IR congress news

CIRSE 2018 – Lisbon
Saturday, September 22, 2018

PICK UP CONGRESS NEWS EVERY DAY!

A major role model for female interventionalists and a distinguished practitioner, Prof. Anna Belli will be the first woman to be awarded the CIRSE Gold Medal at this year's Opening and Awards Ceremony, kicking off in Auditorium 1 at 14:30. Make sure to join us there and find out more about our past-President's career and achievements on page 9.

CIRSE 2018

MEET SHARE CONNECT

Robert A. Morgan
CIRSE President

Afshin Gangi
Vice-President

Fabrizio Fanelli
Scientific Programme Committee Chairperson

Thomas Kroencke
Scientific Programme Committee Deputy Chairperson

Maria José Sousa
CIRSE 2018 Local Host Committee Chairperson

Tiago Bilhim
CIRSE 2018 Local Host Committee SPC Representative

Dear colleagues,

We are pleased to welcome you to CIRSE 2018 and hope that you will enjoy the 33rd CIRSE Annual Congress together with us. For the fourth time, our meeting takes place in the beautiful city of Lisbon. We are sure that with its fantastic congress centre, rich culture and excellent transport links, Lisbon will again be an excellent place to host CIRSE 2018.

Discovering the latest developments in IR

Through the CIRSE and IDEAS 2018 Scientific Programme, we strive to give all delegates an insight into the various themes of the meeting, providing a truly multifaceted congress experience. These themes, among others, include endovascular interventions, embolisation and interventional oncology, which means that there will be something for everyone, regardless of background or level of experience.

The focus on endovascular interventions will again make up more than 50% of the programme, and includes three distinct topic categories: arterial, venous and aortic interventions. The latter is covered in the Interdisciplinary Endovascular Aortic Symposium (IDEAS), a popular parallel multidisciplinary programme, which also includes the IDEAS Industry Training Village. Ample attention will also be given to game-changing research in embolisation during a Hot Topic Symposium on clinical uses of embolisation in the trauma setting. The other Hot Topic Symposium will cover the use of transradial access and its broad application in minimally invasive interventions.

CIRSE is considered a platform for disseminating research and the SPC has consolidated this status by introducing the FIRST@CIRSE session, dedicated to the first data release of several PAD trials and studies. Super Tuesday, which debuted in 2016, is a free paper slot which showcases the latest trial results that all IRs should be aware of. The News on Stage session is designed to allow physicians to share their work with other colleagues in an open and collaborative atmosphere. Selected posters will be displayed and navigated on terminals which are specifically designed for poster discussions in small groups.

A diverse educational offer

As a part of our efforts to continuously expand our educational portfolio, we added the Clinical Evaluation Courses to the Scientific Programme. Covering interventional oncology, arterial interventions, embolisation, non-vascular interventions and neurointerventions, each session will include a multidisciplinary faculty examining the diagnostic evaluation of the patient, interventional and non-interventional treatment options as well as patient follow-up.

A variety of interactive sessions will also be available at CIRSE 2018, such as the Simulation Training session which allows participants to view live demonstrations of interventional techniques and practice certain procedures under the guidance of an instructor. This series of training sessions contains a half-hour round-table discussion with experts in the field, delivering key knowledge and practical tips.

In recent years the "CIRSE meets..." sessions have become one of the programme's highlights. This year, the two "CIRSE meets..." sessions will feature SIDI (Sociedad Iberoamericana de Intervencionismo) and SOBRICE (Sociedade Brasileira de Radiologia Intervencionista e Cirurgia Endovasular). During the meetings, important topics in IR will be covered throughout a number of sessions, including: *CHEVAR, FEVAR and T-Branch: the Latin American aorta's puzzle* and *Complications in uterine fibroid embolisation: how to prevent and solve them*.

Building on the theme of a collaborative learning environment in IR, the Women in IR Session, which proved to be very popular at our last Annual Meeting, will take place again this year. The session aims to identify the reasons why there is a gender gap in IR and the steps that can be taken to eliminate it. It is essential to bring more women into the discipline and encourage entrepreneurial thinking, if the current level of dynamism in IR is to be continued.

Empowering the Next Generation

To draw young talent into the subspecialty, we are once again offering our Student Programme. This year's programme has been expanded to reflect the growing interest from students, with more Simulation and Hands-on Device Training sessions on offer, as well as a bigger Introductory Lecture to give everyone a warm welcome. In order to make CIRSE 2018 more financially accessible for young IRs, the IR Trainee Support Programme was created, giving any CIRSE Junior Member who submitted an abstract for CIRSE 2018 as a first or a presenting author free congress registration, regardless of whether it was accepted for inclusion in the programme. We also offer a number of sessions to the younger generation of IRs, through the European Trainee Forum.

This year, the conference has been streamlined and concludes on Tuesday evening to allow for increasingly limited hospital leave time. Join us for the CIRSE 2018 Dinner & Farewell Party which will take place on Tuesday, September 25 from 19:30 onwards, at the Pateo Alfacinha. Tickets can be purchased at the 'Hotels, Social Events and City Information' desk, located in the entrance hall of the Congress Centre.

The Opening and Awards Ceremony

LIGHTS! CIRSE! ACTION!

The CIRSE Opening and Awards Ceremony is the official kick-off of the congress, bringing delegates together to celebrate their peers' achievements and set the tone of the next four days of science, innovation and education. CIRSE President, Dr. Robert Morgan, will host the ceremony, during which past-President, Prof. Anna Belli, will receive the Gold Medal for her exceptional contributions to interventional radiology. We will also be honouring Dr. Poul Erik Andersen, Dr. Gabriel Bartal and Dr. Scott Trerotola as Distinguished Fellows.

Highlighting important contributions to research in the field, the CVIR Editors' Medal will this year go to Qi-Feng Chen, Zhen-Yu Jia, Zheng-Qiang Yang, Wen-Long Fan, Hai-Bin Shi, a Chinese research group, for their work ontransarterial chemoembolisation in HCC.

The Award of Excellence and Innovation in IR will go to Dr. Maxim Itkin, who has developed game-changing techniques to treat disorders of the lymphatic system.

Today marks our fourth Opening and Awards Ceremony in this magnificent capital city. Past Annual Meeting performances in Lisbon consisted of an amazing acapella group, Vozes da Rádio, in 2009; a beguiling piano recital from Pedro Burmester in 2012; a harmonic water glass work of art in 2012 from Petr Spatina.

What do we have in store this year? A bespoke dance performance – curated especially for this event. To find out more, join us in Auditorium 1 at 14:30!


CIRSE 2015

CIRSE 2012


CIRSE 2009

The Award of Excellence and Innovation in IR

Since its establishment in 2012, the Award of Excellence and Innovation in Interventional Radiology has been given to some of the most innovative physicians in the field. Sponsored by the Rolf W. Günther Foundation for Radiological Sciences, the award comes with a €5,000 cash prize and is presented to the winner during the Opening and Awards Ceremony of the CIRSE congress. Every year, applicants from around the world who have published original research in a peer-reviewed scientific journal, invented a registered patent or published data on an innovative device or equipment are evaluated by a review board, with the prize going to the most relevant contribution to the advancement of IR.

This year, one winner has been chosen from a number of deserving applicants. The winner of the Award of Excellence and Innovation in IR 2018 is Maxim Itkin, who has been given this award for his development of new intervention and imaging techniques of the lymphatic system.

Maxim Itkin will officially receive the award at the CIRSE 2018 Opening and Awards Ceremony, today at 14:30 in Auditorium 1.

About the winner

Maxim Itkin is seen as one of the pioneers of developing imaging and treatment techniques for disorders related to the lymphatic system, from the perspective of interventional radiology. His long-standing dedication to the field is demonstrated through some of the achievements in his career, which include, among others, introducing a novel treatment algorithm for idiopathic chylothorax as well as developing a new way to perform lymphangiogram through the groin lymph nodes. Maxim Itkin has held a number of high-profile positions in different hospitals throughout Philadelphia, including the Penn Presybterian Medical Center and the VA Medical Center. He is currently the Director of HUP/CHOP Center for Lymphatic Imaging and Interventions at the Children's Hospital of Philadelphia, USA.

CVIR Editors' Medal

This year it is our pleasure to award the CVIR Editors' Medal 2018 to the Chinese research group listed below for their investigation on chemoembolisation treatment in HCC:

Transarterial Chemoembolization Monotherapy Versus Combined Transarterial Chemoembolization–Microwave Ablation Therapy for Hepatocellular Carcinoma Tumors ≤5 cm: A Propensity Analysis at a Single Center

Qi-Feng Chen, Zhen-Yu Jia, Zheng-Qiang Yang, Wen-Long Fan, Hai-Bin Shi.

CVIR 2017 (Nov) Vol 40: 1748–1755

Congratulations to the winners, and thank you for making CVIR your preferred journal for your submissions.

More Winners at CIRSE 2018...

