18th Meeting of the EUROPEAN VENOUS FORUM

29 June - 1 July 2017
Porto, Portugal

SCIENTIFIC PROGRAMME AND BOOK OF ABSTRACTS
Krakow, Poland, welcomes

8th evf HOW 2017

HANDS-ON WORKSHOP on VENOUS DISEASE
Holiday Inn, Krakow, Poland
26-28 October 2017

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► Informal and friendly atmosphere
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For further details please contact:
Anna TALL
European Venous Forum, P.O. Box 172, Gothenburg, Sweden; 406 90, UK
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18th Meeting of the European Venous Forum

29 June - 1 July, 2017
Porto, Portugal

Alfândega Porto Congress Center,
Porto,
Portugal

SCIENTIFIC PROGRAMME
AND BOOK OF ABSTRACTS

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Welcome to EVF Porto 2017!

The European Venous Forum Annual Meeting 2017 is held in the city of Porto between June 29th and July 1st. The venue will be the Alfândega Congress Centre that was recently voted Europe’s Best Meetings Conference Centre during the Business Destinations Travel Awards in 2014 and 2015.

The scientific programme will provide participants with a three-day conference on the most up to date information about new developments in clinical practice and relevant research. Important updates and re-evaluations of the latest technologies and techniques, diagnostic modalities, and data from clinical trials will be presented and discussed.

The panel of expert international speakers will present this cutting-edge information as well as being available for your comments and queries.

The target audience will be mostly Vascular Surgeons and Residents but also Angiology Specialists, Phlebologists, Interventional Radiologists, Vascular Medicine Specialists, Nurses, Technicians and all others interested in the management of venous disease.

As always your participation will be crucial! The EVF is your Society and we need the scientific input of all members. The centerpiece of our daily sessions will be the peer-reviewed presentations selected from the best of the submitted abstracts.

We welcome you to Porto and hope that you will enjoy the final scientific programme.

Armando Mansilha

EVF President and Local Chairman
COMMITTEES

CONGRESS PRESIDENT
Prof Armando Mansilha,
President, European Venous Forum

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DATE FOR YOUR DIARY!

8th EVF HOW - Hands-on Workshop on Venous Disease
Krakow, Poland, 26-28 October 2017
www.evfvip.com

19th meeting of the European Venous Forum
Athens, Greece, 28-30 June, 2018
under the Presidency of Professor Athanasios Giannoukas

ANNUAL MEETINGS/PAST PRESIDENTS

Inaugural Meeting, 29 June – 1 July 2000
Lyons, France
Michel Perrin

2nd Meeting, 13-14 September 2001
Rome, Italy
Claudio Allega

3rd Meeting, 14-16 June 2002
Berlin, Germany
Ulrich Schultz-Ehrenburg

4th Meeting, 27-29 June 2003
Lisbon, Portugal
Jose Fernandes e Fernandes

5th Meeting, 25-27 June 2004
Warsaw, Poland
Arkadiusz Jawien

6th Meeting, 24-26 June 2005
Crete, Greece
Asterios Katsamouris

7th Meeting, 29 June-1 July 2006
London, UK
Alun Davies

8th Meeting, 29 June-1 July 2007
Istanbul, Turkey
Mehmet Kurtoglu

9th Meeting, 26-28 June 2008
Barcelona, Spain
Marc Cairoli

10th Meeting, 5-7 June 2009
Copenhagen, Denmark
Nils Bakgaard

11th Meeting, 24-26 June 2010
Antwerp, Belgium
Marianne DeMaeseneer

12th Meeting, 30 June-3 July 2011
Ljubljana, Slovenia
Pavel Paredos

13th Meeting, 28-30 June 2012
Florence, Italy
Giovanni Mosti

14th Meeting, 27-30 June 2013
Belgrade, Serbia
Dragan Milic

15th Meeting, 26-28 June 2014
Paris, France
Jean-Luc Gillet

16th Meeting, 2-4 July 2015
St Petersburg, Russia
Evgeny Shaydakov

17th Meeting, 7-9 July 2016
London, UK
Andrew Bradbury

EUROPEAN VENOUS FOUNDATION

The European Venous Foundation, a UK registered charity (number 1100372) has been established to promote research into the causes, effects, treatment and management of venous disease and to support the work of the European Venous Forum. Further details can be found from the EVF Office.

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is an international scientific journal entirely devoted to venous and lymphatic diseases

AIM AND SCOPE

The aim of Phlebolymphology is to provide the medical community with updated information written by well-known international specialists in the form of state-of-the-art articles and original insights into the phlebolymphology field.

Phlebolymphology has been published four times per year since 1994, and, thanks to its high scientific index, was included in the EMBASE and Scopus databases.

RCTs / Operative treatments: review of all the randomized controlled trials on operative treatments for varicose veins.

PREVAT
PREVAT (PREsence of Varicose After operative ThromboEmbolism) study is an epidemiological, prospective, multicenter study investigating surgical procedures for varicose veins.
Give your legs a new lease of life
CONGRESS INFORMATION

CONGRESS DATES AND TIMES
Thursday 29 June, Friday 30 June, Saturday 1 July 2017

CONGRESS VENUE
Alfândega Porto Congress Centre
Rua Nova da Alfandega 4050-430 Porto, Potugal
Tel: +351 403 000/024
Fax: +351 223 403 099
Email: geral@ccalfandegaporto.com
Web: www.ccafterporto.com

REGISTRATION DESK
The Registration Desk will be open at the following times:
Wednesday 28 June 16.00 - 18.00
Thursday 29 June 07.30 - 18.00
Friday 30 June 07.30 - 18.30
Saturday 1 July 08.00 - 13.30

ON SITE REGISTRATION
On site Registration will be available.
EVF Member € 600
Trainee € 350
Non EVF Member € 700
Exhibitor € 300
Congress Dinner € 60

Refreshments and lunch
Coffee breaks and lunch will be held in the Exhibition Area.
Registration Fee includes:
Congress documentation, Welcome Reception, Refreshments and Lunch, Certificate of Participation.

SOCIAL PROGRAMME
Welcome reception
Thursday 29 June 2016: 18.30
Exhibition Area,
Alfândega Porto Congress Centre

Join us and your friends, colleagues and exhibiting companies at the Welcome Reception in the Exhibition Area. This event is free of charge for all registered delegates and exhibiting companies.

CONGRESS DINNER
Friday 30 June 2017 at 20.00
Bolsa Palace
Address: Rua de Ferreira Borges, 4050-253 Porto
Cost: €60 per person (inclusive of reception, dinner and entertainment)
Dress: Smart Casual
The Bolsa Palace is 10 minute’s walking distance from the conference venue.
See map.

CONGRESS LANGUAGE
The official language of the congress is English. Simultaneous translation will not be provided.

CERTIFICATE OF ATTENDANCE
A certificate of attendance will be available upon completion of the Evaluation Form.

ACCREDITATION
An application has been made to the EACCME® for CME accreditation of this event.

BADGES
Please wear your badges at all times.

MOBILE TELEPHONES
For the courtesy of the speakers and fellow delegates, please ensure that your ‘phone is switched off during lectures.

LIABILITY AND INSURANCE
Neither the Organisers nor the Conference Secretariat will assume any responsibility whatsoever for damage or injury to persons or property during the Conference. Participants are recommended to arrange their personal travel and health insurance.

CHANGES
The Organisers reserve the right to adjust or change the programme as necessary.

CURRENCY
Currency is Euro

MEDICAL AND TECHNICAL EXHIBITION
A trade exhibition of medical and pharmaceutical products will be staged in the Exhibit Area, Refreshments will be served in the exhibition area
(Please see exhibition plan on page XXXIII
ACKNOWLEDGEMENTS
The organisers of the meeting would like to thank the sponsors and exhibitors for their generous support of the meeting.

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PROFESSIONAL GROUPS
World Congress of Phlebology 2018
Venous News/Charing Cross
The scientific programme commences on Friday 30th June with an abstract session on Varicose Vein Surgery. This is followed by a didactic session, jointly organised by the American Venous Forum and Union Internationale de Phlébologie on Superficial Venous Surgery. There are excellent abstract and didactic sessions throughout the programme.

The EVF invited Lecture will be given by Dr Michel Perrin, co-founder of the European Venous Forum on Friday 30th June at 13.00 on “Management of Post-thrombotic Syndrome. Past and Present”.

Thirty-four abstracts of high scientific quality will be presented. These were selected from the 115 abstracts submitted.

This year, in addition to the oral presentations, there are 51 ePoster presentations. The presentations will be available to view on screens situated in Riberia I/II on the 2nd floor on Friday 30th June at 13.30 they will be viewed by the chairmen and a prize awarded to the top presentations.

The presentations from the AVF Servier Award Travelling Fellowship winners 2017, the Japanese Society of Phlebology winners 2017 and the ACP Abstract Award 2016 will take place on Friday 30th June.

All presentations must be formatted using PowerPoint. All presenters must bring their PowerPoint presentations on memory stick to the Slide Preview Desk at least 4 hours prior to presentation (or the previous evening for morning presentations).

Floor microphones are available in the Lecture Theatre. Delegates wishing to join in the discussion should stand by the nearest microphone and wait to be acknowledged by the Chairmen.

The official language of the symposium is English. All presentations, questions and discussion will be held in English.

Abstracts of the presentations can be found at the rear of the book.

CPD/CME
An application has been made to the EACCME® for CME accreditation of this event.

EVF PRIZE
The EVF prize will be awarded to the best 10 minute communication according to originality and quality. Prizes will be awarded to 1st, 2nd and 3rd place.

The winners of the 1st and 2nd prize are awarded travelling grants to attend the annual meeting of the American Venous Forum in 2018. The three abstracts of the winners are sent to the American College of Phlebology who will select one and award a grant to present at the ACP meeting in November 2017 and the Japanese Society of Phlebology who will select two, and award a grant for presentation at the meeting in 2018.
THURSDAY, JUNE 29, 2017

ABSTRACT SESSION 1: VARICOSE VEIN SURGERY

08:30 1.1 Differences in the ablation of the great saphenous vein by endovenous laser ablation, using a radial fibre and radiofrequency ablation. Demonstrated by histology and immunohistochemistry, using an in vitro model of treatment
Henry Ashpiel, Francisco Salguero; Roberto La Ragione; Andreea Radulescu; Mark Whiteley University of Surrey, Guildford, UK
Submitted in consideration for the EVF Prize.

08:50 1.2 Evolution of varicose vein surgical interventions in a specialized outpatient center
O.A. Smirnov; S.A. Tyurin; E.P. Burleva
1Medical Center “Olmed”, Yekaterinburg, Russia; 2Municipal Clinical Hospital №40, Yekaterinburg, Russia; 3Ural State Medical University, Yekaterinburg, Russia

09:10 1.3 Mechanochemical ablation of saphenous vein: learning from 4 years follow-up
Mattia Miranda, Andrea Griso; Bruno Migliara; Tania Cappellari; Marcello Lino Ospedale Pederzoli, Peschiera del Garda, Italy

09:30 1.4 Comparative morphological study of endovenous laser ablation by radial fibers with different power but similar linear endovenous energy density
Denis Borsuk; Alexey Fokin; Evgeniy Kazachkov
1Clinic of Phlebology and Laser Surgery, Chelybinsk, Russia; 2The South Ural’s medical university, Chelybinsk, Russia
Submitted in consideration for the EVF Prize.

09:50 1.5 Incidence and risk factors of endovenous heat-induced thrombosis after endovenous radiofrequency ablation in Asian population
Nuttawut Sermathanaawadi
Division of Vascular Surgery Department of Surgery Faculty of Medicine Siriraj Hospital Mahidol University, Bangkok, Thailand

10:10 1.6 Mathematical modeling of the radiofrequency ablation for saphenous veins with a diameter up to 6 mm
Dmitrii Rosukhovskii; Anna Simonova; Evgenii Iliukhin; Mikhail Khodzitsky
1Institute of Experimental Medicine, St Petersburg, Russia; 2ITMO University, St Petersburg, Russia; 3Private clinic “Medalp”, St Petersburg, Russia
Submitted in consideration for the EVF Prize.

10:30-11:00 Exhibition Hall

10:30-11:00 ePosters
See page XXV

11:00 Didactic Session 1: Superficial Venous Surgery
Chairperson(s): Marianne De Maeseneer, Kurosh Parsi

Randomised controlled trial of cyanoacrylate vs. RF ablation.
Nick Morrison
11:15  Pros and Cons of endovenous glue.
Tobias Hirsch

11:30  How to measure the efficacy of superficial venous surgery and non-surgical interventions?
Kurosh Parsi

11:45  Panel Discussion

12:00-13:00  Industry Session
Archive Room
See page XXXI
Chairperson(s): Armando Mansilha, Andre Van Rij

13:00-14:00  Lunch and Visit to Exhibition

13:00-14:00  ePosters
Ribeira I/II
See page XXV

14:00-15:00  Industry Session
Archive Room
See page XXXI
Chairperson(s): Jaweed Farreed, Frederico Bastos Goncalves

15:00-16:00  Didactic Session 2: Oral Anticoagulation
Archive Room
Chairperson(s): Daniel Menezes, Ivanesio Merlo

15:00  Oral anticoagulation and recent guidelines: What is new?
Stavras Kakkos

15:15  When and how should the anticoagulant effect of NOACs be measured
Luciana Ricca Goncalves

15:30  NOACs to prevent venous thromboembolism and stroke in hospitalised medically ill patients.
Samuel Golghaber

15:45  Panel Discussion

16:00-16:30  Refreshments and Visit to Exhibition

16:00-16:30  ePosters
Ribeira I/II
See page XXV

16:30-18:30  ABSTRACT SESSION 2: DEEP VENOUS THROMBOSIS AND ANTICOAGULATION
(10 minute presentations followed by 10 min discussion)
Chairperson(s): Philippe Nicolini, Pereira Albino

16:30  2.1  Genetic susceptibility for recurrent deep vein thrombosis among young adults
Raghid Kreidy
Saint George Hospital University Medical Center, Beirut, Lebanon

16:50  2.2  Efficacy and safety of rivaroxaban versus apixaban in the treatment of acute VTE
Dalene Bott-Kitslaar\textsuperscript{1}; Benjamin Simmons\textsuperscript{2}; Dawid Janczak\textsuperscript{2}; Malgorzata Mimier\textsuperscript{2}; Rayya Saadig\textsuperscript{1}; Robert McBane\textsuperscript{1}; Waldemar Wysokinski\textsuperscript{1}
\textsuperscript{1}Mayo Clinic, Rochester, USA; \textsuperscript{2}Wroclaw Medical University, Wroclaw, Poland
Integration of the results of thrombodynamics test into Caprini ram allows to increase prediction ability for postoperative DVT in high-risk surgical patients
Kirill Lobastov1; Galina Dementieva1; Nataliya Soshitova1; Victor Barinov1; Veleriy Boyarintsev1; Leonid Laberko1; Grigory Rodoman1
1Pirogov Russian National Research Medical University, Moscow, Russia; 2HemaCore Ltd, Moscow, Russia; 3Clinical Hospital no. 1 of the President’s Administration of Russian Federation, Moscow, Russia

Is Caprini venous thromboembolism risk assessment model applicable to surgical patients in Asia?
Lim Lee; Ngoh Chin Liew; Ahmad Al-Hafeez; Ahmad Zaidi; Ping An Teh
University Putra Malaysia, Serdang, Malaysia

Treatment of varicose veins in patients on oral anticoagulation
Nusrat Iqbal; Jamie Vatish; Alok Tiwari
Queen Elizabeth Hospital Birmingham, Birmingham, UK
Submitted in consideration for the EVF Prize.

Pulmonary embolectomy for massive pulmonary embolism
Satoshi Taniguchi1; Ikuo Fukuda2
1Hirosaki Central Hospital, Aomori, Japan, 2Hirosaki University Graduate School of Medicine, Aomori, Japan.

Welcome Drinks

FRIDAY, JUNE 30, 2017
08:30-10:30
ABSTRACT SESSION 3: VARICOSE VEIN SURGERY
(10 minute presentations followed by 10 min discussion)
Chairperson(s): Evgeny Shaydakov, Jean-Jerome Guex

08:30 3.1 Comparison of 1470nm laser and radial 2ring fibre with 1470nm laser and fibre in endovenous laser ablation of saphenous varicose veins
Robert Vlachovsky1, Robert Staffa2
1St Anne University Hospital, 2St Anne University Hospital and Medical Faculty. Masaryk University, Brno, Czech Republic

08:50 3.2 Fate of groin after radiofrequency ablation of varicose vein...
Mohamed Elsharawy, Ehab Elshaal, Aymen Elsaiid, Mohamed Sawaby
University of Dammam, Alkhobar, Saudi Arabia

09:10 3.3 The effect of using different laser wavelengths (1470 nm and 1560 nm) and fiber types on postoperative pain after endovenous laser therapy in patients with varicose veins
O.N. Guzhkoy; N.A Shichkin; N.V. Tarasova
Yaroslavl State Medical University, Yaroslavl, Russia

09:30 3.4 Comparison of endovenous radiofrequency ablation, laser ablation, foam sclerotherapy and surgical stripping for great saphenous varicose veins. Extended 5-year follow-up of a RCT
Lars Rasmussen1; Birgit Lawaetz2; Martin Lawaetz2; Lars Bjorn3; Bo Eklof4
1Danish Vein Centres, Naestved, Denmark; 2Danish Vein Centres; 3Surgical Center Roskilde; 4Danish Vein Centres, Sweden
<table>
<thead>
<tr>
<th>Time</th>
<th>3.5</th>
<th>Stenting across the inguinal ligament in post thrombotic syndrome: one-year outcomes using nitinol venous stents</th>
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<td>Prakash Saha; Adam Gwozdz; Tamer El-Sayed; Narayan Karunanithy; Karen Breen; Beverley Hunt; Alexander Cohen; Vickie McDonald; Alberto Smith; Stephen Black St Thomas’ Hospital, London, UK</td>
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<td>10:10</td>
<td>3.6</td>
<td>Long-term results of the monocusp valve formation in the common femoral vein in patients presenting with avalvular deep veins of the lower extremities</td>
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<td>Igor Ignatyev Interregional Clinical and Diagnostic Center, Kazan, Russia</td>
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10:30-11:00 Refreshments and Visit to Exhibition

10:30-11:00 Ribeira I/II ePosters
See page XXV

11:00-12:00 Industry Session
See page XXXI
Chairperson(s): Arkadiusz Jawien, Armando Mansilha

12:00-13:00 Didactic Session 3: From Theory to Practice in the Clinical Management of Chronic Venous Disease
Chairperson(s): Armando Mansilha, Michel Perrin

12:00 Has the SYM Vein consensus clarified all aspects of venous symptoms. 
Eberhard Rabe

12:15 Key factors influencing the adherence and the efficacy of medical treatments: The Vein Act Programme. 
Jorge Ulloa

12:30 REVEAL CEAP. A promising tool for GPs. 
Armando Ulloa

12:45 Panel Discussion

13:00-13:30 EVF Invited Lecture
Chair: Armando Mansilha

12:00 Management of Post Thrombotic Syndrome. Past and Present 
Michel Perrin

13:30-14:30 Lunch and Visit to Exhibition

13:30-14:30 Ribeira I/II Judging of ePresentations

13:30-14:30 Archive Room Annual General Meeting (EVF Members only)

14:30-16:30 ABSTRACT SESSION 4: MISCELLANEOUS
(10 minute presentations followed by 10 min discussion)
Chairperson(s): Tomasz Urbanek, Jean-Luc Gillet,

14:30 4.1 Randomised controlled trial of compression therapy following endothermal ablation (COMETA Trial) 
Roshan Bootan, Layla Bolton-Saghdaoui, Tristan RA Lane, Celia Riga, Alun H Davies Imperial College London, UK
Submitted in consideration for the EVF Prize.
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Institution(s)</th>
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<tbody>
<tr>
<td>14:50</td>
<td>4.2</td>
<td>Effects of graduated elastic compression stockings in patients with primary varicose veins: results of a randomized double-blind placebo-controlled trial</td>
<td>Chrysanthy Papageorgopoulou¹, Stavros Kakko¹, Marios Timpilis², Panagiotis Patrinos³, Konstantinos Nikolakopoulos³, Anastasia Kouri³, Ioannis Ntouvas³, Spyros Papadoulas³, Georgios Lampropoulos³, Ioannis Tsolakis¹</td>
<td>Department of Vascular Surgery, University of Patras, Patras, Greece; ¹University of Patras, Patras, Greece</td>
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<tr>
<td>15:10</td>
<td>4.3</td>
<td>Noninvasive evaluation of calf muscle oxygenation in patients with chronic venous insufficiency using near-infrared spectroscopy-correlation with clinical severity</td>
<td>Yumiko Sasaki, Takashi Yamaki, Hiroki Yago, Yuki Hasegawa, Atsuyoshi Osada, Hiroyuki Sakurai</td>
<td>Tokyo Women’s Medical University, Tokyo, Japan</td>
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<tr>
<td>15:30</td>
<td>4.4</td>
<td>Utilisation of the health improvement network (THIN) UK database to assess the impact of 2013 UK NICE Clinical Guideline CG168 on the general practitioner management of varicose veins</td>
<td>Huw Davies¹, Matthew Popplewell¹, Ronan Ryan¹, Tom Marshall¹, Andrew Bradbury¹</td>
<td>¹Heart of England NHS Foundation Trust, Birmingham, UK; ¹University of Birmingham, Birmingham, UK</td>
</tr>
<tr>
<td>15:50</td>
<td>4.5</td>
<td>Surgical procedures in treatment of venous malformations</td>
<td>Sergey Sapelkin, V Dan, Irina Timina, Natalia Druzhinina, Marina Demina, Anna Dudareva</td>
<td>Surgery Institute n.a. A.V. Vishnevsky, Moscow, Russia</td>
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<td>16:10</td>
<td>4.6</td>
<td>Anomalies of the inferior vena cava: not always congenital?</td>
<td>E.E. Willms, R.R. van den Bos, M.G.R. De Maeseneer</td>
<td>Erasmus MC, Rotterdam, Netherlands</td>
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<td>16:30-17:00</td>
<td>Exhibition Hall</td>
<td>Refreshments and visit to exhibition</td>
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<td>16:30-17:00</td>
<td>Ribeira I/II</td>
<td>ePosters</td>
<td>See page XXV</td>
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<td>17:00-18:40</td>
<td>Archive Room</td>
<td>Prize Session: Prize winning presentations from the American Venous Forum (AVF), American College of Phlebology (ACP) and Japanese Society of Phlebology (JSP)</td>
<td>(10 minute presentations followed by 10 min discussion)</td>
<td>Chairperson(s): Andrew Nicolaides, Armando Mansilho</td>
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<tr>
<td>17:00</td>
<td>Pr1</td>
<td>Characterisation of profunda femoral deep venous thrombosis</td>
<td>T.L. Repella, E. Jung, O. Britantchouk, S. Afroce, T.K. Liem, E.L. Mitchell, G.J. Landry, G.L. Moneta</td>
<td>Oregon Health and Science University, Oregon, USA</td>
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<td>17:20</td>
<td>Pr2</td>
<td>Ultrasound proof of pre-reflux stages of venous insufficiency</td>
<td>J.C. Ragg, O.R. Despa, K. Stoyanova, S.E. Chamali</td>
<td>Angioclinic Vein Centers, Europe</td>
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</table>
**Pr3** 17:40  
**Indications for medical compression stockings in venous and lymphatic disorders. An evidence-based consensus statement**  
Rabe E.1, Partsch H.2, Hafner J.1, Lattimer C.4, Mosti G.1, Neumann M.6, Urbanek T.3, Huebner M.8, Guillard S.5, Carpentier P.10  
1 Department of Dermatology, University of Bonn, Bonn, Germany; 2 Medical University of Vienna, Vienna, Austria; 3 University Hospital of Zurich, Department of Dermatology, Zuereich, Switzerland; 4 Ealing Hospital and Imperial College, London, UK; 5 MD Barbantini Clinic, Lucca, Italy; 6 Erasmus University Hospital, Rotterdam, Netherlands; 7 Szpital Bielski, Department of Vascular Surgery and Angiology, Warsaw, Poland; 8 SIGVARIS AG, St. Gallen, Switzerland; 9 SIGVARIS Management AG, Winterthur, Switzerland; 10 Grenoble University Hospital, Department of Vascular Medicine, Grenoble, France

**Pr4** 18:00  
**Long-term results of great saphenous vein ligation at the sapheno-femoral junction and above the knee combined with trunk foam sclerotherapy**  
Toshima M., Makino S.  
Department of Vascular Surgery, Kamiichi General Hospital, Toyama, Japan

**Pr5** 18:20  
**Comparison between DVT after earthquake in Japan and Italy: relationship with gender and atherosclerosis**  
Hanzawa K.1, Okamoto T.1, Aoki K.1, Namura O.1, Tsuchida M.1, Stipa S.2, Lugli M.3  
1 Niigata University Graduate School of Medicine, Niigata, Japan; 2 Finale Emilia, Moderna, Italy; 3 Hesperia Hospital, Modena, Italy

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**SATURDAY, JULY 1, 2017**

**ABSTRACT SESSION 5: MISCELLANEOUS**

(10 minute presentations followed by 10 min discussion)

Chairperson(s): Attilio Cavezzi, Rui Machado

**08:30-10:30**

**08:30 5.1**  
**Outcome of small diameter recanalization of the great saphenous vein after ultrasound guided sclerotherapy. 1 and 2-year follow-ups**  
Jean-Luc Gillet 1, Michel Lausecker 2, Claudine Hamel-Desnos 1, Christian Daniel 4, François-André Allaert 5  
1 French Society of Phlebology, Bourgion-Jallieu, France; 2 Vascular Medicine, Phlebology, Selestat, France; 3 Vascular Medicine, Phlebology, Caen, France; 4 Vascular Medicine, Phlebology, Rueil-Malmaison, France; 5 Chaire d'évaluation Médicale Ceren ESC et Cenbiotech, Dijon, France

**08:50 5.2**  
**Adjuvant phlebotropic therapy and its effect on the inflammatory response after sclerotherapy**  
Vadim Bogachev1; B V Boldin1; N R Lobanov2; N R Arkadan3; K. A. Kaperiz2  
1 Russian National Research Medical University named after N.I. Pirogov, Moscow, Russia; 2 First Phlebological Centre, Russia

**09:10 5.3**  
**Percutaneous ultrasound-guided sclerotherapy with polidocanol microfoam for symptomatic lymphatic malformations**  
Atsuyoshi Osada; Takashi Yamaki; Yumiko Sasaki; Yuki Hasegawa; Hisato Konoeda; Atsumori Hamahata; Hirokuki Sakurai  
Tokyo Women’s Medical University, Tokyo, Japan
09:30  5.4  Comparative study of duplex-derived parameters in patients with chronic venous insufficiency - correlation with clinical manifestation with special reference to early symptoms

Masakazu Ochi¹, Yamaki Takashi², Atsumori Hamahata¹, Hisato Konoeda¹, Atsuyoshi Osada², Yuki Hasegawa³, Motohiro Nozaki³, Hiroyuki Sakurai³
¹Tokyo Metropolitan Tama Medical Center, Tokyo, Japan, ²Tokyo Women’s Medical University, Tokyo, Japan, ³Saitama Cancer Center, Saitama, Japan

09:50  5.5  Prevalence of venous symptoms in Russian general population

Igor Zolotukhin¹, Evgeny Selivertov¹, Yuri Shevtsov¹, Ilona Avakians¹, Alexander Kirienko¹
¹Pirogov Russian National Research Medical University, Moscow, Russia, ²St Josaphat Belgorod Regional Hospital, Belgorod, Russia

10:10  5.6  Effect of MPFF treatment on great saphenous vein transitory reflux in CVD patients with CEAP classification C0s or c0,1s

Yu T Tsukanov; A. Yu Tsukanov; A Nikolaychuk
Department of Surgical Diseases, Omsk State Medical University, Omsk, Russia

10:30-11:00  
Exhibition Hall

10:30-11:00  
Archive Room

ePosters
See page XXV

11:00-12:20  
Archive Room

ABSTRACT SESSION 6: INVESTIGATIONS
(10 minute presentations followed by 10 min discussion)
Chairperson(s): Andrew Bradbury, Luis Mendes Pedro

11:00  6.1  Time taken to the maximum increase in the oxygenated hemoglobin level during standing reflect the earliest change in post-thrombotic syndrome

Takashi Yamaki; Yumiko Sasaki; Atsuyoshi Osada; Hiroyuki Sakurai
Tokyo Women’s Medical University, Tokyo, Japan

11:20  6.2  Changes in a marker of endothelial dysfunction in post-thrombotic syndrome of the lower limbs

R.E Kalinin; I.A Suchkov; A.S Pshennikov; N.D Mzhavanadze
Ryazan State Medical University named after academician I.P. Pavlov, Moscow, Russia

12:00  6.3  Comparisons between the venous arterial flow index the recirculation index and the venous filling index in quantifying superficial venous insufficiency

Christopher R Lattimer²; Annalena Recke³; Philipp B Rudolph³; George Geroulakos³; Evi Kalodikil; Birgit K Kahle³
¹West London Vascular and Interventional Centre, London, UK; ²Universitätsklinik Schleswig-Hostein, Campus Lübeck, Germany

6.4  Invited Presentation

Microcirculatory alterations detected in patients Cos
Bernardo Senra Barros, Helen Cristian Pessoni, Carlos Eduardo Virgini-Magalhaes, Eliete Bouskela
Laboratory for Clinical and Experimental Research on Vascular Biology, Biomedical Centre, State University of Rio de Janeiro, Rio de Janeiro, Brazil

12:20-13:15  
Didactic Session 4: Deep Venous Surgery
Chairperson(s): Athanasios Giannoukas, Jose Fernandes e Fernandes

12:20  Deep venous reconstructive surgery: When and how?
Marzia Lugli
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<thead>
<tr>
<th>Time</th>
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<th>Presenter</th>
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<tr>
<td>12:35</td>
<td>What should be the requirements for the future venous stents?</td>
<td>Stephen Black</td>
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<td>12:50</td>
<td>Compression and deep venous disease</td>
<td>Lowell Kabnick</td>
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<td>13:05</td>
<td>Panel Discussion</td>
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<td>13:15</td>
<td>End of Meeting</td>
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**THURSDAY, JUNE 29, 2017 – SATURDAY, JULY 1, 2017**

**ePosters: Group A: Obstruction, Prevention, Treatment**

**Chairperson(s): Niels Backgaard, Daniel Brandao**

**A1**  
**Electrical calf stimulation prevents recurrent DVT after cessation of standard anticoagulation in patients with residual venous obstruction**  
1 Pirogov Russian National Research Medical University, Russia; 2 Clinical Hospital no. 1 of the President's Administration of Russian Federation, Russia

**A2**  
**First experience of performing hybrid operations in chronic venous obstructions of iliofemoral segments in patients with postthrombotic syndrome**  
Igor Ignatyev, Anatoly Pokrovsky, Evgeny Gradusov  
1 Interregional Clinical and Diagnostic Center, Russia; 2 Vishnevsky Institute of Surgery, Russia; 3 Russian Medical Academy of Postgraduate Education, Russia

**A3**  
**Venous thrombus resolution with Rivaroxaban compared to Warfarin therapy**  
Dalene Bott-Kitslaar, Alexander Lekah, Thanila Macedo, Yvonne Little, Troy Penz, Rayya Saadiq, Ana Casanegra, Robert McBane, Waldemar Wysokinski  
1 Mayo Clinic, USA; 2 University of California, Irvine, USA; 3 Bethel University, USA

