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CONTENTS

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EDITORIAL

315 Ablate early the superficial reflux but don't neglect deep reflux or obstruction

Efthymios D. Avgerinos, MD, and George Geroulakos, MD, *Pittsburgh, Pa; and Athens, Greece*

CLINICAL RESEARCH STUDIES

ACUTE VENOUS THROMBOEMBOLISM

317 Empirical systemic anticoagulation is associated with decreased venous thromboembolism in critically ill influenza A H1N1 acute respiratory distress syndrome patients

Andrea T. Obi, MD, Christopher J. Tignanelli, MD, Benjamin N. Jacobs, MD, Shipra Arya, MD, Pauline K. Park, MD, Thomas W. Wakefield, MD, Peter K. Henke, MD, and Lena M. Napolitano, MD, *Ann Arbor, Mich*

Thirty-six critically ill patients with H1N1 acute respiratory distress syndrome had increased risk of venous thrombotic complications, particularly pulmonary embolism. Prophylactic systemic anticoagulation significantly reduced venous thromboembolism incidence without increased hemorrhagic complications.

325 Four-extremity venous duplex ultrasound for suspected deep venous thrombosis is an anachronism

Taehwan Yoo, MD, MS, Rishav Aggarwal, BS, Shayna Brathwaite, MD, MS, Bhagwan Satiani, MD, MBA, and Mounir J. Haurani, MD, *Columbus, Ohio*

Analysis of 188 four-extremity duplex ultrasound (FED) studies to diagnose suspected deep vein thrombosis suggests that FED is not routinely indicated and it is an inefficient use of healthcare resources.

333 Clinical outcomes after direct and indirect surgical venous thrombectomy for inferior vena cava thrombosis

Markus U. Wagenhäuser, MD, Christos Dimopoulos, MD, Kamile Antakyali, MD, Yvonne K. Meyer-Janiszewski, MD, Joscha Mulorz, MD, Wiebke Ibing, PhD, Neslihan Ertas, MD, Joshua M. Spin, MD, PhD, Hubert Schelzig, MD, and Mansur Duran, MD, *Düsseldorf, Germany; and Stanford, Calif*

This retrospective study of 152 patients with open surgical thrombectomy for acute inferior vena cava thrombosis performed during a 31-year period found a 5-year secondary patency of 94% and freedom from post-thrombotic syndrome after 25 years in 84%, regardless of undergoing direct or indirect thrombectomy. Open surgical approaches may be considered for those not candidates for endovascular treatment.

Cover Image: See Venous Images, page 450

CONTENTS (continued)

SUPERFICIAL VENOUS DISEASE

344 Treatment pattern of consecutive patients with chronic venous disease

Joel M. Crawford, MD, Antonios Gasparis, MD, Sahar Amery, MD, and Nicos Labropoulos, PhD, *Stony Brook, NY*

This is a retrospective analysis of 200 patients who presented over a 9-month period to a vascular clinic with chronic venous insufficiency. The average ablation per patient with chronic venous insufficiency was 1.3, while those who underwent ablation averaged 1.7 ablations. Average ablations per CEAP class increased as C class increased.

349 Duplex ultrasound findings and clinical classification of lower extremity chronic venous insufficiency in a Thai population

Tanapong Panpikoon, MD, Banjongsak Wedsart, MD, Tharintorn Treesit, MD, Orapin Chansanti, MD, and Chinnarat Bua-ngam, MD, *Bangkok, Thailand*

This retrospective study of 1010 limbs in 585 Thai patients with chronic venous disease found duplex abnormalities in 66.2% and 44.8% had CEAP clinical class 2 disease. There was a higher prevalence of C4-6 disease in men vs women and short saphenous and perforator reflux was rare (<1%) in those without great saphenous reflux.

356 Editors' Choice

Ultrasound-based topographic analysis of tributary vein connection with the saphenous vein during ambulatory conservative hemodynamic correction of chronic venous insufficiency

Sangchul Yun, MD, PhD, RPVI, RVT, *Seoul, Korea*

This retrospective cohort study in 41 limbs of 30 patients found that 82% of escape points from refluxing saphenous veins to tributary veins (EPSTs) were located below the knee. Patients having above-knee thermal saphenous vein ablations should have treatment of EPSTs below the knee with sclerotherapy, miniphlebectomy, or direct ligation of tributary veins to prevent residual venous shunting and reduce recurrences while minimizing the potential of saphenous nerve injury.