Gold Medallist

Anna-Maria Belli

Laudation: Robert Morgan

Anna-Maria Belli was born and educated in Swansea, Wales, before studying medicine at the Middlesex Hospital in London and graduating in 1980. She then trained in radiology at St. George's Hospital in London, during which she also completed an Interventional Fellowship. From 1987-1990, she worked as a Senior Lecturer and Consultant Radiologist at the University of Sheffield/ Royal Hallamshire Hospital. Following that, she worked for two years at the Royal Postgraduate Medical School/Hammersmith Hospital in London before returning to St. George's Hospital and Medical School in 1992, where she worked as a Consultant Radiologist until becoming a professor of IR in 2008. Since then, she has held the position of Professor of Interventional Radiology at St. George's. Throughout her academic career, Prof. Belli has taken particular interest in vascular interventional radiology. Her research interests over the years have included endovascular treatment of peripheral arterial disease including the role of lasers, mechanical and atherectomy devices, vascular malformations, uterine fibroids and all causes of massive haemorrhage, with a particular focus on trauma and obstetric haemorrhage.

Prof. Belli has made substantial contributions to the field of IR, which, thus far, have included over 160 peer-reviewed publications, three books, numerous book chapters and presentations at invited lectures.

Alongside her clinical and scientific workload, she is also active in committees and societies at a national and international level. Prof. Belli was the first (and so far only) female President of the British Society of Interventional Radiology from 2001-2003 and served as the first female president of the Cardiovascular and Interventional Radiological Society of Europe from 2013-2015. Throughout her time at CIRSE, she has worked in every role of the Executive Board and has been a fundamental source of inspiration for women IRs through her active leadership role. She has introduced new features in the CIRSE Annual Meeting, most notably the Women in IR session, which began at CIRSE 2017. She also led the Task Force which developed the European Curriculum and Syllabus for IR, a standardised guideline for training that covers an array of general IR topics and safety concepts with which a well-trained IR should be familiar.

Distinguished Fellow

Poul Erik Andersen

Laudation: Arindam Bharadwaz

Poul Erik Andersen was born in 1948 in Odense, Denmark, and, throughout his fruitful career, has continued to work there to this day and is regarded as a pioneer in the field of vascular interventional radiology in Denmark. Dr. Andersen received his medical degree from the University of Southern Denmark (USD) in Odense in 1974. In 1979, he worked as a lecturer at USD in anatomy and radiology before becoming Chief Radiologist and Consultant of the Department of Radiology, Chest and Cardiovascular/Interventional Section at the Odense University Hospital in 1983. Starting in 1985, he served as Associate Professor at the Institute of Radiology of USD, and, in 1987, he earned his PHD from USD. In 1996, he became Head of Research for the Center of Radiology at the Clinical Institute of USD, and since 2011, he has worked there as the Clinical Professor of Radiology.

Dr. Andersen has played a huge role in the innovation of IR techniques and development of the field in Denmark. In 1984, he introduced percutaneous transluminal angioplasty of peripheral arteries at Odense University Hospital before introducing renal percutaneous angioplasty in 1985 and percutaneous angioplasty of coronary arteries in 1986. He introduced the use of peripheral vascular stents in 1991 and, in 1992, he used the first coronary stent in Denmark followed by the first carotid stent implantation in Scandinavia in 1996.

Dr. Andersen has introduced several different embolisation techniques in Odense, Denmark, such as detachable silicone balloons, coils, microcoils, detachable coils and vascular plugs. He has also been a leader in the treatment of uterine fibroids in Denmark through the use of uterine artery embolisation and also performs many other embolisation procedures for conditions including gastrointestinal bleeding, bleeding from trauma, haemoptysis and in tumours.

He has been a member of CIRSE since 1994 and has served as the Local Meeting Chairperson for the CIRSE Annual Congress in 2008 and 2017. Throughout his career he has published more than 150 peer-reviewed and PubMed indexed publications and is the author of the radiological textbook, *Chest Radiology* and several book chapters, and the editor of two radiological textbooks *Musculoskeletal Radiology* and *Basic Radiology.*

Distinguished Fellow

Gabriel Bartal

Laudation: Afshin Gangi

Gabriel Bartal began his career by studying medicine at the Tel-Aviv University from 1975-1978. Following medical school, he served in the Israel Defence Forces as a physician, where he was introduced to IR by a senior colleague.

With completion of his service in 1984, he began a residency in Radiology at the Tel Aviv Medical Center, learning and performing image-guided interventions on daily basis. In 1989, he completed his specialisation in diagnostic radiology and then went on to complete his Research and Clinical Fellowship in IR at the Hammersmith Hospital Royal Postgraduate Medical School in London, where he was mentored by Professor David Allison and Professor Andy Adam. Since 1992, he has been practicing interventional radiology at the Tel Aviv Medical Center and has served as a lecturer in interventional radiology at Tel Aviv University Postgraduate Medical School. In 1994, Dr. Bartal was appointed as Chairman of the Department of Radiology at Hillel Yaffe Medical Center in Hadera and was the only interventional radiologist serving a large population. Since 1995, he has worked as a lecturer of students for clerkship, first at Rappaport Medical School in Haifa until 2005, when he began lecturing at the Sackler School of Medicine in Tel Aviv.

Additionally since 2005, he has been the Director of the Department of Medical Imaging and Interventional Radiology at the Meir Medical Center in Kfar Saba, Israel. Dr. Bartal has served as a reviewer for such journals as *JVIR, CVIR, Academic Radiology, American Journal of Roentgenology, Journal of Endovascular Therapy* and *Computer Methods and Programs in Biomedicine*. He is a President of the Israeli Society of Interventional Radiology (ILSIR) and is also a member of the Israel Medical Association, the European Society of Radiology (ESR), and is a Fellow of both CIRSE and the North American Society of Interventional Radiology (SIR). Dr. Bartal has numerous research interests beyond interventional radiology, amongst which are radiation protection of patients and personnel, medical simulation with 3D printing and information technologies and PACS.

Throughout his career, Dr. Bartal has also presented over 150 scientific abstracts and posters at major national and international conferences as well as published 35 peer-reviewed papers.

Distinguished Fellow

Scott O. Trerotola

Laudation: Christoph Binkert

Scott O. Trerotola is the Stanley Baum Professor of Radiology and Professor of Radiology in Surgery at the University of Pennsylvania School of Medicine in Philadelphia, where he also serves as Associate Chair and Chief of Interventional Radiology as well as Vice Chair for Quality and Safety. Dr. Trerotola pursues research in haemodialysis and venous access, IVC filters and PAVM embolotherapy, among other topics. He holds eight patents on devices for interventional procedures. Dr. Trerotola was a member of the original Dialysis Outcomes Quality Initiative Clinical Practice Guidelines for Vascular Access, a document which has shaped haemodialysis access care for the last generation. He has developed multiple techniques that have become widespread in IR, including balloon-assisted placement of large bore gastrostomy, ultrahigh-pressure angioplasty, forceps removal of inferior vena caval filters and backbleeding treatment for arterial emboli during dialysis declotting, to name but a few. Dr. Trerotola is a strong advocate of research in IR and evidence-based practice, an increasingly important focus as healthcare reform develops. Among his more than 250 research and educational publications are multiple prospective randomised trials. He has also mentored over 50 medical students and 35 residents in research publications.

Dr. Trerotola has been a CIRSE Member since 1998, initially as a Corresponding Member and, since 2002, as a Fellow. He has served as abstract reviewer for the CIRSE Annual Meeting and served on the Editorial Board of *CardioVascular and Interventional Radiology (CVIR)* from 1999-2017. He continues to review manuscripts for *CVIR,* as he's done for over 20 years now. Dr. Trerotola has received a lot of recognition for his achievements, including awards for teaching, distinction in reviewing and acknowledgement for his efforts in patient advocacy. He regularly appears on lists of the Best Doctors in America and Best Doctors in Philadelphia. In 2010, he received the Louis Duhring Outstanding Clinical Specialist Award from his institution, reflecting peer recognition of the strong clinical drive now ingrained in IR. In 2015, he received the Alfred Stengel Health System Champion Award from his institution for his efforts in system-wide coordination of patient quality and safety. He has given invited lectures worldwide, including the inaugural Man-Chung Han lecture to the Korean Society of Cardiovascular and Interventional Radiology, and, in 2016, the Society of Interventional Radiology's Dotter Lecture.