**A4**  
**Comparative anticoagulant effects of unfractionated heparin, antithrombin and recombinant thrombomodulin: vascular and hematological implications**  
Evi Kalodiki, Zafar Siddiqui, Parul Aggarwal, Omer Iqbal, Debra Hoppensteadt, Mary Lewis, Schuurazad Abro, Kazuisha Tsuruta, Jawed Fareed  
1 Loyola University Medical Center, USA and Josef Pflug Vasc Lab and Imperial College and West London Vascular and Interventional Centre, UK; 2 Loyola University Medical Centre, Maywood IL, USA

**A5**  
**Idarucizumab, a specific antidote for dabigatran, cross-reacts with melagatran and may also interact with other benzamidine-containing compounds**  
1 Loyola University Medical Center, USA and Josef Pflug Vasc Lab and Imperial College and West London Vascular and Interventional Centre, UK; 2 Loyola University Medical Center, Maywood IL, USA; 3 Hospital e Maternidade Dr Christovao da Gama, Brazil; 4 Tenon, University Hospital, France

**A6**  
**Therapeutic effects of MPFF on the secondary varicosities of pelvic veins**  
Yu T. Tsukanov, A. Yu Tsukanov  
Department of Surgical Diseases, Omsk State Medical University, Russia

**A7**  
**Impact of low molecular weight heparin on thrombus recanalization in paraneoplastic deep vein thrombosis**  
Xavier Jiménez-Guin, Antonio Romera-Villegas, Ramon Vila-Coll  
Hospital Universitari de Bellvitge, Hospitalet del Llobregat, Spain
A8 Quality of life of patients with acute haemorrhoidal disease and coexisting chronic venous disease: result of valuable observational study
Stefan Jianu1; Oana Vittos2
1Proepeetica Medical Center, Bucharest, Romania; 2Scientific consulting, Medone Research, Bucharest, Romania

A9 The role of high medical education in solving chronic venous disease problem
Oleksiy Guzd1; Roman Hrytsyk1; Oleg Trombola1; Ivan Guzd2
1National Medical University, Ivano-Frankivsk, Ukraine; 2Vascular Surgery, Ivano-Frankivsk, Ukraine

A10 Comparative analysis of surgical and conservative treatment of free-floating thrombus in the system of inferior vena cava
Vladimir Khrishechanovich1; Ivan Klimchuk1; Sergey Kalinin2
1Belarusian Medical Academy of Postgraduate Education, Minsk, Belarus; 24th N.E. Savchenko City Clinical Hospital, Minsk, Belarus

A11 A complex approach to the treatment of inferior vena caval thrombosis complicated by floating embolus and acute venous insufficiency
Kalinin S.S.1; Khrishechanovich V.Y.1; Klimchuk I.P.3; Turlyuk D.V.3
14th N.E. Savchenko City Clinical Hospital, Minsk, Belarus

A12 Nutcracker phenomenon in live donor kidney transplant. Is there a clinical impact in the receptor?
Rui Machado1; Miguel Machado2; Daniel Mendes3; Rui Almeida4
1Institute of Biomedical Sciences Abel Salazar, Oporto University, Portugal; 2San Antonio Hospital, Oporto University Medical Centre and Institute of Biomedical Sciences, Abel S, Portugal; 3Santo Antonio Hospital, Oporto University Medical Centre, Portugal

A13 Marjolin ulcers: a diagnostic and therapeutic challenge; discussion on real cases and an update on the literature
Valentin-Tudor Popa1; Manocher Esmaili1; Patricia Cristodor2; Caius Solovan2
1Timisoara County Hospital, Romania; 2Victor Babes University of Medicine and Pharmacy, Romania

A14 Pelvic congestion syndrome treatment
Chernuhka L.M.1, Guch A.A.2, Kondratyuk V.A.1, Vlasenko E.A.1, Bobrova A.O.1
1Department of Surgery of Major Vessels, National Institute of Surgery and Transplantology, Ukraine; 2Department of Radiation and Functional Diagnostics, National Institute of Surgery and Transplantology, Ukraine; 3Department of Angiography and Endovascular Surgery, National Institute of Surgery and Transplantology, Ukraine

Ribeira I/II
ePosters: Group B: Varicose Veins
Chairperson(s): Mehmet Kurtoglu, Alexandra Canedo

B1 Endovenous thermal ablation can be used to treat the great saphenous vein of any diameter. Vein size is no reason to opt for open surgery
Emma B. Dabbs, Laurensius E. Mainsiouw, Barrie A. Price, Mark S. Whiteley
The Whiteley Clinic, Guildford, UK

B2 Risk factors for proximity of occlusions of great saphenous and short saphenous vein to the deep veins following endovenous laser ablation
Viswa Rajalingam, Nusrat Iqbal, Peter Nightingale, Jamie Vatish, Alok Tiwari
Queen Elizabeth Hospital, Birmingham, UK
B3 Compliance with nonoperative treatments in outpatients with chronic venous disease consulting general practitioners: results of the vein act program in colombia
Juan Guillermo Tamayo1, J. Ulloa2, G. Garcia3, A.S. Hoyos4
1Manuel Uribe Ángel Hospital, Envigado, Colombia; 2Vascular Fundation, Bogota, Colombia; 3Department of Vascular Surgery, Antioquia University, Medellin, Colombia; 4Imbanaco Medical Center, Cali, Colombia

B4 The causes and patterns of recurrent varicose vein after surgery
Seung-Kee Min1, In Mok Jung1, Minji Cho2, Sung Sin Cho3, Sang Hyun Ahn4, Jongwon Ha5
1Seoul National University Hospital, Seoul, Republic of Korea, 2Seoul National University, Seoul, Republic of Korea

B5 10 Year experience of varicose vein laser surgery
Imre Bihari1, Imre Bihari2
1A B Clinic, Budapest, Hungary; 2A and B Clinic, Budapest, Hungary

B6 New concept for management of varicose veins - endoscopic assisted surgery for varicose veins
Sin-Daw Lin1, Yun-Nan Lin1, Yur-Ren Kuo2, Chich-Han Chuang3, Su-Shin Lee2, Shu-Hung Huang2, Chih-Hau Chang2, Ming-Jer Tsai2
1Kaohsiung Municipal Siagang Hospital, Kaohsiung, Taiwan; 2Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung, Taiwan

B7 Superficial vein ablation without long term compression leads to venous ulcer healing
Neoh Chin Liew, Limi Lee
University Putra Malaysia, Serdang, Malaysia

B8 Endovenous laser ablation of Giacomini vein in the surgical treatment of varicose disease of lower extremities
Rogovoy Nickolay1, Yanushko Vyacheslav2, Turliuik Dmitry1, Ivan Klimchuk1, Sergey Kalinin1
14th N.E. Savchenko City Clinical Hospital, Minsk, The Republic of Belarus, 2RSPC “Cardiology”, Minsk, The Republic of Belarus

B9 Anesthetic effect induced by cold treatment within patients submitted to sclerotherapy
Maraisa Fernanda Martins Ferreira de Souza1, Juliana Castro Pacheco1, Bruno Lima Naves2, Claudio Santana Ivo1, Bruna Lima Naves1, Lara Mendes Chaer Rezende Costa1
1Madre Teresa Hospital, Belo Horizonte, Brazil, 2Madre Teresa Hospital and Mater Dei Hospital, Belo Horizonte, Brazil, 3Sao Jose Hospital, Belo Horizonte, Brazil, 4Life Center Hospital, Belo Horizonte, Brazil

B10 Acrylate adhesion of saphenous varicose veins: what do we know about the allergenic potential?
Tobias Hirsch
Practice for Internal Medicine and Vascular Diseases, Halle, Germany

B11 Reflux patterns of varicose vein determined by duplex ultrasonography
Seung-Kee Min, SY Kim, JS Kim, SH Ahn, SI Min, J Ha.
Seoul National University Hospital, Seoul, Republic of Korea

C1 MMP-9 gene polymorphism in patients with chronic venous disease
Veronika Slonková1, Vladimir Vasků2, Anna Vasků2
1St.Ann University Hospital, Brno, Czech Republic, 2Medical Faculty, Masaryk University, Brno, Czech Republic
C2 Local inflammatory damage measured with the markers of cell death and cellular debris increase significantly during the gravitational stress of prolonged standing
Christopher Lattimer1, Evi Kalodiki1, Paula Maia1, Debra Hoppensteadt1, Jawed Fareed1
1Josef Pflug Vascular Laboratory, West London Vascular and Interventional Centre, UK; 2Loyola University Chicago, Maywood, IL, USA. West London Vascular and Interventional Centre, UK; 3Loyola University Chicago, Maywood, IL, USA

C3 Application of magnesium-containing medication in patients with varicose veins and its effect on the activity of matrix metalloproteinases
Roman Kalinin, Igor Suchkov, Aleksandr Pshennikov, Nina Mzhavanadze, Aleksey Kamaev
Ryazan State Medical University, Ryazan, Russia

C4 Prevalence and risk factors of chronic venous disease of lower limbs in Thai female workers
Chumphon Wilasrusme1, Suthas Horsriramanont1, Napaphta Poprom2
1Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand; 2Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok, Thailand

C5 Characteristics of the patients with chronic venous disease consulting general practitioners: results of vein act Colombia
Juan Guillermo Tamayo1, J. Ulloa2, G. Garcia2, A. S. Hoyos4
1Manuel Uribe Angel Hospital, Envigado, Colombia; 2Vascular Foundation, Bogota, Colombia; 3Department of Vascular Surgery, Antioquia University, Medellin, Colombia; 4Imbanaco Medical Center, Cali, Colombia

C6 Symptom evolution with nonoperative treatments in outpatients with chronic venous disease consulting general practitioners: results of the vein act program in Colombia
Juan Guillermo Tamayo1, J. Ulloa2, G. Garcia2, A.S. Hoyos4
1Manuel Uribe Angel Hospital, Envigado, Colombia; 2Vascular Foundation, Bogota, Colombia; 3Department of Vascular Surgery, Antioquia University, Medellin, Colombia; 4Imbanaco Medical Center, Cali, Colombia

C7 Transforming growth factor β isoforms and soluble endoglin concentrations in different phases of wound healing in venous leg ulcers
Ferdinando Mannello1, Daniela Ligi1, Lidia Croce1, Giovanni Mosti1, Joseph D. Raffetto3
1University Urbino, Urbino, Italy; 2Barbantini Clinics, Lucca, Italy; 3Harvard Medical School, Boston, MA, USA

C8 Elastography as an useful method to determine venous thrombosis age
Jan Swiertez, Lukasz Paluch
Centrum Flebologii, Warsaw, Poland

C9 Nutcracker syndrome a rare or underdiagnosed pathologie? Our experience
Miguel Machado1, Rui Machado1, Daniel Mendes1, Rui Almeida1
1Institute of Biomedical Sciences Abel Salazar/Oporto University, Oporto, Portugal; 2St Antonio Hospital, Oporto University Medical Centre and Institute of Biomedical Sciences Abecel Salazar, Oporto, Portugal; 3San Antonio Hospital, Oporto University Medical Centre, Oporto, Portugal

C10 Upper extremities deep vein thrombosis: a cases series of 16 patients
Stanislava Tzaneva
Medical University of Vienna, Vienna, Austria

C11 In vitro apoptotic effects of detergent sclerosant, sirolimus and propranolol on endothelial and haemangioma cells
David Conner, Osvaldo Cooley-Andrade, An-Ning Chew, Kurosh Parsi
St Vincent’s Centre for Applied Medical Research, Sydney, Australia
C12 The associations between levels of 25-oh-vitamin D and venous leg ulcers
Ihar Ihnatovich, Natalla Novikava, Genadij Kondratenko, Antanina Gancharik
Belarusian State Medical University, Minsk, Belarus

C13 Microscopic evaluation of trapped blood. Is sclero-thrombus a true thrombus?
Kurosh Parsi, Osvaldo Cooley-Andrade, Elton Chee, David Connor
St Vincent’s Centre for Applied Medical Research, Sydney, Australia

C14 Anatomical relationship of the saphenous nerve with primary varicose veins
Shu-Hung Huang, Yun-Nan Lin, Sin-Daw Lin
Kaohsiung Medical University Hospital Kaohsiung Medical University, Kaohsiung, Taiwan

D1 Patency of venous stents inserted for thrombotic disease in patients who become pregnant
Justinas Silickas1, Prakash Saha1, Alberto Smith1, Adam Gwozdzi1, Beverley Hunt1,
Catherine Nelson-Piercy2, Susan Robinson2, Karen Breen2, Narayan Karunanithy2, Stephen Black3
1King’s College London, London, UK; 2‘Guy’s and St Thomas’ NHS Foundation Trust, London, UK; 3‘St Thomas’ Hospital, London, UK

D2 Long-term outcomes of veno-venous bypass operations in postthrombotic syndrome
Igor Ignatyev1, Anatoly Pokrovsky2, Evgeny Gradusov2
1Interregional Clinical and Diagnostic Center, Kazan, Russia; 2Russian Medical Academy of Postgraduate Education, Russia

D3 Predictive value of a day orthostatic loading test for the reversibility of the great saphenous vein reflux after phlebectomy of all varicous tributaries
Yurii Tsukanov, Anton Tsukanov
Omsk State Medical University, Omsk, Russia

D4 Impact of chronic venous disease on quality of life: results of an epidemiological study
Daciana Elena Branisteana1, Toni Feodor2, Oana Vittos1
1University of Medicine and Pharmacy Gr. T. Popa, Iasi, București, Romania; 2Medical Center for Diagnose, Ambulatory Treatment and Medical Prevention, Surgery Clinic, Romania; 3Scientific consulting, Medone Research, București, Romania

D5 Lower limb velocity gradient subversion in superficial venous disease
Sergio Gianesini, Erica Menegatti, Giovanni Di Domenico, Francesco Sisini
University of Ferrara, Ferrara, Italy

D6 Can infrared imaging improve the knowledge of CEAP C1 class?
Francisco Ortega-Santana1, Aritz Ortega-Centol2, Fátima Ruano-Ferrer1
1Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain; 2Bellvitge University Hospital, Barcelona, Spain; 3Materno-Insular University Hospital, Las Palmas de Gran Canaria, Spain

D7 Isolated removal of vertical venous reflux in the treatment of varicose veins
Ihar Ihnatovich, Natalla Novikava, Genadij Kondratenko
Belarusian State Medical University, Minsk, Belarus

D8 Treatment of great and small saphenous vein insufficiency using a cyanoacrylate glue: our first experience on 30 patients
Patrizia Pavei, Maurizio Ferrini, Marinella Menegazzo
Azienda Ospedaliera di Padova, Padova, Italy
Aesthetic ambulatory surgical therapy of the varicose veins of a large diameter
Valerian Ciubotaru
Flebest Medical Clinic, Bucharest, Romania

Clinical outcomes and quality of life after endovenous ablation for great saphenous vein incompetence: a single center prospective nonrandomized study
Christos Karathanos, Konstantinos Spanos, Athanasios Athanasoulas, Vasileios Saleptsis, Athanasios Giannoukas
Department of Vascular Surgery, Faculty of Medicine, University Hospital of Larissa, University of Thessaly, Larissa, Greece

Brand new tool for mechanosclerotherapy -- Flebogrif -- assessment of effectiveness on an animal model
Zbigniew Rybak, Maciej Janeczek, Andrzej Chróścicz, Anna Noszczyk-Nowak, Maciej Dobrzyński, Maria Szymonowicz
Wroclaw Medical University, Wroclaw, Poland; Wroclaw University of Environmental and Life Sciences, Wroclaw, Poland

Compression vs. CVD - a three punch combo
Torbjorn Lundh, Andreas Nilsson
Chalmers University of Technology, Gothenburg, Sweden

Evaluation of the application of radiofrequency ablation treatment of varicose veins of the lower extremities in early term after surgery
Anastasia Artemova, Michel Ivanov, Nikolay Lukyanchikov, Igor Sonkin
North-Western State Medical University named after I.I. Mechnikov, St Petersburg, Russia; L.M. Sechenov First Moscow State Medical University, Moscow, Russia; Department of Vascular Surgery JSC “Russian Railways”, St Petersburg, Russia
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THURSDAY, JUNE 29, 2017

12:00-13:00  Industry Session: Progression of Chronic Venous Disease: Where are we today?
             (Supported by an educational grant from Servier)
             Chairperson(s): Armando Mansilha, Andre Van Rij

12:00  Evolution of chronic venous disease. Update of epidemiological data
             Armando Mansilha
12:15  Pathophysiology of progression of chronic venous disease
             Andre Van Rij
12:30  Therapeutic options to delay the progression
             Marc Vuylsteke
12:45  Panel Discussion

13:00-14:00  Lunch and Visit to Exhibition

14:00-15:00  Industry Session: The value of Glycosaminoglycan in Venous Disease
             (Supported by an educational grant from Alfa Wassermann)
             Chairperson(s): Jaweed Fareed, Frederico Bastos Goncalves

14:00  Pleiotropic activities that affect multiple sites of venous disease
             Ferdinando Mannello
14:15  Review of clinical trials on the reduction of symptoms and ulcer healing.
             Tomasz Urbanek
14:30  Prevention of recurrent deep venous thrombosis as the key to preventing postthrombotic syndrome.
             Andrew Nicolaides
13:05  Panel Discussion

FRIDAY, JUNE 30, 2017

11:00-12:00  Industry Session: New data on chronic venous disease, New place for Cyclo 3
             (Supported by an educational grant from Pierre Fabre)
             Chairperson(s): Arkadiusz Jawien, Armando Mansilha

11:00  Effects of venotonic drugs on the microcirculation: Comparison between ruscus extract and diosmine
             Eliete Bouskela
11:15  Cyclo 3. New clinical meta analysis
             Stavros Kakkos
11:30  Guidelines Update
             Andrew Nicolaides
11:45  Panel Discussion
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3 x 3 metres
1.1 DIFFERENCES IN THE ABLATION OF THE GREAT SAPHENOUS VEIN BY ENDOVENOUS LASER ABLATION, USING A RADIAL FIBRE AND RADIOFREQUENCY ABLATION, DEMONSTRATED BY HISTOLOGY AND IMMUNOHISTOCHEMISTRY, USING AN IN VITRO MODEL OF TREATMENT

Henry Ashpitel, Francisco Salguero, Roberto La Ragione, Andreea Radulescu, Mark Whiteley
University of Surrey, Guildford, UK

AIM Endothermal ablation of truncal varicose veins has become a first line treatment, as recommended by numerous national boards.1 Although there has been much clinical research into recurrence rates and patient satisfaction,2 3 there is a paucity of data concerning the biological effects of the different techniques.

The aim of this study was to examine the difference between two common endothermal ablation techniques, endovenous laser ablation (EVLA), using a radial firing fibre, and radio frequency ablation (RFA), in vitro, focusing on differences in their effect on the vein wall on a biological level.

MATERIALS AND METHODS Ten lengths of extra-fascial GSV were removed from patients undergoing varicose vein surgery. Post-removal, the lengths of vein were cultured at 37 °C overnight. Five lengths were treated with a 1470 nm endovenous laser with a radial fibre. Five were treated with an Olympus RFiT. Each length was treated in 5 sections with different LEEDs; 0 (control), 20, 40, 60 and 80 J/cm at 10W. Treated sections were cultured in vitro and harvested at 6 and 4 hours. Tissue was sampled for histological analysis and stained with haematoxylin and eosin (H&E). Immunohistochemistry (IHC) was performed for anti-smooth muscle actin (αSMA) and anti-p53 (αp53).

RESULTS Basic visual analysis showed a clear increase of thermal damage as the LEED increased, for both treatments, and in general, good contraction around the fibres. Analysis of the damage profile in the vein wall, using αSMA IHC (Figure 1), did not show a clear difference between the two different treatments. Both treatments led to significant penetration of thermal damage into the vein wall. The pattern of damage was the same and homogeneity of treatment and necrosis was also clearly seen throughout the vein walls.

The expression of p53, (Figure 2), in the controls were significantly higher than in the sections treated with both EVLA and RFA, at 60 J/cm. This indicated that the majority of cells in the vein wall underwent necrosis after treatment. Expression of p53 were not significantly different in sections with different treatment techniques.
Figure 1. Sections of GSV wall stained with αSMA immunohistochemistry. GSV treated with either 1470 nm EVLA or RFiTT at an LEED of 60 J/cm and presented with their controls. Significant necrosis in the treated tissue, as shown by absence of SMA compared to the control, seen throughout whole vein wall.

Figure 2. Sections of GSV stained with p53 immunohistochemistry. GSV treated with either 1470 nm EVLA or RFiTT at an LEED of 60 J/cm and presented with their controls. Arrows indicate p53 expression. Significant background staining seen in control section for 1470 nm EVLA.
CONCLUSION | Preliminary results indicate that both treatments caused necrosis and death of the vein wall at similar power levels. There seems to be little difference, at a biological level, between treatment with EVLA, with a radial fibre, and RFA in vitro. Work presented by us earlier this year showed a significant difference between EVLA with a forward firing fibre and EVLA with a radial fibre in vitro. A similar significant difference between EVLA with a forward firing fibre and RFA is likely.

Submitted for the EVF Prize.

REFERENCES
1.2 EVOLUTION OF VARICOSE VEIN SURGICAL INTERVENTIONS IN A SPECIALIZED OUTPATIENT CENTER

O.A. Smirnov 1, S.A. Tyurin 2, E.P. Burleva 3
1 Medical Center “Olmed”, Yekaterinburg, Russia
2 Municipal Clinical Hospital №40, Yekaterinburg, Russia
3 Ural State Medical University, Yekaterinburg, Russia

AIM To identify trends in the outpatient technologies for treatment of patients with varicose vein disease over the last 10 years.

MATERIALS AND METHODS 9395 surgical procedures performed in patients with varicose vein disease in the great saphenous vein (GSV) and CEAP classes C2-C6 from 2006 to 2015 were analyzed. Mean age of patients was 42.9 years, and twice as many women as men were treated. 3 groups of outpatient procedures: crossectomy plus surgery for incompetent perforators under local anesthesia, followed by staged sessions of ultrasound-guided foam sclerotherapy (UGFS) of the GSV trunk and courses of UGFS of the GSV tributaries (group 1; n=1369); crossectomy plus stripping plus minimally invasive phlebectomy under spinal anesthesia in the one-day hospital, followed by staged outpatient UGFS of the GSV tributaries (group 2; n=1341); and endovenous laser ablation (EVLA) or radiofrequency ablation (RFA) of the GSV trunk in the thigh plus EVLA of incompetent perforators, if indicated (group 3; n=6685). The EVLA or RFA were supplemented with UGFS of tributaries in almost all patients, or with Muller’s phlebectomy below the knee in 0.5% of cases. To reveal trends, the separate analysis by year was performed using the statistical software BioStat.

RESULTS From 2006 to 2015, the number of operated patients per year increased 19-fold from 91 to 1755. In the first 4 years, the main types of interventions were minimally invasive procedures of both groups (n=1314). In the following 6 years, due to adoption of endovascular techniques, the number of patients who underwent EVLA/RFA in the GSV system grew significantly. From 2010 to 2015, endovascular procedures per year increased from 235 to 1640 (7-fold). EVLA was used more frequently (n=6384, 95.5%) than RFA (n=301, 4.5%), because of the greater availability of EVLA for patients. This accumulated experience allowed us to develop algorithms for all the options of minimally invasive procedures. 818 procedures of group 1 (10.1%) and 578 procedures of group 2 (7.2%) were performed in 2010-2015, despite growth in the endovascular interventions. Perioperative management of patients included prevention of infectious and thrombotic complications, regimens of elastic compression treatment, and use of vasoprotective agents (micronized purified flavonoid fraction; MPFF).

CONCLUSION Our 10-year practice in the setting of a specialized outpatient center underwent a significant transformation of interventions for varicose veins in the GSV system, with predominance of ablation techniques in recent years. The clinical and technical limitations associated with anatomy of the GSV and the patient’s state, as reflected in our center’s algorithms, give priority to phlebectomy and UGFS in 17.3% of cases.
1.3 MECHANOCHEMICAL ABLATION OF SAPHENOUS VEIN: LEARNING FROM 4 YEARS FOLLOW-UP
Mattia Mirandola, Andrea Griso, Bruno Migliara, Tania Cappellari, Marcello Lino
Ospedale Pederzoli, Peschiera del Garda, Italy

In September 2012 we began an observational study including all the patients eligible for the treatment with mechanochemical ablation (MOCA). Patients have been treated in daily care on an outpatient basis and the procedures was made without sedation, nor local anesthesia except in site of phlebectomy. MOCA was performed according to standard procedure suggested from the Company; we chose to use polidocanol at 2%. Inclusion criteria were: symptomatic incompetent great saphenous vein (GSV) or small saphenous vein (SSV), with or without saphenofemoral or -popliteal junction incompetence, diameter of the vein >4 mm and <20 mm. Exclusion criteria were: previous thromboflebitis or DVT, too much superficial vein (<4 mm from the skin), tortuosity more than 120°, allergy to polidocanol, pregnancy.

From September 2012 to September 2016 we treated 303 saphenous veins with MOCA. The treated veins included 266 GSV (in 6 cases we treated also anterolateral side branches), 37 SSV. The mean diameter of GSV was 6.8 cm. The mean operating time was 12 minutes (from 8 to 26, not including phlebectomy). The technical success rate was 99% (in 3 patients we performed an uncomplete treatment due to spasm). The mean follow-up time was 18 months (from 3 to 51 months).

At 1 year follow-up, 2 years and 3 years there was respectively a 94% occlusion rate, 90%, 89%. No major complications were observed; as regard minor complications we recorded superficial thrombophlebitis (3%), induration along the course of the treated vein (6%); no hyperpigmentation of the skin later 6 months follow-up. In 7 patients we observed at 1 week from treatment a thrombus progression in the anterior side of the deep vein (6 femoral veins and in 1 popliteal vein); at 1 month the thrombus was no more visible. After 6-month follow-up we had not additional complications nor recanalizations.

Our results show a very good occlusion rate without major complications also in veins with short dilatations of >15 mm, with only 11% of recanalizations >5 cm between 3 and 4 years. The results are unrelated to the diameter of veins; half of the total recanalizations are related to a severe spasm during procedure that made an uncomplete treatment of the vein. The treatment is very fast and anesthesia is not necessary that is very appreciated. In our experience, if the operator injects sclerosant from the first centimeter from sapheno-femoral junction, recanalizations are reduced; it's possible to have a thrombus progression in deep vein even if it's not necessary a therapy because it's not a real thrombosis.
1.4 COMPARATIVE MORPHOLOGICAL STUDY OF ENDOVENOUS LASER ABLATION BY RADIAL FIBERS WITH DIFFERENT POWER BUT SIMILAR LINEAR ENDOVENOUS ENERGY DENSITY

Denis Borsuk 1, Alexey Fokin 2, Evgeniy Kazachkov 2
1 Clinic of Phlebology and Laser Surgery, Chelyabinsk, Russia
2 The South Urals Medical University, Chelyabinsk, Russia

For Endovenous laser ablation (EVLA) effective usage in the majority of clinical practice guidelines linear endovenous energy density (LEED) approximately 70 J/cm has been recommended. On the other hand we can achieve this LEED on different power.

AIM The aim of our study was to investigate the depth of venous walls’ damage after EVLA 1470 nm by radial fibers of using different power as 5, 7 and 10 Watts but the same LEED which was approximately 70 J/cm.

MATERIALS AND METHODS Prospective comparative morphological blind study included 30 patients whose great saphenous veins were treated by EVLA 1470 nm by radial fibers with automatic pull-back traction. The patients were divided into 3 groups for 10 persons. In the 1st group the patients were treated by EVLA with power 5 Watts with speed of fiber traction 0.7 mm/s (LEED 71.4 J/cm). In the 2nd group the power was 7 Watts with the traction speed 1 mm/s (LEED 70 J/cm). And in the 3rd group the power was 10 Watts and the traction speed was 1.5 mm/s (LEED 66.7 J/cm). After EVLA suprafascial part of the ablated vein in the middle thigh were taken by microphlebectomy. We did 3 preparations from each vein with the distance of 2 mm from each other. The specimens were stained with hematoxylin and eosin and Van Gieson’s stain. The intergroup comparison of the depth of venous wall damage was based on comparison of the coefficient of alteration, which was calculated as the relation of damage depth to thickness of the vein wall. We measured the coefficient of alteration in 4 points of each preparation. There were 360 measurements (120 in every group).

RESULTS The mean depth of venous wall damage was 122.9 µm in the 1st group, 182.9 µm in the 2nd group and 267 µm in the 3rd group. The coefficient of alteration was 25.7%, 37.9% and 55% in the 1st, the 2nd and in the 3rd group accordingly (P=0.0001 comparing with each group by Kruskal Wallis nonparametric H test). So in spite of insignificant decreasing of LEED from the 1st to the 3rd group with the increase in the power the depth and coefficient of alteration were statistically risen.

CONCLUSION 1) Having used more power with EVLA at the same LEED the depth of venous wall damage becomes more significant. 2) This direction is demanded further investigation with comparing of frequency of recanalisations and evaluation of quality of life and severity of pain syndrome.

Submitted for the EVF Prize.
1.5 INCIDENCE AND RISK FACTORS OF ENDOVENOUS HEAT-INDUCED THROMBOSIS AFTER ENDOVENOUS RADIOFREQUENCY ABLATION IN ASIAN POPULATION

Nuttawut SermSathanasawadi
Division of Vascular Surgery Department of Surgery Faculty of Medicine Siriraj Hospital Mahidol University, Bangkok, Thailand

AIM  We aimed to determine the incidence and associated risk factors for endovenous heat-induced thrombosis (EHIT) after endovenous radiofrequency ablation (RFA).

MATERIALS AND METHODS  We retrospectively reviewed the medical records of 282 patients with 288 great saphenous veins and 29 anterior accessory great saphenous veins undergoing RFA from 2012 to 2016. Serial duplex ultrasonography was performed at 1 week, 3 weeks and 3 months after operation.

RESULTS  From 317 veins, the incidence of EHIT was 38 veins (11.99%). EHIT class 1, 2, 3 and 4 were found in 16 (5.05%), 17 (5.36%), 4 (1.26%), and 1 (0.32%) veins respectively. No pulmonary embolism occurred. Most of EHIT class 1 spontaneously disappeared within 2 weeks. Most of EHIT class 2 resolved spontaneously without anticoagulant treatment except 1 patient with EHIT class 2 required anticoagulant treatment because he could not come to hospital for serial ultrasound examination. Two patients with EHIT class 2 who did not receive anticoagulant progressed to EHIT class 3. All 5 patients with EHIT class 3 and class 4 required anticoagulant until EHIT resolved. So the incidence of EHIT after RFA which required anticoagulant treatment was only 1.58%. We found that age of the patients and vein diameter were significantly different between no EHIT and EHIT group (P=0.046 and P=0.006 respectively).

CONCLUSION  After performing RFA of GSV and AAGSV, the incidence of EHIT was 11.99%. Most of EHIT spontaneously disappeared. Incidence of EHIT required anticoagulant treatment was only 1.58%.
**AIM** Radiofrequency ablation (RFA) for insufficient saphenous veins treatment is accompanied by a high incidence of paresthesia.\textsuperscript{1,2} The temperature at which there is a risk of nerve damage during more than a 20-seconds exposure is 60 °C.\textsuperscript{3} The standard temperature-time radiofrequency ablation (RFA) regime for saphenous veins with a most typical diameter up to 6 mm was investigated.\textsuperscript{2}

**MATERIALS AND METHODS** The experimental temperature dependences on time of the catheter surface were obtained by processing second by second VNUS generator monitor readings video records during the first RFA cycle of the proximal part of the saphenous vein. The information on the 30 procedures was obtained and processed by parametric statistics method. Consequent patients with primary chronic C2 venous disease (CEAP-classification) with a diameter of the great saphenous vein up to 6 mm in 3 cm below the junction were included. The simulation was performed with the step of $t = 0.5 \text{ s}$. The task of modeling the propagation of heat emitted by the catheter on the vessel wall was solved numerically using the differential heat equation.\textsuperscript{5} COMSOLMultiphysics 5.1 Software package was used for calculations. The temperature dependences on time of the RFA exposure were designed for the middle (at a distance of 0.5 mm from the surface of the catheter) and outer surface (1 mm from the surface of the catheter) of the venous wall for the standard mode of ClosureFast catheter.