364 Two-year results of a multicenter randomized controlled trial comparing Mechanochemical endovenous Ablation to RADiOfrequeNcy Ablation in the treatment of primary great saphenous vein incompetence (MARADONA trial)

Suzanne Holewijn, MSc, PhD, Ramon R. J. P. van Eekeren, MD, PhD, Anco Vahl, MD, PhD, Jean Paul P. M. Vries, MD, PhD, and Michel M. P. J. Reijnen, MD, PhD, on behalf of the MARADONA study group, *Arnhem, Amsterdam, Nieuwegein, and Groningen, The Netherlands*

This multicenter randomized controlled trial comparing mechanochemical ablation (MOCA) versus radiofrequency ablation (RFA) in 209 patients found that MOCA resulted in lower postoperative pain scores, earlier restart of daily activities, and quicker improvement of Venous Clinical Severity Scores but anatomical failures due to partial recanalizations. MOCA and RFA showed similar outcomes and health-related quality-of-life measures through 2 years.

375 Regression of varicose veins after cyanoacrylate closure of incompetent great saphenous veins without a localized concomitant procedure

Jin Ho Hwang, MD, PhD, Sang Woo Park, MD, PhD, Ki Hyun Kim, MD, Woo Young Yang, MD, Jae Joon Hwang, MD, PhD, Song Am Lee, MD, PhD, Jun Seok Kim, MD, PhD, Jae Bum Park, MD, Hyun Keun Chee, MD, PhD, and Ik Jin Yun, MD, PhD, *Seoul, Republic of Korea*

This retrospective study of cyanoacrylate closure of 63 limbs with great saphenous vein (GSV) incompetence found that all GSVs demonstrated closure with resolution of varicose veins without an adjunctive procedure in 71.7% at 3 months. Resolution of varicose veins was associated with greater coverage of the varicosity entry points ($P = .002$) and more distal location of the access site ($P = .024$).

CONTENTS (continued)

382 **A pilot study of preoperative heart rate variability predicting pain during local anesthetic varicose vein surgery**

Katarzyna Powezka, MRCS, Tricia Adjei, MEng, Wilhelm von Rosenberg, MSc, Pasha Normahani, MSc, Valentin Goverdovsky, PhD, Nigel J. Standfield, MD, Danilo P. Mandic, PhD, and Usman Jaffer, PhD, *London, United Kingdom*

This prospective pilot study found that preoperative heart rate variability predicted intraprocedural pain in patients undergoing local anesthetic varicose vein surgery and the predicted pain scores correlated with postoperative patient reported intraprocedure pain scores.

387 **Transient increased tumescence of the glans penis during penile erection after endovenous ablation of the great saphenous vein**

Jens Cordes, PhD, Michael Zimbelmann, Axel S. Merseburger, PhD, Mario Kramer, PhD, Reinhard Vonthein, PhD, Hartwig Büttner, PhD, Andreas Recke, MD, and Birgit K. Kahle, PhD, *Lübeck and Bad Homburg, Germany*

Using a validated questionnaire of erectile function, this single-center prospective study found that 11 of 62 patients (11%) undergoing great saphenous vein ablation had postoperative subjective enlargement of the glans penis upon penile erection compared to glans tumescence preoperatively, without a sustained positive impact on general erectile function.

ENDOASCULAR TREATMENT OF VENOUS DISEASE

392 **Assessing radiation exposure to patients during endovascular treatment of chronic venous obstruction**

Mohammad Esmaeil Barbaty, MD, Alexander Gombert, MD, Karina Schleimer, MD, Drosos Kotelis, MD, Cees H. A. Wittens, MD, Philip Bruners, MD, and Houman Jalaie, MD, *Aachen, Germany*

This prospective study assessed radiation exposure in 78 patients during endovascular venous recanalization procedures and found that radiation exposure did not reach the level of deterministic effects and indirect parameters of radiation exposure correlated with direct measurements of effective dose. Radiation dosage should still be minimized to obviate against longer term possible stochastic effects of radiation.

VENOUS TRAUMA

399 **The mortality for surgical repair is similar to ligation in patients with traumatic portal vein injury**

Joseph Sabat, MD, PhD, Chiu-Hsieh Hsu, PhD, Quyen Chu, MD, FACS, and Tze-Woei Tan, MD, FACS, *Tucson, Ariz; and Shreveport, La*

A review of 752 patients with traumatic portal vein injury in the National Trauma Data Bank revealed that mortality and bowel resection for ligation and repair of the portal vein injury were not statistically different after adjusting for race, Injury Severity Score, Glasgow Coma Score, and associated vascular injury.