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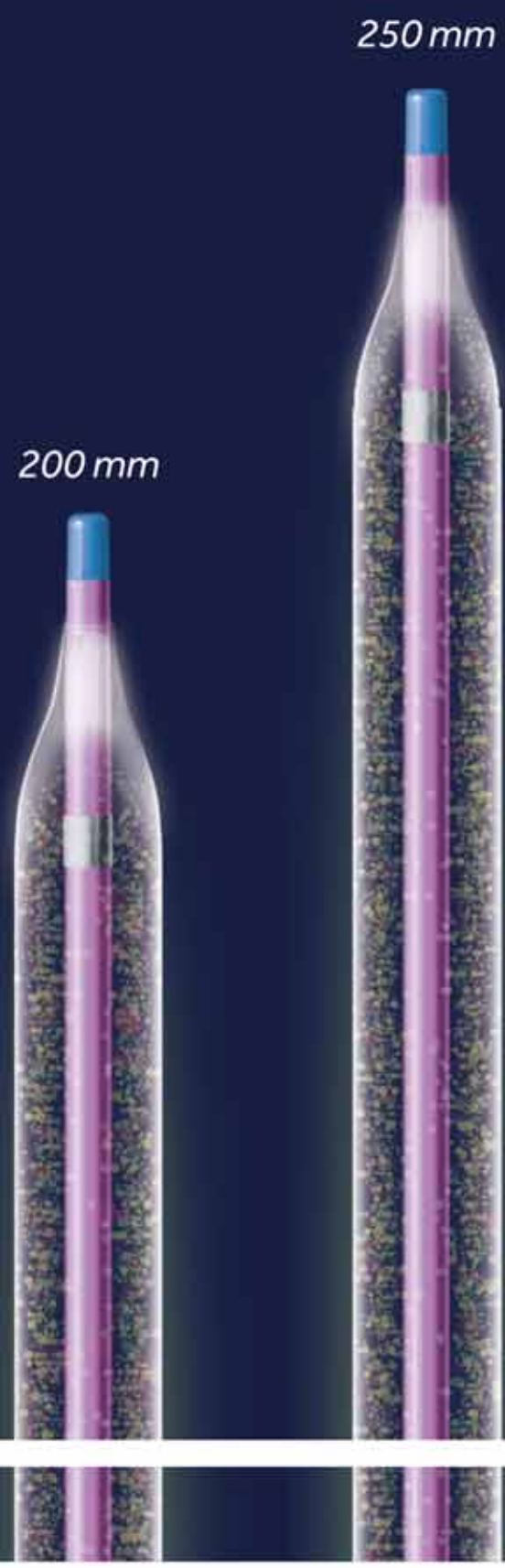

SYMPOSIUM

Strategies and Innovative Solutions for Success in Complex Peripheral Vascular Disease

Monday, September 24 | Auditorium 8		
14:30–14:40	Introduction	F. Fanelli
14:40–14:55	What are the DCB Data from Real-world Global trials telling us?	G. Goyault
14:55–15:10	Calcium: the Achilles Heel of Endovascular Treatments	C. Nolte-Ernsting
15:10–15:25	What are the Consequences of Dissection and How to Avoid Them?	J. van den Berg
15:25–15:30	Closing Remarks	K. Katsanos

LEARNING CENTER

Medtronic Booth, Exhibit Hall

Saturday, September 22 | 14:00–14:45	
How do you treat calcium? Hands on Directional Atherectomy	M. Treitl
Sunday, September 23 | 12:30–13:15	
RESCUE ME! Must have tools to get you out of complications.	Y. Bausback
Monday, September 24 | 12:30–13:15	
Directional Atherectomy with CO_2 Angiography: when and how?	T. Bisdas
Monday, September 24 | 15:30-16:15	
How do you minimize dissection? Chocolate balloon from bench to routine clinical practice.	G. Schuetz
Tuesday, September 25 | 11:00-11:45	
Directional Atherectomy with CO_2 Angiography: when and how?	T. Bisdas

Medtronic
Further, Together

Combining chemotherapy with interventional oncology treatments

Philippe L. Pereira, EBIR

Don't miss it !
Interventional oncology and clinical practice
Focus Session
Saturday, September 22, 08:30- 09:30
Auditorium 6

Philippe L. Pereira
(EBIR)
SLK – Clinics GmbH
Heilbronn, Germany

Prof. Pereira is the Director of the SLK Clinic for Radiology, Minimally-Invasive Therapies and Nuclear Medicine. He is an active CIRSE Member, currently serving as the Chairperson of the Research Committee. In addition, he is also a member of the Oncology Alliance Subcommittee, the ECIO Scientific Programme Committee and is the Co-Chaiperson of the CIREL and CIEMAR CIRSE clinical registries. He is an associate member of the German Society of Interventional Radiology (DeGIR), and a reviewer for multiple journals, including CVIR. Prof. Pereira's work has been published in over 240 publications, and recognised with numerous awards, including from the RSNA, ESGAR, ECR and WCIO.

Nowadays, medical care of the majority of cancer patients requires an individual approach, often referred to as "personalised medicine", and is mostly based on a multi-disciplinary approach and combined treatments. Depending on the type of cancer and the goal of therapy, different treatment modalities may be used to provide the most complete treatment for the patient. The main types of treatments for cancer patients include surgery, systemic treatments and radiation therapy. Interventional oncology (IO) is also an established treatment for small liver cancers, as well as small renal cancer and has emerged as the "fourth pillar" of cancer care for the treatment of metastatic cancers, the most common of which being metastatic colorectal cancer (mCRC). The potential of IO for inducing long-term disease control with minimal-invasiveness, low toxicity and low complication rates makes IO ideal for combination with other treatment modalities. Therefore, IO, with its wide spectrum of therapies including intra-arterial and local ablative therapies as well as symptomatic and palliative treatments, plays an increased role in cancer patients' care.

Clinical evidence of the efficacy of combined chemotherapies and IO have been reported in various prospective randomised trials, mostly in patients with primary liver cancer and metastatic colorectal cancer. Several prospective observational studies and retrospective cohort studies have also been reported with other types of metastatic cancer such as breast cancers, melanomas, gastric and pancreatic cancers but in general with only a small number of patients.

Hepatocellular carcinoma (HCC) is the most common primary malignancy of the liver, the sixth most common cancer and the third most common cause of cancer-related deaths worldwide. Transarterial chemoembolisation (TACE) is the standard of care for patients with intermediate-stage HCC (BCLC stage B). A randomised phase II trial found that TACE with doxorubicin-eluting beads (DEB-TACE) reduced the rates of systemic adverse events and liver toxicity compared with conventional TACE with Lipiodol and doxorubicin [1]. Sorafenib is a multikinase inhibitor that has shown in two large, double-blind, randomised, placebo-controlled phase III clinical trials to significantly improve overall survival (OS) and time-to-tumour progression (TTP) in patients with advanced HCC [2,3]. Single-arm studies combining sorafenib with various forms of chemoembolisation have suggested that this combination is safe and effective. Since TACE and sorafenib both enhance patient survival without obvious overlapping toxicities, their combination was evaluated in a prospective phase II randomised, double-blind, placebo-controlled study that enrolled 307 patients with intermediate-stage HCC treated with DEB-TACE plus sorafenib or a placebo [4]. In this prospective study, patients with BCLC-B HCC without macrovascular invasion or extrahepatic spread were randomised 1:1 to DEB-TACE plus sorafenib 400 mg twice daily or a placebo. Of 307 patients randomised, 154 received sorafenib and 153 received a placebo. Median TTP for subjects receiving sorafenib plus DEB-TACE or a placebo plus DEB-TACE was similar (169 vs. 166 days, respectively, p = 0.072). Median time to OS was not reached in this study. The overall response rates (ORR) for patients in the sorafenib and placebo groups with post-baseline scans were 55.9% and 41.3% respectively and the disease control rates (DCR) were 89.2% and 76.1% respectively. Untreatable TTP was lower with sorafenib than with the placebo (median 95 vs. 224 days). The conclusion of this trial was that sorafenib plus DEB-TACE was technically feasible without unexpected toxicities, but the combination did not provide meaningful clinical benefits compared with DEB-TACE alone [4]. A more recent phase III trial, with the inhibitor brivanib as combined (adjuvant) therapy after TACE also failed to improve OS in patients with HCC [5]. However, some observational studies, showing more favourable results with the combination of TACE and sorafenib in a subgroup of patients with BCLC stage C, support the need for further trials.

Colorectal cancer (CRC) is the second most common cause of cancer death in developed countries and the third most common malignancy worldwide. Fifty percent of patients will develop liver metastases and only a minority (10-25%) can undergo hepatic resection. Percutaneous thermal ablation with radiofrequency (RFA) or microwave (MWA) is often employed for unresectable colorectal liver metastases (CRLM). Retrospective studies comparing thermal ablation with resection have reported similar clinical outcomes after the treatment of liver metastases with a size of up to 3-5 cm [6]. In non-surgical candidates, systemic therapy is offered with the goal of improving survival or potentially converting patients into resection or even ablation candidates. Although the outcomes of systemic therapy are continuously being improved and new biological agents have been incorporated into treatment protocols, the role of systemic treatments remains palliative. For this reason, more aggressive local therapeutic approaches are being investigated in patients with colorectal liver metastases, one of them being the combination of chemotherapy and thermal ablation and/or resection treatments. To deliver clinical evidence of the beneficial effect of such an aggressive approach, a European intergroup randomised phase III study (EORTC 40004 CLOCC trial, ClinicalTrials.gov, No. NCT00043004) was initiated. The trial was designed with OS as the primary end point. Patients with unresectable colorectal liver metastases were randomly assigned to systemic treatment alone (standard arm) or systemic treatment plus local treatment with RFA, with or without additional resection (experimental arm). Because of slow accrual, the study was amended to a randomised phase II trial [7]. In this randomised phase II trial, 119 patients with unresectable colorectal liver metastases (n < 10 and no extrahepatic disease) received systemic treatment alone or systemic treatment plus aggressive local treatment using RFA and/or resection. At a median follow up of 9.7 years, there was a statistically significant difference in OS in favour of the combined modality arm (p = .01). Three-, five-, and eight-year OS were 56.9%, 43.1%, 35.9% respectively in the combined modality arm and 55.2%, 30.3%, 8.9% respectively in the systemic treatment arm. Median OS was 45.6 months (95% CI 30.3 to 67.8 months) in the combined modality arm vs 40.5 months (95% CI 27.5 to 47.7 months) in the systemic treatment arm. This prospective randomised phase II trial demonstrates that aggressive local treatment, combining thermal ablation and resection with systemic chemotherapy, can prolong OS in patients with unresectable CRLM. These results should encourage further studies comparing thermal ablation in combination with systemic treatments, at least in patients with unresectable or even resectable CRLM.