**RESULTS** It was shown that the temperature in the middle of vein wall is more than 60 °C after 2.5 seconds at the standard temperature-time radiofrequency ablation regime. The vein wall outer surface heating exceeds 60 °C at the 9\textsuperscript{th} second (Figure 1).

Figure 1. The catheter surface (solid), the middle (dash-dot) and the outer surface (dashed curve) of the vein wall.
At the 20th second of standard RFA cycle the border of “risk zone” meaning the possibility of nerve damage reaches its maximum at the distance of 1.38 mm from the surface of the catheter. At the end of two standard cycles performed in a continuous mode the boundary of the “risk zone” is located at a distance of 1.77 mm from the surface of the catheter (Figure 2).

Figure 2. The “risk zone” for a single (solid black curve) and a single (solid black) and a double (dashed gray curve) RFA cycles.

**CONCLUSION** The safe distance from the catheter to the nerve for avoiding complications is more than 1.38 mm. It’s more safely to make a pause between RFA cycles to make a pause between RFA cycles to minimize the cumulative thermal effect.

Submitted for the EVF Prize.

**REFERENCES**

2.1 GENETIC SUSCEPTIBILITY FOR RECURRENT DEEP VEIN THROMBOSIS AMONG YOUNG ADULTS

Raghid Kreidy
Saint George Hospital University Medical Center, Beirut, Lebanon

AIM  Lower extremity deep venous thrombosis is uncommon among young adults. Thrombophilia is the most common risk factor for venous thrombosis in this subgroup of patients. The aim of this study is to assess prothrombotic genetic polymorphisms among young adults with primary and recurrent venous thrombosis.

MATERIALS AND METHODS  From January 2000 to January 2017, 459 patients diagnosed with lower extremity deep venous thrombosis in a tertiary center were retrospectively reviewed. Eight patients were less than 50 years (range: 19-50 years, mean: 38 years). Forty three of these patients suspected for hypercoagulation state according to the international guidelines were tested for genetic thrombophilia and homocystein level. Thirty of these patients presented for primary venous thrombosis (group 1) and thirteen for recurrent venous thrombosis (group 2).

RESULTS  All the forty patients tested were carriers for some form of prothrombotic genetic defects. Thirteen patients were carriers for factor V - Leiden mutation in group 1 (43.33%) and 7 patients in group 2 (53.84%). Of these patients, 12 were carriers for the heterozygote form in group 1 (40%) and 5 in group 2 (38.46%). One patient was carrier for the homozygote form in group 1 (3.33%) and 2 in group 2 (15.38%). MTHFR C 677 T mutation was detected among 15 patients of group 1 (50%) and 7 patients of group 2 (53.84%), of whom 13 patients were carriers for the heterozygote form in group 1 (43.33%) and 5 in group 2 (38.46%), 2 patients carriers for the homozygote form in group 1 (6.66%) and 2 in group 2 (15.38%). MTHFR A 1298 C mutation was observed only in its heterozygote form in 7 patients of group 1 (23.33%) and 1 patient of group 2 (7.6%). There was no difference in the prevalence of factor II (prothrombin) mutation in both groups: 2 patients in group 1 (6.66%) and 1 patient in group 2 (7.61%). Plasmatic homocystein level was increased among 6 patients in group 1 (20%) and 4 patients in group 2 (30.76%).

CONCLUSION  MTHFR A 1298 C and factor II mutation were not determinant for venous thrombosis recurrence. However, factor V - Leiden mutation and essentially its homozygote form, MTHFR C 677 T homozygote mutation and increased homocystein level were associated with a higher rate for thrombosis recurrence. Patients carriers for these mutations and having hyperhomocysteinemia require more aggressive prevention measures for thrombosis and extension of anti-coagulation treatment after the first episode of venous thrombosis.
2.2 EFFICACY AND SAFETY OF RIVAROXABAN VERSUS APIXABAN IN THE TREATMENT OF ACUTE VTE

Dalene Bott-Kitslaar ¹, Benjamin Simmons ¹, Dawid Janczak ², Malgorzata Mimier ², Rayya Saadiq ¹, Robert McBane ¹, Waldemar Wysokinski ¹
¹ Mayo Clinic, Rochester, USA
² Wroclaw Medical University, Wroclaw, Poland

AIM Direct oral Xa inhibitors such as rivaroxaban and apixaban are approved and currently extensively used for treatment of acute venous thromboembolism (VTE). However, the data comparing efficacy and safety of these two anticoagulants are lacking. Our aim was to compare the efficacy and safety of rivaroxaban and apixaban in patients with acute VTE.

MATERIALS AND METHODS Consecutive patients treated with either rivaroxaban or apixaban for deep vein thrombosis (DVT) and/or pulmonary embolism (PE), enrolled into Mayo Thrombophilia Clinic Anticoagulants Registry between March 1, 2013 and February 1, 2017 were followed prospectively to evaluate the rates of VTE recurrence, major bleeding and survival.

RESULTS Within the study period, there were 820 patients with VTE enrolled into the registry. Of these, 236 were treated with rivaroxaban and 125 with apixaban within the first 14 days of VTE diagnosis and had at least 3 months of follow-up. Patients treated with apixaban were older, had more often cancer, and creatinine clearance <50 mL/min compared to those treated with rivaroxaban.

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<td>48 (38.4%)</td>
<td>113 (47.9%)</td>
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<td>83 (66.4%)</td>
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<tr>
<td>PE only</td>
<td>28 (22.4%)</td>
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<td>BMI</td>
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<td>CrCl &lt;50 ml/min</td>
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<td>Active cancer</td>
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<td>Thrombophilia</td>
<td>3 (2.4%)</td>
<td>10 (4.2%)</td>
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<td>Hormonal therapy</td>
<td>2 (1.6%)</td>
<td>10 (4.2%)</td>
<td>0.23</td>
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Continuous variables are summarized with mean (SD) and categorical variables with N (%)

All other demographic and clinical variables were distributed evenly between two groups. There were 5 (2.1%) VTE recurrence in rivaroxaban and 4 (3.2%) in apixaban treated patients (P=0.50). Also within the group of patients with active malignancy, VTE recurrence was similar (3 patients (2.8%) vs. 4 patients (5.4%), P=0.45, respectively). Major bleeding rates were not significantly different between rivaroxaban and apixaban treated patients when comparing the whole groups.
(9 patients (3.8%) vs. 4 patients (3.2%), \( P=1.0 \), respectively) as well as those with active cancer (9 patients (8.3%) vs. 3 patients (4.1%), \( P=0.37 \), respectively). Treatment with rivaroxaban and apixaban was associated with the similar rate of all-cause mortality (19 patients (8.1%) vs. 7 patients (5.6%), \( P=0.52 \), respectively).

**CONCLUSION**  The “real world” effectiveness and safety of rivaroxaban and apixaban are similar for VTE patients. Great majority of VTE recurrence, major bleeding and death occurred in patients with active malignancy.
2.3 INTEGRATION OF THE RESULTS OF THROMBODYNAMICS TEST INTO CAPRINI RAM ALLOWS TO INCREASE PREDICTION ABILITY FOR POSTOPERATIVE DVT IN HIGH-RISK SURGICAL PATIENTS

Kirill Lobastov 1, Galina Dementieva 1, Nataliya Soshitova 2, Victor Barinov 3, Veleriy Boyarintsev 1, Leonid Laberko 1, Grigory Rodoman 1

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AIM To compare how well the classic Caprini 2005 risk assessment model (RAM) and its modified version predict postoperative deep vein thrombosis (DVT), considering the results of thrombodynamics test (TD) in surgical patients at high risk.

MATERIALS AND METHODS This was a prospective observational clinical study involving 80 patients (33 men and 47 women, mean age 73.9±7.2 years) who underwent major (79 cases) or minor (1 case) surgery for colorectal cancer. Patients were at high risk for postoperative venous thromboembolism (i.e., Caprini scores between 5-15; mean – 9.9±2.0) and received combined prophylaxis (i.e., anti-embolic above-knee compression stockings and low-molecular-weight heparin (LMWH) injections (i.e., enoxaparin 40 mg once daily)) until discharge. LMWH was administered at a fixed hour according to the time of blood sampling for TD. Duplex ultrasound was performed to detect postoperative DVT before and after surgery (0 day, 5-7 days, and 1 month).

RESULTS DVT was found in 1 of 80 patients (6.3%; 95% CI: 17.9-36.8%) at 5-7 day post-surgery. No new venous thromboembolism events were detected at 1 month. Regression analysis and ROC-curve showed that Caprini scores significantly predicted DVT (P<0.0001, S=0.839±0.045). Analysis of ROC-curve coordinates showed a cut-off point of 11 scores, with a sensitivity of 76.2% and a specificity of 74.6%.

The results of the TD test showed significant hypercoagulation at the background of LMWH administration in patients with DVT. Regression analysis and ROC-curves demonstrated that the following TD parameters had the greatest predictability for postoperative DVT: stationary velocity of clot growth, measured at 2 hours after surgery (Vst) (S=0.764±0.109, P=0.049), and initial velocity of clot growth, measured 4 hours after the LMWH injection (Vin) (S=0.946±0.047, P=0.001). The cut-off points for DVT prediction appeared to be Vst>3.5 µm/min (normal range 0-9) and Vin>64.5 µm/min (normal range 36-56).

Identified thresholds for TD parameters have been integrated into Caprini RAM under the item “other congenital or acquired thrombophilia” (score of 3). Total Caprini scores were recalculated in patients where one or both TD parameters had exceeded the cut-off, followed by re-analysis of the ROC-curves. For these patients, the Caprini RAM that used integrated Vin>64.5 µm/min was characterized by the highest predictability for DVT (S=0.876±0.038, P<0.0001) and increased cut-off up to 12 scores with sensitivity of 85.7% and specificity of 72.9%.

CONCLUSION Integrating TD parameters into Caprini RAM increases the ability to predict postoperative DVT.
2.4 IS CAPRINI VENOUS THROMBOEMBOLISM RISK ASSESSMENT MODEL APPLICABLE TO SURGICAL PATIENTS IN ASIA?

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AIM Incidence of venous thromboembolism (VTE) in Asia is lower than in Western countries though its incidence is increasing in the recent literature. There is yet an appropriate risk assessment model that is validated in this population with lower VTE incidence. While the acquired risk factors are similar to Asian population, there may be difference in the ethnic or familial risk factors. With a difference in the incidence of VTE between Asia and the West, the applicability of Caprini VTE risk assessment among surgical patients in Asia is largely unknown.

MATERIALS AND METHODS The electronic records of 419 patients aged 18 years and above admitted to surgical ward of a General hospital between 1 January 2013 and 31 December 2014 were reviewed. Non-Asian patients such as Caucasians, Middle Easterners and Africans were excluded. VTE risk of each the patient was assessed with Caprini risk assessment model (RAM). Medical records were reviewed for VTE risk factors and evidence of symptomatic VTE during hospital admission and within 90 days after discharge. Descriptive analysis of individual risk factors, overall VTE incidence and incidence of VTE in each risk category was performed. Association between each risk factors and incidence of VTE was analysed using Chi-square or Fisher’s exact test.

RESULTS The overall symptomatic VTE incidence rate was 0.6%. Incidence rates of deep vein thrombosis (DVT) and pulmonary embolism (PE) were 0.4% and 0.2% respectively. In each risk levels of Caprini RAM, the incidence rates were 0% in very low, 0.2% in low, 0.4% in moderate and 2.3% in high categories. The significant risk factors using Caprini RAM associated with VTE were obesity with BMI> 25 (P=0.028), varicose veins (P=0.013), serious lung disease including pneumonia (P=0.008), history of prior major surgery (P=0.032), swollen legs (P<0.001), age 61-74 years (P=0.029), patient confined to bed >72 hours (P=0.013), malignancy (P=0.001), history of DVT/PE (P<0.001) and positive lupus anticoagulant (P=0.011).

CONCLUSION The overall VTE incidence among Asian surgical patients was lower and was less than half of the incidence reported in a similar retrospective hospital discharge study in Michigan as reported by Bahl et al. The risk factors associated with VTE were however similar to the western population. Caprini RAM overestimated VTE risk and using this model may lead to unnecessary and over utilization of VTE prophylaxis in Asia.

Submitted for the EVF Prize.
2.5 TREATMENT OF VARICOSE VEINS IN PATIENTS ON ORAL ANTICOAGULATION

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AIM The success of endovenous laser therapy (EVLT) in treating symptomatic varicose veins has been well documented; however few studies have examined outcomes in patients on warfarin or novel oral anticoagulation drugs. The aim of this study is to investigate the outcome of EVLT in these patients matched well to a control group.

MATERIALS AND METHODS All patients on anticoagulation undergoing EVLT were extracted from a prospective database and age, sex and site of procedure matched to controls. All patients underwent standard EVLT procedure and were asked to continue on oral anticoagulation throughout. Patients were followed up with an ultrasound duplex scan at 6 weeks.

RESULTS A total of 23 patients on anticoagulation (10 males, mean age 59 years) were included in the study and matched with a further 23 control patients. 20 patients were on warfarin, 2 were on apixaban and 1 on rivaroxaban. Indications for anticoagulation were atrial fibrillation (39%), DVT (30%), prosthetic heart valve (13%), TIA (9%), PE (4%) and polycythemia (4%). In each cohort 18 patients demonstrated long saphenous (LSV) reflux and 5 had reflux of the short saphenous vein (SSV). At 6 week follow-up the occlusion rate in the study group was 1/3 (91%) and 100% in the control group. The 2 patients who failed to show occlusion had SSV reflux and were on warfarin for prosthetic heart valves. One underwent repeat EVLT with success whilst the other still had patent SSV following a repeat procedure. No procedure related complications were experienced in the anticoagulation group.

CONCLUSION EVLT demonstrates high success rates in patients on oral anticoagulation who can continue medication throughout the procedure and 6 week follow-up, with few complications. Patients with SSV reflux had a trend toward increased rate of recanalization within 6 weeks, which should be investigated with further study.

Submitted for the EVF Prize.
2.6 PULMONARY EMBOLECTOMY FOR MASSIVE PULMONARY EMBOLISM

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AIM  Mortality of acute massive pulmonary embolism (mPE) is as high as 50% to 65% in multicenter registry, especially for patients having shock or cardiopulmonary arrest. Most patients with mPE die within several days after onset. ESC guideline 2014 indicates surgical pulmonary embolectomy as a valuable therapeutic option in patients with high-risk PE in whom thrombolysis is absolutely contraindicated or has failed. However, real outcome of pulmonary embolectomy for this acute mPE is not known because of extremely small volume experiences in each hospital. Japanese Adult Cardiovascular Database (JACVSD) is nation-wide database for cardiac surgery in Japan. To elucidate risk factors for mortality and morbidity, data extracted from JACVSD was retrospectively analyzed.

MATERIALS AND METHODS  There were 355 patients who underwent pulmonary embolectomy for acute pulmonary embolism during January 2008 and December 2014 in the database. Median age of patients was 64.8 years, ranging from 15 to 91 years. There were 169 males and 182 females. Preoperative condition of patients was critical, including shock in 50.1%, cardiopulmonary resuscitation in 7.6%, support by portable cardiopulmonary bypass support in 6.5% and emergent pulmonary embolectomy within 4 hours after admission in 93.0%.

RESULTS  In-hospital mortality was 73/355 patients (20.6%). Univariate analysis demonstrated statistically significant preoperative risk factors for hospital death were shock (14.5% in survivors vs. 31.5% in dead patients, P=0.002), cardiopulmonary resuscitation (23.4% vs. 43.8%, P=0.001), renal dysfunction (10.3% vs. 23.3%, P=0.006), chronic obstructive pulmonary disease (11.7% vs. 28.8%, P=0.011), Body Mass Index >30 (9.6% vs. 20.5%, P=0.014), and tricuspid regurgitation (33% vs. 47.9%, P=0.01). Intraoperative risk factor for hospital death was blood transfusion (87.2% vs. 98.6%, P=0.005) and longer cardiopulmonary bypass time (170 vs. 120 min). Postoperative risk factors for hospital death were re-exploration for bleeding (6.7% vs. 37.0%, P=0.001), coma (6.8% vs. 21.9%, P=0.01), postoperative renal failure (7.8% vs. 31.5%, P<0.001) and septicemia (2.8% vs. 11.0%, P=0.007). Postoperative ventilator time and the length of ICU stay were longer in dead patients than in survivors.

CONCLUSION  Mortality of pulmonary embolectomy for acute mPE was acceptable, considering of high risk-adjusted-mortality in target population. Early intervention with cardiopulmonary support by cardiopulmonary bypass and surgical embolectomy is crucially important to save patients having critical mPE. Indication of pulmonary embolectomy for patients with prolonged cardiopulmonary resuscitation due to mPE is questionable.
3.1 COMPARISON OF 1470 NM LASER AND RADIAL 2RING FIBER WITH 1470 NM LASER AND RADIAL FIBER IN ENDOVENOUS LASER ABLATION OF SAPHENOUS VARICOSE VEINS

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AIM The aim of this study is to compare the clinical efficacy and safety of two laser fiber types in endovenous laser ablation (EVLA) of saphenous varicose veins of the lower limb.

MATERIALS AND METHODS From January 2013 to September 2015, 94 patients (94 limbs) with primary varicose veins were randomized into two groups. They were treated with radial fiber and 1470 nm laser in Group 1 (46 limbs) and radial 2ring radial fiber and 1470 nm laser in Group 2 (48 limbs) in order to ablate the saphenous vein. Vein occlusion rates at 1, 6 weeks and 6 and 12 months and pain in treated region were recorded as primary endpoint. Venous clinical severity scores (VCSS) for assessment of quality-of-life outcomes following endovenous laser ablation with both fiber types were recorded as secondary endpoint.

RESULTS Occlusion rates at 1 and 6 weeks were 100% in both groups, at 6 months and 12 months were 100% in Group 1, and 97.9% in Group 2. Rates of pain (3% vs. 14.8 %) were lower in Group 2, but not significantly. VCSS scores were significantly better in Group 2 at 1 week (P <0.001). At 6 weeks, 6 and 12 months, no significant differences between the groups were evident.

CONCLUSION Endovenous treatment of saphenous vein reflux with either fiber types results in clinical improvement of symptoms and comparable occlusion rates. In the early postoperative period, 2-ring laser fiber seems to remove quality-of-life limitations associated with conventional radial fiber.

REFERENCES


3.2 FATE OF GROIN AFTER RADIOFREQUENCY ABLATION OF VARICOSE VEIN...

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AIM Neovascularisation and non-ligation of terminal tributaries of great saphenous vein (GSV) are main causes of recurrence after open surgery for varicose veins. The endovascular procedures, without touching, groin can minimize the possibility of the first one. However, it may increase the likelihood of the second. The objective of this study is to assess the groin, one year after great saphenous vein radiofrequency ablation (RFA) for varicose veins, to confirm the previous advantage and check for any other complications.

MATERIALS AND METHODS This is a prospective study on all cases admitted to the vascular unit, King Fahd Hospital of University, Saudi Arabia who had more than 1 year follow-up after RFA for varicose veins of GSV. Assessment of the groin was performed by using duplex ultrasonography that mandated views at the saphenofemoral junction (SFJ) and its tributaries and check for presence of neovascularisation.

RESULTS One hundred and forty two limbs in 111 patients were included in this study. There was no reflux at SFJ with partial recanalisation of GSV in 16 (11%) cases. Neovascularity was identified in 4(2.8%) limbs. Junctional tributaries were patents in all and were dilated in 46(32%) limbs, with mean diameter 4.1mm±1.2. Factors increased the incidence of this dilatation were preoperative GSV diameter (8.2±2.1 vs. 6.4±1.9 P=0.04) and partial recanalisation of GSV (22% vs. 6% P=0.003). There were no significant difference as regards age, sex, body mass index, side and class of varicose veins.

CONCLUSION RFA, does not incite groin neovascularity and eliminates the GSV as a refluxing conduit in >90% of limbs at one year. However, it disturbs physiologic tributary flow in >30% of cases.
3.3 THE EFFECT OF USING DIFFERENT LASER WAVELENGTHS (1470 NM AND 1560 NM) AND FIBER TYPES ON POSTOPERATIVE PAIN AFTER ENDOVENOUS LASER THERAPY IN PATIENTS WITH VARICOSE VEINS

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AIM To compare the pain syndrome after performing endovenous laser therapy (EVLT) on the great saphenous vein in the early postoperative period using different laser wavelengths (1470 nm and 1560 nm) and fiber types.

MATERIALS AND METHODS This prospective study included 380 patients (259 females) with primary varicose veins of the lower extremities. The patients were 20 to 79 years old (mean age, 43; IQR, 35-54), with a C2-C5CEAP classification. EVLT was performed using a diode laser at either a wavelength of 1470 nm (n=244) or 1560 nm (n=136). End fibers were used in 50 patients, radial fibers in 139, radial 2ring fibers in 156, and radial slim fibers in 35. The pain was assessed according to the visual analog scale (VAS). The follow-up was performed at days 1, 3, 5, 7, 14, and 1 post-EVLT.

RESULTS When comparing the two laser wavelength groups (1470 nm vs. 1560 nm) at various times post-EVLT, the pain score was significantly lower in the 1560 nm group (VAS, 3.3; IQR, 2.2-4.3) than in the 1470 nm group (VAS, 3.6; IQR, 2.3-5.2) (P<0.04). Compared with preoperative pain, the level of pain in the 1470 nm group post-EVLT increased by 9% on day 1 (P=0.01), decreased by 30% on day 7 (P<0.0001), and decreased 1.8- and 4.1-fold on days 14 and 21, respectively. In the 1560 nm group, the postoperative pain decreased to 17% on day 3 (P=0.002), with a median pain score of 2.4 (IQR, 0-3.4). The postoperative pain was reduced by 31% and 69% on days 7 and 14, respectively, and the median pain score on day 21 was 0 (IQR 0-1.6; P<0.0001). When comparing the different types of laser fibers, the postoperative pain was lower in the radial 2ring fiber group vs. the radial fiber group on all days post-EVLT, which was lower than the radial slim fiber on the day 3 and 7 post-EVLT. The pain score decreased by days 21, 7, 14 and 3 in the end fiber group, the radial group, the radial slim group, and the radial 2ring group, respectively.

CONCLUSION By applying a laser wavelength of 1470 nm, there was a significant increase in pain on the first day post-EVLT, while the 1560 nm wavelength did not amplify the pain. A significant reduction in pain in the postoperative period occurred in both groups: from day 7 in the 1470 nm group and day 3 in the 1560 nm group. Lastly, the most powerful reduction in pain was observed in the radial 2ring fiber group.
3.4 COMPARISON OF ENDOVENOUS RADIOFREQUENCY ABLATION, LASER ABLATION, FOAM SCLEROTHERAPY AND SURGICAL STRIPPING FOR GREAT SAPHENOUS VARICOSE VEINS. EXTENDED 5-YEAR FOLLOW-UP OF A RCT

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AIM This study compares the outcome 5 years after treatment of varicose veins with endovenous radiofrequency ablation (RFA), endovenous laser ablation (EVLA), ultrasound guided foam sclerotherapy (UGFS) or high ligation and stripping (HL/S) by assessing technical efficacy, clinical recurrence and the rate of reoperations.

MATERIALS AND METHODS Five hundred patients (580 legs) with great saphenous vein (GSV) reflux and varicose veins were randomized to one of the 4 treatments. Follow-up included clinical and duplex ultrasound examinations.

RESULTS During 5 years there was a difference in the rate of GSV recanalization, recurrence and reoperations across the groups, KM P<0.001, P<0.01, P<0.001 respectively. Thus 8 in the RFA group (Kaplan Meier (KM) estimate 5.8%), 8 in the EVLA group (KM estimate 6.8%), 37 (KM estimate 31.5%) in the UGFS group and 8 in the HL/S group (KM estimate 6.3%) of GSVs recanalized or had a failed stripping procedure. Nineteen (RFA) (KM estimate 18.7%), 4 (EVLA) (KM estimate 38.6%), 28 (UGFS) (KM estimate 31.7%) and 38 (surgery) (KM estimate 34.6%) legs developed recurrent varicose veins. Within 5 years after treatment, 19 (RFA) (KM estimate 17%), 19 (EVLA) (KM estimate 18.7%), 43 (UGFS) (KM estimate 37.7%) and 25 (surgery) (KM estimate 23.4%) legs were retreated in the RFA, EVLA, UGFS and HL/S groups. A summary of the highlights during 5 years and updated REVAS classification will be presented.

CONCLUSION More recanalization’s of the GSV occurred after UGFS and no difference in the technical efficacy was found between the other modalities during 5-year follow-up. The higher frequency of clinical recurrence after EVLA and surgery cannot be explained and requires confirmation in other studies.
3.5 STENTING ACROSS THE INGUINAL LIGAMENT IN POST THROMBOTIC SYNDROME: ONE-YEAR OUTCOMES USING NITINOL VENOUS STENTS

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AIM Endovenous stents can be used for deep venous reconstruction to treat patients with post-thrombotic syndrome. Guidelines on iliocaval stenting suggest stenting across the inguinal ligament should be avoided, however stenting from a normal peripheral inflow segment is more important therefore stenting across the ligament may be necessary. There is limited data on the outcomes of nitinol venous stents placed across the inguinal ligament for patients with occlusive post thrombotic disease, but it is thought that this procedure is associated with early stent thrombosis due to the extensive nature of the disease. The aim of this study was to examine patency rates in patients having deep venous reconstruction using nitinol venous stents that were placed across the inguinal ligament.

MATERIALS AND METHODS Consecutive patients in whom a venous stent was inserted for symptomatic post-thrombotic disease between 2012 and 2015 were included for analysis. All patients had a minimum of one-year follow-up, with preoperative Villalta scores taken before intervention and at one year. Patients were therapeutically anticoagulated following surgery and patency was assessed perioperatively using intravascular ultrasound and postoperatively using duplex ultrasonography. Computed tomography and venography was also used in selected cases. Primary patency was defined as a patent stent with <50% diameter reduction; primary-assisted patency included those requiring re-intervention to maintain patency, and; secondary patency defined as stents that were blocked and successfully re-opened.

RESULTS Of 168 patients treated in our venous programme during the study period, 102 (61%) were treated for post-thrombotic obstruction. From this group, 94/102 (92%) patients had a nitinol venous stent of which 71 (76%) crossed the inguinal ligament. In six patients an endophlebectomy and fistula was also created to ensure adequate inflow. The respective patency rates are shown in table I. Primary, primary-assisted and secondary patency rates were significantly better in stents placed above the inguinal ligament (P<0.05). There was a significant improvement in Villalta scores of both patients with patent stents in those placed above the inguinal ligament (median improvement of 9 points, range 0-18) and those with stents placed across it (median improvement of 11, range 0-25).

Table I. Patency rates following nitinol venous stenting above and below the inguinal ligament.

<table>
<thead>
<tr>
<th></th>
<th>Primary Patency</th>
<th>Primary assisted patency</th>
<th>Secondary patency</th>
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<tr>
<td>Above the ligament (N.=23)</td>
<td>72%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Across the ligament (N.=71)</td>
<td>52%</td>
<td>80%</td>
<td>82%</td>
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CONCLUSION Patients with post-thrombotic syndrome frequently have lesions that involve the common femoral vein and often require stenting across the inguinal ligament. Maintaining stent patency when the stents cross the ligament can be challenging and close surveillance is required as re-intervention may be required. However, nitinol venous stent patency is good at one year in both groups and significant clinical improvement can be achieved.
3.6 LONG-TERM RESULTS OF THE MONOCUSP VALVE FORMATION IN THE COMMON FEMORAL VEIN IN PATIENTS PRESENTING WITH AVALVULAR DEEP VEINS OF THE LOWER EXTREMITIES

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AIM  Aim of the study was to evaluate the long-term results of the monocusp valve formation in the common femoral vein (CFV) in patients presenting with a valvular deep veins (ADV) of the lower extremities.

MATERIALS AND METHODS  A total of 36 patients (4 women and 12 men) at the age varying from 37 to 58 years old were given surgical treatment during the period from 2008 to 2014. 6 patients presented with congenital ADV while in the remaining 30 ADV was a consequence of the post-thrombotic lesion in the valves with the complete recanalization and manifested deep venous axial reflux. In terms of CEAP clinical classification, the patients were categorized into the following groups: C4b (N.=11), C5 (N.=18), C6 (N.=7). All the patients underwent duplex ultrasound (DUS) examination. 12 patients were additionally examined by venography. Kistner grade IV reflux was diagnosed in all the patients. 28 patients had undergone surgical interventions on superficial and perforating veins before. The severe (C4b-C6) forms of chronic venous disease with manifested axial reflux in deep veins were regarded as an indication for surgery in the patients refractory to traditional treatment. The method described by J. Opie et al. was employed to construct the monocusp venous valve in the CFV.

RESULTS  The long-term results of the treatment were evaluated in 6 patients followed up during the period from 18 to 48 (mean - 29.5±8.2) months. Cumulative clinical success rate at four years was 76.5%. Freedom from ulcer recurrence at four years was 83.4% (C6 patients). Cumulative competence rate of the neovalve was accomplished in 70.6%. The evaluation in two years based on the VCSS revealed the reduction in the severity of the manifestations of chronic venous insufficiency (P<0.01). The quality of life was improved, its index decreased from 60.6±18.7 to 40.7±1.8 (P<0.05). The circumference of the narrowest segment of the tibia decreased from 271.1±4.7 to 256.8±5.7 мм (P<0.05).

CONCLUSION  Formation of the monocusp valve in CFV makes it possible to eliminate pathological blood reflux from the inferior vena cava to deep veins of the lower extremities that is known to be one of the main factors in the appearance and progression of chronic venous insufficiency (CVI). The high effectiveness of this operation is confirmed by the well apparent clinical improvement in the state of the affected lower extremity and the quality of life of the patients.

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1. Ignatyev I. Department of Vascular Surgery, Interregional Clinical and Diagnostic Center, Course of Cardiovascular Surgery, Russian State Medical University, Kazan, Russian Federation.
4.1 RANDOMISED CONTROLLED TRIAL OF COMPRESSION THERAPY FOLLOWING ENDOThermal ABLATION (COMETA TRIAL)
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AIM Since the turn of the century, endovenous ablation has rapidly progressed to become the main treatment method for varicose veins. It has been demonstrated to be highly effective clinically and to improve the quality of life of patients. There is, however, uncertainty regarding the management post-intervention, especially in terms of post-operative compression. Hence, a randomised study was undertaken to investigate the effects of wearing compression stockings following varicose vein treatment.

MATERIALS AND METHODS Patients with saphenous vein reflux and undergoing treatment with endothermal ablation were randomised to receive either 7 days of compression stockings or no stockings. The primary outcome measure was the pain score over the first 10 postoperative days. The pain scores, clinical score and time to return to normal activities at 2 weeks and 6 months were assessed, but only the interim results at 2 weeks are presented below.

RESULTS In total, 134 patients have been randomised, 48.5% of them to the compression group. The mean age was 50 (±16) years and approximately 49% of the population was male. Sixty-five percent of the population attended the 2-week follow-up. In the compression group, 67% of patients were in clinical CEAP class C2-C3 and 32% were in CEAP class C4-6. The baseline clinical CEAP classification for the no compression group was C2-3 56% and C4-6 44%.