INFERIOR VENA CAVA FILTERS

405 **Trends in inferior vena cava filter placement and retrieval at a tertiary care institution**



Nathan Belkin, MD, Benjamin M. Jackson, MD, Paul J. Foley, MD, Scott M. Damrauer, MD, Venkat Kalapatapu, MD, Michael A. Golden, MD, Ronald M. Fairman, MD, and Grace J. Wang, MD, MSCE, *Philadelphia, Pa*

This retrospective, single-institution study of 627 patients undergoing inferior vena cava filter placement between 2013 and 2017 shows both a decline in overall filter placement (predominantly in prophylactic filters) and an increase in overall filter retrieval. These data reflect a changing clinical environment marked by more conservative filter insertion and more aggressive filter retrieval and follow-up.

CONTENTS (continued)

413 Endobronchial forceps-assisted complex retrieval of inferior vena cava filters

Sidhartha Tavri, MBBS, DABR, Indravadan J. Patel, MD, Pavan Kavali, MD, Zubin Irani, MBBS, Suvrana Ganguli, MD, and T. Gregory Walker, MD, *Cleveland, Ohio; St. Louis, Mo; and Boston, Mass*

This retrospective cross-sectional study shows that rigid endobronchial forceps can be used safely and effectively for complex inferior vena cava filter retrieval. Preprocedure imaging can be utilized to assess anticipated complexity of retrieval and we propose forceps can be considered a first-line retrieval device in this population.

CENTRAL VENOUS OBSTRUCTION

420 Medial claviculectomy for the treatment of recalcitrant central venous stenosis of hemodialysis patients

Philip L. Auyang, MD, Yusuf Chauhan, MD, Thomas M. Loh, MD, Matthew E. Bennett, MD, and Eric K. Peden, MD, *Houston and Bryan, Tex*

This single-center retrospective review of medial claviculectomy for venous thoracic outlet decompression in 25 patients with ipsilateral arteriovenous dialysis access demonstrated a low procedural complication rate with no perioperative mortality and 84% subclavian vein secondary patency, excellent symptom relief, and good preservation of the ipsilateral dialysis access.

VENOUS LABORATORY

428 Ambulatory venous pressure, air plethysmography, and the role of calf venous pump in chronic venous disease

Seshadri Raju, MD, FACS, Jordan Knepper, MD, MSc, Corbin May, MS, Alexander Knight, BS, Nicholas Pace, MS, and Arjun Jayaraj, MD, FACS, *Jackson, Miss*

This retrospective study of 4599 limbs with chronic venous disease (CVD) found that ambulatory venous pressure (AMVP) likely can be omitted in routine clinical testing if air plethysmography (APG) is normal but that AMVP is a better reflection of underlying venous hypertension in advanced CVD and can be used to identify venous hypertension when APG is abnormal.

CHRONIC ILOCAVAL OBSTRUCTION

441 Prevalence, risk factors, and evaluation of ilio caval obstruction in advanced chronic venous insufficiency

Nuttawut Sermsathanasawadi, MD, PhD, Kanin Pruekprasert, MD, Wacharaphong Pitaksantayothin, MD, Khamin Chinsakchai, MD, Chumpol Wongwanit, MD, Chanean Ruangsetakit, MD, MSc, and Pramook Mutirangura, MD, *Bangkok, Thailand*

This prospective study in 106 patients with CEAP class 4-6 disease found >50% ilio caval venous obstruction (ICVO) with computed tomography venography (CTV) in 28.1% of 135 limbs. Left leg and previous deep vein thrombosis predicted >50% ICVO; all such patients should undergo duplex ultrasound (DUS). DUS-positive patients should be advised intervention; DUS-negative patients should have CTV.

CASE REPORT OF THE MONTH

448 Varicose veins due to reflux in a tortuous sartorius muscle vein

Kees-Peter de Roos, MD, PhD, and Marianne G. R. De Maeseneer, MD, PhD, *Uden and Rotterdam, The Netherlands*

VENOUS IMAGES

450 Anomalous course of the left common iliac vein anterior to the right common iliac artery with resultant May-Thurner syndrome

Arash Fereydooni, MS, Christine Deyholos, MD, Nariman Nezami, MD, Joshua R. Feler, MS, Hamid Mojibian, MD, and Naiem Nassiri, MD, RPVI, *New Haven, Conn*

EVIDENCE SUMMARY

452 Pediatric deep venous thrombosis

Christopher O. Audu, MD, PhD, Thomas W. Wakefield, MD, and Dawn M. Coleman, MD, *Ann Arbor, Mich*

UNDER THE MACRASCOPE

463 Understanding MIPS scoring

Jill Rathbun, MHSA, Karen Woo, MD, MS, and Patrick C. Ryan, MD, *Chicago, Ill; Los Angeles, Calif; and Nashville, Tenn*

VENOUS VANTAGE POINT

465 Review and commentary of key non-JVS-VL articles

CORRECTION

468 Correction

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