In recent years, immunotherapy has emerged as a successful treatment modality, with encouraging efficacy and only slight adverse events in cancer therapy. Several studies have shown that RFA-induced tumour antigen-specific T-cell response detected by ELISPOT assay using peripheral blood mononuclear cells. Cytokine-induced killer (CIK) cells are a subset of T-lymphocytes with a natural killer T-cell phenotype expressing both CD3 and CD56. They present potent non-major histocompatibility complex-restricted cytotoxicity against multiple tumours [8]. CIK cell therapy has been evaluated for cancer patients in a number of clinical trials. A recent phase II/III non-randomised clinical trial examined the efficacy and safety of the combination of RFA and CIK cells transfusions for patients with colorectal liver metastases [8]. In this study, a total of 60 patients with CRLMs were enrolled and divided into group A (RFA alone, n = 30) and group B (RFA plus CIK, n = 30). The median progression-free survival (PFS) times of group A and group B were 18.5 months and 23 months respectively (p = 0.03). The median OS time was 43 months in group A and not reached in group B. The 3-year survival rates were 64.6% in group A compared with 81.0% in group B, respectively (p = 0.12). This trial firstly confirms that this new combination of RFA and CIK cells boosts CEA-specific T-cell response and provides an efficacious and safe treatment modality for patients with CRLMs.

Selective internal radiation therapy (SIRT) delivers a measured, targeted radiation dose to liver tumours via injection of small radioactive particles into the hepatic artery. Previous studies have demonstrated that combining SIRT with chemotherapy increases ORRs and improves TTP and OS in patients with metastatic CRC. A phase I study demonstrated that SIRT could be added safely to oxaliplatin-based chemotherapy, with promising clinical outcome data [9]. Given these data, the SIRFLOX study, a large randomised controlled trial of fluorouracil + leucovorin + oxaliplatin (FOLFOX)–based chemotherapy with or without SIRT plus or minus bevacizumab as first-line treatment of patients with liver-only or liver-dominant mCRC, was undertaken. The primary end point was PFS at any site. 530 patients were randomly assigned to treatment (control = 263 and SIRT = 267). Median PFS at any site was 10.2 vs 10.7 months in control versus SIRT (p = .43). Median PFS in the liver was 12.6 vs 20.5 months in control versus SIRT (p = .002). ORRs at any site were similar (68.1% vs 76.4% in control vs SIRT; p = .113). ORR in the liver was improved with the addition of SIRT (68.8% vs 78.7% in control vs SIRT; p = .042). Grade 3 adverse events, including recognised SIRT-related effects, were reported in 73.4% and 85.4% of patients in control vs SIRT. The conclusion of this study was that the addition of SIRT to FOLFOX-based first-line chemotherapy in patients with liver-dominant or liver-only metastatic colorectal cancer did not improve PFS at any site but significantly delayed disease progression in the liver. The safety profile was consistent with previous studies. The combined analysis of three randomised clinical trials FOXFIRE, SIRFLOX, and FOXFIRE-Global with a total of 549 patients shows similar results but demonstrates that a global, multidisciplinary trial involving complex liver-directed therapy can be done with adequate power to answer an important clinical question. In addition, it concludes that studies investigating the role of SIRT as consolidation therapy after chemotherapy are needed, [11] separate and combined analyses were performed on data from the SIRFLOX and FOXFIRE Global trials. Among others, primary tumour site, which is emerging as an important prognostic factor and predictive marker for patients with CRC, was prospectively analysed. In this analysis, in a total of 739 patients, addition of SIRT significantly improved OS (median 22.0 vs 17.1 months, p = .008) for the 179 patients (24.2%) with right-sided colon cancer (RSCC). A test of treatment interaction by primary tumour side was statistically significant for RSCC and SIRT (p = .002) (12).

These reported data of several analyses of randomised clinical trials support a scientific and prospective approach of combined systemic treatment with local therapies to definitively establish IO in the management of cancer patients.

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The official journal of the Cardiovascular and Interventional Radiological Society of Europe

JOIN US AT THE CVIR RECEPTION AND CELEBRATE THE JOURNAL'S

ANNIVERSARY

CIRSE and CVIR Editor-in-Chief Prof. Klaus Hausegger are pleased to invite you – readers, authors, reviewers and editors – to this year's CVIR Anniversary Reception and Award Ceremony.

This year is a special one for CVIR, as it is celebrating its 40th Anniversary, as well as the newly received impact factor of 2.210, the highest in the journal's history.

Come enjoy some delicious finger food and mingle with the CVIR Editorial Board members, and your fellow authors, editors and reviewers!

CVIR Anniversary Reception
Saturday, September 22
12:00-13:00
Room 1.10

We look forward to celebrating with you!

www.cvironline.org

16:15-17:15, Auditorium 7
Free Paper Session

FP 608 FIRST@CIRSE
First data release on PAD trials and studies

Moderators: F. Fanelli (Florence/IT), A. Holden (Auckland/NZ)

608.1 DISRUPT PAD II: primary outcomes and mechanistic actions of intravascular lithotripsy in complex, calcified femoropopliteal arteries
M. Brodmann[1], M. Werner[2], A. Holden[3], G. Tepe[4], T.J. Brinton[5], D. Scheinert[6], A.G. Schwindt[7], F. Wolf[8], M.R. Jaff[9], A.J. Lansky[10], T. Zeller[11]; [1]Graz/AT, [2]Freiburg/DE, [3]Auckland/NZ, [4]Rosenheim/DE, [5]Stanford, CA/US, [6]Leipzig/DE, [7]Münster/DE, [8]Vienna/AT, [9]Boston, MA/US, [10]New Haven, CT/US, [11]Bad Krozingen/DE

608.2 Three-year results from the IN.PACT global study
G. Tepe; Rosenheim/DE

608.3 Impact of severe calcification on procedural characteristics and 12-month outcomes following femoropopliteal treatment with the Stellarex drug-coated balloon
F. Fanelli[1], Y. Gouëffic[2], A. Holden[3]; [1]Florence/IT, [2]Nantes/FR, [3]Auckland/NZ

608.4 Zilver PTX post-market surveillance study of paclitaxel-eluting stents for treating femoropopliteal artery disease in Japan: 5-year results
K. Kichikawa; Kashihara/JP

608.5 Twelve month results of the IMPERIAL randomized trial comparing the Eluvia and Zilver PTX stents for treatment of femoropopliteal arteries
S. Müller-Hülsbeck[1], K.F. Keirse[2], K. Ando[3], A.J. Benko[4], A. Babaev[5], Y. Yokoi[6], H. Schröder[7], J. Prem[8], A. Holden[9], J. Popma[10], M.R. Jaff[10], J. Diaz-Cartelle[11], W.A. Gray[12]; [1]Flensburg/DE, [2]Tienen/BE, [3]Kitakyushu/JP, [4]Sherbrooke, QC/CA, [5]New York, NY/US, [6]Osaka/JP, [7]Berlin/DE, [8]North Canton, OH/US, [9]Auckland/NZ, [10]Boston, MA/US, [11]Marlborough, MA/US, [12]Wynnewood, PA/US

RPP OPENING CEREMONY TODAY 12:45

CIRSE **Radiation Protection**

How to make your angio suite smart and safe!

Visit the Radiation Protection Pavilion

CIRSE's Radiation Protection Pavilion, located in the exhibition hall, is here for you during the entire Annual Meeting, offering information material and opportunities to engage directly with experts in radiation protection. Interventional radiologists are exposed to high levels of radiation in daily practice and therefore face particular health risks. Take a seat in the Radiation Protection Pavilion and learn how to reduce and protect against exposure.

Today's RPP Mini-Talks, which feature short expert presentations, offer an introduction to the wide range of topics on radiation safety which will be covered over the next few days of the programme. We hope to see you there!

Today's RPP Mini-Talks

	Time	Mini-Talk	Speaker
SAT SEPT 22	12:45 – 13:00	Opening ceremony	W. Jaschke *(Innsbruck/AT)*
	13:00 – 13:15	Dose management programmes	E. Brountzos *(Athens/GR)*
	13:15 – 13:30	Staff safety procedures (MDT X-RAY)	D. Janssen *(Hilvarenbeek/NL)*
	13:30 – 13:45	BSS Directive and its implementation	G. Paulo *(Coimbra/PT)*

Words from a Gold Medallist

Former CIRSE President Anna Belli is currently Professor of Interventional Radiology at St. George's Hospital and Medical School, where she works with a renowned team of interventional radiologists. Alongside her many contributions to CIRSE over the years, she has been President of the British Society of Interventional Radiology (2001-2003), a member of the Council of the British Institute of Radiology (2007-2009), and a long-standing advisor for both NICE and the Medicines & Healthcare Regulatory Authority. Prof. Belli is the author of more than 130 peer-reviewed publications and more than 20 chapters in IR and she has also edited three books on interventional radiology. She is actively involved in many meetings, both as an organiser and a lecturer, including ECR, CIRSE and the BSIR. Prof. Belli has been active in working to eradicate the gender gap in IR, setting up the Women in IR session, which debuted at CIRSE 2017, and publishing articles on the topic in CVIR.