The mean daily pain score in the compression group using a visual analogue scale (VAS) was significantly lower at 20.6 (±18) mm, compared to 32.3 (±26) mm in the no compression group (P=0.019). Significantly better pain scores were also noted in the compression group on days 1 to 5 compared to the no compression group. However, using a numerical scale, the mean score over the 10 days was similar in both groups (mean numerical pain score 3.1 in the compression group versus 3.8 in the no compression group; P=0.300).

The clinical scores in both the compression and no compression groups show improvement with the mean improvement in VCSS at -1.61±.4 in the compression group compared to -1.98±.2 in the no compression group (P=0.484).

The time to return to normal activities was a median of 2 days in both groups, while the median time to return to work was 3 days in the compression group compared to 5 days in the no compression group (P=0.263).

CONCLUSION These interim results indicate that wearing compression stockings following endothermal ablation is advantageous in the first few days following treatment. However, this is not translated in notable clinical differences at two weeks or in the time to resume usual activities.

Submitted for the EVF Prize.
4.2 EFFECTS OF GRADUATED ELASTIC COMPRESSION STOCKINGS IN PATIENTS WITH PRIMARY VARICOSE VEINS: RESULTS OF A RANDOMIZED DOUBLE-BLIND PLACEBO-CONTROLLED TRIAL

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AIM There is currently a lack of high quality evidence that graduated elastic compression stockings (GECs) improve symptoms in patients with varicose veins. The aim of our trial was to investigate the effectiveness of below the knee GECs in improving symptoms in patients with varicose veins.

MATERIALS AND METHODS Randomized double-blind placebo-controlled trial. Patients and outcome assessors were blinded to treatment allocation. Thirty patients who were naïve to elastic stockings, presenting with primary varicose veins causing calf pain or ache were randomized to off the shelf knee-length Class 1 (18-21 mmHg at the ankle level) GECs (Varisan®, Cizeta Medicali, Cuggiono, MI, Italy), (N.=15) or placebo stockings (0 mmHg, N.=15). Two patients, one in each group, withdrew consent, which left 14 patients in each group at the completion of the study after one week. Pain or ache of the index leg was the primary outcome measure. In patients with bilateral varicose veins the leg with the most severe pain/ache was considered. Secondary outcomes included pain or ache in the contralateral leg, the leg symptoms of heaviness, swelling sensation, throbbing of the varicose veins, burning sensation, paresthesia, night cramps and restless legs, and insomnia as a secondary symptom caused by the leg symptoms, rVCSS excluding the compression component(-S) and ankle circumference, all assessed bilaterally. Symptoms were scored with a visual analogue scale (VAS).

RESULTS The two study groups were well balanced at baseline. GECs were more effective than placebo stockings in reducing pain or ache (VAS score 1.7±3.0 vs. 4.5±2.8 for placebo, P=0.02), feeling of swelling (VAS score 0.9±1.9 vs. 3.3±3.5 for placebo, P=0.03), paresthesia (VAS score 0.2±0.6 vs. 2.1±3.1 for placebo, P=0.04), the number of symptoms other than pain or ache (1.3±1.1 vs. 2.8±1.7 for placebo, P=0.01) and their sum VAS score (4.1±1.1 vs. 14.2±12.0 for placebo, P=0.02) in the index leg. Non-significant trends towards increased efficacy of GECs compared to controls for most of the remaining symptoms of the index and contralateral legs were observed. Number needed to treat (95% CI) for a 50% or complete improvement of pain or ache in the index leg was 2 (95% CI 1.2-5.5) and 2 (95% CI 1.2-5.3), respectively. rVCSS(-S) and ankle circumference were not significantly different between the two groups at one week follow-up. Mean daily use of the placebo stockings and GECs was 8.0 hours and 10.2 hours, respectively (P=0.13).

CONCLUSION Among patients with varicose veins, GECs are highly effective in ameliorating leg symptoms, particularly pain or ache, sensation of swelling and paresthesia compared to placebo stockings, based on trial evidence.

Submitted for the EVF Prize.
4.3 NONINVASIVE EVALUATION OF CALF MUSCLE OXYGENATION IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY USING NEAR-INFRARED SPECTROSCOPY-CORRELATION WITH CLINICAL SEVERITY

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Aim
Despite the established role of the calf muscle pump for preventing chronic venous disorders, hemoglobin flow in the calf muscle is poorly understood. Near-infrared spectroscopy (NIRS) provides continuous noninvasive monitoring of changes in tissue-oxygenated hemoglobin (O2Hb) and deoxygenated hemoglobin (HHb) levels. The purpose of this study was to investigate the changes in calf muscle O2Hb and HHb levels during standing and exercise in patients with primary valvular insufficiency (PVI).

Materials and Methods
One hundred and twenty-five limbs in 112 patients with PVI were enrolled. The clinical manifestations of these patients were categorized according to the CEAP (clinical, etiologic, anatomical, and pathophysiologic) classification, and patients were divided into normal limbs, early chronic venous insufficiency (CVI) (C1-3S,Ep,As,d,p,Pr) and advanced (C4-6S,Ep,As,d,p,Pr) CVI. NIRS was used to measure changes in the calf muscle O2Hb and HHb levels. On standing, increases in O2Hb and HHb were calculated by subtracting the baseline value from the maximum value (ΔO2Hbst and ΔHHbst). The time elapsed until the maximum increases in O2Hb and HHb concentrations (TO Hbst and THHbst) were also measured. During 10 tiptoe movements, the relative change in O2Hb was calculated by subtracting the value measured at the end of exercise from the value measured at the beginning of exercise (ΔO2Hbex). On the other hand, 10 tiptoe movements produced venous expulsion (ΔHHbEex) and a subsequent retention (ΔHHbRex). The oxygenation index (HbD; HbD=O2Hb - HHb) was also calculated at the end of standing and 10 tiptoe movements (ΔHbDSt and ΔHbDex).

Results
Among the 125 limbs evaluated, 13 were classified as normal limbs, 68 as early and 44 as advanced CVI. During standing, TO2Hbst decreased as the clinical severity progressed (130.6±73.5, 60.9±36.8, 38.9±33.7 s, respectively, P<0.001). Similarly, THHbst significantly decreased in patients with early and advanced CVI in comparison with these with normal limbs. During 10 tiptoe movements, there were no significant differences in ΔHHbEex or ΔHHbRex between the groups. However, falls in ΔHbDex were more pronounced in patients with advanced CVI than these with early CVI (3.8±15.6, -9.4±25.5 μmol/L, P=0.003).

Conclusion
Changes in O2Hb and HHb concentrations differ according to CEAP clinical manifestation. These data offer new insights into calf muscle hemodynamics at the microcirculation level in patients with PVI.

Submitted for the EVF Prize.

References
4.4 UTILISATION OF THE HEALTH IMPROVEMENT NETWORK (THIN) UK DATABASE TO ASSESS THE IMPACT OF 2013 UK NICE CLINICAL GUIDELINE CG168 ON THE GENERAL PRACTITIONER MANAGEMENT OF VARICOSE VEINS

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AIM UK National Institute for Health and Care Excellence (NICE) Clinical Guideline (CG) 168, published in July 2013, recommends that all people with symptomatic varicose veins (VV) be referred to a vascular specialist for consideration of interventional treatment by their general practitioner (GP). Previously guidance limited referral to only those with skin damage and ulcers, with most people being managed conservatively in primary care by GPs, usually with compression. Within the NHS, GPs control access to specialist elective care. Therefore, their awareness of, and compliance with CG168, is critical to successful guideline implementation. The Health Improvement Network (THIN) UK database contains data on around 3.5 million people registered with around 450 GP practices. Data is prospectively gathered onto an electronic database at the time of patient consultation or changes to their management.

To use THIN to assess the impact of CG168 on GP management of people with VV.

MATERIALS AND METHODS Interrogation of THIN for incident cases of VV (in people >18 years) during the 18 months before and after publication of CG 168. The two cohorts were compared in terms of demographics, referrals, compression hosiery prescriptions and interventions.

RESULTS The approximately 2 million eligible patients in each cohort were demographically very well matched (40.2% vs. 39.5% male, mean age 62.7 vs. 61.8 years and similar spread of social deprivation and urban/rural residence). Before CG 168, 13 014 people were diagnosed with VV compared with 12 466 afterwards. However, there was a significant increase in the number of specialist referrals (3173 to 3457, Cox model hazard ratio, HR, 1.15, P<0.0001) and VV interventions (469 to 526, HR 1.16, P=0.023). By contrast, there was a significant reduction in number of prescriptions for compression hosiery (2558 to 2292, HR 0.93, P=0.008). There was an increased risk of referral for those aged between 30-60 years, this age group were also at increased risk of intervention. Body mass index (BMI) also appeared to effect risk of intervention, with those with a BMI>30 being less likely to undergo intervention than those whose BMI was <30.

CONCLUSION Publication of NICE CG168 has been associated with a statistically significant increase in VV referrals and interventions and it would appear a reduction in the proportion of patients being managed conservatively in primary care with compression only. Although somewhat less than the 25% increase in VV and leg ulcer referrals predicted by NICE, the THIN data are very encouraging, however, on-going professional and patient education is likely to be required to sustain this improvement in evidence-based management of VV across the UK.

Submitted for the EVF Prize.
AIM  Venous malformations (VMs) are common congenital benign lesions characterized by slow progression. The purpose of this study was to evaluate the surgical outcomes in VM patients to provide standards for comparison with endovenous therapy.

MATERIALS AND METHODS  A retrospective analysis and evaluation results of treatment of 87 patients with VM, which was made between 2010 and 2015, were reviewed. The clinical data of consecutive patient with VM who underwent open venous surgical treatment. Demographics, clinical presentation, operative data, and clinical outcomes were recorded. Follow-up information was obtained from the medical records and mailed as questionnaires.

RESULTS  54 females and 33 males (mean age 25.3 ± of 12.2 years, range 18-64) were included in this study. In 8 cases the disease was complicated by bleedings from angiomatous tissues. Standard diagnostic complex was made to clarify the area and angioarchitecture of malformation.

All patients had varicose and dysplastic veins. Among them 57 (65.5 %) had limb hypertrophy, and 55 (63.2%) had capillary malformations. The most frequent subjective symptom was pain (94.2%). Stripping of the GSV, small saphenous vein, accessory saphenous and lateral embryonic veins was performed in 10 (11.5%), 9 (10.3 %), 7 (8.0%), and 25 (28.7%) limbs, respectively. In 11 cases we perform thermoablation (radiofrequency and laser) procedures. The mean follow-up was in 35.6 months (range, 0-64 months). All patients reported initial improvement, but some varicosities recurred in 5 patients (8.7%), an ulcer did not heal during 1 year, and a new ulcer developed during 1-2 years after surgery. 13 patients underwent reoperation for recurrent varicosities. At the following visit (1 month) the venous clinical severity score had decreased from 8.3+2.2 to 5.5+2.5 (P<0.001). Inclusion in conservative treatment MPFF helped to achieve a reduction VCSS of up to 5.1+1.4 (P<0.01). Freedom from disabling pain at 1 and 2 years was 89% and 67% respectively.

CONCLUSION  Multidisciplinary approach, including the principles of plastic and reconstructive surgery, should be used in treatment of VM to achieve best cosmetic results that is extremely important for social adaptation of patients. Type and sequence of surgical methods depend on the form and localization of malformation. Although the recurrence rate is still high, clinical improvement is significant, and reoperations can be performed if needed.
4.6 ANOMALIES OF THE INFERIOR VENA CAVA: NOT ALWAYS CONGENITAL?

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**AIM**  To increase our knowledge about underlying conditions and risk factors in patients with an anomaly of the inferior vena cava (AIVC) developing a unilateral or bilateral deep venous thrombosis (DVT).

**MATERIALS AND METHODS**  Two groups of patients were retrospectively studied. The first group consisted of a cohort of 30 patients, who presented at the phlebology clinic of a third line referral centre, Erasmus MC, Rotterdam, Netherlands, between January 2012 and July 2016, with a history of DVT based on an underlying AIVC (“EMC group”). The second group included 249 patient cases with an AIVC and DVT, reported in the literature the last 40 years until July 2016, based on an extensive literature search in Embase, Medline Ovid, Cochrane, Google Scholar and Web of Science (“LIT group”). Patient demographics, location and extent of DVT, location of AIVC, underlying risk factors, duration of follow-up since diagnosis of AIVC and DVT, and clinical presentation were analyzed in both groups.

**RESULTS**  The mean age at the time of the first episode of DVT was 26 years in both groups. Male gender was less prevalent in the EMC group than in the LIT group (50% vs. 76%; P=.002). Bilateral DVT was very common, in 60% of the EMC group and in 51% of the LIT group, with a predominance of iliofemoral DVT in respectively 58% and 61% and iliofemoropopliteal DVT in 27% and 28%. The IVC was affected infrarenally only in 59% of the EMC group and in 39% of the LIT group (P=0.046). Thrombophilia was a quite common risk factor, in respectively 47% and 35% of patients. In the EMC group more patients had a history of central venous catheter (CVC) placement in the neonatal period or severe disease during the first year of life (20%) whereas this was very rarely reported in the LIT group (1%) (P<0.001). Mean follow-up was much longer in the EMC group, 12.9 years vs. 3.3 years in the LIT group. In the EMC group, one third of patients had unilateral or bilateral C5 or C6 at clinical presentation. In the LIT group the “C” class was very rarely mentioned.

**CONCLUSION**  In young patients, with an AIVC presenting with advanced chronic venous disease and/or a history of uni- or bilateral iliofemoral DVT, underlying conditions such as thrombophilia, CVC placement or severe disease during the first year of life may be found. This may suggest AIVC is not always a congenital abnormality but may also be acquired after a DVT of the IVC at very young age.

Submitted for the EVF Prize.
5.1 OUTCOME OF SMALL DIAMETER RECANALIZATION OF THE GREAT SAPHENOUS VEIN AFTER ULTRASOUND GUIDED SCLEROTHERAPY. 1- AND 2-YEAR FOLLOW-UPS

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Duplex ultrasound examination performed on patients treated some years ago for great saphenous vein (GSV) incompetence by ultrasound guided foam sclerotherapy (UGFS) may identify a small diameter recanalization of above-knee GSV trunk.

What is the significance of such recanalizations and their outcome?
Should the small diameter recanalizations be considered, in all cases, as a failure in treatment?
Do we have to re-treat the GSV trunk as soon as a recanalization is identified?

AIM To assess the anatomical outcome of small diameter (≤3 mm) above-knee GSV recanalization.

MATERIALS AND METHODS Patients treated by UGFS for GSV incompetence (from 1 to 10 years) and presenting a recanalization of the GSV trunk whose diameter was 3 mm at the most were enrolled in a prospective study. Primary outcome was the diameter of the recanalized GSV trunk measured at 15 cm below the SFJ. Secondary outcome was the identification of factors that might influence GSV recanalization. Patients were scheduled for a yearly follow-up assessment for the following 5 years.

RESULTS Inclusion
110 (73% female, 27% male) patients. Average age: 57.3 years (median, 59; range, 35-80)
CEAP C1: 71% C2: 8% C3: 9% C4: 12% 87%: Asymptomatic
Average VCSS: 1.6±1.3 (median, 2; range, 0-6).
Average diameter: 1.9±0.5 mm (med, 1.8; range, 1.0-2.9)
The GSV had been treated 4.1±2.6 years (median, 3; range, 1-10) ago.

One-year follow-up. Variation of the diameter from the inclusion:
Average diameter: 1.9±0.6 mm (med, 1.8; range, 1.0-3.6) P=0.04
Reduction or identical: 63% of patients
Increase 0.1 mm to 0.5 mm: 24%
Increase >0.5 mm: 13%

Two-year follow-up. Variation of the diameter from the inclusion:
Average diameter 2.1±0.8 mm (med, 1.9; range, 1.1-4.0) P<0.01
Reduction or identical: 52% of patients
Increase 0.1 mm to 0.5 mm: 30%
Increase >0.5 mm: 18%
No risk factors for progression (BMI, initial diameter of the GSV, terminal or pre-terminal reflux, time of the initial treatment) was identified in multivariate analyses. No clinical changes (CEAP clinical class, A/S, VCSS) was reported at 1 and 2-year follow-ups.

**CONCLUSION**  It is not uncommon to observe a small diameter recanalization of the GSV trunk in patients treated by UGFS several years in the past. Most of them are C1 and asymptomatic patients. At one and two-year follow-ups, no increase of the recanalization diameter was observed in more than 50% of patients. These findings indicate that a small recanalization after UGFS should not always be considered as a failure in treatment and question the necessity to re-treat the GSV trunk as soon as possible.
5.2 ADJUVANT PHLEBOTROPIC THERAPY AND ITS EFFECT ON THE INFLAMMATORY RESPONSE AFTER SCLEROTHERAPY

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AIM The study assessed the effects of micronized purified flavonoid fraction (MPFF) on the systemic and local inflammatory response after sclerotherapy.

MATERIALS AND METHODS A total of 60 women aged 18 to 35 (mean age, 27.4±4.5 years) with CEAP class C1Ep, who had telangiectasias or reticular veins on the outer thigh without valvular incompetence in the superficial veins or their tributaries, were allocated into two groups. Patients in the study group received MPFF 1000 mg daily for 2 weeks before and 2 months after sclerotherapy. Before sclerotherapy, blood samples were taken from the feeding vein to evaluate the levels of proinflammatory markers (hs-CRP, histamine, IL-1, TNF-α, and VEGF). Sclerotherapy was performed using standard doses of STS 0.2% or POL 0.5%. Blood samples were taken from the forearm vein in 15 patients of the control group to assess the systemic inflammatory response before sclerotherapy and 10 days, after, control blood samples were obtained from the feeding vein.

RESULTS The baseline levels of inflammatory markers in the blood before sclerotherapy did not differ significantly between the groups. A statistically significant increase in the levels of all markers of endothelial dysfunction was observed 10 days postprocedure; however, no significant difference was found when comparing the inflammatory markers in the blood taken from the forearm vein before or after sclerotherapy. As such, the injection of sclerosants at low concentrations only causes a local inflammatory response. A significant local increase in the levels of vein-specific inflammation was observed 10 days postprocedure, with a greater increase in the control group: hs-CRP, 6.0±0.9 mg/L vs. 8.3±1.0 mg/L (P<0.001); histamine, 87.0±9.8 μ/L vs. 156.9±33.9 μ/L (P<0.0003); IL-1, 5.9±0.4 pg/mL vs. 7.6±0.6 pg/mL (P<0.0003); and TNF-α, 5.9±0.9 pg/mL vs 7.5±0.4 pg/mL. While the TNF-α levels increased significantly (P<0.001 vs. baseline) in the control group, no significant differences were observed between baseline and induced TNF-α levels (P=0.49) in the study group. The VEGF levels in the study and control groups were increased to 252.3±26.0 pg/mL and 325.1±47.7 pg/mL, accordingly; however, the increase in VEGF levels in the study group was not significant (P=0.5).

CONCLUSION Sclerotherapy for telangiectasias and reticular veins with the use of low-concentration detergent drugs is associated with both a local vein-specific inflammatory response and an expression of typical proinflammatory cytokines and growth factors, which can cause adverse side effects and affect the cosmetic outcome and quality of life of the patients. Administration of MPFF for 2 weeks before and 2 months after sclerotherapy can reduce the vein-specific inflammatory response and improve the outcomes.
5.3 PERCUTANEOUS ULTRASOUND-GUIDED SCLEROTHERAPY WITH POLIDOCANOL MICROFOAM FOR SYMPTOMATIC LYMPHATIC MALFORMATIONS

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AIM Lymphatic malformations are low-flow congenital lesions that consist of cysts of varying size. Sclerotherapy with intraliesional bleomycin and OK-432 has been reported to yield dramatically beneficial results for this disorder. However, inflammation-related symptoms are often seen after treatment with these sclerosing agents. On the other hand, polidocanol (POL) is reportedly associated with fewer allergic and inflammatory reactions. Up to now, however, very few reports have documented the use of POL microfoam for treatment of LMs. The present study was performed to assess the efficacy and safety of POL microfoam sclerotherapy for symptomatic LMs.

MATERIALS AND METHODS Between 2003 and 2016, cases were identified from a prospectively compiled database on low-flow CVMs before undertaking a retrospective electronic chart review. Patients were included if they had macrocystic or mixed LMs that had been treated by POL microfoam sclerotherapy. The location, size and type of LMs were assessed using ultrasound and magnetic resonance imaging (MRI). Twenty-gauge venous catheters were inserted into the lymphatic space under ultrasound visualization, and the LMs were fully aspirated. Microfoam comprising 3% polidocanol was then injected under ultrasound guidance. The outcome was assessed by clinical examination combined with findings of post-sclerotherapy imaging using ultrasound and MRI.

RESULTS During a 13-year period, 8 patients met the inclusion criteria. These comprised 11 (39%) males and 17 (41%) females with a mean age of 19 years. The LMs were localized to the head and neck (50%), the trunk (32%) and the extremities (18%). The lesions were subdivided into macrocystic (64%) and mixed macrocystic and microcystic LMs (36%). The average lesion size was 6.5x4.5x3.0 cm. The mean number of treatment sessions was 2.5 (range: 1-15) with a mean foam volume of 4.7 (range: 1-10) ml. Excellent (54%) and moderate (39%) responses were seen in 93% of the patients. Notably, half of the patients achieved complete or significant resolution with a single treatment session. Intralesional hemorrhage occurred in four patients (14%), but resolved spontaneously. Only one patient with mixed macrocystic and microcystic lymphatic malformations developed post-therapy infection. However, the other patients did not develop any post-therapy inflammation-related symptoms including fever, pain, and marked swelling.

CONCLUSION Percutaneous sclerotherapy using POL microfoam appears to be safe and effective for treatment of lymphatic malformations. Ultrasound-guided POL microfoam sclerotherapy should be considered for such lesions, particularly those that are exclusively macrocystic.
5.4 COMPARATIVE STUDY OF DUPLEX-DERIVED PARAMETERS IN PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY - CORRELATION WITH CLINICAL MANIFESTATION WITH SPECIAL REFERENCE TO EARLY SYMPTOMS

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AIM Quantification of venous reflux is still a matter of debate especially in patients with early chronic venous insufficiency (CVI). This study was undertaken to compare the duplex-derived parameters of reflux between patients with early and advanced CVI, and to identify parameters reflecting the severity in patients with PVI.

MATERIALS AND METHODS Two thousand and three hundred forty three limbs with PVI were categorized according to the CEAP classification, and the patients were divided into three groups: telangiectasis and reticular vein (mild CVI: C1), varicose veins without skin change (moderate CVI: C2 and C3), and varicose veins with skin changes (severe CVI: C4, C5 and C6). The duplex-derived parameters assessed were the vein diameter (cm), reflux times (RT; s), peak reflux velocity (PRV; cm/s), and flow at peak reflux (FPR; ml/s) were determined at the sapheno-femoral junction (SFJ) in the great saphenous vein (GSV), in the perforator veins, and in the deep veins.

RESULTS There were 47 limbs with mild, 1487 with moderate, and 609 with severe CVI. There were significant differences in the gender distributions between mild and severe CVI, moderate and severe CVI (P<0.001 and P<0.001, respectively). Vein diameter and PRV at the SFJ significantly increased as the clinical class progressed (P<0.001). Similarly, vein diameter, PRV and FPR in the GSV increased significantly as the clinical class progressed (P<0.001).

CONCLUSION Superficial vein insufficiency may play a major role in the development of advanced CVI, and increased vein diameter, PRV and FPR are considered to be important indicators of disease progression. The proportion of perforating and/or deep vein insufficiency increases as the clinical severity increases. PRV and FPR are significantly lower in patients with C1 than those without. RT is a poor discriminator of disease severity.
5.5 PREVALENCE OF VENOUS SYMPTOMS IN RUSSIAN GENERAL POPULATION

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AIM  Patients complaints related to a chronic venous disease (CVD), i.e. venous symptoms, are considered to be frequent among both general population and CVD sufferers.1-4 The prevalence of venous symptoms in Russian population has not been studied yet. The aim of our study was to establish the prevalence of venous symptoms in general ethnically homogeneous population.

MATERIALS AND METHODS  In 2015 we conducted cross-sectional epidemiological study on the CVD prevalence in Kryukovo rural community in Central Russia. Of 894 inhabitants of 10 years and older we examined 783 (88%) subjects with the mean age 49.3. Except 10 subjects all others were of Slavic ethnicity (Russians, Ukrainians). There were 298 men (38.0%) and 485 women (61.9%). Included persons were examined both clinically and by duplex ultrasound. We asked the patients about the presence of venous pain, heaviness, fatigue, night cramps, paresthesia. After having had a patient’s statement that he/she has had leg complaints members of the study team performed a detailed investigation by thorough looking for other pathology that can cause similar symptoms and asking patient of the conditions in which symptoms appeared and resolved.

RESULTS  CVD was found in 484 (61.8%) subjects. The prevalence of venous pain was 9.2% among all the residents and 14.7% in CVD patients. Heaviness was found in 22.6% and 36.2%, fatigue in 20.4% and 32.7%, sensation of swelling in 18.3% and 29%, night cramps in 9.1% and 14.5% and paresthesia in 1.9% and 3.1% cases respectively. Overall prevalence of venous symptoms (persons having at least one symptom) was found at 33.1% while 53% of CVD patients had complaints of venous origin.

CONCLUSION  The prevalence of venous symptoms in a studied population was significantly less than in previously published data of different epidemiological studies and surveys. The most notable difference was found in the frequency of venous pain.

REFERENCES
AIM The study investigated the clinical group of patients presenting with subjective leg symptoms without visible signs of chronic venous disease (CVD) (C0s) and with telangiectasias and reticular varicose veins (C0,1s). If reflux was present, the possibility of eliminating it with micronized purified flavonoid fraction (MPFF) was assessed.

MATERIALS AND METHODS Women who were consulting for complaints related to CVD of the lower extremities, but without visible signs (N.=41) and with telangiectasias and reticular varicose veins (N.=147) were enrolled. The great saphenous vein (GSV) was investigated using duplex scanning to verify whether reflux occurred at the end of the day. Patients underwent duplex scanning twice a day: once before 10 am and once after normal physical effort (after 6 pm). The evening examination included the following measurements: (i) reflux duration; (ii) GSV diameter in the groin area (mm); and (iii) the difference in the GSV diameter between the evening and morning (mm). Patients with evening reflux received MPFF for 2 months (1000 mg of MPFF once a day in the morning), and duplex scanning was repeated after the treatment in these patients.

RESULTS Of the 188 women enrolled in the study, 103 had no evening reflux and 85 had no reflux in the morning, but presented with an evening GSV reflux. The evening GSV diameter in the subgroup with reflux was significantly larger (P<0.05) compared with patients without evening reflux (6.33 mm vs. 5.45 mm), which was also true for the difference in GSV diameter between the evening and morning (0.82 mm vs. 0.42 mm). Of the 85 patients with previous baseline evening GSV reflux who were investigated after a 2-month MPFF treatment, 60 no longer had reflux at 6 pm and 25 had a significantly reduced length of reflux. In parallel, the GSV diameter decreased from 6.33 mm to 5.50 mm, and the difference in GSV diameter between the evening and morning decreased from 0.82 mm to 0.37 mm (P=0.000008). There was a significant decrease in the intensity of subjective symptoms and an improvement in the quality of life after treatment (P=0.00001).

CONCLUSION Patients presenting with subjective leg symptoms without visible signs of CVD (C0s) and with reticular varicose veins (C1s) may present with an evening reflux in the GSV. Treatment with MPFF (1000 mg once a day in the morning for 2 months) eliminated the evening GSV reflux in most of the patients, provided symptom relief, and improved the quality of life.
6.1 TIME TAKEN TO THE MAXIMUM INCREASE IN THE OXYGENATED HEMOGLOBIN LEVEL DURING STANDING REFLECT THE EARLIEST CHANGE IN POST-THROMBOTIC SYNDROME

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AIM The purpose of this study was to investigate changes in calf muscle oxygenated (O2Hb) and deoxygenated hemoglobin (HHb) levels using near-infrared spectroscopy during standing and exercise to determine if these changes reflect the hemodynamic changes in patients with post-thrombotic syndrome (PTS).

MATERIALS AND METHODS This study consists of two parts. The first part sets out to determine if NIRS-derived parameters are indicators of established PTS. The second part sets out to determine if NIRS-derived parameters are predictive of PTS at early phase of PTS. NIRS was used to measure changes in the levels O2Hb and HHb in calf muscle.1 On standing, increases in O2Hb and HHb were calculated by subtracting the baseline value from the maximum value (ΔO2Hbst and ΔHHbst). The times taken for the O2Hb and HHb concentrations to become maximal (TO2Hbst and THHbst) were also measured. During ten tiptoe movements, the change in O2Hb was calculated by subtracting the value measured at the end of the exercise from the value measured at the beginning of the exercise (ΔO2Hbex). On the other hand, ten tiptoe movements produced venous expulsion (ΔHHbEex) and a subsequent retention (ΔHHbRex). The oxygenation index (HbD; HbD = O2Hb-HHb) was also calculated at the end of standing, and at the end of 10 tiptoe movements (ΔHbDst and ΔHbDex).

RESULTS The first study included 21 patients with PTS and 22 without PTS. The ΔHbDst was significantly decreased in patients with PTS (12±8, 23±11μmol/L, P=0.001). The TO2Hbst was also significantly reduced in patients with PTS (43±41, 107±58 s, P=0.001). The ΔHHbEex was significantly reduced (-2±1, -3±1μmol/L, P=0.016) and the ΔHHbRex was significantly increased in patients with PTS (8±7, 3±2μmol/L, P=0.001). Furthermore, falls in ΔHbDex were more pronounced in patients with PTS (-10±16, 10±10μmol/L, P<0.001). On the contrary, 116 patients with a first episode of unilateral DVT were enrolled in the second study. NIRS was used to measure changes in the levels of O2Hb and HHb in calf muscle at 6 months after DVT. Among various NIRS-derived parameters, TO2Hbst had the highest under area curve (0.88, 95% confidence interval (CI) 0.80-0.93, P<0.0001) with the best cut-off value (TO2Hbst ≤48 s). Multivariate logistic regression analysis finally revealed NIRS-derived TO2Hbst ≤48 (OR 53.21 CI 9.36-302.44, P<0.001) as independent predictor.

CONCLUSION NIRS-derived O2Hb appeared to reveal the earliest change in PTS rather than the change in HHb during follow-up of DVT.

REFERENCES
6.2 CHANGES IN A MARKER OF ENDOTHELIAL DYSFUNCTION IN POST-THROMBOTIC SYNDROME OF THE LOWER LIMBS

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AIM  To assess changes in nitric oxide (NO) levels in post-thrombotic syndrome (PTS) of the lower limbs.

MATERIALS AND METHODS  120 patients with a history of deep vein thrombosis of the lower limbs were allocated to receive standard conservative therapy (anticoagulants, anti-inflammatory drugs, and elastic compression) without (group 1) or with (group 2) addition of micronized purified flavonoid fraction (MPFF; Detralex). Serum NO levels were measured using a photocolorimetric method. Patients were examined at admission to the hospital and after 1, 3, 6, and 12 months. The severity of venous insufficiency of the lower limbs was assessed using the CEAP classification for chronic venous disorders.

RESULTS  At admission, NO levels were 38.3±7.0 μmol/mL and 38.6±4.9 μmol/mL in groups 1 and 2, respectively. In group 1, NO levels increased by 17.8%, 29.8%, 35.0%, and 43.7%, while in group 2 they increased by 35.3%, 44.3%, 51.3%, and 52.7%, after 1, 3, 6, and 12 months, respectively. The maximum effect of MPFF on endothelial NO production was observed over the first 6 months of treatment. After 1 year, patients in group 1, with lesions in the iliac segment were in classes C0-2 and C3-4 in 31.6% and 57.9% of cases respectively, patients with localization of the proximal end of the thrombus in the common femoral vein were in classes C0-2 and C3-4 in 25% and 75% of cases respectively, patients with lesions of the femoral vein were in classes C0-2 and C3-4 in 55.5% and 45.5% of cases respectively, and patients with lesions of the popliteal-tibial segment were in classes C0-2 and C3-4 in 66.7% and 33.7% of cases, respectively.