The deciding factor in my becoming an IR was witnessing how effective IR was in rendering a very high-risk surgical procedure safe for a young patient. This was as a very junior doctor, but I saw so many instances of how it modified or replaced open surgery when I was training and how it could be applied to so many different situations, I couldn't help but be fascinated.

Interventional oncology is certainly an area of exciting development and is romping away with so many innovative applications. But I am a vascular radiologist and remain excited by the role IR has in managing peripheral vascular disease and haemorrhage. This area is certainly not shrinking and IRs remain the main providers for this in most of Europe.

For every step forward there is one back. UAE is now an accepted treatment in some European countries, but by no means all. Too many women are still not told about it, or are told they are not suitable, without even seeing an interventional radiologist. In the UK, whilst hysterectomy remains a standard treatment for symptomatic fibroids, UAE now requires local permission from those who fund the procedure. To me, that is a retrograde step, based on funding issues and a decision made by those who perhaps do not fully understand the modern evidence.

Impossible to choose a favourite moment – every moment was great because I was supported by so many fabulous people. I have not been bored a single day of my 30-year IR career!

To become President of an IR society was never an aspiration as I thought it was beyond me, so to have been President of two, I consider quite an achievement. But what makes me most proud is the difference you can make to young professionals by inspiring and encouraging them. I hope I have shown that an average woman can be an effective IR and have a rewarding career and that young women thinking about their careers will feel inspired to do IR (but I don't know whether I have achieved that)!

We are missing out on some of the best young minds and talent. In some countries, more than 50% of newly qualified doctors are women. And yet, the numbers of women coming into IR has remained at approximately 10%. I would love to see more women stand for election to committees and for office in CIRSE to help shape our future.

IR is not for the faint-hearted. On-the-spot decisions make the difference between success and failure, life or death, and there may be serious complications. I would say that the nature of the job is very similar to that of a surgeon.

Watch Prof. Belli receive her Gold Medal during the Opening and Awards Ceremony at 14:30 in Auditorium 1!

News on Stage

News on Stage will feature displays on the latest results from multi-centric trials, ground-breaking techniques and many more IR hot topics, shown in a dedicated open area. Large-screen presentations given by the authors during dedicated slots around lunch time will give delegates the opportunity to hear from the experts and engage with them and other key opinion leaders in active, lively discussions.

Saturday, September 22, 13:15-14:15, News on Stage Area

NoS 404 Embolisation News on Stage

Moderators: A.C. Roberts (La Jolla, CA/US), O.M. van Delden (Amsterdam/NL)

404.1 Novel approach for anterograde obliteration of gastric varices utilizing intravascular ultrasound
R. Melikian, H. Aryafar; San Diego, CA/US

404.2 WITHDRAWN

404.3 WITHDRAWN

404.4 Direct percutaneous sac puncture for type II endoleak management
G. Falcone, M. Citone, F. Mondaini, C. Raspanti, G. Gabbani, E. Casamassima, F. Fanelli; Florence/IT

404.5 Contrast clearance following hepatic transarterial embolization with radio-opaque and non-radio-opaque micro beads in swine
A.S. Mikhail[1], W. Pritchard[1], Q.M.B. De Ruiter[1], I. Bakhutashvili[1], J. Esparza-Trujillo[1], D.L. Woods[1], A.L. Lewis[2], J. Karanian[1], B.J. Wood[1]; [1]Bethesda, MD/US, [2]Camberley/UK

404.6 The practice of mixing biological embolics and radiographic contrast: "Is it safe?"
T. Ncube[1], G. Wagner[1], D.W. Edwards[2], R.E.B. Watson[2], G.C. Smith[1], H.-U. Laasch[2]; [1]Chester/UK, [2]Manchester/UK

The importance of role models in IR

Aneeta Parthipun

Don't miss it !
The IR gender gap 2
Women in IR
Saturday, September 22, 11:30-12:30
Auditorium 2

"When you do things for the right reasons, eventually no matter how long it takes, people will take notice of it and can't help but respect it."

– Gina Carano, mixed martial artist

The journey to the top of the career ladder can be tough going for anyone in our profession. However, as a woman in a male-dominated speciality, such as interventional radiology or surgery, this can be especially challenging. Trainees and consultants experience disillusionment with the "system" and this is often associated with an added complication: having children.

These thorny issues were recently highlighted in a Channel 4 series broadcasted in the UK, "Confessions of a Junior Doctor", where a female surgical registrar stated, "The hours were punishing, and I'd go home and find I had nothing left to give them. I was expending too much energy firefighting on the job to actually be a mum. It tore me apart".

My journey began when I decided to specialise in interventional radiology as a Radiology Specialist Registrar. I completed four years of radiology training at St. George's Hospital in London, where I was mentored by the esteemed professor, Anna-Maria Belli herself. This was followed by a two-year interventional radiology fellowship at Guy's, Evelina and St. Thomas' Hospitals in London, and a further one-year fellowship in trauma and oncology intervention at King's College London.

My experience so far has been phenomenal but undulating. The troughs have been the struggle to find "role models", the feeling of "being in a man's world", the sensation of "having to prove myself as equal to or even better than my male counterparts" and putting up with male colleagues being prioritised to enhance their career progression. The peaks have been glimpses of a movement of support as more women are coming through the system and seeing more senior colleagues who have faced the same issues.

My own experience has been tarred by negative comments. Once I was told, as a young trainee, that I should aspire to work in a quiet district general hospital so that I could show commitment and dedication to my two young children. This was from a male interventional consultant who did not have children. I was dumbfounded by his arrogance and lack of awareness. As my consultant, he should have inspired me to achieve my full potential rather than assuming that my career was not important to me. I doubt he would have given the same advice to my male IR fellow colleagues. I distinctly remember reflecting on his comments and realising that all role models have a responsibility to advise their colleagues to aim for the sky.

In contrast, another male consultant gave me some advice towards the end of my training: "You are highly sought-after now due to your extensive training. Don't go for just any job... aim high... you will get whatever you want," he said. This is not about women having children. It's a lot more than that. It's about acknowledging, respecting and commending the challenges that we all have to go through (even though some of us have had to wade through more than others) at different points in our career.

In 2016, 58% of people accepted into medical school in the UK were women. In this very same year, women composed just 11.1% of consultant surgeons in England. According to the 2016 UK Radiology workforce census, only 10% of current IR consultants are female.

Although the NHS workforce is made up of 77% women, only 36% of CEOs and 24% of medical directors are female. There has been ample research showing that greater diversity and inclusion (not just gender inclusion) improves quality of care, recruitment and retention, well-being of staff, and most of all, performance of the organisation overall. So why are we not moving fast enough towards this goal?

Despite massive amplification in the number of women in medicine, females still continue to be responsible for the bulk of household tasks and childcare responsibilities. Support for those trying to create a work-life balance hasn't kept pace with the insurgence of women, nor has the divide of household duties shifted to reflect the increase in women in the medical work force.

This leads me to consider the topic of work-life balance. For too long this has been attributed to a female issue. A good work-life balance, however, should be a public health initiative in the prevention of poor child health, reduction of substance misuse in both men and women and improved mental and physical health for all families.

Achieving change means overcoming cultural barriers, which can be very subtle and hard to spot, but which are damaging to women in limiting their progress. One of the biggest is the absence of role models.

Too many talented women opt out before they fulfil their potential. The various barriers, both informal and formal, make it too laborious and too exhausting for talented women to progress the career ladder. An additional problem that needs to be tackled is the lack of aspiration among many women. Some might wonder why we need to worry about this lack of aspiration: perhaps women just don't want the top jobs? This is a false assumption.

However, inspiration can be all around us. Modelling ourselves on others is part of human nature and it is natural to seek out colleagues on whom we can model ourselves and who can inspire us. Young women often talk about self-doubt holding them back. Seeing a woman in a higher position does a huge amount to dispel those doubts and instil a belief that we too can achieve great things. These approachable role models can have a direct impact on the professional journey.

I myself worried about pursuing a career in interventional radiology. Towards the end of my radiology training, after having my second baby, I sought to find a consultant in the same situation that I could look up to and ask for advice from. I struggled to find an independent person that I knew within easy reach. I finally found a female consultant with children and I remember asking her whether there was a possibility to have a career in interventional radiology with kids.

Aneeta Parthipun
Great Ormond Street Hospital
London, United Kingdom

Dr. Aneeta Parthipun is a consultant paediatric interventional radiologist at Great Ormond Street Hospital and her specialisation is tumour ablation and transarterial chemoembolisation of liver tumours. She is also FRCR-qualified and completed four years of radiology training at St. George's Hospital in London, where she was mentored by Prof. Anna-Maria Belli.
This was followed by a two-year interventional radiology fellowship at Guy's, Evelina and St. Thomas' Hospitals in London, and a further one-year fellowship in trauma and oncology intervention at King's College London.

Would I have these thoughts if I were a man with children?

Another thing I now reflect on was when I was a third-year registrar and decided that I wanted to do interventional radiology. I distinctly remember receiving the CIRSE newsletter through the post and counting the number of women on the executive photo page. I was disheartened. Would I have felt the same way if there were an equal number of women to men?

Every person can support change. What better achievement is there than to inspire the next generation? I hope that by sharing some of my own professional insights, I'll encourage colleagues to aim high and not let outdated norms steer them off course. I have no doubt I will find them equally inspiring.

"A sustainable world means working together to create prosperity for all"

– Jacqueline Novogratz, CEO of Acumen

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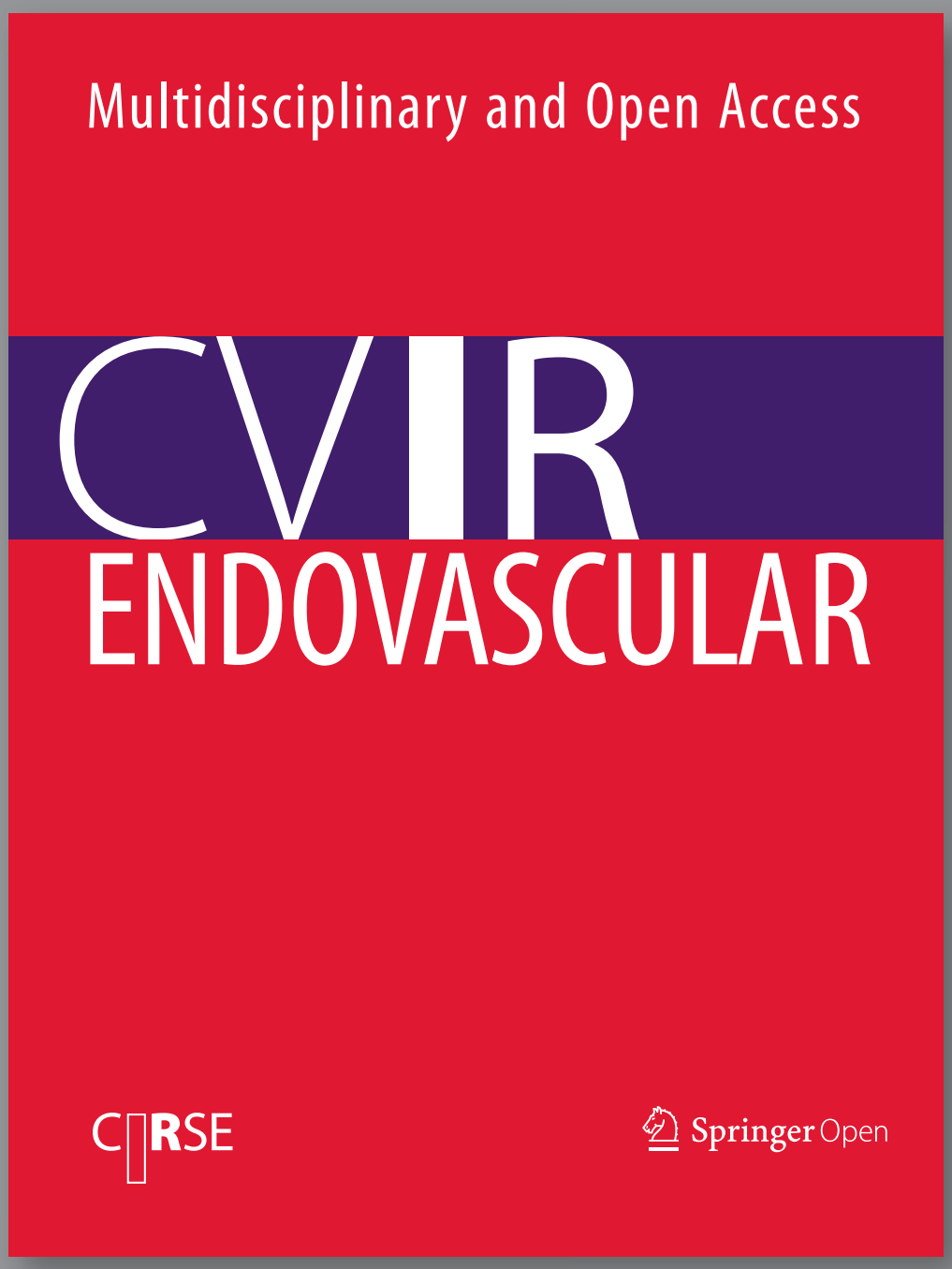

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GEST Europe becomes ET

ET2019

Following the success of GEST Europe, CIRSE is excited to welcome a new member to its family of annual conferences: ET – the European Conference on Embolotherapy!

Between 2009 and 2017, CIRSE successfully organised the biennial GEST Europe Meeting in cooperation with the GEST founders. However, this partnership contract has now come to an end, and both parties have agreed to establish annual meetings of their own. In the USA, the meeting will be organised by Jafar Golzarian and Marc Sapoval and in Europe, CIRSE will organise the new European Conference of Embolotherapy, which will be held annually. CIRSE continues to work closely with the GEST Founders and is already planning an 'ET meets GEST' meeting in 2020.

All about Embolotherapy

Due to the rapid growth in embolisation, it is important that regular education is available to support the many IRs who provide embolotherapy in its numerous applications. This annual meeting will perfectly complement our existing education portfolio, which includes our dedicated embolisation track at the CIRSE Annual Meeting, the range of sessions at the European Conference on Interventional Oncology (ECIO) and the ESIR Clinical Procedure Training Courses. The new European Conference on Embolotherapy features a number of exciting sessions that are designed to give delegates a comprehensive overview of this rapidly expanding area of interventional radiology. The conference will cover the many areas of embolotherapy, including trauma management, vascular and lymphatic malformations, GI haemorrhage, UAE and PAE as well as embolotherapy in cancer care, which will make up around 20% of the programme.

Alongside Christoph Binkert and Patrick Haage as Chairperson and Deputy Chairperson, respectively, our Scientific Programme Committee is made up of highly experienced physicians who have a deep understanding of the field as well as bountiful experience in organising educational medical conferences. The European Conference on Embolotherapy will take place on June 26-29, 2019 in Valencia, Spain. This south-eastern Spanish city is a cultural hotspot and an ideal location for a medical congress, largely because of its magnificent conference centre, which is not only aesthetically pleasing but also offers an excellent range of facilities and layout.

We look forward to welcoming you in Valencia!

ET 2019 Scientific Programme Committee

Christoph Binkert | *Chairperson*
Patrick Haage | *Deputy Chairperson*

Thierry de Baère
Otto van Delden
Enrique Esteban
Fabrizio Fanelli
Tarun Sabharwal
Marc Sapoval

Sessions at ET 2019

Case Remedy Sessions

In the Case Remedy Sessions, four panellists will present their cases, which will focus on a number of elements, including the personalised approach, other therapy options, technical aspects, outcome and follow-up. These sessions will be highly interactive and include videos to demonstrate specific tips and tricks, as well as audience voting.

Technical Focus Sessions

The sessions will contain four talks, highlighting the latest trends in a specific embolic material or in the delivery systems (microcatheter and wire) as well as advanced guiding modality (CBCT).

Special Topic Sessions

Special Topic Sessions aim to cover new areas and developments in embolotherapy. They are designed to impart the latest knowledge on topics important to daily practice, with current evidence being their central focus.

Established Therapy Sessions

Established Therapy Sessions will focus on the most popular topics in embolisation. Each talk will feature a different aspect, from patient selection, procedural aspects, peri-procedural care to the latest literature and study results. Sufficient time for questions and discussions will again be allocated.

Morbidity and Mortality Conferences

In the Morbidity and Mortality – Bad Day session, experts will present complicated cases which had a negative outcome and each speaker will have ten minutes presentation time plus five minutes discussion, per presented case. Using the same format, the Morbidity and Mortality – Good Day session will feature a panel of IRs presenting cases that involved a disastrous complication but had a positive outcome.