CONCLUSION  Serum NO concentration, a marker of endothelial dysfunction, increases with the development of PTS. Addition of MPFF to the medical therapy reduces the rate of severe forms of chronic venous disorders. Serum NO concentration increase during MPFF therapy provides evidence of the endotheliotropic action of the drug. MPFF should be prescribed for 6 months, which will significantly improve endothelial function.
6.3 COMPARISONS BETWEEN THE VENOUS ARTERIAL FLOW INDEX THE RECIRCULATION INDEX AND THE VENOUS FILLING INDEX IN QUANTIFYING SUPERFICIAL VENOUS INSUFFICIENCY

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AIM Isolated reflux measurements are qualitative. Quantitative measurements of superficial venous insufficiency (SVI) include the venous arterial flow index (VAFI), the saphenous recirculation index (RCI), the venous filling index (VFI) and the postural diameter change (PDC) of the saphenous trunk. The aim was to investigate their relationship.

MATERIALS AND METHODS Haemodynamic parameters were compared concurrently in 21 legs from 16 volunteers without deep venous disease. Legs were stratified into no reflux (N.=7) and reflux (N.=14). The VAFI is performed supine and is a ratio of common femoral vein volume flow over common femoral artery volume flow. The RCI is performed standing and it is a ratio of reflux volume over antegrade volume after a calf compression and release manoeuvre. The VFI is an air-plethysmography parameter measuring the rate of calf expansion on dependency in mL/s. The PDC is the percentage reduction of the saphenous trunk diameter from standing to lying. The Ethics commission of the University of Lübeck approved the study (Ref. 16-340).

RESULTS The median [inter-quartile range] age, BMI and VCSS were: 5 [37-69], 5.7 [4.5-30.9] and 4 [1-6], respectively. The clinical part of the CEAP classification was: C0=3, C1=4, C2=5, C3=1, C4a=1, C4b=6, C5=1. The performance of the 4 tests are shown in figure 1, with the correlations between them in table I.

Figure 1. Comparison of the haemodynamic tests quantifying superficial venous insufficiency. Horizontal lines represent established cut-off values.
Table I. Cross-tabulation summary of the haemodynamic correlations (Spearman r) in 21 legs using 4 different methods of measurement.

<table>
<thead>
<tr>
<th></th>
<th>VAFI</th>
<th>RCI</th>
<th>VFI</th>
<th>PDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAFI</td>
<td>r=1, P&lt;0.0005</td>
<td>r=0.523, P=0.015</td>
<td>r=0.489, P=0.025</td>
<td>r=-0.474, P=0.030</td>
</tr>
<tr>
<td>RCI</td>
<td>r=1, P&lt;0.0005</td>
<td>r=0.446, P=0.043</td>
<td>r=-0.57, P=0.014</td>
<td></td>
</tr>
<tr>
<td>VFI</td>
<td>r=1, P&lt;0.0005</td>
<td>r=-0.391, P=0.080</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDC</td>
<td>r=1, P&lt;0.0005</td>
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**CONCLUSION** The haemodynamic disorder of SVI is not limited to an assessment of reflux. Superficial venous insufficiency has many components manifest as VAFI, RCI, VFI and PDC. They all signify the presence of SVI with a significant but moderate correlation. Understanding the interactions between them is required to quantify the extent and define the nature of the haemodynamic impediment of SVI.

**REFERENCES**

The profunda femoris vein (PFV) drains the inner thigh traveling superiorly and medially to join the femoral vein. One prior study of >15,000 duplex ultrasounds with 2,568 positive for DVT found only 8 instances of PFV DVT, many fewer than we were anecdotally observing in our vascular laboratory. We therefore prospectively identified patients with PFV DVT over a one year period in our vascular laboratory to characterize the anatomic distribution of venous thrombus in patients with PFV DVT as well as their demographic characteristics.

**MATERIALS AND METHODS** Prospective study of patients at our tertiary care university hospital with deep vein thrombosis (DVT) determined with venous duplex scanning between June 2014 and June 2015. DVT Patients were categorized as to PFV involvement (yes or no) and the anatomic distribution of venous thrombi were further stratified to determine whether there was external iliac vein (EIV), common femoral vein (CFV), femoral vein (FV), or popliteal vein (PV) involvement. Patient demographics were also compared between groups, PFV DVT + vs. PFV DVT- (controls).

**RESULTS** There were a total of 4,584 lower extremity venous duplex studies for DVT performed, 398 (8.7%) were positive for DVT with 22.1% of the 398 positive studies (88 studies in 60 individual patients, 2% of the overall studies) demonstrating DVT involving the PFV. There were 111 patients with CFV DVT and of those patients 53 (47.7%) also had involvement of the PFV. Of the 60 patients with PFV DVT, 54 (90%) were found to also have involvement of the CFV. There was no difference in laterality of DVT between the PFV DVT and control DVT groups (35% vs. 41.5% respectively for the left and 35% vs. 33.5% respectively for the right P=0.619). 30% of the PFV DVT group had bilateral DVT as compared to 5% of the control DVT group. There was a higher proportion of PFV DVT with EIV DVT (1.7%) as compared to control (.5%) (P<0.00001). There was also a higher proportion of patients in the PFV DVT group with more distal DVT (FV or PV) as compared to control (68.3% vs. 19% respectively P<0.00001). Patients in the PFV DVT group were more likely to have a history of a hypercoagulable disorder compared to the control DVT group (26.7% vs. 14.5% P=0.029). There was also a higher proportion of patients in the PFV DVT group with a history of immobility compared to the control DVT group (58.3% vs. 42% P=0.026). There were no differences with regard to smoking, recent surgery, personal or family history of DVT, or other medical comorbidities.

**CONCLUSION** PFV DVT is more common in patients with DVT than previously reported and patients with PFV thrombosis tend to have more thrombus burden with more frequent concurrent DVT in iliac veins as well as distal deep veins. Patients with PFV DVT are also more likely to have a history of hypercoagulable disorder and immobility. US protocols for assessment of DVT should include routine examination of the PFV as a potential marker of a more virulent prothrombotic state.
PR2 ULTRASOUND PROOF OF PRE-REFLUX STAGES OF VENOUS INSUFFICIENCY
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Angioclinic Vein Centres Europe

AIM There are several attempts to explain the origin of venous insufficiency, like hereditary or acquired modifications of receptors and transmitters, by wall extension or shear stress. Using novel high resolution ultrasound systems (12-40 MHz), valvular structures and low-flow microaggregates may be depicted. This study examines associations between the appearance of microaggregates, changes of valve cusps, valve function and variations of vein flow (B-flow) in patients with different patterns of vein stress.

MATERIALS AND METHODS 33 patients (21 f, 11 m; 32-58 J.), including professions with >6 hours of sitting (N.=22) or standing (N.=12) with inconspicuous findings of their GSV during routine ultrasonography (5-10 MHz) underwent ultrasound examination with high-resolution systems (8-16 MHz, peak up to 40 MHz). A total of 120 well depictable GSV vein valves were selected for this study. Criteria were shape, thickness, mobility and closure mechanism of vein valves, but in particular the appearance of microaggregates and the ability of the patients to resolve these aggregates by movements, simulating their daily life. Furthermore, the effects of newly worn medical compression stockings (MCS, class II) and additional daily walking distances (+3 miles) was investigated.

RESULTS The higher the resolution of the chosen ultrasound mode, the more intense is the appearance of low-flow pseudoaggregates (PA), which is the basis for “B-flow” mode. The definition is that PA are always resolvable by flow increase (Figure 1). True microaggregates (MA), characterized by failing dissolution or mobilization, were found within the sinus of 47/120 “healthy” vein valves (39.1%). Pathological findings were more frequent in valves of subjects with sitting or standing professions (87/96; 90.6%). Focal thickenings of valve cusps could only be detected in slim patients (depth of GSV <2.5 cm, N.=11), all of them were associated with local MA. Measurements after 4 weeks with MCS or increased daily walking distances did not detect relevant changes.

CONCLUSION The observations seem to support a thesis of inflammation-induced changes of vein valves, while inflammation is generated by local accumulation of blood particles. Long periods with decreased or stagnant flow, like typically in individuals with lack of movement or exercise, seem to promote the formation of such aggregates. However, to eliminate MA or the underlying impaired venous flow, 4 weeks of MCS or walking exercise seem to be too short. The study is continued, updates will be presented.
The higher the resolution of the chosen broad-band ultrasound mode, the more intense is the appearance of low-flow pseudoaggregates (PA), which is the basis for "B-flow" mode. The definition is that PA are always resolvable by flow increase. True microaggregates (MA) are characterized by failing dissolution or mobilization, their presence is associated with valve thickening, roughness and reduced valve mobility.
**PR3 INDICATIONS FOR MEDICAL COMPRESSION STOCKINGS IN VENOUS AND LYMPHATIC DISORDERS. AN EVIDENCE-BASED CONSENSUS STATEMENT**

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**AIM**

Compression therapy for the management of chronic venous disease (CVD) and lymphoedema provides non-invasive treatment options and has been widely documented. The International Compression Club published a consensus statement in 2008 on the use of compression therapy in the management of venous and lymphatic diseases. The aim of this article is two-fold: to provide an update of the 2008 consensus statement, in order to potentially answer open clinical questions and to highlight where the level of evidence has changed, in regard to the use of medical compression stockings (MCS).

**MATERIALS AND METHODS**

Evidence published between 1 January 2007 and 8 July 2015 was reviewed and critically appraised, using predefined search terms and limiters. The results of this search strategy were further refined, reviews and duplicates were excluded and the evidence was graded according to the grading recommendations of Guyatt et al. The evidence was then assessed and discussed by a board of international experts experienced in compression therapy and recommendations have been formulated.

**RESULTS**

The analysis of new published evidence allowed to answer many of the clinical questions that were outstanding after the 2008 consensus statement.

**CONCLUSION**

New recommendations, suggestions and comments that complete the 2008 consensus statement, have been formulated to provide guidance for the use of MCS in the areas of venous and lymphatic disorders.
To evaluate the long-term results of double ligation combined with trunk foam sclerotherapy for the treatment of primary varicose veins associated with great saphenous vein (GSV) reflux.

**Materials and Methods**

Double ligation combined with trunk sclerotherapy was indicated for legs with GSV <8 mm diameter above the knee (AK).

We compared the AK GSV occlusion rates and varicose vein recurrence rates (higher than CEAP [clinical, etiologic, anatomic, and pathophysiologic] Classification clinical class 2) after surgery among the following four treatment groups:

- **Group Lq**: ligation and partial resection of the GSV at the sapheno-femoral junction (SFJ) and AK, combined with trunk liquid sclerotherapy of the GSV (408 legs, 1999-2003).
- **Group F1%**: ligation and partial resection of the GSV at the SFJ and AK combined with trunk foam sclerotherapy (1% polidocanol) of the GSV (200 legs, 2003-2004).
- **Group F3%**: ligation and partial resection of the GSV at the SFJ and AK, combined with trunk foam sclerotherapy (3% polidocanol) of the GSV (358 legs, 2004-2006).
- **Group ST**: ligation at the SFJ and stripping of the GSV (226 legs, 1999-2006).

The retrospective data were analyzed statistically. Univariate life table analysis was conducted to determine the success rates. Multivariate Cox regression analysis was used to detect covariates affecting the outcome.

**Results**

Ten years after treatment, the AK GSV occlusion rate in Group F1% (50.3%) was higher than that in Group Lq (17.4%, P<0.0001), and the rate of Group F3% (74.5%) was higher than that of Group F1% (50.3%, P=0.0104).

The recurrence rate in Group F1% (32.8%) was lower than that in Group Lq (78.9%, P=0.0069) at 10 years posttreatment.

There was no significant difference in the recurrence rate at 10 years among groups F1% (32.8%), F3% (39.0%), and ST (36.1%).

**Conclusion**

High ligation and partial resection of the GSV at the SFJ and AK combined with trunk foam sclerotherapy is a minimally invasive and effective method for treating varicose veins associated with GSV reflux and GSV diameter <8 mm. Ten years posttreatment, this therapy resulted in a better GSV occlusion rate, with a recurrence rate similar to that after GSV stripping.
PR5 COMPARISON BETWEEN DVT AFTER EARTHQUAKE IN JAPAN AND ITALY; RELATIONSHIP WITH GENDER AND ATHEROSCLEROSIS

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AIM In Kumamoto Earthquake 2016, many venous thromboembolisms (VTEs) occurred in women who evacuated into own car. 32 VTEs occurred after the quake. 39 of 52 (75%) VTE were women. One woman died from pulmonary embolism during car shelter. We have attempted to investigate DVT after earthquake in Modena, Italy since 2013. We attempted to compare DVT between Japan and Italy after earthquake.

MATERIALS AND METHODS Subjected were 1125 residents lived in Mid Niigata Prefecture Earthquake 2004 in Japan, 407 residents did in Emilia Earthquake (Modena) in Italy and 1493 residents in control area without earthquake in Japan. Many residents after Mid Niigata Prefecture Earthquake or Emilia Earthquake spent in their own car (car shelter). We corrected residents and examined calf DVT by ultrasound machine with 7-10 MHz liner probe in sitting position.

RESULTS Positive rate of calf DVT in residents 1-2 year after Mid Niigata Prefecture in Japan was 5.4% in men and 9.1% in women. That in those 1-2 year after Emilia Earthquake was 14.0% in men and 8.9% in women. That in control area without earthquake in Japan was 3.1% in men and 4.9% in women. Positive rate of 20s years old, 30s, 40s, 50s, 60s, 70s, 80s in Mid Niigata Prefecture Earthquake were 0%, 3.2%, 6%, 4.5%, 10.7%, 8.8%, 25%, respectively. Those in Modena were 0%, 5.9%, 7.2%, 11.5%, 13%, 8.7%, respectively. Those in control area in Japan were 0%, 0%, 0.7%, 3.6%, 3.1%, 8%, 17.3%, respectively. Diastolic blood pressure in Modena with calf DVT was significantly higher than those in that without it. History of hypertension was higher rate in residents with calf DVT (36%) than those without it (27.8%). 8 years after Mid Niigata Prefecture Earthquake, cerebral infarction or TIA occurred more frequently in the residents with calf DVT (odds ratio 4.02, 95%CI; 2.04-7.93, P<0.0001) and myocardial infarction or angina pectoris did more frequently in those with it (odds ratio 1.98, 95%CI; 1.07-3.67, P<0.05). Pulmonary embolism did more frequently in those with it (odds ratio 73.3, 95%CI;9.81-578.5 P<0.0001).

CONCLUSION 60 years old or under Japanese or Italian occurred many VTE after Earthquake due to car shelter. However, women seem to occur VTE more frequently in Japan. The present study may show that atherosclerosis correlate with VTE. Further study is needed to clarify the reasons.
A1 ELECTRICAL CALF STIMULATION PREVENTS RECURRENT DVT AFTER CESSATION OF STANDARD ANTICOAGULATION IN PATIENTS WITH RESIDUAL VENOUS OBSTRUCTION

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AIM To assess the efficacy of electrical calf muscle stimulation (EMS) in patients with post-thrombotic syndrome (PTS) and residual venous obstruction (RVO) after cessation of their standard anticoagulation therapy.

MATERIALS AND METHODS This was a prospective, comparative, non-randomized clinical trial involving patient evaluation after the first episode of unprovoked femoro-popliteal DVT; a masked outcome assessor performed the evaluations. Patients who had completed a standard 6-month course of anticoagulation therapy and had signs of RVO in the affected veins and a Villalta score of >5 were enrolled in the study. A total of 60 patients in the age range from 40 to 86 years (mean 58.5±11.4) consisting of 38 men and 22 women were enrolled. They were divided into two groups of 30 participants each. In both groups (treatment and control), PTS was treated by active walking (at least 5,000 steps per day as recorded by an individual pedometer), below-knee graduated compression stockings (23-32 mmHg), and micronized purified flavonoid fraction (2-month course twice a year). In the treatment group, EMS with «Veinoplus VI» device (three procedures for 30 min every day) was also used. The main endpoint of the study was symptomatic or asymptomatic recurrent venous thrombosis confirmed by duplex ultrasound (DUS). Additional criteria for treatment efficacy included changes in the degree of current venous stenosis. The patients were followed for 12 months with monthly DUS in order to reveal recurrent DVT and a six month DUS for evaluation of stenosis degree.

RESULTS RVO was represented by an average of 48%-stenosis of the common femoral vein in 12 patients, 53%-stenosis of the superficial femoral vein in 16 cases and 55%-stenosis of the popliteal vein in all participants. Through the 12-month follow-up period the degree of stenosis decreased in all affected veins in both groups (P <0.05). The most significant dynamics were found in the popliteal vein; 60.8% decreased to 55.1% followed by a further decrease to 28.8% in the main group and 50.9% to 30.1% to 27.3% in the control group (P <0.0001) with significant differences between the groups (P=0.004).

Recurrence of venous thrombosis was found in seven of 30 patients in the control group and in zero of 30 patients in the treatment group (23.3% versus 0%, P=0.011). In five cases, the recurrent DVT was silent and revealed by regular DUS.

CONCLUSION There is an ongoing process of deep veins recanalization during the 12-month period after cessation of anticoagulation in patients with RVO and PTS. Using EMS in complex PTS treatment allows reduction of the recurrent DVT rate and an increase in the speed of recanalization.
A2  FIRST EXPERIENCE OF PERFORMING HYBRID OPERATIONS IN CHRONIC VENOUS OBSTRUCTIONS OF ILIOFEMORAL SEGMENTS IN PATIENTS WITH POSTTHROMBOTIC SYNDROME

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²Vishnevsky Institute of Surgery, Russia
³Russian Medical Academy of Postgraduate Education, Russia

AIM  To assess the first results of hybrid operations in chronic venous obstructions of iliofemoral segments in patients with postthrombotic syndrome (PTS).

MATERIALS AND METHODS  Hybrid operations (open endovenectomy from the common femoral vein (CFV) with arteriovenous fistula (AVF) creation and iliac vein stenting) were performed in 12 patients diagnosed with PTS. All of the patients were diagnosed with severe chronic venous insufficiency (CVI). The degree of manifestations of PTS was assessed by means of the Villalta scale before, and seven months after, the surgical intervention. Diagnostic methods of study included ultrasound duplex scanning (UDS), magnetic resonance and/or multispiral computed venography and contrast venography.

RESULTS  Technical success of the procedure was 92%. The outcomes of hybrid operations after seven months were followed up in six patients. Secondary patency rates of the stented iliac veins amounted to 100%. No recurrences of venous ulcers were observed. Median Villalta scores improved from 15 to 7 (P=0.012).

CONCLUSION  The first experience of hybrid operations for obstructive lesions of veins of the iliofemoral segments demonstrated their high efficacy and safety.
A3 VENOUS THROMBUS RESOLUTION WITH RIVAROXABAN COMPARED TO WARFARIN THERAPY

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AIM Rivaroxaban, a direct oral Xa inhibitor is currently used for treatment of acute deep vein thrombosis (DVT). Although anticoagulants have no direct fibrinolytic action, strong inhibition of prothrombotic activity might favor and facilitate thrombus resolution. The aim of this study was to assess extend of thrombus resolution in patients with lower extremity deep vein thrombosis (DVT) rivaroxaban compared to warfarin therapy.

MATERIALS AND METHODS Ultrasonography/Doppler images of lower extremities DVT were analyzed to compare initial diagnostic image of thrombus to subsequent study performed after 3-6 months of anticoagulation. Special pre-determined method of standardized assessment was used by two independent radiologists blinded to anticoagulant used. Patients treated with rivaroxaban were identified from the Mayo Thrombophilia Clinic Anticoagulants Registry (November 2015 - June 2016) and compared to the corresponding number of patients treated with warfarin identified from Mayo Clinic Mayo Clinic, Rochester electronic medical record (November 2015 - June 2015).

RESULTS 63 patients with DVT affecting 66 legs and 181 venous segments treated with rivaroxaban were compared to 48 patients with 53 legs and 195 segments with thrombosis treated with warfarin. Mean duration of anticoagulation therapy with rivaroxaban (91.6 days) was shorter compared to anticoagulation with warfarin treated patients (107.2 days, P=0.002). Percentage of patients with complete or partial resolution of thrombosis was similar in rivaroxaban and warfarin treated groups (95.2% vs. 91.7%, P=0.46, respectively); also proportion of patients with total thrombus resolution was not significantly different (38.1% vs. 29.2%, P=0.42, respectively). There was no significant difference in the proportion of patients without visible thrombus resolution between rivaroxaban and warfarin treated groups either (4.8% vs. 2.1%, P=0.63). Thrombus propagation with warfarin therapy was observed in 6.3% of patients treated with warfarin and in none of the patients from the rivaroxaban group but this difference has not reached statistical significance (6.3% vs. 0% vs. P=0.078).

CONCLUSION Resolution of venous thrombosis in patients treated with rivaroxaban is similar to those treated with warfarin. An important signal (P=0.078) of better rivaroxaban protection from thrombus propagation (anticoagulation failure) compared to warfarin may have been apparent with a larger sample size.
A4 COMPARATIVE ANTICOAGULANT EFFECTS OF UNFRACTIONATED HEPARIN, ANTITHROMBIN AND RECOMBINANT THROMBOMODULIN: VASCULAR AND HEMATOLOGICAL IMPLICATIONS

Evi Kalodiki 1, Zafar Siddiqui 2, Parul Aggarwal 2, Omer Iqbal 2, Debra Hoppensteadt 2, Mary Lewis 2, Schuarazad Abro 2, Kazuhisa Tsuruta 2, Jawed Fareed 2

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AIM Unfractionated heparin (UFH), antithrombin (AT), and recombinant thrombomodulin (RT) are all anticoagulant/antithrombotic agents. Currently, a recombinant and soluble version of human thrombomodulin, ART-123 (Recomodulin©) is undergoing clinical trials for treatment of various vascular and hematologic indications. The purpose of this study is to compare the anticoagulant and platelet modulatory effects of UFH, AT and RT.

MATERIALS AND METHODS Porcine UFH was obtained from Medefil Inc. (Glendale Heights, IL, USA), AT from Baxter Healthcare Corporation (Deerfield, IL, USA), and RT from Asahi Kasei Pharma (Tokyo, Japan). The effects of UFH, AT and RT at 0-5 μg/mL on glass activated clotting time (ACT) and thromboelastography (TEG) were measured. The prothrombin time (PT), activated partial thromboplastin time (aPTT) and thrombin time (TT) were measured in citrated whole blood and retrieved plasma. The effect of these drugs on agonist induced platelet aggregation (arachidonic acid, adenosine diphosphate (ADP), collagen, thrombin and epinephrine) was measured in platelet rich plasma from healthy donors.

RESULTS In contrast to AT and UFH, RT showed no anticoagulant effects in ACT and TEG at 1.25 μg/mL. At higher concentrations of up to 5.0 μg/mL, RT was a much weaker anticoagulant. In the clotting assays, all agents produced anticoagulant effects in the following order: UFH > AT > RT. The UFH mildly increased aggregation with some agonists. The AT and RT did not produce any effects at concentrations of up to 5 U/ml and 10 μg/mL, respectively, for all of the agonists except thrombin.

CONCLUSION This study shows that RT is a much weaker anticoagulant compared to UFH and AT, and at therapeutic concentrations, it does not produce measurable anticoagulant effects. The circulating levels of RT for the management of vascular disorders range from 0.5-1.5 μg/mL. At supratherapeutic concentrations of >2.5 μg/mL, which may occur in patients with renal dysfunction, RT exhibits weak anticoagulant effects which are unlikely to contribute to any hemostatic deficit resulting in potential bleeding complications.
Dabigatran etexilate is used to prevent embolic stroke in patients with atrial fibrillation. Idarucizumab is an anti-dabigatran Fab fragment that binds to the benzamidine group on dabigatran and inhibits its anti-thrombin activity.

**AIM**  To determine the relative specificity antidote for benzamidine as a sole antidote for dabigatran.

**MATERIALS AND METHODS**  Several of the anti-thrombin agents (argatroban, melagatran, hirudin, and bivalirudin, human antithrombin, thrombomodulin, heparin cofactor II, and heparin-AT complex and anti-factor Xa (rivaroxaban, apixaban and DX-9065a) agents were supplemented to citrated plasma at concentrations ranging from 0.1 to 100 µg/mL. Idarucizumab was added to each mixture at a concentration of 1 mg/mL and anticoagulant activity was assessed using prothrombin time (PT), activated partial thromboplastin time (aPTT), thrombin time (TT) and chromogenic anti-IIa/Xa and fluorometric thrombin generation assays.

**RESULTS**  Idarucizumab itself did not produce any effect on whole blood or plasma clotting profile at concentrations of <1.0 mg/mL. The antibody showed strong specificity for the inhibition of dabigatran and did not affect the anticoagulant and other effects of the other synthetic and natural thrombin and FXa inhibitors with the exception of melagatran. The prolongation of the PT, aPTT and TT by melagatran was completely inhibited by idarucizumab. Idarucizumab inhibited more effectively the prolongation of TT time by dabigatran than the prolongation induced by melagatran.

**CONCLUSION**  The cross-reactivity of idarucizumab with melagatran may result from the presence of a common benzamidine. The benzamidine is present in a number of serine protease inhibitors as well as drugs such as pentamidine, propamidine and dibromopropamidine. These observations suggest that simultaneous administration of idarucizumab may compromise the pharmacodynamic profile of benzamidine derived drugs such as: anti-malarials, anti-psychotic, anti-fungal and other compounds.
A6 THERAPEUTIC EFFECTS OF MPFF ON THE SECONDARY VARICOSITIES OF PELVIC VEINS
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AIM The study analyzed the therapeutic effects of micronized purified flavonoid fraction (MPFF) on the secondary varicosities of varicose pelvic veins (VPV) that developed after an iliac vein thrombosis (IVT).

MATERIALS AND METHODS A total of 24 patients (17 men and 7 women) with secondary VPV diagnosed by duplex scanning and without a history of varicose veins after IVT (mean time since the episode, 3.9 years; 95% CI, 1-8 years) were evaluated. All patients were treated with MPFF 1000 mg once a day for 1 month. At the end of the treatment, both the clinical and ultrasound parameters were compared with those at baseline. Organ lesions were assessed during urological, proctological, and gynecological examinations.

RESULTS According to the duplex scanning data, MPFF reduced the degree of the varicosities in 75.0% of the patients and normalized the vein diameter in 25.0% of the patients. The rate of bilateral varicosities decreased from 41.7% to 8.3%, while the rate of ipsilateral varicosities increased from 58.3% to 66.7% due to the transformation of bilateral lesions into unilateral lesions. In men, MPFF reduced the rate of VPV from 100% to 50.0%, the mean diameter of paraprostatic veins from 7.52 mm to 5.77 mm, and the rate of reflux from 70.6% to 17.6%. In women, MPFF reduced the rate of VPV from 100% to 25.0%, the mean diameter of parametrial veins from 7.79 mm to 6.28 mm, and the rate of reflux in the parametrial plexus veins from 57.1% to 14.3%. In addition, the rates of pelvic pain were reduced from 33.3% to 4.5% and urination disturbances from 100% to 37.5% (mean international prostate symptom score decreased from 9.6 to 3.8; 95% CI, 0-19). At baseline, hemorrhoids were diagnosed in 62.5% of the patients, and, after MPFF treatment, the hemorrhoid grade was significantly reduced. The percentage of women with dyspareunia decreased from 42.9% to 14.3%.

CONCLUSION MPFF causes a regression of secondary varicose veins and plexuses, reduces the diameter of affected vessels, the area of secondary venous lesions, and the incidence of reflux, and, in general, it improves pelvic hemodynamics. MPFF monotherapy reduces the severity of the organ disturbances caused by secondary VPV after IVT. The profound action of MPFF can be explained by the specificity of secondary lesions in the initially preserved venous walls in patients who have no other signs of venous disease.
A7 IMPACT OF LOW MOLECULAR WEIGHT HEPARIN ON THROMBUS RECANALIZATION IN PARANEOPLASTIC DEEP VEIN THROMBOSIS

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AIM The aim of this study is to evaluate if the treatment with low molecular weight heparin in paraneoplastic deep vein thrombosis of the lower limbs increases the thrombus recanalization.

MATERIALS AND METHODS Oncologic patients who presented with a first episode of deep vein thrombosis from January 2012 to December 2015 were eligible. Patients received low molecular weight heparin at least 1 year or meanwhile the cancer was active, according to our hospital protocol. Clinical and sonographic follow-up was performed at three, six and twelve months. The primary endpoint was the presence or not of complete thrombus recanalization. Secondary outcomes included the evaluation of vein valve competence and the presence of postthrombotic syndrome (according to Villalta’s scale).

RESULTS 143 oncologic patients were selected out of 427 patients who suffered a deep vein thrombosis during the study period. Eight of them did not fulfil inclusion criteria. We finally reviewed 135 patients, 49% women, with a mean age of 68 years-old. Follow-up was achieved in 89% of patients at 12 months. When echography was performed, at three months we observed thrombus recanalization on 60% of patients, at six months at 81% of patients and at twelve months at 91% of patients. The presence of valve incompetence at twelve months was observed in 48 patients (40%) and post-thrombotic syndrome in 25 patients (60% low-grade, 36% moderate-grade and 4% severe-grade).

CONCLUSION Treatment with low molecular weight heparin helps the recanalization of the thrombus at twelve months in patients with paraneoplastic deep vein thrombosis of the lower limbs, and this may decrease the presence and grade of postthrombotic syndrome and valve incompetence.
A8  QUALITY OF LIFE OF PATIENTS WITH ACUTE HAEMORRHOIDAL DISEASE AND COEXISTING CRONIC VENOUS DISEASE: RESULT OF VALUABLE OBSERVATIONAL STUDY

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The haemorrhoidal disease (HD) and chronic venous disease (CVD) are affecting a large part of the population. Despite of this, there are not enough evidences from studies regarding the impact of coexisting acute HD and CVD on quality of life (QoL).

**AIM**  The aim of the observational study was to assess the QoL of adult patients with acute HD, which addressed the GP’s offices within urban area in Romania between February-March 2016.

**MATERIALS AND METHODS**  Each site (155 GPs) included 10 consecutive patients with acute HD episode addressing the GP’s office. The study consisted in 2 visits (1 month apart) and collected the following data: demographic data, occupational status, diet, risk factors, HD and CVD signs and symptoms and patient’s questionnaire regarding QoL.

**RESULTS**  1439 subjects signed the inform consent and based on inclusions/exclusion criteria 1187 subjects were enrolled in the study (58.4% females). The most frequent reported HD risk factors were quite similar between male and female population, family history of chronic venous disease (CVD) 61.7% males, respectively 51.5% females, bowel disease 52.6% males, 59.9% females and sedentary lifestyle 50.2% males and 55.8% females. The medical history identified previous HD episodes (50.8%), CVD (45.5%), HBP (48.6%), and a significant association between diagnosis of acute HD episode and presence of CVD symptoms (P<0.001). CVD and acute HD symptoms coexisted in 58.4% of patients, being a significant correlation between HD and CVD symptomatology (P<0.001). CVD and acute HD symptoms coexisted in 58.4% of patients, being a significant correlation between HD and CVD symptomatology (P<0.001). The most frequent recommended treatment prior the study was systemic (63.8%), followed by topical (61.3%) and lifestyle changes (61.0%), with the most frequent medication used being MPFF (47.3%), followed by Diosmin (19.5%). During V1, there was a significant increase in systemic treatment (93.9%), lifestyle changes (88.1%) and the most recommended medication was MPFF (81.89%)(P<0.001). Significant changes were noticed between V1 and V2 regarding increase of physical activity, decrease of meat and fast-food consumption and increase in liquid intake and fruit and vegetable consumption, as well as the treatment adherence (P<0.001). Significant decrease of acute HD signs and symptoms was observed between V1 and V2 (P<0.001). Between V1 and V2, all QoL investigated self-reported parameters (health, general mood status) improved significantly, while the impact of HD on daily life decrease in similar manner (P<0.001). Similar, CVD impact on health status and physical activities decreased significantly (P<0.001).