Find out more on **www.ETconference.org**

Poster Awards 2018

SCIENTIFIC POSTERS

Magna Cum Laude
EW-7197 eluting nano-fiber covered self-expandable metallic stent to prevent granulation tissue formation in a canine urethral model
J.-H. Park, H.-Y. Song, S.H. Yoon, J. Choi, N.G. Bekheet, J.M. Kang, D.S. Ryu; Seoul/KR

Cum Laude
Contrast clearance following hepatic transarterial embolization with radio-opaque and non-radio-opaque micro beads in swine
A.S. Mikhail[1], W. Pritchard[1], Q.M.B. De Ruiter[1], I. Bakhutashvili[1], J. Esparza-Trujillo[1], D.L. Woods[1], A.L. Lewis[2], J.W. Karanian[1], B.J. Wood[1]; [1]Bethesda, MD/US, [2]Camberley/UK

Nonsurgical placement of a balloon-expandable metallic stent: human cadaver study of the Eustachian tube
J.-H. Park, H.-Y. Song, K.Y. Kim, J. Choi, S.H. Yoon, J.M. Kang, D.S. Ryu; Seoul/KR

Certificate of Merit
Image fusion guidance with pre-procedural CT with real-time fluoroscopy for adrenal venous sampling
S. Morita, H. Yamazaki, K. Endo, S. Suzaki, K. Kamoshida, K. Suzuki, S. Sakai; Tokyo/JP

The usefulness of liver parenchymal perfusion simulation using commercial 3-dimensional workstation and simulation software in conventional transcatheter arterial chemoembolization for hepatocellular carcinoma
M. Kinoshita[1], K. Takechi[1], Y. Arai[1], R. Shirono[1], Y. Nagao[1], S. Izumi[1], S. Noda[1], S. Takao[2], S. Iwamoto[2], M. Harada[2]; [1]Komatsushima/JP, [2]Tokushima/JP

EDUCATIONAL POSTERS

Magna Cum Laude
Variant arterial anatomy related to prostate artery embolization
S. Nirmalarajan[1], G. Schlaphoff[2]; [1]Randwick, NSW/AU, [2]Liverpool, NSW/AU

Cum Laude
Cryoablation of large iliac bone metastasis using augmented reality: enhanced ablation planning using 3D holographic models, virtual probe trajectories, and virtual ablation zones
B. Park, M. Sheng, C. Jiang, G.J. Nadolski, T. Gade, S. Hunt; Philadelphia, PA/US

Effectiveness of automated tumor-feeder detection software (ATDS) using CT arteriography images in super-selective transarterial chemoembolization for hepatocellular carcinoma
T. Kubo, Y. Arai, M. Sone, S. Sugawara, C. Itoh, S. Wada, T. Hasegawa, N. Umakoshi, H. Kuwamura; Tokyo/JP

Certificate of Merit
A primer on the management of pleural effusions
W. Bremer, C.E. Ray, Jr.; Chicago, IL/US

Diagnosis and techniques to improve the clinical success of the transarterial embolization of type II endoleaks after endovascular aneurysm repair
R. Kawasaki[1], M. Yamaguchi[2], T. Okada[2], T. Gentsu[1], M. Kinoshita[1], S. Shohei[1], H. Horinouchi[2], K. Sasaki[2], K. Sugimoto[2]; [1]Himeji/JP, [2]Kobe,/JP

Management of difficult cases of balloon-occluded retrograde transvenous obliteration for gastric varices
S. Takenaga[1], K. Masuda[1], K. Morikawa[1], K. Michimoto[2], Y. Matsui[1], S. Yamazoe[3], H. Ashida[1]; [1]Tokyo/ JP, [2]Shizuoka/JP, [3]Chiba/JP

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[2] Randomized, Controlled Trial Comparing the Lutonix Drug Coated Balloon Versus Standard Ballon Angioplasty for Treatment of Below-the-Knee (BTK) Arteries. Protocol #NCT01870401

[3] TASC II. (2007). Journal of Vascular Surgery, Volume 45, Number 1, Supplement S

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Mortality and complication risks after osteoporotic vertebral fractures

Alexis D. Kelekis, EBIR

Osteoporosis, the progressive loss of bone matrix and demineralisation, is the most common metabolic bone disorder, affecting millions of inhabitants throughout the globe each year. This systemic disease is the leading cause of vertebral compression fractures (VCFs), which will affect up to 40% of the population of women aged 80 years or older. Approximately 700,000 VCFs occur every year and with the aging population, this number is expected to increase fourfold during the next 50 years, often after minimal or no trauma. A high number from those patients (approximately one third) will seek medical attention to cope with debilitating pain. In the population of 65 years of age or older, vertebral fractures account for 150,000 hospital admissions annually in the United States. The economic burden of managing these fractures is estimated to be over $700 million.

There are direct and indirect complications associated with VCFs. These direct complications include fracture pain, spine instability, secondary fractures (cascade phenomenon), spinal stenosis, facet hypertrophy and vertebral osteonecrosis, resulting in an increased morbidity and mortality rate. The most frequent indirect complications are decreased pulmonary function from kyphotic deformity, loss of independence, decreased quality of life, sleep disturbances, depression as well as altered mood and mental status, which compound the overall condition. Concomitant decrease in mobility has sequelae in these patients, with increased risk for pneumonia, deep vein thrombosis, and pulmonary embolism, causing an overall increase in mortality in this vulnerable group of patients.

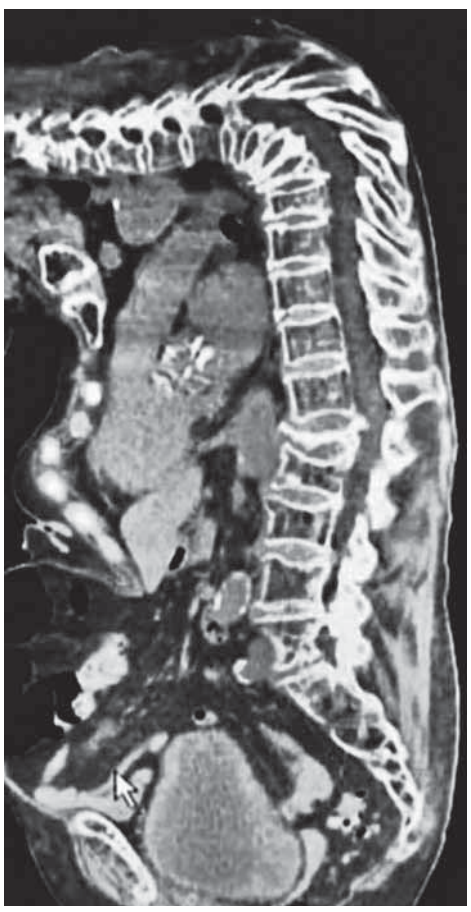
Until approximately the year 2000, most studies investigating vertebral fractures and mortality examined data on prevalent vertebral fractures, but none assessed the risk of mortality in relation to incident vertebral fractures. As many authors have reported, in most cases, the fracture itself is not the cause of mortality. Usually, the observed increased mortality is associated with general poor underlying health that is further compromised by the occurrence of an osteoporotic fracture. Kaldo et al. reported that older women with prevalent vertebral fractures had an increased risk of mortality that was independent of 13 other predictors of mortality [1]. In 2013, the same group performed a prospective cohort study of 7,233 community dwelling older white women aged 65 years or older. As reported, over an average of 3.7 years, 389 (5.4%) women had at least one incident of vertebral fracture. During an additional 8 years of follow-up, 1,617 (22%) women died. Women with at least one new fracture had an age-adjusted 32% increased risk of mortality (RH=1.32; 95% CI=1.10–1.58, P=0.003) compared to those without incident vertebral fractures.

It is a fact that older women who have incident vertebral fractures are at increased risk for mortality. The risk increases with greater numbers of fractures and is independent of having low bone density, prevalent vertebral fractures or poor self-reported health. However, it is interesting to note that the highest risk comes from frailty, such as weight loss, inability to rise from a chair or stand on one's feet for more than two hours. It is difficult to discern whether these markers of frailty caused or resulted from incident vertebral fractures. Research is also needed to establish if these are markers of an accelerated aging process. A concept described as the attempt to use biological markers as predictive factors for adverse outcomes of aging including functional decline and mortality.

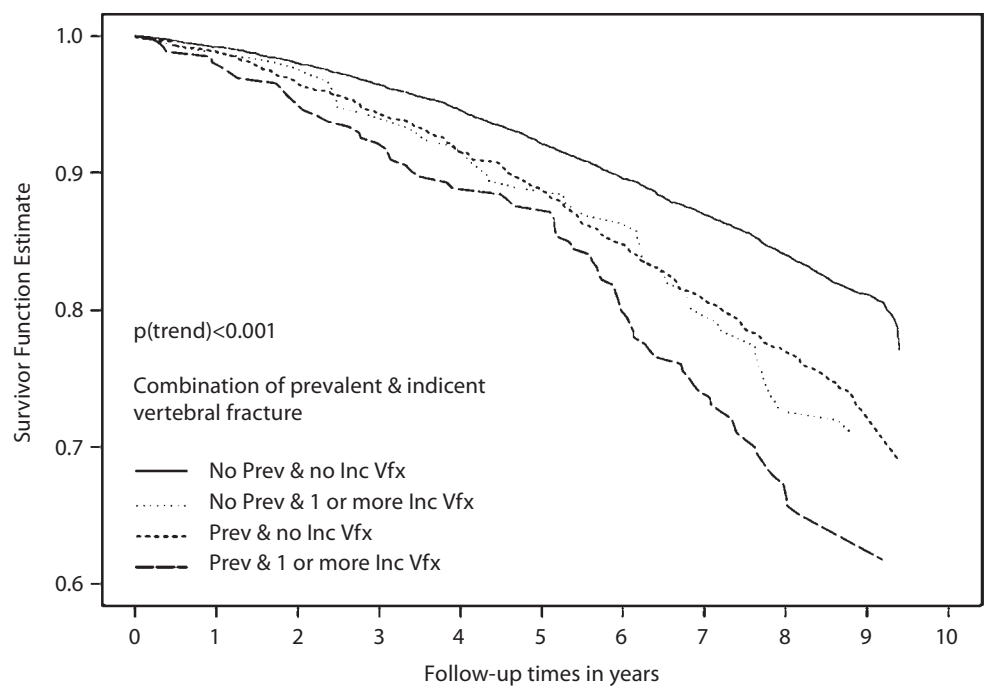
In the medical community there are different strategies and a lot of debate on how these patients should be treated. The standard approach supported by the medical community for many years is the conservative management of VCFs, which includes primarily relief of pain through therapy with narcotics, analgesics, nonsteroidal anti-inflammatory agents and immobilisation. Mobilisation, with or without a brace, and exercise are subsequently prescribed as rehabilitation therapy.