**CONCLUSION**  There is a significant correlation between HD and CVD symptoms. The impact of acute HD episodes and CVD on QoL decreased significantly after correct therapeutic management and implementation of lifestyle changes.

Additional research will be needed for assessing the long-term effect of CVD and HD on QoL.
A9 THE ROLE OF HIGH MEDICAL EDUCATION IN SOLVING CHRONIC VENOUS DISEASE PROBLEM

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AIM The Bonn Vein Study results showed that only 7.9% had no symptoms of chronic venous disease (CVD). Analysis of Vein Consult Program indicates that the general practice doctors have troubles in finding CVD and do not direct patient in time to vein specialist. The aim of this study was to test how university graduates understand the importance of CVD health problems.

MATERIALS AND METHODS 320 students of the last year study of the medical faculty were given questionnaires concerning CVD problems. More than 50% of graduates will work as general practitioners. The questionnaire had two parts: identifying students with CVD prevalence (complaints and self-investigation), and students were asked for assessing knowledge depth on diagnostics and medical tactics of CVD.

RESULTS In 82.5% of students with CVD symptoms analysis showed: leg pain -64.1%, tension -57%, heaviness -56.6%, night cramps -30.7%, swelling -21.7%, itching -17%, restless leg -12.7%. The use of 10-point score for assessing the severity of the symptoms: the highest number of points were characteristics of itching, restless leg and night cramps. The results of self-investigation CVD according CEAP: C0A – 17.5%, C0S – 44.3%, C1A – 4.2%, C1S – 29.2%, C2A – 1%, C2S – 3.8%. In C0S group only 2% considered their symptoms as manifestation of the disease. At the same time, 55.3% of students in C0S group considered it appropriate to perform veins ultrasound. In C0S group only 12.8% consider their symptoms as indications to lifestyle change, but 29.8% were willing to undergo treatment by phlebotonic drugs (on a question of any known drug, more than half of them called micronized purified flavonoid fraction). In C1 group, the presence of reticular veins or telangiectasia was not considered as a manifestation of the disease by 22.5% of students. Only a third part of students in the C1 group believed that it is advisable to adjust the lifestyle, much less point to the possibility of sclerotherapy or reception of phlebotonic drugs. As for the small group of C2 (4.8%), it should be noted that the visible veins encouraged students to seek additional information: almost all considered wearing compression stockings, the need to undergo an ultrasound examination and do not rule out surgery in the future.

CONCLUSION The results indicate that higher medical education for various reasons do not provide graduates willingness to solve the CVD problem, which remains the most common pathology of people in different ages.
A10 COMPARATIVE ANALYSIS OF SURGICAL AND CONSERVATIVE TREATMENT OF FREE-FLOATING THROMBUS IN THE SYSTEM OF INFERIOR VENA CAVA

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AIM To study the long-term results of surgical and conservative treatments of free-floating deep vein thrombosis (DVT) by comparing the patients’ quality of life, the incidence and severity of post-thrombotic syndrome (PTS).

MATERIALS AND METHODS The study included 578 patients with DVT, 364 males and 214 females 55.5 [45-65] y.o., who underwent hospital treatment from 2010 to 2016. DVT localization was as follows: tibial and popliteal segments 137 (23.7%) and 5 (0.9%) respectively, femoral 60 (10.4%), femoral-popliteal-tibial 193 (33.4%), iliac-femoral 94 (16.3%), iliac-femoral-popliteal-tibial 32 (5.5%), sapheno-femoral 6 (1%). The long-term results of the free-floating DVT treatment have been studied with the adapted Villalta scale and valid questionnaire CIVIQ-2.

RESULTS USG signs of thrombus flotation were detected in 61 (10.6%) patient. The length of the floating thrombus’ part in the conservative treatment group was 11.5 [15-22] mm, whereas in the surgical group it was 20 [30-45] mm (P=0.0001). 29 patients were provided with completed questionnaires and 3 of them have had no sign of PTD. The severity in other 26 patients was the following: mild (5-9 points) – 13; intermediate (10-14 points) – 7, severe (15-33 points) – 6. In the conservative treatment group the PTS severity was 9 (7-16) points, whereas in the surgical treatment group it was 10 (7-13) points (P>0.05). It was established the correlation relationship between the severity of PTS and the quality of life (r=0.53; P=0.003).

CONCLUSION Surgical treatment of free-floating DVT effectively prevents PE, but leads to PTS and decreases the patients’ quality of life. Thus, in patients with high-risk of life-threatening PE, direct or endovascular surgery should be the method of prophylaxis.
A11 A COMPLEX APPROACH TO THE TREATMENT OF INFERIOR VENA CAVAL THROMBOSIS COMPPLICATED BY FLOATING EMBOLUS AND ACUTE VENOUS INSUFFICIENCY

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MATERIALS AND METHODS A prospective analysis was conducted on 753 patients with deep vein thrombosis (DVT) between 2013 and 2016. In 279 patients (37%), DVT with floating thrombus was diagnosed, 15 patients (2%) had DVT complicated by venous phlegmasia. In 37% of cases, conservative treatment id est Warfarin was used, 24% received conservative therapy with new oral anticoagulants (NOACs), 16% underwent vein ligation and conservative treatment, 20% had thrombectomy with vein plication, 2% had cava filter implantation, 1% received systemic thrombolysis, one patient was treated with local thrombolysis. Between 2013 and 2016, all patients with DVT were given intravenous administration of unfractionated heparin in dose of 1000 I.U. per hour under aPTT control on the level 1.5-2 times higher than the norm during the selection of therapeutic dosage of Warfarin or NOACs.

RESULTS During the analysis, a high percentage of complications of inferior vena caval thrombosis with floating emboli was observed while surgery remained a reliable method for preventing pulmonary embolism. Vein ligation in the proximal lower limb leads to a high prevalence of post-thrombotic syndrome (PTS) in the postoperative period. It is necessary to improve the surgical treatment methods to reduce the incidence and severity of PTS in the postoperative period. In patients with DVT complicated by acute venous insufficiency, systemic thrombolysis was administered. Manifestations of such symptoms as pain, acute swelling, and redness of the skin were observed in 6 out of 7 cases, and the symptoms disappeared immediately after administration of systemic thrombolysis. During the ultrasound examination on the day after thrombolysis procedure, a reduction of the thrombus size and recanalization in all seven cases were marked.

CONCLUSION Deep vein ligation in patients with floating emboli and in patients with DVT of the lower extremities is a reliable method for the prevention of pulmonary embolism, but it is characterized by a high incidence of PTS occurring in the postoperative period which requires the improvement of methods of surgical treatment of deep venous thrombosis, in particular the performance of thrombectomy with vein plication. Systemic thrombolysis is still a relevant and reliable method for the treatment of extended DVT of the lower extremities with acute venous insufficiency, local access significantly reducing the risks of complications and the degree of PTS.
A12 NUTCRACKER PHENOMENON IN LIVE DONOR KIDNEY TRANSPLANT. IS THERE A CLINICAL IMPACT IN THE RECEPTOR?

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AIM The Nutcracker phenomenon (NCP) result from the left renal vein compression between the superior mesenteric artery and the aorta (Anterior NCS), or more rarely by compression of the LRV between the aorta and the lumbar vertebra when the vein passes behind the aorta, (posterior NCS). The association of the two anomalies can occur when a circumaortic renal vein exists. The difference between the NCP and the Nutcracker syndrome is the absence of clinical symptoms and signals associated with the NCP. Normally patients with NCP don’t need any special care. However when we are facing a live kidney donor transplant with a NCP, we don’t know if the asymptomatic renal venous hypertension lead to tissue damage, and if this will have impact in the future renal function of the receptor.

MATERIALS AND METHODS We retrospectively evaluated our experience in living kidney donors with NCP. In our program all patients realize an abdomino-pelvic angio CT before the donation, and 3 patients were identified with hemodynamic stenosis of the renal vein. Anatomically there were two anterior and one posterior NCP. All were females, and they don’t have any symptom or signal of renal venous hypertension, namely microscopic hematuria or proteinuria. The relative renal function of the affected kidney was 53.8%, 57.7% and 47.2%, the nephrectomy was done by laparoscopy, the time of warm ischemia was 3.4, 4.5 and 4 minutes and one kidney artery was reconstructed with a saphenous vein graft. The receptors were two males and one female with, 20, 60 and 37 years. At 30 days after transplantation, one patient necessitated an angioplasty of the ureter and creatinine was 1.46, 2.7 and 1.19 mg/dL. With a follow up of 11, 21 and 8 months we don’t find any clinical disturbance, the creatinine was 1.15, 1.58 and 1.29 and there are no signals of hematuria or proteinuria.

CONCLUSION In our experience, the Nutcracker Phenomenon in the live kidney donor as no clinical impact in the renal function of the receptor. However, facing the low number of publications, we must be cautious and long term follow up is necessary.
The term Marjolin’s ulcer refers to a malignant degeneration of the skin on the site of chronic tissue damage, as in chronic venous ulcers or scar tissue from burns. It was coined in the 19th century in Paris and histologically this tumour is most frequently a squamous cell carcinoma, with varying degrees of differentiation. We present two cases from our clinic where a malignant tumour arose in chronic venous ulcers, we underline our diagnostic approach and then we present a review of the recent literature on the subject of how we should manage these tumours. Our patients have all had longstanding venous insufficiency and leg ulcers. We discuss their treatment regimens and what prompted the suspicion of malignant degeneration and what led the physician to biopsy the ulcer, a procedure not so frequently done. Out of the two Marjolin ulcers, one was a well differentiated squamous cell carcinoma, which account for more than 90% of Marjolin ulcers, but one was a basal cell carcinoma (Figure 1) a very rare presentation of this disease. First step in all cases was surgical removal of the tumour with safety margins when applicable, followed by local treatment and skin grafts.

Figure 1. Marjolin ulcer. Basal cell cancer on the site of a longstanding venous ulcer in a 90 year old female patient.
Our review focuses on criteria for diagnosis, prognosis and treatment options. A biopsy should be considered based on wound appearance (exaggerated granulation or lack of healing, signs of ulceration or necrosis despite treatment), wound etiology (burn scar, skin graft, osteomyelitis fistulisation, chronic venous ulcers), or wound age (usually over 10 years of evolution). Once the diagnosis of Marjolin’s ulcer is established it is important to ascertain the risk of metastases and recurrence which have been shown to correlate with wound size and depth of invasion. Once established, the risk of recurrence and metastases can guide the choice of therapy, starting with surgical removal with 2 cm margins, and going further to radiotherapy, chemotherapy (for example 5 fluorouracil orally) and even amputation.

We want to stress the fact that Marjolin’s ulcer is a notable disease that involves multiple specialties, requiring a team effort to diagnose and treat accordingly. Although a rare complication, it is nonetheless severe and may lead to loss of quality of life, waste of resources and sometimes even to dire consequences if not suspected. We hope our presentation is a necessary and practical reminder for all medical specialties that encounter and treat chronic wounds.

REFERENCES
A14 PELVIC CONGESTION SYNDROME TREATMENT

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AIM Pelvic congestion syndrome (PCS) causes chronic pelvic pain in women and is associated with pelvic varices and pelvic venous hypertension. Patients with PCS present with chronic pelvic pain that lasts more than 6 months, dyspareunia, and prolonged postcoital discomfort. The Department of Surgery of Major Vessels has an experience of examination and treatment of 22 women with PCS. Combination of PCS and varicose veins of lower extremities was found in 12 women (54.5%). The aim of our study was to improve treatment results in patients with PCS by eliminating the main cause of disease in the pelvis and venous outflow correction of the lower extremities.

MATERIALS AND METHODS 22 women aged 29-38 years (median 33.5 years) with lower extremities, vulvar and perineum varicose veins were consulted. Patients underwent an ultrasound examination (US) of the lower extremities, transvaginal ultrasound (TUS), selective angiography and computer tomography (CT) on indication. The investigations included the following measurements: retrograde ovarian and lower extremities venous flow, dilated ovarian veins >4 mm, dilated tortuous myometrium veins that communicate with bilateral pelvic varicose veins, slow blood flow (less than 3 cm/s). Obstructing anomalies (signs of Nutcracker phenomenon or May-Thurner syndrome) were excluded. In 7 patients of 22 was discovered pelvic arteriovenous vascular malformation, in 12 - varicose veins of lower extremities.

RESULTS Diagnostic and treatment methods for managing PCS were identified and their results analyzed. The main diagnostic method was selective angiography with iohexol 350. Embolization with aetoxisclerol 3% 8-10 mL foam was made in 19 patients. We have performed endovenous laser ablation of ovarian vein in 1 patient using a 1470 nm diode laser (radial 2ring fiber) and radiofrequency ablation of ovarian vein in 2 patients. Varicose veins were treated with endovenous procedures. Additional treatment included Daflon 500 in postoperative period during 2 months. Periods of observation lasted 2 years, diagnostic control was made by TUS and US of lower extremities. No clinical complaints were reported.

CONCLUSION Treatment of PCS remains a complicated problem that needs cooperation of different specialists: gynecologists, vascular surgeons and radiologists. Fortunately, improvement of medical and surgical tools can help medical professionals to find promising solutions of PCS management. We believe that endovenous procedures may be used for treatment of PCS. First results of endovenous procedures are encouraging.

REFERENCES
B1 ENDOVENOUS THERMAL ABLATION CAN BE USED TO TREAT THE GREAT SAPHENOUS VEIN OF ANY DIAMETER. VEIN SIZE IS NO REASON TO OPT FOR OPEN SURGERY

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AIM To report on the distribution of incompetent Great Saphenous Vein (GSV) diameter in patients presenting with lower limb varicose veins, and to report on our technique for ablating incompetent veins with large diameters, using endovenous laser ablation (EVLA).

MATERIALS AND METHODS Data collection: we conducted a database search of all GSV ablation cases that have been performed by one consultant vascular surgeon at our unit. We collected data over 5 years and 6 months and obtained measurements from 2005 clinically incompetent GVS’s (977/2005 left leg and 1028/2005 right leg) treated with EVLA.

Surgical technique: percutaneous access of the GSV was achieved by an ultrasound-guided Seldinger technique. A 1470 nm laser fibre was passed to the saphenofemoral junction (SFJ) and tumescent anaesthesia was applied around the vein under ultrasound control to separate surrounding tissue, act as a heat sink, and enable appropriate venous constriction around the laser fibre. Tumescence and external compression by the ultrasound probe should concentrically compress the vein; if it has a wide diameter, the vein may constrict asymmetrically and develop lateral bulges, limiting the circumferential vein wall laser target (the “smile sign”). For these larger veins, we perform multiple passes of the laser fibre. We believe this ensures all areas of the vein wall are treated, which is necessary to achieve complete fibrosis and long-term venous occlusion. 10 watts was used and all pullbacks were 6-9cm/s with an LEED of 60-90 J/s except for areas of multiple passes.

RESULTS

Figure 1. The left leg GSV diameter distribution.
Venous diameter ranged from 2 mm to 42 mm in the left leg, and 1 to 33 mm in the right leg, with a mean value of 9.5 mm in both legs. Of this cohort, 16.66% (334/2005 (167/977 (17.1%) left GSV, 167/1028 (16.24%) right GSV) of veins measured at 15 mm or over. This has been recommended by some as the upper limit for EVLA. All subjects returned approximately 8 weeks post-procedure to receive follow-up ultrasound-guided foam sclerotherapy and upon examination the GSV was successfully occluded in all cases.

**CONCLUSION** Using the multiple laser pass technique, veins of all diameters can be successfully and safely treated with EVLA. We suggest that open surgery should never be recommended and thermal ablation should always be administered for truncal venous reflux treatment.
B2 RISK FACTORS FOR PROXIMITY OF OCCLUSIONS OF GREAT SAPHENOUS AND SHORT SAPHENOUS VEIN TO THE DEEP VEINS FOLLOWING ENDOVENOUS LASER ABLATION

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AIM Instruction for use (IFU) for endovenous laser ablation (EVLA) recommends that the laser tip should be 2 cm distal to sapheno-femoral (SFJ) or sapheno-popliteal (SPJ) junction to reduce the incidence of endothermal heat induced thrombosis (EHIT) and deep vein thrombosis (DVT). In our study we aim to assess risk factors for patients with occlusion of the vein to within 2 cm of the SPJ or SFJ at 6 week follow-up.

MATERIALS AND METHODS A prospective database of a vascular surgeon performing patients undergoing EVLA of the great saphenous (GSV) and short saphenous vein (SSV) under local anaesthetic without any adjunctive procedure such as foam sclerotherapy was examined. Patients with previous deep vein thrombosis were excluded. Demographic data, intraoperative distance to junction, distribution of varicose vein (either GSV or SSV), length of vein ablated were collected at the time of the procedure. Patients were then reviewed in clinic at 6-weeks post operatively and the venous duplex measurements were taken to assess the distance of the occlusion from the respective junction.

RESULTS 194 patients underwent EVLA during the study period without any confounding factors such as adjunctive therapy or previous DVT. These included 36 SSV and 158 GSV. The pre-procedure junction was >2 cm in 154 patients (77.7%). 141 patients (72.7%) had post-operative occlusion within 2 cm of the SPJ or SFJ. The mean age was the 51 males and 90 females were 52 years (range 17-80 years). One patient had a diagnosis of EHIT (0.5%) and with no incidence of DVT’s. 18/194 (9.3%) patients had flush occlusion, 40/194 (20.6%) within 1 cm of junction and 81/194 (42.8%) between 1-2 cm with the reminder having occlusion more than 2 cm distal to SPJ/SFJ. There was a statistically significant difference between flush occlusion rates in patients undergoing SSV EVLA (25%) and GSV EVLA (5.7%) (P=0.002) as well as pre-op positioning of laser catheter to less than 2 cm (5/40 (12.5%) vs. 13/154 (8.4%) (P=0.006)).

DISCUSSION Laser catheter positioning to within 2 cm of the SPJ/SFJ increases the risk of flush occlusions and may risk development of EHIT or DVT. SSV treatment is also a risk factor for flush occlusions. Age, length of vein and sex do not appear to be associated with increased risk of <2 cm or flush occlusions.

CONCLUSION SSV and pre-op positioning of laser catheter less than 2 cm distal to the junction are associated with vein occlusion to within 2 cm from the junction at 6 weeks. Consideration should be given to increase the pre-procedure laser tip junction to more than 2 cm especially in patients undergoing SSV treatment.
**B3 COMPLIANCE WITH NONOPERATIVE TREATMENTS IN OUTPATIENTS WITH CHRONIC VENOUS DISEASE CONSULTING GENERAL PRACTITIONERS: RESULTS OF THE VEIN ACT PROGRAM IN COLOMBIA**

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The VEIN Act Program (VAP), an international survey, assessed compliance with nonoperative treatments for chronic venous disease (CVD), as well as evaluating the efficacy and safety of these treatments.

**MATERIALS AND METHODS**

The VAP program included adult outpatients who were consulting general practitioners (GPs) for CVD symptoms, consenting to participate in the program, not consulting for an emergency or an acute episode of an ongoing event, and who were free of concomitant diseases that might interfere with venous treatment. Patients underwent a clinical examination of the lower limbs, including identifying the presence and severity of CVD signs using the CEAP classification. After evaluating clinical symptoms and signs and prescribing nonoperative treatments, the patients were asked to return for a follow-up visit in which GPs assessed the compliance and efficacy of nonoperative treatments.

**RESULTS**

A total of 1570 patients were enrolled; only 8 patients were lost during follow-up. The mean time gap between the 2 visits (V0 and V1) was 2 months with no difference between women and men (P=0.7). The mean compliance with lifestyle advice was 95.7%, with the main reasons for noncompliance being a lack of time (49%) and too difficult (43%). At the follow-up visit, 87.9% of questioned subjects wore their compression stockings, and of these, only 13.3% wore the compression therapy as prescribed and 49.7% used it intermittently or not at all. Patients who were prescribed “moderate” and “strong” compression stockings had a slight tendency to buy “mild” stockings. Regarding compliance to venoactive drugs, 98.1% of patients followed the right dosage, 53.1% correctly followed the 4- to 8-week duration, 19.9% correctly followed the 9- to 12-week duration, and 4% did not follow the prescribed treatment duration. The most prescribed venoactive drug (VAD) was MPFF (98.5%). Regarding the efficacy of nonoperative treatments (including VADs, medical advice, and compression therapy), most patients (98.5%) reported symptom relief, mainly after 1 to 3 weeks (62.6%), but for some patients (22.3%), the time for symptoms relief was shorter (<1 week).

**CONCLUSION**

The VAP program in Colombia demonstrated a high adherence to VADs, mainly MPFF, and to lifestyle advice, but not to compression therapy, with only 1 out of 10 patients wearing it as prescribed. A chronic and progressive disease, such as CVD, deserves all of our efforts to obtain optimal treatment compliance.
B4 THE CAUSES AND PATTERNS OF RECURRENT VARICOSE VEIN AFTER SURGERY

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AIM
To analyze the causes and patterns of recurrent varicose vein after surgery (REVAS)

STUDY DESIGN
Retrospective observational cohort study.

MATERIALS AND METHODS
Patients with REVAS treated in Seoul National University Hospital between March 2010 and February 2016 were enrolled. The diagnosis was confirmed by duplex ultrasonography (DUS) or computed tomography venography (CTV) and electrical medical records were reviewed.

RESULTS
Among the 1,373 varicose vein patients, REVAS was found in 32 patients (2.4%). Clinical score of C2 was most common (47.6%), followed by C3 (35.7%) and C4 (14.3%). There was no patient with active venous ulcer. The most common cause of recurrence was incomplete surgery in 52.4%, including tactical or technical failure. Perforator reflux were 19.0% and, abdomino-pelvic incompetence were 14.3%. However, there was no recurrence due to neovascularization. Deep vein reflux was detected in 21 (50%) limbs with REVAS, and the most common location was femoral vein in 17 (38.6%) limbs. A total of 29 incompetent perforators was observed on 21 (50.0%) limbs. The average number of refluxed perforator on each REVAS limb was 0.69 (29/42). However, only 6 incompetent perforators on 6 limbs were pathologic perforator. The average number of pathologic perforator on each REVAS limb was 0.14 (6/42).

CONCLUSION
The incomplete surgery was the most common cause of REVAS. To reduce a tactical or technical failure, education of DUS technique and surgical performance for young surgeons are important. CTV was very informative in understanding the pathophysiology of REVAS.
B5 10 YEAR EXPERIENCE OF VARICOSE VEIN LASER SURGERY

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**AIM** This 10 year follow-up compares different patient conditions and technical modifications as influential factors for recurrence rates. For this reason we tried to follow as many operated cases as it was possible to find recurrent varicosities.

**MATERIALS AND METHODS** We modified the usually employed method and it was performed on 1483 saphenous vein varicosity limbs over a 10 year period, with various laser instruments (980, 1470, 1550 nm). The age range was between 14 and 82 years, women:men=71:29. The diameter of the saphenous veins (GSV 82.8%, SSV 12.5% and AASV 4.5%) was between 4 and 32 mm. VCSS 7.1

Our modifications are as follows: (1) the tip of the laser fibre is 0.5 cm from the femoral vein (2) the tumescent solution compresses the SFJ (3) the delivered energy is about 100 J/cm (4) more energy to the proximal than to the distal part of the saphenous stem (5) the amount of cooled tumescent anaesthetic solution is 5 ml/cm (6) all insufficient perforators are treated in the same session and (7) LMWH prophylaxis is given.

Manual pullback was employed. To remove tributaries, foam sclerotherapy, Varady’s hook and the saw-knife were used. In the last 6 years, classic varicose vein surgery has not been performed, which means every saphenous stem varicosity case without selection was included in this survey.

**RESULTS** 68.1% of legs could be followed longer than 1 year and recurrent varicosity was found in 6.3%. If there were no risk factors in 3.5% stem or side branch varicosity appeared again. Recurrence rate was much higher in different special condition groups: (1) double saphenous stems 12.5%, (2) extremely dilated saphenous stems or their segments (>20 mm) 26.7%, (3) high BMI >35 15.1%, (4) surgery of recurrent varicosity 6.3%, (5) sporting activity and demanding manual labour 15.5%, (6) cardiac decompensation 100%, (7) pregnancy 33.3%. There were further ultrasound positive cases (recanalised saphenous veins, refluxive perforator veins) without the clinical appearance of varicosity 1.2%. In 25% more than one risk factor was present. VCSS after surgery 2.2.

Factors without any influence on the recurrence rate are: age, gender, other diseases (except former deep venous thrombosis and cardiac decompensation), presence of a crural ulcer and superficial phlebitis.

**CONCLUSION** According to our study, our modified method is suitable for treating any varicose vein case with laser surgery with an acceptable recurrence rate. There is no need to do classic surgery in any varicose vein case.
B6  NEW CONCEPT FOR MANAGEMENT OF VARICOSE VEINS - ENDOSCOPIC ASSISTED SURGERY FOR VARICOSE VEINS

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AIM  Currently, the recurrence rate of management of varicose veins was high and ranged 20-60% in all reports. In this study, we explored anatomically the cause of the risk factors of recurrence rate and the effective method to manage primary varicose veins.

MATERIALS AND METHODS  Since 1997 to June 2016, more than 1900 limbs of primary varicose veins and its complications were managed with the assistance of endoscopic surgery. With good illumination and magnified view offered by the endoscopy, tissues in the operative field were visualized clearly. The varicositic and non-varicositic veins could be identified definitely. During the procedure, it was helpful for excision only the varicositic veins but the non-varicositic veins were preserved. The unusual relationship of varicositic veins among the main trunk, tributaries and incompetent perforating veins was complicated. There may have more than one varicositic veins or tributaries and presented in parallel, 3-dimensional or cluster like pattern. The conventional methods cannot manage these abnormal varicosities properly. The incompetent perforating veins could be identified and divided if they presented in the operative field. The operation procedures will be demonstrated in a video.

With endoscopic surgery, the varicositic main trunk, tributaries and incompetent perforating veins could be directly identified, dissected and excised radically. Therefore, residual varicositic lesion decreased.

RESULTS  The recurrence rate in our series markedly ranged from 0-2.3%. The satisfaction rate of 689 patients (2004-2013) was 96.5%.

CONCLUSION  The recurrence rate of management of varicose veins could be decreased efficiently with endoscopic assisted surgery.
AIM   The management of venous leg ulcer (VLU) has been influenced to a large extent by ESCHAR study which determines that compression alone or compression with surgery made no significant difference in the healing rate of VLU associated with superficial venous reflux but it reduces the recurrence rate of VLU. This randomized controlled trial was conducted in the United Kingdom and the applicability to Asian population is unknown.

MATERIALS AND METHODS   Among patients who presented with chronic venous disease, 120 VLU patients with significant superficial venous reflux with or without associated deep vein reflux and treated with superficial vein ablation (either conventional surgery or endovenous therapy) were selected in this study. Patients with iliac vein obstruction and post thrombotic limbs were excluded. Compression was advised for a period of one to two months post-operatively but patients were given the choice of continuing or discontinuing compression. Those with recurrent ulcers were subjected to repeat ultrasound and irrespective of subsequent therapy, were advised for long term compression.

RESULTS   Majority of the patients have isolated superficial venous reflux. Ulcers were healed after superficial vein ablation in 72% of patients. Of those whose ulcers that remained healed, 80% have discontinued the compressive stocking post-operatively.

CONCLUSION   Superficial vein ablation without long-term compression leads to high ulcer healing rate. The epidemiology of VLU in Asia differs from those in Europe and America. More than half of our chronic venous disease (CVD) patients present late with Clinical classification of C4 to C6. Post thrombotic syndrome is not commonly encountered. The late presentation of CVD and low venous thromboembolism rate could account for the excellent healing rate and low recurrence of VLU with superficial vein ablation, even without long term compression. Therefore, superficial vein ablation may be considered as a primary therapy in countries with low incidence of venous thromboembolism.
B8 ENDOVENOUS LASER ABLATION OF GIACOMINI VEIN IN THE SURGICAL TREATMENT OF VARICOSE DISEASE OF LOWER EXTREMITIES

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AIM Reflux in the GSV due to sapheno-popliteal incompetence associated with ascending (paradoxical) reflux in the Giacomini vein (GV) is a rare but well described pattern of reflux.

MATERIALS AND METHODS

In 2014-2016 we operated on 25 patients with paradoxical reflux in GV (31-year-old woman with varicose veins on the right leg with paradoxical reflux in GV). The average diameter of VG was 0.75 cm (0.4-0.9). All endovenous laser ablations (EVLA) were performed with ultrasound (US) control visualization, using pulse medical diode laser “Mediola” with wavelength 1560 nm (“FOTEK”, RB) under tumescent anesthesia. The energy delivered was 60J/cm and 10 watts power. Men were 8(32%), women 17(68%), median age 48.8 y.o. (22-79).

Endovascular treatment procedure. We determined the point of puncture with US control, which is the end point distribution of the antegrade blood reflux in the subfascial part of GV. Under ultrasound guidance, the GV was accessed by retrograde vein puncture using a 18-gauge needle, through which a J-formed wire was injected into the vein. 6-Fr envoy guiding catheter was advanced over the guide wire into the GV. The laser optical fiber was inserted in the guiding catheter, which was positioned at sapheno-popliteal junction (SPJ). The Introducer was removed from the vein.
(The scheme of EVLA GV 1. sapheno-femoral junction, 2. great saphenous vein, 3. a laser fiber, 4. The point of GV juction, 5. Guiding catheter into, 6. antegrade reflux in GV, 7. sapheno-popliteal junction, 8. Small saphenous vein). Taking into account the significant local temperature rise in the process of EVLT, the paravasal introduction of the solution (tumescent anesthesia) was performed to protect surrounding tissues from thermal damage and narrowing of the vein and tighter circumference of the working parts of the fiber. EVLA was performed by the gradual extraction of the fiber under US control.

The results. Evaluation of the treatment results was conducted based on clinical data and US control. Occlusion of the ablation veins was confirmed during surgery and on the follow-up examination on day 1, 7, and 1, 3, 6, and 12 months after EVLA.

CONCLUSION

1. EVLT of GV with intraoperative US control is an effective and safe method of treatment for varicose disease of the lower limbs with incompetent GV with high clinical and cosmetic results.
2. In this study, the treatment for varicose disease associated with GV used the method preserving the GSV and SSV, without disturbing the natural hemodynamics of the saphenous venous system with the preservation of material for potential arterial bypass surgery.
Sclerotherapy is the chemical ablation targeted at varicose and spider veins by intravenous injection of a sclerosing liquid. Over time, the vessel turns into scar tissue that fades from view. Unfortunately, the sclerotherapy for varicose and spider veins treatment, is associated with an uncomfortable and painful situation. This study aims to evaluate analgesia induced by a frozen high flow air generator which, within skin contact, produces a cryoanesthesia with a temporary effect causing pain relief at the time of venipuncture.

Evaluate the effect of cold anesthetic skin treatment through cold induced equipment introduce in patients submitted to sclerotherapy.

MATERIALS AND METHODS | Sixty six female patients submitted to sclerotherapy have participated in this study. Treatment was performed without the utilization of a frozen high flow air at the lateral side of one thigh and with the cold treatment at the lateral side of the other thigh on the same day. After each treatment, patients were questioned about the pain that they felt with and without use of cryoanesthesia. For this evaluation, a specific score related to the pain intensity and discomfort according to a pre-defined scale, VAS (Visual Analogue Scale), was used. The following variables were analyzed: pain perception without cold and with cold induced analgesia. The individual responses were obtained by Wilcoxon statistical test.

RESULTS | None of the patients complain about the induced cold treatment or had complication with the method. Within patients with moderate pain, 82.93% had a significant decrease in light pain perception. Therefore 17.07% remain the same. Within those with huge pain, 66.67% has a significant decrease in light pain perception and 33.33% reduced to moderate pain. Data statistics demonstrated the desirable robustness (P=0.0004).

CONCLUSION | The use of a frozen high flow air induced by a special equipment placed within skin contact at sclerotherapy, demonstrated to be an efficient method to reduce pain perception during the procedure.
B10  ACRYLATE ADHESION OF SAPHENOUS VARICOSE VEINS: WHAT DO WE KNOW ABOUT THE ALLERGENIC POTENTIAL?

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AIM  For decades, cyanoacrylate has been used in medicine in different chemical derivatives as an adhesive. It has been applied intravascularly since 1989 as N-butyl-2-cyanoacrylate. In 2011 the first of two current systems was introduced that treated varicose veins by applying an acrylate adhesive. Since polymerized acrylate is an implant, its allergy risk must be assessed alongside its possible toxicity.

MATERIALS AND METHODS  As part of internet research (PubMed) the case reports of allergic reactions to acrylates as described in literature were analysed.

RESULTS  A total of 87 entries were detected of which 53 described allergic reactions connected to the effect of acrylates. These were individual cases or small series (1-5 cases) identified between 1977 and 2016. Allergic reactions to CA have been described by dental technicians, beauticians, hair stylists and a series of other professional groups. Only 17 cases relate to a medical application connected to cutaneous wound closure.

In all cases it was found to be a contact allergy (type IV). Cases of type I allergic reactions with anaphylaxis have not been reported.

CONCLUSION  Despite thousands of medical applications, only a few individual cases of allergic reaction have been identified. This could be explained by the fact that the dendritic cells responsible for immune mediation to internal organs and vessels were not exposed to the acrylate monomers. One exception is wound closure in the context of which repeated contact-related allergic reactions were observed. During varicose vein treatment, cyanohydrate is introduced into the vessel through a catheter. The treatment algorithm stipulates that the placing and the removal of the catheter is to be done using a guide catheter which, in principle, rules out immune-mediating contact to the cutis.

REFERENCES
B11 REFLUX PATTERNS OF VARICOSE VEIN DETERMINED BY DUPLEX ULTRASONOGRAPHY

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AIM The purpose of this study was to investigate the baseline characteristics of duplex ultrasonography (DUS) in Korean patients with varicose vein and to define the reflux patterns of varicose vein.

MATERIALS AND METHODS Lower extremity DUS was performed in 916 patients from January 2015 to December 2015. Among them, 429 (46.8%) patients had varicose vein in 694 limbs, who were enrolled in this study. All DUS was performed by an experienced registered vascular technologist.

RESULTS Mean age was 57±14.4 years and female were 63.6%. Both limbs were involved in 265 (61.8%) patients. Clinical classification were C1 (17.7%), C2 (61.7%), C3 (17.9 %), and C5 (2.7%). Reflux was detected in GSV (51.2%), perforating vein (32.8%), SSV (16.4%), and pelvic vein (9.5%). Perforator reflux was found in Boyd (16.7%), Cockett (13.3%), Dodd (6.3%), and Hunterian (0.9%) perforators. Pathologic perforator (≥3.5 mm) was presented in 28 (4%) limbs and Dodd perforator (39.3%) was most common. Reflux in deep vein was accompanied in 299 (43.1%) limbs. Mean diameter and peak velocity of Rt. GSV, Lt. GSV, Rt. SSV, and Lt. SSV were 0.65±0.24, 0.65±0.24, 0.50±0.19, 0.52±0.19 cm and 28.69±25.93, 26.63±19.82, 26.88±20.04, 31.22±23.19 ms⁻¹. High ligation and stripping or endovenous thermal ablation were performed in 48.9% of patients, and 55% had follow-up DUS after the operation. The fate of untreated reflux of 35 perforators resulted in persistent reflux in 65.7% and disappeared reflux in 34.3%. Only one perforator reflux was newly discovered. Deep vein reflux disappeared in 47.5%, but new reflux was detected in 28.9%.

CONCLUSION In varicose vein, reflux in multiple veins in multiple limbs was common. Accompanying perforator or deep vein reflux was also common. Thorough DUS examination is mandatory for optimal treatment of varicose veins. The influence of superficial vein surgery to perforator or deep vein reflux need to be further studied.
Chronic venous disease (CVD) is a common disorder of lower extremities. Genetic predisposition is known to be an important risk factor for CVD. Matrix metalloproteinase-9 (MMP-9) gene -1562C/T polymorphism has been reported to be associated with several cardiovascular diseases. The aim of this case-control study was to investigate the relationship between polymorphism of MMP-9 (-1562 C/T) and CVD risk.

Materials and Methods
A total of 150 Czech patients with chronic venous disease (clinical stages C2-6 according to CEAP classification) and 227 controls were enrolled in the study. The patients were genotyped for the polymorphism in MMP-9 (-1562 C/T) gene using the polymerase chain reaction-restriction fragment length polymorphism-based methodology.

Results
A significant association between CVD and -1562C/T polymorphism in MMP-9 gene was found. The frequencies of MMP-9 alleles and distribution of genotypes significantly differed between CVD patient and control groups (Pa =8.94x10^-6; Pg =9.46x10^-6), both in men and women. The T-allele was observed 2.571 times more frequently in CVD patients than in the control individuals with clinically significant specificity (61/239 vs. 41/413, P = 0.0000009, odds ratio =2.571, 95% confidence interval = 1.678-3.939; sensitivity 0.203, specificity 0.910, power test 0.984).

Conclusion
These results suggest that MMP-9 polymorphism (-1562 C/T) is significantly associated with CVD in the Czech population.
C2 LOCAL INFLAMMATORY DAMAGE MEASURED WITH THE MARKERS OF CELL DEATH AND CELLULAR DEBRIS INCREASE SIGNIFICANTLY DURING THE GRAVITATIONAL STRESS OF PROLONGED STANDING

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AIM Chronic venous insufficiency (CVI) results from the relentless force of gravity hampering the upward drainage of veins. Prolonged pressurisation of the dependent venous system in the leg may lead to local biochemical changes which manifest as inflammation and cell damage. These can be measured in local venous plasma using the markers of apoptosis and cellular debris: anti-annexin V antibody and microparticles, respectively. The aim was to measure these markers (i) after prolonged standing stress, (ii) after elevation healing on lying and (iii) after compression treatment whilst standing. This was performed in healthy volunteers and in patients with advanced CVI.

MATERIALS AND METHODS Twelve patients with advanced CVI awaiting venous laser treatment (C4a-b) and 12 volunteers (C0-I) were tested under 3 laboratory conditions. All subjects acted as their own controls. (i) Stationary standing on a small paper square while holding onto an orthopaedic frame, was supervised for 1 hour. (ii) Lying was on a couch with both legs elevated 20 degrees for 1 hour. (iii) Treatment with compression using a 23-32 mmHg, below knee, medical compression stocking (SIGVARIS, Switzerland) on standing, was likewise supervised for 1 hour. Immediately after each test, on separate days, venous blood was taken locally from the ankle and centrifuged at 3,500 rpm for 10 minutes. The plasma was stored at -20 degrees Centigrade for batch analysis. Commercial ELISA kits were used for the analysis of Anti-Annexin V Antibody and Microparticles. The London-Queen Square Research Ethics Committee approved the study (16/LO/0326).

RESULTS Irrespective of clinical pathology, the results on the volunteers and patients combined demonstrated significantly reduced Anti-Annexin V Antibody and Microparticles after lying and compression treatment (Figure 1). Significance was demonstrated also for the volunteers as well as the patients with advanced CVI (Table I).
Figure 1. Compared to standing, there are significant reductions in anti-annexin V antibody and microparticles with compression treatment and lying. Wilcoxon test.

Table I. Median and [inter-quartile range] values of anti-annexin V antibody (AU/mL) and Microparticles (nM) in 3 different laboratory situations. The P values standing (A) versus the conditions of compression (B) and lying (C) are provided at the bottom of each column.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Anti-Annexin V (Volunteers)</th>
<th>Anti-Annexin V (Patients)</th>
<th>Microparticles (Volunteers)</th>
<th>Microparticles (Patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B: Compression</td>
<td>2.1 [1.4-3.3]</td>
<td>1.6 [1.3-2.7]</td>
<td>7.5 [6.8-11.8]</td>
<td>9.2 [7.9-12.3]</td>
</tr>
<tr>
<td>P value</td>
<td>A versus B</td>
<td>0.041</td>
<td>0.019</td>
<td>0.041</td>
</tr>
<tr>
<td>P value</td>
<td>A versus C</td>
<td>0.019</td>
<td>0.004</td>
<td>0.041</td>
</tr>
</tbody>
</table>

CONCLUSION Significant increases of anti-annexin V antibody and microparticles were observed in the venous blood draining the tissues of the leg during the gravitational stress of stationary standing. These were reduced during lying healing and with compression treatment. A reliable biomarker quantifying the damaging effects of gravity and the healing effects of elevation and compression may soon be identified.
C3  APPLICATION OF MAGNESIUM-CONTAINING MEDICATION IN PATIENTS WITH VARICOSE VEINS AND ITS EFFECT ON THE ACTIVITY OF MATRIX METALLOPROTEINASES

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**AIM**
To evaluate the effect of magnesium-containing medication on the concentration of matrix metalloproteinase 1 (MMP-1), metalloproteinase 9 (MMP-9) and tissue inhibitor of matrix metalloproteinase-1 (TIMP-1) in patients with varicose veins.

**MATERIALS AND METHODS**
The study included 124 patients with varicose veins, clinical class C2-C6 according to the CEAP classification. The subjects were divided into 4 groups: group 1 – operative treatment plus standard conservative treatment; group 2 – operative treatment plus conservative treatment with application of magnesium-based medications; group 3 – standard conservative treatment; group 4 – standard conservative treatment with application of magnesium-based medications. Operative treatment included crossectomy, stripping of the great saphenous vein with following mini phlebectomy and possible dissection of incompetent perforating veins. Conservative treatment was prescribed for 3 months and included compression therapy and phlebotonics. Additional application of magnesium orotate 1000 mg BID was used for 3 months in groups 2 and 4. Concentration of MMP-1, MMP-9, and TIMP-1 in blood serum was assessed using quantitative ELISA assay. Concentration of magnesium ions was assessed using colorimetry.

**RESULTS**
Considering the normal concentrations of magnesium ions (Mg2+) in blood serum according to the World Health Organization guidelines, we divided the obtained data into 3 groups: normal concentration of Mg2+ 0.75-1.26 mmol/l, moderate deficiency – 0.5-0.74 mmol/l, severe deficiency – less than 0.5 mmol/l. 64.5% of patients (80 subjects) had normal concentration of Mg2+. 28.2% of patients (35 subjects) had moderate Mg2+ deficiency. 7.3% of patients (9 subjects) had severe Mg2+ deficiency. Application of magnesium orotate caused statistically significant (p<0.05) decrease in MMP-9 activity in group 2 and group 4 patients after a 1-month period of time (10.1±1.3 ng/mL, 11.6±2.1 ng/mL before treatment and 8.2±0.8 ng/mL, 8.7±1.1 ng/mL at 1 month, respectively). Activity of MMP-9 remained decreased throughout a 6-month period. Concentration of MMP-1 decreased in all patients included in the study. Application of magnesium orotate lead to a statistically significant (p<0.05) decrease in TIMP-1 activity in group 1 and group-2 patients after the start of treatment (207.6±9.4 ng/mL, 214.3±7.7 ng/mL before treatment and 186.3±7.8 ng/mL, 197.3±8.3 ng/mL at 6 months, respectively).

**CONCLUSION**
1. The concentration of matrix metalloproteinases changed over the treatment period in patients with varicose veins.
2. Application of magnesium-based medication led to a decrease in MMP-9 and TIMP-1 activity in patients with varicose veins.
PREVALENCE AND RISK FACTORS OF CHRONIC VENOUS DISEASE OF LOWER LIMBS IN THAI FEMALE WORKERS

Aim  Venous disease of the lower limbs is common problems presenting to physician and occur frequently in woman. It is a public health problem that affects the industrialized countries. The aim of this study is to evaluate the etiology and prevalence of venous disease of the lower limb in workers, and to identify some risk factors using a detailed questionnaire and interview.

Materials and Methods  This cross-sectional survey study was carried out in 2 groups of female workers from factories and nurses, aged 18-60 years, an interviewer administered a questionnaire and examination assessed risk factor for venous disease.

Results  The overall prevalence of chronic venous disease was 38%; 25.5% in factory workers group and 85.7% in nurses group. Most clinical manifestation was venous symptom and appearance of varicose vein. Comparing between 2 group, working hours and standing hours were longer in nurses. The most associated risk factor was prolonged standing that following with BMI and family history of venous disease.

Conclusion  Chronic venous disease of lower limbs occurs very commonly in female working-aged population. This study shows that occupational factors such as prolonged standing play an important role in the symptomatic disease. Attention should be provided to female workers for risk-factor modification to prevention, to use early therapeutic measures in view of morbidity as a consequence of venous disease, of the high social costs and disturbance of quality of life.
**C5** CHARACTERISTICS OF THE PATIENTS WITH CHRONIC VENOUS DISEASE CONSULTING GENERAL PRACTITIONERS: RESULTS OF VEIN ACT COLOMBIA

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⁴ Imbanaco Medical Center, Cali, Colombia

**AIM** The VEIN Act Program (VAP), a prospective observational survey, is endorsed internationally by the European Venous Forum and, in Colombia, by the Colombian Chapter of the Latin American Venous Forum. The program was designed to assess compliance with nonoperative treatments for chronic venous disease (CVD) and report the type of treatment prescribed to patients seeking care for CVD.

**MATERIALS AND METHODS** The VAP program included male and female outpatients 18 years and older who were consulting general practitioners for CVD symptoms, consenting to participate in the program, not consulting for an emergency or an acute episode of an ongoing event, and who were free of concomitant diseases that might interfere with venous treatment. All patients underwent a clinical examination of the lower limbs, including identifying the presence and severity of CVD signs using the CEAP classification. After evaluating the clinical symptoms and prescribing nonoperative treatments, the patients were asked to return for a follow-up visit.

**RESULTS** A total of 1570 patients were enrolled. Patients were mainly female (80%), with a mean age of 58.7±14.5 years and a mean BMI of 26.92±4.24. For the CEAP classification, 6% were C0s, 16.6% C1, 19% C2, and 57.9% C3 to C6. A total of 29.3% of patients had previously consulted for leg problems, and 22.4% had already been treated. Symptom quantification was over 5 cm on VAS: 6 for heaviness, 6.4 for pain, 5.8 for the feeling of swelling, and 5.5 for cramps. Symptoms were felt mainly at the end of the day (60%) and after prolonged standing (54.4%). Regarding the frequency of symptoms, patients particularly felt the symptoms at a regular time (66.5%). With increasing CEAP classes, the presence and intensity of symptoms increased, and prior consultations and treatments for leg problems were more frequent. Regarding the presence of signs during the clinical examination, doctors reported telangiectasis (16.6%), varices (19.4%), edema (28.2%), skin changes (17.4%), and leg ulcers (7.8%). Most patients received a nonoperative treatment (94.9%), and a few also received an operative procedure (5.1%). Most nonoperative treatments consisted of lifestyle advice combined with vеноactive drugs (VADs). Compression therapy was prescribed in half of the patients, and VADs, mainly MPFF, were prescribed in most cases for 4 to 8 weeks.

**CONCLUSION** The VAP survey among general practitioners in Colombia provides reliable data on patients consulting for CVD, and it shows that many patients have symptomatic CVD. The VAP survey also showed that a nonnegligible percentage of patients have advanced stages despite previous treatments and medical care. Moreover, treatment duration was not realistic with this chronic condition.
C6 SYMPTOM EVOLUTION WITH NONOPERATIVE TREATMENTS IN OUTPATIENTS WITH CHRONIC VENOUS DISEASE CONSULTING GENERAL PRACTITIONERS: RESULTS OF THE VEIN ACT PROGRAM IN COLOMBIA

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AIM The VEIN Act Program (VAP), a prospective observational survey, is endorsed by the European Venous Forum and, in Colombia, by the Colombian Chapter of the Latin American Venous Forum. The program was designed to assess compliance with nonoperative treatments for chronic venous disease (CVD) and evaluate the effects of nonoperative treatments on CVD symptoms.

MATERIALS AND METHODS The VAP program included adult outpatients who were consulting general practitioners (GPs) for CVD symptoms, consenting to participate in the program, and not consulting for an emergency. Patients underwent a clinical examination of the lower limbs, including identifying the presence and severity of CVD signs using the CEAP classification. After evaluating the clinical symptoms with the visual analog scale (VAS) and prescribing nonoperative treatments, the patients were asked to return for a follow-up visit in which GPs assessed the efficacy of nonoperative treatments and the evolution of symptoms.

RESULTS A total of 1570 patients were enrolled. With lifestyle advice, compression therapy, and venoactive drugs, most patients reported symptom relief, mainly after 1 to 3 weeks (62.6%), but for some patients (22.3%), the time was shorter (<1 week). MPFF was the most prescribed venoactive drug (98%), so the results cannot be extrapolated to other venoactive drugs. In 302 patients who were only treated with VADs (mainly MPFF) and lifestyle advice, the symptoms decreased between the first and the second visit as follows: heaviness by 57%, pain by 61%, and swelling by 54% (P<0.0001). The mean time gap between the 2 visits (V0 and V1) was 2 months, and 92% of the patients were satisfied with their treatment.

CONCLUSION Regarding symptom relief and patient satisfaction, the VAP program in Colombia confirms the efficacy of MPFF, a well-known venoactive drug, in clinical practice.
The complexity of Venous Leg Ulcer (VLU) microenvironment, as final manifestation of Chronic Venous Disease (CVeD), and the biomolecular pathways involving in wound healing process have been extensively investigated but are still not fully understood.¹

Present study is aimed to clarify the role of the three Transforming Growth Factor β (TGF-β) isoforms and soluble Endoglin (sEng), as critical inflammatory mediators in both CVeD and wound healing, investigating their expression in Wound Fluid (WF) of both not-healing (Infl) and healing (Gran) VLU of thirty-two patients, through multiplex immunoassays. To study the role(s) of monocytes in wound healing and in the release of TGF-beta isoforms and sEng, we treated human monocyte THP-1 cell line with inflammatory stimuli induced by WF, with and without the co-treatment with Sulodexide, a therapeutic glycosaminoglycan mixture used in the VLU treatment.²

Our results showed that the quantitative expression of the three TGF-β isoforms in forty-six WF samples from VLU, revealed that TGF-β1 and TGF-β2 levels were not statistically different in Infl vs. Gran WF samples (P=0.5899 and P=0.1463, respectively). On the contrary TGF-β3 concentration was significantly higher in Infl vs. Gran WF (P=0.0185). Moreover, a statistically significant increased concentration of sEng was found in Gran compared to Infl WF samples (P=0.0003), suggesting that in VLU microenvironment a different shedding of sEng may occur during the healing process. Interestingly, we found increased levels of sEng in culture media (up-to 3-fold) after the co-treatment of THP-1 cells with Sulodexide plus WF (both Infl and Gran WF) compared to WF alone, hinting that only the interaction of glycosaminoglycan with the complex proteolytic network present in WF is able to induce the shedding of sEng in culture media. Our study revealed that TGF-β3 level was significantly higher in Infl WF compared to Gran WF, whereas sEng was significantly increased in Gran WF compared to Infl WF, mirroring the TGF-β3 ability to affect the healing process and the possible sEng involvement in the leukocyte adhesion and transmigration through the endothelium with a reduction of the inflammatory response, and the promotion of the granulating phase during wound closure.

Gleaning eventual modulation of TGF-β expression and activity during the healing process and monitoring sEng in endothelial dysfunction, as well as targeting their crucial signaling, may help to identify promising therapeutic approach to prevent the pathological wound progression improving prognosis for patients suffering of CVeD.
C8  ELASTOGRAPHY AS AN USEFUL METHOD TO DETERMINE VENOUS THROMBOSIS AGE

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AIM  Venous thrombosis is a common condition with challenging treatment. Accurate diagnosis is important for decision-making in both: medical and interventional treatment. Most specific and widely used method to diagnose vein thrombosis is ultrasonography. However, this method is not specific and diagnosis poses challenges, particularly with determining the thrombus age. Iatrogenic superficial venous thrombosis induced with polidocanol injection mimics the disease and allows to accurately investigate thrombus ageing.

MATERIALS AND METHODS  Our prospective study analysed patients with iatrogenic superficial venous thrombosis induced with polidocanol injection in patients undergoing sclerotherapy for varicose veins. Sixty patients (45 females and 15 males) aged 27-77 with no proximal GSV and SSV insufficiency were enrolled. Foam sclerotherapy was performed using standard procedure with polidocanol. Elastography was performed 7, 14 and 21 days after sclerotherapy and thrombus stiffness was evaluated. Thrombosed vessel lumen was divided into three grades of stiffness (red, green and blue) and surface area of each grade was measured.

RESULTS  Proportion of regions with different stiffness has changed over first, second and third examination with changes being statistically significant (P<0.001). Using these measurements we were able to create a model of stiffness changes over time.

CONCLUSION  Elastography can precisely measure thrombus age in iatrogenic superficial venous thrombosis.
C9 NUTCRACKER SYNDROME A RARE OR UNDERDIAGNOSED PATHOLOGIE? OUR EXPERIENCE

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AIM The Nutcracker syndrome (NCS) result from the left renal vein compression between the superior mesenteric artery and the aorta (Anterior NCS), or more rarely by compression of the LRV between the aorta and the lumbar vertebra when the vein passes behind the aorta, (posterior NCS). The association of the two anomalies can occur when a circumaortic renal vein exists. The prevalence of NCS is unknown, but it appears to be rare and underdiagnosed.

MATERIALS AND METHODS We retrospectively evaluated our experience in the treatment of patients with the diagnosis of NCS between 2012 -2016. The diagnoses was made by clinical suspicion after exclusion of other more common etiologies, and the observation of a significant hemodynamic stenosis of the venous kidney drainage by computed tomography. We observed 7 patients, 57.1%(4) females, with a mean age of 21.7 years with 85.7% in their second or third decade of life. Anterior NCS were observed in 42.9%(3), posterior NCS in 28.6% (2), antero-posterior NCS in 14.3%(1), and compression of a left side vena cava by the aorta when it cross to right side in 14.3%(1). The most common symptom was macroscopic hematuria (71.4%), follow by flank pain exacerbated by exercise (28.6%) and congestion pelvic syndrome in 14.3%. Three patients were submitted to surgery, two realized a renal autotransplant and one a left ilio-caval stenting. The other four patients followed a conservative management and surveillance. In all patients their symptoms were solved, but one patient submitted to an autotransplant necessitate a nephrectomy do to a renal venous thrombose.

CONCLUSION The diagnose of NCS can be made at any age, particularly in the second and third decade of life and is reported to be more frequent in females. In our experience we observed a female /male ratio of 1.3, and a low proportion of anterior NCS (42.9%). A policy of wait and see, decreased the necessity of surgery to near one half of the patients (42.9%) The choice of the autotransplant was do our long and good experience in kidney transplantation, with more than 2500 cases done. The nephrectomy was done by laparoscopy to reduce the invasiveness, and we should pay attention of the tension free of the renal vein, as it can result in thrombose. Despite the recent reports of good results with stenting of the renal vein we keep concern about the durability of the stents in this young population.
AIM  Upper extremities deep vein thrombosis (UEDVT) accounts for about 10% of all diagnosed deep venous thrombosis. UEDTV is classified as primary, which include both idiopathic and effort-related thrombosis and secondary, which is associated with exogenous and endogenous risk factors. The incidence of pulmonary embolism (PE) attributable to UEDVT is small (2%), regardless of treatment with anticoagulation, but the frequency of post-thrombotic syndrome after UEDVT ranges from 7-46%. We retrospectively analyzed all patients with UEDVT who were treated in our department of dermatology between 2012 and 2016.

MATERIALS AND METHODS  Retrospective analysis of the data of 16 case series.

RESULTS  16 patients were diagnosed with acute deep venous thrombosis of v. subclavia and/or v. axillaris from January 2012 to December 2016. The mean ± SD follow-up was 8.5±7.3 months. There were 8 women and 8 men. The mean age ± SD was 41.6±12.4 years. None of the patients were diagnosed with pulmonary embolism. 14 patients had secondary UEDTV and only 2 patients were diagnosed with primary UEDVT due to cancer. A venous thoracic outlet syndrome (TOS) respectively Paget-von-Schroetter syndrome was confirmed in 9 patients (56%). 15 patients (94%) were treated with oral anticoagulation and one patient with low molecular weight heparin. All patients received compression treatment until disappearance of swelling. In 10 of 16 patients (63%) a recanalization of the veins was documented, but in 6 patients more pronounced and in 2 patients minimal post-thrombotic changes were detected with venous duplex at the end of the treatment. Three patients underwent additionally thoracic outlet decompression at the Division of Plastic and Reconstructive Surgery, Medical University of Vienna, with good results.

CONCLUSION  In our case series the most patients were young adults with TOS respectively Paget-von-Schroetter syndrome. Despite oral anticoagulation and compression treatment, half of the patients developed post-thrombotic changes.

REFERENCES
C11 IN VITRO APOPTOTIC EFFECTS OF DETERGENT SCLEROSANT, SIROLIMUS AND PROPRANOLOL ON ENDOTHELIAL AND HAEMANGIOMA CELLS

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**AIM** The traditional treatment of infantile haemangioma has been surgery or corticosteroids with limited success. The current standard treatment is propranolol, with a number of reports of success using rapamycin (sirolimus). Our previous studies have identified a potential pro-apoptotic activity of detergent sclerosants at sublytic concentrations. The aim of this study is to determine the apoptotic effect of detergent sclerosants (STS, POL), propranolol and sirolimus) on haemangioma, placental and endothelial cells *in vitro*.

**MATERIALS AND METHODS** Human Umbilical Vein Endothelial Cells (HUVECs) and mouse haemangioendothelioma (EOMA) cell lines were obtained. Cells were cultured using standard methods to confluency. HUVEC and EOMA cells were then incubated either with sirolimus (0-20 nM), Propranolol (obtained as Haemangiol, 0-200 µM), or with varying concentrations of the detergent sclerosants sodium tetradecyl sulphate or polidocanol (0-0.15%). Cell counts and viability was assessed using trypan blue staining. Cellular proliferation was assessed using an MTS assay. Cellular apoptosis was assessing using lactadherin and propidium iodide (PI) staining and assessed using flow cytometry. Flow cytometry was used to assessed caspase 3 and caspase 8 expression, CFSE staining and for analysis of cell cycle by nuclear a VybrantTM green cell dye. Tube forming assays were performed using a matrigel assay. Cell morphology and growth was assessed using microscopy.

**RESULTS** Detergent sclerosants induced cellular death and decreased cellular viability. Detergent sclerosants, sirolimus and propranolol decreased cellular proliferation by the MTS assay. Both detergent sclerosants, but not sirolimus significantly increased lactadherin and PI staining in HUVEC and EOMA cell lines, suggestive of increased cellular apoptosis or necrosis. There was however, no increase in caspase 3 expression. Decreased cellular proliferation was detected using CFSE staining with propranolol, sirolimus and sclerosants. A decreased percentage of cells in the G1 phase of the cell cycle was detected in sirolimus incubated cells, however this was not found in detergent sclerosant incubated cells.

**CONCLUSION** This study has demonstrated that two separate pathways can be targeted. The incubation of EOMA cells with sclerosants and propranolol induces cellular death, whereas sirolimus inhibits cellular proliferation. This may suggest the feasibility for a combined therapy of low concentration sclerotherapy and the administration of sirolimus of haemangioma.
C12 THE ASSOCIATIONS BETWEEN LEVELS OF 25-OH-VITAMIN D AND VENOUS LEG ULCERS

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AIM The effects of 25-OH-vitamin D in the body is much wider than just the effect on calcium and bone metabolism. One of the little-studied its effects is the associations between levels of 25-OH-vitamin D and venous leg ulcers.1-4
To identify the relationship of 25-hydroxy-cholecalciferol (25-OH-vitamin D) and vascular endothelial growth factor (VEGF) with the presence of trophic disorders of varicose veins.

MATERIALS AND METHODS A prospective study included 41 patients divided into 2 groups. Group 1-19 patients with varices C2-C3. Group 2-22 patients with varices C6.

RESULTS The distribution of patients in group 1 and group 2 depending on the serum level of 25-OH vitamin D (less or more than 30.0 nmol/L) was differed. The level of 25-OH-Vitamin D less than 30 nmol/L associated with the presence of venous leg ulcers (Fisher’s test, P=0.026). The distribution of patients in group 1 and group 2, depending on the ratio of level 25-OH-vitamin D to a level VEGF (less or more than 1.5) was differed. The ratio more than 1.5 is associated with the presence of venous leg ulcers (Fisher’s test, P = 0.029). The small sample size of the study is limited the ability to generalize the results and calls for more extensive research.

CONCLUSION There are significantly greater number of patients with venous leg ulcers had the level of 25-OH-vitamin D less than 30 nmol/L. With regard to the ratio level of 25-OH-vitamin D to a level of VEGF less than 1.5 there were significantly more patients with the presence of venous leg ulcers.

REFERENCES
C13 MICROSCOPIC EVALUATION OF TRAPPED BLOOD. IS SCLERO-THROMBUS A TRUE THROMBUS?
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AIM The aim of this study was to compare the microscopic characteristics and structural composition of ex-vivo coagulum/trapped blood post-sclerotherapy with the microscopic characteristics of a thrombus.

MATERIALS AND METHODS Coagulum/trapped blood was identified and extracted with a 20 mL syringe. Samples were stained for fibrinogen and analysed with fluorescence microscopy or dehydrated and coated in gold palladium and analysed by scanning electron microscopy. Normal whole blood was also incubated in vitro with varying concentrations of detergent sclerosants.

RESULTS On fluorescence microscopy fibrin strands in trapped blood appeared to be thinner than the strands found in spontaneous thrombus samples. Trapped blood displayed a disorganised mesh-like pattern. On scanning electron microscopy, a disorganised pattern was evident. There was a small number of clusters of platelets and multiple polyhedrocytes generated during the platelet contraction stage of the clot. There were also multiple debris and structures resembling casts of cells.

CONCLUSION In conclusion, coagulum/trapped blood seen after sclerotherapy shares similarities with spontaneous thrombus formed in superficial veins. Trapped blood contains a vast number of polyhedrocytes confined into the fibrin strands. They also present a reduced number of clusters of platelets. However, the distribution of the fibrin strands is different showing a disorganized, mesh-like pattern and the strands seem to be thinner. There were also an increased number of cast structures that have not been described previously.
C14 ANATOMICAL RELATIONSHIP OF THE SAPHENOUS NERVE WITH PRIMARY VARICOSE VEINS
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AIM In endoscope-assisted surgery for varicose veins, the anatomical relationship of the saphenous nerve with the varicositic vessels was studied.

MATERIALS AND METHODS Primary varicose veins were managed through endoscope-assisted surgery.

RESULTS Between January 2007 and November 2015, 924 legs with primary varicose veins were managed. During the process, the saphenous nerve was encountered in 82 legs (8.9%). The anatomical relationship of the nerve to the main trunk, tributaries, and incompetent perforating veins was evaluated and was classified into 4 types: I, II, III, and IV, with incidences of 0.8%, 6.4%, 0.5%, and 1.1%, respectively. The incidence of the presence of this nerve in the upper-, middle- and lower-thirds of the leg was 0.6%, 4%, and 4.2%, respectively.

CONCLUSION This study revealed the relative location and incidence of the saphenous nerve among the varicositic vessels as well as the possible risk of the nerve injury in management of varicose veins.
D1 PATENCY OF VENOUS STENTS INSERTED FOR THROMBOTIC DISEASE IN PATIENTS WHO BECOME PREGNANT

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AIM  Deep venous thrombosis (DVT) affects around 100,000 patients a year in UK 1 including women of childbearing age. Contemporary management of acute iliofemoral DVT includes lysis and stenting of an obstructive lesion, while patients with a post-thrombotic iliocaval obstruction may also be successfully treated using a venous stent. 2 Anticoagulation is used to help maintain stent patency following these procedures. Pregnancy is associated with an increased risk of DVT and choice of anticoagulation therapy is limited. The aim of this study was to examine venous stent related outcomes in females who became pregnant following their procedure.

MATERIALS AND METHODS  A database of 190 patients treated at a single centre using a venous stent between January 2012 and December 2015 was analysed for women that subsequently become pregnant. Patient demographics, procedural details, stent patency (assessed using duplex ultrasonography) and any adverse events were recorded. Primary patency was defined as a patent stent with <50% diameter reduction; primary-assisted patency included those requiring re-intervention to maintain patency, and; secondary patency defined as stents that were blocked and successfully re-opened.

RESULTS  95 women were treated using a venous stent, of whom 6 became pregnant after stent insertion. Median age at the time of stent insertion was 31yrs. One woman was treated following lysis for an acute iliofemoral DVT and five patients were treated for a post-thrombotic obstruction. Three patients had a thrombophilia (APS, Factor V Leiden). The median time of pregnancy following stent insertion was 18 months and patency rates before pregnancy were: primary patency, 50%; primary assisted patency, 83% and; secondary patency, 100%. One patient with antiphospholipid syndrome developed a thrombosed stent post-partum. She had interruption of anticoagulation for 36 hours at the time of delivery. She underwent endovenous thrombectomy and stent extension 2 weeks post-partum. Although initially successful, occluded stents were found at four weeks. The remaining 5 patients suffered no stent related complications and had no interruption in anticoagulation.

CONCLUSION  Venous stents can remain patent during pregnancy despite prothrombotic tendencies. Close anticoagulation monitoring is advised and pregnant women should be counselled about the risk of stent blockage if there is a need to interrupt anticoagulation.

REFERENCES
D2  LONG-TERM OUTCOMES OF VENO-VENOUS BYPASS OPERATIONS IN POSTTHROMBOTIC SYNDROME

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AIM  The present study was aimed at assessing long-term results of veno-venous bypass operations in postthrombotic syndrome (PTS).

MATERIALS AND METHODS  We analyzed long-term outcomes of crossover vein bypass procedures in 69 patients with unilateral postthrombotic iliac vein obstructions at periods from two to 28 years and 12 patients who underwent saphenopopliteal bypasses for femoral vein obstructions.

RESULTS  It was validated that the decisive factor of the success of the crossover bypass procedure was a sufficient diameter of venous graft, i.e. not less than 7-8 mm. It has been determined that in 70.6% of the patients, crossover grafts have a propensity to dilate, furnishing the requisite venous blood outflow from an affected extremity. Venous hemodynamic studies of the affected extremity with the graft being open and cross-clamped revealed that crossover bypasses assume the primary role in the maintenance of venous returns. Some grafts (23.6%) undergo pathological transformations that diminish venous blood outflow and they require redo surgeries. Such operations were auspiciously performed in seven patients in a long-term period. In 15 years, cumulative patency of crossover grafts was 77%. There was cumulative clinical success in 71% of the patients. The patency rate of saphenopopliteal grafting within the period up to 12 years was 91.7%. Long-term outcomes of the procedures proved durable functioning of the grafts and improvement of regional venous hemodynamics. It was established that the grafts are capable of prolonged functioning without pathological dilatations and that there was significant improvement of reconstructive operations with the usage of distal arteriovenous fistulas.

CONCLUSION  Long-term results demonstrated a high efficacy of veno-venous bypass operations in PTS.
D3 PREDICTIVE VALUE OF A DAY ORTHOSTATIC LOADING TEST FOR THE REVERSIBILITY OF THE GREAT SAPHENOUS VEIN REFLUX AFTER PHLEBECTOMY OF ALL VARICOUS TRIBUTARIES

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AIM To evaluate predictive value of a day orthostatic loading test (DOL-test) for the reversibility of the great saphenous vein (GSV) reflux after phlebectomy of all varicose tributaries (VTs).

Patients with reflux in the GSV were included. Patients were treated by phlebectomy for all VTs of the GSV. GSV reflux was measured during a duplex ultrasound examination with DOL-test. We included 87 lower limbs (LLs) in 65 patients (51 women and 15 men) aged from 29 to 53 (mean age 36.7) years. In 12 months after the surgery the amount of limbs with eliminated reflux constituted 77.0%. In LLs with resolved GSV reflux (n=67) the initial evening RE constituted 3.76 and reduced in the morning to 1.51, P=0.000001. In LLs with persistent GSV reflux (n=20) the initial evening RE constituted 3.75 and reduced in the morning to 3.00, P=0.028418. In LLs with resolved GSV reflux the initial evening RD constituted 2.10 s and reduced in the morning to 0.93 s, P=0.000001. In LLs with persistent GSV reflux the initial evening RD constituted 2.13 s and reduced in the morning to 1.82 s, P=0.043115. In LLs with resolved GSV reflux the initial evening PRV constituted 173.46 mm/s and reduced in the morning to 101.57 mm/s, P=0.000001. In LLs with persistent GSV reflux the initial evening PRV constituted 172.50 mm/s and reduced in the morning to 158.50 mm/s, P=0.007686. In LLs with resolved reflux the initial OG was 0.93 mm with the initial evening GSV diameter of 7.20 mm. After the surgery OG reduced to 0.59 mm, P=0.000001. The evening vein diameter decreased to 5.07 mm, P=0.000001. In LLs with persistent reflux the OG and the GSV diameter decreased from 0.55 mm to 0.51 mm, P=0.017961 and evening GSV diameter from 7.75 mm initially to 7.55 mm after the treatment, P=0.067890 respectively.

CONCLUSION Characterizing GSV with minimum volume loading, DOL-test shows the degree of preservation of muscular-tonic properties of GSV and allows to predict the reversibility of the GSV reflux after phlebectomy. Being initially high, the GSV OG points that the potential of muscular-tonic function is saved. Its decrease after the surgery proves the decrease of the volume loading on GSV.
**D4 IMPACT OF CHRONIC VENOUS DISEASE ON QUALITY OF LIFE: RESULTS OF AN EPIDEMIOLOGICAL STUDY**

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**AIM** Chronic venous disease (CVD) affects millions of people and most of the patients are diagnosed with CVD in advanced stages. CVD is negatively impacting the patient’s Quality of Life (QoL) at physical and psychological levels. The impact of newly diagnosed CVD on QoL was not evaluated by other studies in Romania. The aim of this project is to assess the QoL for adult patients newly diagnosed with CVD addressing to the GP’s office in Romania.

**MATERIALS AND METHODS** The epidemiological study was conducted in Romania and planned to include 18 patients per site recruited by 120 sites (GPs) between June-August 2016. Patients included in the study were adult, signing the inform consent form, newly diagnosed with CVD or patients diagnosed with CVD, without CVD treatment the past 6 months. During the study visit, data about demographic distribution, risk factors, clinical profiles, CVD symptomatology, QoL parameters, as well as pharmacological management practice were collected.

**RESULTS** The study included 1893 patients (79.1% females) with 50.4% of patients belonging to age group (51-70 years). The most frequent CVD symptoms reported were heavy leg sensation (85.7%), followed by swelling of the feet (77.3%) and pain (73.1%) and “restless” feet (72.4%). The most frequent CVD signs were telangiectasia and reticular veins (79.2%), varicose veins (65.8%) and edema (53.4%). Risk factors were present for most patients: prolong sitting (>5h/day) (42% females, 46.7% males), prolonged standing (>5 h/day) (44.4% females, 45.7% males). The CEAP classification placed most of the patients within C3 class (31.9%), followed by C2 class (28.0%), C1 class (21%) and C4a (8.9%). Most of the patients reported “low” or “moderate” intensity of the CVD symptoms. QoL was affected for most of the patients in “a little” or “moderate” degree, being noticed a significant negative impact on physical, psychological, and social functioning components of QoL, which was correlated with CEAP class (P<0.001). The most recommended venoactive medication for CVD was MPFF (48.4%), followed by Diosmin + micronized hesperidin (21.5%) and treatment period was indicated as “permanent” in 64.9% of cases. Despite of patients being diagnosed with CVD 3.8% of patients did not received any treatment indication. Data regarding correlation of CEAP class, CVD symptoms and impact on QoL identified a significant correlation between all analyzed components (P<0.001).

**CONCLUSION** Study results prove that CDV diagnosis was established with relative delay and CVD is negatively affecting patients’ QoL. There was a significant correlation between CEAP class, CVD symptoms and impact on QoL parameters. Additional research will be needed to identify the long-term impact of CVD on QoL of affected patients and their families.
**AIM**  Venous hemodynamics literature is still in need of objective data supporting a validated physical model of lower limb drainage. Our group published data demonstrating that, in physiological lower limbs, venous velocities increase when moving from the saphenous tributaries, to the saphenous system.¹

The aim of the present study is to assess changes in venous kinetics in case of superficial chronic venous disease (CVD), so providing objective data to implement the knowledge in venous pathophysiology and in the related laws of physics application.

**MATERIALS AND METHODS** Venous Doppler scanning was performed on 40 lower limbs of 28 patients affected by CVD (mean age 56±6, M/F: 1/1, BMI 23±2, C2-6Ep,As,Pr). Diameters, peak systolic velocity (PSV), peak diastolic velocity (PDV), end diastolic velocity (EDV), reflux time (RT), resistance index (RI) and diastolic time average velocity (DTAV) were measured in three different groups of venous segments:

a) great saphenous vein (GSV) at 2 cm above the origin of the incompetent tributary (T)(Group-A);
b) GSV at 2 cm below the origin of the incompetent T (Group-B);
c) incompetent tributary at 2 cm from its origin from the GSV (Group-C) (Figure 1).

Figure 1. Refluxing venous network. Double arrows indicate the points of assessments at 2 cm from the emergence of the incompetent great saphenous vein (GSV) tributary (T). Group-A: GSV at 2 cm above the origin of T. Group-B: GSV at 2 cm below the origin of T. Group-C: T at 2 cm from its origin from the GSV.

**RESULTS** PSV in group-B (16.7±6.6 cm/s) was significantly lower than in group-A (30.5±12.1 cm/s; P=0.0001) and C (28.1±5 cm/s; P=0.0001).

PDV was significantly higher in group-C (-60.2±25 cm/s) compared to group-A (-36.8±12.9 cm/s; P=0.0001) and group-B (-15.1±4.4 cm/s; P=0.0001) (Figure 2).
DTAV was significantly higher in group C (-21.3±8.5 cm/s) compared to group A (-15.7±5.2 cm/s; P=0.0001) and group B (-11.1±2.9 cm/s; P=0.0001). In group B, DTAV was significantly lower than in group C (P=0.0001).

RI was significantly higher in group B (1.7±0.8) compared to group A (1.4±0.2) (P=0.04) and group C (1.4±0.1) (P=0.03) (Figure 3).

Venous diameter was significantly larger in A (5.9±0.9 mm) compared to C (3.8±0.8 mm)(P=0.0001) and B (3.8±0.5 mm) (P=0.0001).

All the other comparisons were not significantly different.

**DISCUSSION** Compared to physiology, refluxing saphenous tributaries present an inverted velocity gradient whenever compared with the GSV above and below their confluence. These data introduce the Venturi effect role in venous drainage. Moreover, these findings provide objective measures paving the way for further investigation in venous pathophysiology.

**REFERENCES**
D6 CAN INFRARED IMAGING IMPROVE THE KNOWLEDGE OF CEAP C1 CLASS?

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AIM Although infrared imaging (IR) have been used for subcutaneous vein (ScV) detection to improve venipuncture, this technique was used during the thirties of the last century in order to improve visualization of varicose veins.1 Recently, Bustos has used it for the study of CEAP C0-C1 patients,2 but unfortunately his work has not had continuity. CEAP class 1 patients have visible telangiectasia or reticular veins. This, being subcutaneous, generally go unnoticed, although they were altered. At the present moment, we have no information about their behaviour in these patients because the devices available in the market do not allow the recording. To obtain images from the visible (VS) and the infrared spectra (IrS) from CEAP C1 patients using a system that: allows both real-time viewing and recording, be easy to use in medical offices and be economically affordable.

SYSTEM DEVELOPED Specific material: two infrared light sources (850 nm) and a sensitive infrared camera (IDSTM, range filter of 715-1100 nm) that allows real-time visualization of what is captured by the lens.

GENERAL MATERIAL Digital camera (Canon EOS 1200) and personal computer.

MATERIALS AND METHODS One hundred consecutive CEAP C1 patients were selected and explored while standing. During the examination the doctor explained the meaning of the altered ScV. Thirty-six photos (18 VS and 18 IrS) were taken from each of them: six of the whole limb, six of the thighs and six of the legs (one anterior, two internal, two external and one lateral). Three hundred and fifty paired images (175 of VS and 175 of the IrS) from both the thigh (anterior, internal, posterior and external) and the leg (internal, posterior and external) were randomly selected. With a pen tablet (Intuos Draw, WacomTM) the area to be studied was measured and 1-pixel line was drawn along the axis of the visible veins, being calculated the venous area and their percentage related to the total area. All measurements were expressed as pixels. T-test was applied and P <0.05 were admitted as significant.

RESULTS
1. Visible veins occupy a larger surface in the IrS images than in their VS counterparts in all studied regions (P <0.05).
2. Patients believe that infrared exploration help to better understand the clinical condition.
3. The cost of the specific material is about 600 €.

CONCLUSION Infrared exploration of ScV improve in a simple, efficient and economical way the knowledge of the CEAP C1 class and the patients will know better the disease. More studies are needed to determine the limits and scope of the proposed technique.

REFERENCES
D7  ISOLATED REMOVAL OF VERTICAL VENOUS REFLUX IN THE TREATMENT OF VARICOSE VEINS
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**AIM**
The aim of this study was to investigate the influence of isolated removal of vertical venous reflux in varicose veins to the symptoms of disease and it cosmetic manifestation.

**MATERIALS AND METHODS**
Prospective study included 87 patients, divided into 2 groups.
Group 1. C6. This group consisted of 24 patients. Their age ranged from 35 to 76 years (Me=57.5, IQR 51.0-70.0).
Group 2. C2-4. This group consisted of 63 patients. Their age ranged from 26 to 75 years (Me=49.0, IQR 41.0-56.0).

**STUDY DESIGN**
1st stage of treatment: isolated removal of vertical venous safena reflux.
2nd stage of treatment: removal of cosmetic defects as subcutaneous varicose veins 2 months after.

**RESULTS**
Group 1. The removal reflux by EVLA performed in 13 patients, by foam-sclerotherapy - 11. Subsequently, two patients withdrew from the study because of noncompliance. Pain significantly decreased in all patients in 2 month follow-up. 16 patients had no pain, 6 – had weak pain in the epithelizing ulcers. Swelling did not have 18 patients and 4 – had moderate swelling in the ankle after walking. Ulcers (including multiple) 5 cm in diameter were healed in 20 patients without additional manipulations, 2 patients with larger ulcers refrained from dermoplasty because of clinical improvement and decrease in the ulcers sizes. 2 months follow-up found a decrease VCSS from 20 (Me) to 5 (Me). 2 years follow-up found a final decrease VCSS to 2 (Me).
Group 2. EVLA for removal of vertical reflux performed in 63 patients. 2 months after 61 patients had a complete absence of pain, heaviness and edema. 2 patients noticed the appearance of moderate edema in the afternoon. 2 months follow-up found a decrease VCSS from 5 (Me) to 4 (Me). 2 years follow-up found a final decrease VCSS to 2 (Me).
After isolated removal of reflux the second stage of treatment was not required in 29.7% of patients. Foam-sclerotherapy performed in 15.6%. miniphlebectomy – in 54.7%. Meanwhile the number of skin punctures in the case of miniphlebectomy decreased by 25.0-58.0% (Me=40.0, IQR 34.25-45.0) in comparison with the initial examination planning.

**CONCLUSION**
Isolated removal of vertical venous reflux promoted:
- in varicose veins C6 – reduction of symptoms and healing of varicose ulcers 5 cm in diameter without additional skin plastic surgery;
- in varicose veins C2-C4 – substantial symptom relief in most cases and disappearance of cosmetic defects such as visible varices in 29.7% of patients.
D8  TREATMENT OF GREAT AND SMALL SAPHENOUS VEIN INSUFFICIENCY USING A CYANOACRYLATE GLUE: OUR FIRST EXPERIENCE ON 30 PATIENTS
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AIM  Treatment of saphenous veins insufficiency has undergone a substantial change in the last years. A new method using a Cyanoacrylate glue, has recently been approved being as efficacious as endothermal ablation, without the need of perivenous tumescent anaesthesia (TA). The aims of the study were: a. the complete occlusion of the treated vein; b. the incidence of post-procedural pain and complications.

MATERIALS AND METHODS  30 patients (28 great saphenous and 2 small saphenous veins) were enrolled in our department between November 2015 and February 2017. The inclusion criteria were: insufficiency of the great or small saphenous vein, a diameter while standing of 5-12mm and a navigable trunk, without previous history of DVT, PE or thromboflebitis. All the patients gave an informed consent to the study. The patients underwent the treatment following the known protocol given by the manufacturer (Venaseal Closure System) and published in previous papers. Unlike other authors, we decided to treat at the same time the visible varicose branches by phlebectomies under TA. All the patients wore a II class elastic stocking for 1 week.

RESULTS  Patients underwent a visit and an echochlordoppler examination at day 3, day 7, at 3 months and 1 year. At each control the presence of pain, the use of pain killer and the occlusion rate were reported. At day 3 none of the patients experienced pain in the trunk treated with the adhesive, while 12 out of 30 patients experienced light to mild pain in the site of phlebectomies. At day 7, 4 patients reported some discomfort along the trunk, that did not required the use of pain killers, while 2 patients (1 at day 10 and the other at day 14) experienced an intense inflammatory reaction that required non-steroidal antinflammatory medication for 5 days. The occlusion rate at day 3 and 7 was of 100% with a residual competent stump 1 cm to 5 cm long. At 3 months, 2 out of 23 patients had a refluxing stump. We did not have DVT. At the 3 months visit, all the patients stated that they would have chosen again this kind of treatment, except 1.

CONCLUSION  As stated by other papers the use of the Cyanoacrylate Adhesive is safe effective and simple. The possibility to treat more than one saphenous vein in the same session, could be very attractive with a rapid return to work. Longer follow-up are needed to compare this new method with the other endovascular treatments.
The aim of this paper is to present VANST (Varices’ Ambulatory Non-stripping Surgical Therapy) - a particular minimally invasive surgical method of treatment of the large diameter varicose veins. This technique consist in the complete disconnection of the pathologically dilated superficial veins.

This retrospective study regards cases operated on between September 1998 - December 2016. Only cases with varicose veins of a diameter of 40 mm. or greater (observed in minimum two segments with patient in standing position) where included in the study.

The steps of the procedure are:
1. The marking on the skin of the places of the future incisions
2. The surgical procedure:
   - local anesthesia with lidocaine 1%
   - incisions of 3-5 mm
   - the varicose veins (including insufficient saphenous trunks) and the insufficient perforators are intercepted, sectioned and ligated – in this manner both the venous flux and reflux are eliminated; the varices rest in place but they are taken out of the venous circuit and become just empty non-functional tubes
   - the closing-up of the incisions.
3. A non-compressive bandage is applied.
4. The patient is immediately mobilized after the operation and leaves the clinic after 30 minutes. Domestic activities can be immediately resumed after surgery and the professional ones after a maximum of 24-48 hours.

Number of cases in the study: 648 limbs (623 patients – 166 women and 457 men).

The structure of the cases based on CEAP classification: C2-53; C3-127; C4a-224; C4b-184; C5-19; C6-41.

Postoperative closing up of the varicose veins takes place immediately in 100% of the cases.

5 years follow-up: recurrence after VANST occurs in 6.24% of the cases.

The surgical treatment of the varicose veins has changed. The advantages of VANST are:
- minimally invasive procedure;
- ambulatory treatment (2-3 hours hospitalization);
- no intraoperative bleeding, no postoperative echimosis or hematoma;
- postoperative evolution - practically painless;
- aesthetic postoperative appearance.

VANST is an excellent alternative to stripping for treating large diameter varicose veins.
D10 CLINICAL OUTCOMES AND QUALITY OF LIFE AFTER ENDOVENOUS ABLATION FOR GREAT SAPHENOUS VEIN INCOMPETENCE: A SINGLE CENTER PROSPECTIVE NONRANDOMIZED STUDY

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AIM Endovenous thermal ablation is a minimally invasive technique that has challenged conventional varicose vein surgery. The objective of this study was to report our experience and to evaluate the short term outcomes.

DESIGN Single-center prospective nonrandomized study.

MATERIALS AND METHODS Patients with great saphenous vein (GSV) incompetence involving the sapheno-femoral junction and no previous venous interventions treated from September 2015 to January 2016 were included. Demographic data, clinical, and procedural information were collected. Clinical-etiopathology-pathophysiology (CEAP) classification, CEAP clinical score, Venous Clinical Severity Score (VCSS) and Chronic Venous Insufficiency Quality-of-Life Questionnaire (CVIQ) were analyzed. Follow-up including duplex scan (DUS) performed at 1 and 12 months. Primary outcome was anatomic success defined as absence of reflux or recanalization of GSV. Secondary outcomes were complications, improvement of CEAP clinical, VCSS and CVIQ scores. Patients in whom recanalization was demonstrated were analyzed for anticoagulant or antiplatelet usage.

RESULTS A total of 59 patients (19 male, mean age 52, range 22-75 years) were included over a 16-month period. All patients completed 1 year follow-up. The majority of the patients (74%) were classified as C2 or C3 venous disease. Forty three patients underwent endovenous laser ablation (EVLA) with a 1470 nm diode laser, while the remaining ones (16 patients), radiofrequency ablation (RFA). Additional phlebectomy was performed, if required. Patients in the EVLA group received on average 83.05 J/cm (SD, 10.40). Total occlusion rate was 89% with comparable results between EVLA and RFA (88%, n=38; 87%, n=14, respectively). Segmental (n=5), or complete (n=2) recanalization was seen in 7 limbs (11%) after initial successful ablation at 1 year. Anticoagulation or antiplatelet agent usage did not increase the risk of endothermal ablation failure. All patients showed significant (P <0.0001) improvement of CEAP clinical, VCSS and CVIQ scores including those with recanalization. The complication rate was low (10%) with most frequent reported a burning sensation or numbness (3 patients) followed by superficial vein thrombosis (2 patients). No major complications such as endothermal heat-induced thrombosis or pulmonary embolism were recorded.

CONCLUSION Endovenous thermal ablation is an effective treatment. No difference in the outcomes was found between EVLA and RFA. Improvement of clinical and quality of life scores at 1 year was observed in all patients regardless the presence of recanalization in few patients.
AIM The aim of the study was to assess the mechanosclerotherapy with a new device Flebogri on an animal model.

MATERIALS AND METHODS The experiment was done in nine sheep Polish merino breed, weighting 40-50 kg. Animals were anaesthetized intravenously. The histometric investigations consisted with the lateral saphenous vein wall measurements. The material was divided into three groups: two experimental (1 and 2) and control (3) group. The 1st experimental group included histological slides of the veins treated with the use of Flebogri and sclerosant simultaneously, in the 2nd experimental group was used only Flebogri. Flebogri was applied into lateral saphenous vein of the both hind limbs. The vessel wall thickness was estimated in four points of histological image in mm (V1-4). All measurements were taken using Axiovision software. The statistical analysis of achieved results was performed using IBM SPSS 23.0 software.

In a period of one month animals were euthanized and the occlusion rate of the treated veins and changes in the vein wall were calculated. The Shapiro-Wilk test results and the quantity of the investigated parameter groups allowed for non-parametric method use in four points of thickness measurements comparison (Manna-Whitney test), P<0.05.

RESULTS The Mann-Whitney test proved the statistically significant differences between both experimental groups, the results achieved for 2nd experimental group (2) were higher. Moreover the mentioned test showed the statistically important differences between the 1st experimental (1) and control group (3), the results achieved in the 1st experimental group were higher than in control group. Finally, the statistical analysis stated the significant differences between the 2nd experimental (2) and control (3) group in V 1, V 2, V 3 and V – average values.

CONCLUSION The achieved results allowed for statement, that the simultaneous use of Flebogri and sclerosant gave better results of vein lumen reduction than separately used Flebogri.
Consider a not too uncommon case where Chronic Venous Disorder is initiated by inherited valvular dysfunction, valvular damage due to DVT or enlargement of vein diameter leading in sequence to: reflux, increased pressure and blood volume in the legs, even more enlarged veins, even higher reflux, higher capillary pressure, increased flow of fluid into the surrounding tissues, oedema, lesser oxygen and nutrition support the skin which finally leads to leg ulcers.

In order to fight this, a compression strategy of has been used even long time before Hippocrates bandaged his first patient. But what good does the compression bring to the table? In this talk we will focus on three different functionalities: i) increased static pressure leading to higher interstitial hydrostatic pressure which in turn leads to lesser fluid outflow from the capillary system; ii) increased static pressure in the tissues around the dysfunctional valves leading to a decreased vein radius that could in many cases improve and even cure the leaking valves; iii) increased dynamic pressure boosting the calf pumping mechanism improving the ejection fraction of the venous flow towards the heart.¹

This three punch combo is a powerful tool to prevent CVD, but what are the optimal pressures in these cases in order for the whole ensemble to be optimal? In this talk we will discuss underlying mathematical models for i), ii) and iii) one by one, but also in a sequence in order to view a classical treatment in a novel perspective.

i) Under Starlings model ² and with a few assumptions, we get that the net filtration

\[ \Delta J = K_f \Delta P_i \]

where \( P_i \) is the interstitial hydrostatic pressure, i.e. the net decreases linearly with increased interstitial hydrostatic pressure.

ii) Using a combination of the two models: Laplace’s law [3] and Hooke’s law [4], and assuming that the thickness of the vein can be approximately constant, we get that the new radius under compression depends on the internal venous blood pressure, PV, and the external hydrostatic pressure outside the vessel, PT, as

\[ r = r_0 / (C - PV + PT) \]

where \( r_0 \) is the radius of the vein without circumferential tension; \( C = 2 \pi k t \), where \( k \) is the spring constant in Hook’s equation and \( t \), the thickness of the vein. It turns out that this function is convex wrt PT, see the graph, and hence even a small increase of the external pressure will decrease the vein radius rather effectively.

iii) Assuming well functioning valves, we have an ejected volume per length unit of

\[ \Delta V = \pi (rr^2 - rf^2) \]

where \( rr \) are \( rf \) radii under relaxed and flexed calves according to ii).
Figure 1.

Graph of vein compression according to ii)

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REFERENCES
D13 EVALUATION OF THE APPLICATION OF RADIOFREQUENCY ABLATION TREATMENT OF VARICOSE VEINS OF THE LOWER EXTREMITIES IN EARLY TERM AFTER SURGERY

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AIM  Comparison of life quality and chronic venous insufficiency’ (CVI) dynamics during radiofrequency ablation (RFA) and combined phlebectomy (PE) in the early period after the surgery.

MATERIALS AND METHODS  This work is based on the observation of 61 patients in the early postoperative period (1 month after surgery). 35 patients were performed radiofrequency ablation (RFA - main group), 26 patients were performed combined phlebectomy (control group). In this research, we used: a questionnaire (to evaluate the quality of life) (SF-36), Digital Rating Scale (TSSHR) for the subjective assessment of the level of pain, severity score of chronic venous insufficiency (CVI) on VCSS. We analyzed the presence of thrombotic complications (phlebothrombosis, thrombophlebitis) in the postoperative period. Statistical processing of the data was performed using “STATISTICA-8” software package, the difference was considered significant at P <0.05.

RESULTS  Changing of physical health component in the main group was 19.76%, in the control group - 12.3% (P <0,01). Changing of mental health component in the main group was 3.5% higher compared with the control group (P <0,05). Reduction of pain in patients of the main group was 22.7%, while in the control group - 13.9% (P <0,05). The pain level in the first day after RFA was 2.5, after PV - 5.9 (P <0,05). In the main group, significant CVI dynamics was observed: improvements in the first month after surgery in the main group was 1.7, in the control 1.01 (P <0,05); 3 months later - 1.89 and 1.19 respectively (P <0,05). The control group patients were more likely to develop postoperative hematomas: 53.9% in the control, 37.1% in the main group (P <0,05). Paresthesia in the main group was observed in 17.1%, in the control group - 38.5% (P <0,05). Thrombotic complications were reported more frequently in the control group (two cases of phlebothrombosis), in the main group - 1 case.

CONCLUSION  Early after intervention radiofrequency ablation has many advantages compared with the combined phlebectomy.
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- Restoration of endothelial function
- Reduction in inflammation
- Improvement in CVD signs and symptoms

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1 Rabe et al. Phlebologie 2012; 4:206-213 (Guideline)
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COMPOSITION*: Dry Ruscus extract titrated in steric heterosides 150.0 mg; Hesperidin methyl chalcone 150.0 mg; Ascorbic acid 100.0 mg; for one hard capsule. INDICATION*: Indicated in adults for Treatment of symptoms related to veno-lymphatic insufficiency and Treatment of functional signs linked to haemorrhoid attacks. DOSAGE AND ADMINISTRATION*: In veno-lymphatic insufficiency: usual dose is 2 to 3 capsules per day; In proctology: 4 to 5 capsules per day. CONTRAINDICATIONS*: Hypersensitivity to the active substances or to any of the excipients listed in section 6.1.**; Iron storage disorders due to the presence of ascorbic acid in the composition of the medicinal product. WARNINGS**: If diarrhoea develops, discontinue treatment. Haemorrhoid attacks: Treatment must be of short duration. The administration of the product is no substitute for specific treatment of other proctological diseases. If the symptoms do not resolve rapidly, proctological examination must be conducted and treatment must be reviewed. INTERACTIONS**: FERTILITY**, PREGNANCY/LACTATION**: There are no or limited amount of data available. DRIVE & USE MACHINES**: UNDESIRABLE EFFECTS**: The most commonly reported are diarrhoea and abdominal pain; Uncommon: Insomnia, Dyspepsia, Nausea, Erythema, Pruritus, Muscle spasms, Pain in extremity. OVERDOSE**: No cases of overdose have been reported. PROPERTIES**: Venotonic action: in vitro, in isolated perfused vein, Ruscus extract rapidly induces (within 5 to 8 minutes) a marked, progressive and lasting contraction; in vivo, in animals, Ruscus extract administration induces an increase in venous perfusion pressure. The intensity of the effects is comparable in healthy and rendered pathological veins. Action on lymphatic circulation: lymphatic flow measured on the thoracic duct in dogs shows a significant and lasting increase. Vasculo-protective actions: a reduction in capillary permeability was demonstrated in humans. PRESENTATION**: Pack-sizes of 20, 30, 60 or 100 hard capsules. Not all pack sizes may be marketed.

* For complete information, please refer to the Summary of Product Characteristics for your country.

Pierre Fabre