An additional form of management alongside conservative treatment includes the technique of bone augmentation. Although there are many disputes as to whether bone augmentation provides any benefit to local anaesthetic infiltration, most studies do agree that it is by far a better treatment to the available alternative which is conservative management. This was clearly shown by a series of studies, such as the one performed by Edidin et al., who examined 1,038,956 VCF patients, including 141,343 balloon kyphoplasty patients and 75,364 vertebroplasty patients [5]. The non-operated cohort (NSM) were found to have a 55% higher adjusted risk of mortality (p<0.001) than the kyphoplasty cohort and 25% higher adjusted risk of mortality (p<0.001) than the vertebroplasty cohort. The morbidity with propensity score matching in the NSM patients had significantly higher risks of pneumonia, DVT, myocardial infarction/cardiac complications and urinary tract infections than augmentation cohort. Beall et al., in the EVOLVE trial, investigated 12-month disability, quality of life and safety outcomes specifically in a Medicare-eligible population, representing characteristic patients seen in routine clinical practice [6]. They were able to demonstrate that at the 3-month primary endpoint, NRS improved from 8.7 to 2.7 and ODI improved from 63.4 to 27.1; SF-36 PCS was 24.2 at baseline improving to 36.6 and EQ-5D improved from 0.383 to 0.746 (P<.001 for each). These outcomes were statistically significant at every follow-up time point up to 12 months.

In conclusion, it is evident that VCFs increase the risk of morbidity and mortality in the osteoporotic cohort, as well as provoke a huge cost of hospitalisation and invalidity cost. It is still debatable whether the fracture itself or the frailty associated with the fracture is the actual reason for the increased morbidity and mortality. It is also debatable whether VCFs causes frailty or vice versa. For years medical management has been the treatment of choice but there is a continuous debate whether immediate percutaneous treatment should be performed to help these patients return to their normal lifestyle faster than the medical treatment will allow.



Age-adjusted survival curves
stratified by both prevalent & incident vertebral fracture status



From the article of Kado, D.M., Duong, T., Stone, K.L. et al. Incident vertebral fractures and mortality in older women: a prospective study. Osteoporos In. 2003;7:14: 589-594.

Don't miss it !
Osteoporosis and vertebral fractures Clinical Evaluation Course
Saturday, September 22, 16:15-17:15
Auditorium 2

Alexis D. Kelekis
(EBIR)
National and Kapodistrian University of Athens – Attikon University Hospital Athens, Greece

Prof. Alexis Kelekis is an Associate Professor of Radiology and Interventional Radiology at the National and Kapodistrian University of Athens, where he also obtained his medical degree. In addition, Prof. Kelekis works at the National and Kapodistrian University of Athens – Attikon University Hospital in Athens, Greece. Currently, he is the President of the Society for Injectable Osteoarticular Biomaterials (GRIBOI) and is also on the Board of Directors for the Society of Interventional Oncology (SIO). Prof. Kelekis holds the European Board of Interventional Radiology (EBIR) qualification and his research interests include interventional oncology, musculoskeletal and non-vascular interventions.

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Don't miss it !
Arterial gastrointestinal embolisation
Focus Session
Saturday, September 22, 11:30-12:30
Auditorium 6

Strategies for chronic and intermittent acute GI bleeding

Małgorzata Szczerbo-Trojanowska

Małgorzata Szczerbo-Trojanowska
University of Lublin
Lublin, Poland

Prof. Małgorzata Szczerbo-Trojanowska is a Professor at the Department of Interventional Radiology and Neuroradiology at the Medical University in Lublin, Poland. She is a founding member of the Interventional Radiology Society in Poland, which she managed from 1980-1990. Prof. Szczerbo-Trojanowska was also the President of the Polish Medical Radiological Society from 2001-2004 and the President of ECR in 2010. Her research interests include treatment of aortic aneurysms, vascular malformations, uterine fibroids and a number of other embolisation procedures. She delivered the CIRSE 2011 Roesch Honorary Lecture and became a CIRSE Distinguished Fellow in 2012.

Gastrointestinal (GI) bleeding can manifest in several forms depending on the rate of blood loss. It can be classified as acute or chronic. Acute bleeding may appear also as a form of intermittent acute bleeding. Chronic GI bleeding is defined as the microscopic haemorrhage with a positive faecal occult blood test (FOBT) and/or iron-deficiency anaemia [1].

Chronic bleeding may occur in any part of the GI tract, from the oral cavity to the rectum. Bleeding that originates from the oesophagus to the ampulla of Vater is recognised as upper GI bleeding, and that originating distally from the ampulla is defined as lower GI bleeding. Lower GI bleeding has been further subdivided into mid-GI bleeding, beginning from the ampulla of Vater to the terminal ileum, and lower GI bleeding, originating from the colon to the rectum [2].

Up to approximately 70% of patients have an upper GI source and 20-30% of patients have a lower GI source of chronic bleeding [3]. Chronic bleeding can be categorised into mass lesions, vascular, inflammatory and infectious [4].

Upper GI bleeding

Chronic upper GI bleeding can originate in the oesophagus, stomach and duodenum. Approximately 50% to 60% of upper GI bleeding is related to ulcers. Other causes are neoplasms, oesophagitis, erosive gastritis/duodenitis, Mallory-Weiss syndrome, Dieulafoy's lesions and oeso-gastric varices due to portal hypertension. Less common are: haemobilia, haemosuccus pancreaticus and endometriosis [5, 6].

In patients with chronic upper GI bleeding, endoscopy is the investigation of choice. In most cases endoscopy allows for the identification of the bleeding source and introduction of therapeutic procedures in the same session. For upper GI bleeding, endoscopic therapy is highly effective, with reported success rates of 80-90% for both arterial and variceal bleeding.

In case of inconclusive endoscopy, the diagnostic options include CT, CT angiography (CTA) and catheter angiography. CTA can evaluate the wall of the entire gastrointestinal tract, identifying the underlying lesion as well as other digestive structures that may sporadically be the source of bleeding, such as the pancreas and biliary tract. CTA shows pathology, but not necessarily the bleeding site itself [7].

CTA is recommended before catheter angiography and facilitates better therapy planning. It may decrease procedure time, radiation dose and contrast volumes during embolisation.

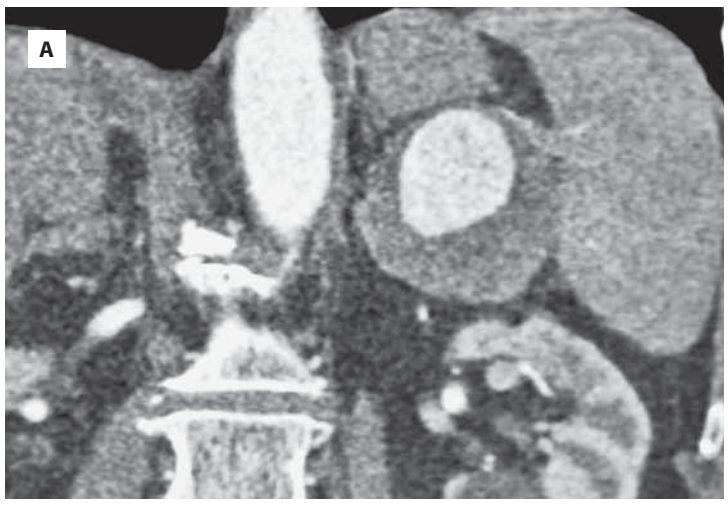
Embolisation is becoming the treatment of choice in cases of failed endoscopic control of bleeding [8, 9]. It should begin with angiography of the celiac trunk, as the majority of bleeds are caused by gastroduodenal ulcers supplied by the celiac artery branches. In case of negative celiac angiography, the left gastric and the gastroduodenal artery should be investigated, and if no evidence of bleeding is seen, the superior mesenteric artery has to be examined. In patients with chronic GI bleeding, it is very unlikely that angiography demonstrates the culprit vessel, but pseudo-aneurysms, irregular vessel walls, arterial spasm, early venous filling and focal hypervascularity with contrast blush are useful indirect signs. Depending on the vascular pathology, endovascular treatment employs different embolic materials, including particles, coils, liquid materials or covered stents [10]. In patients with upper GI bleeding, even non-superselective embolisation is acceptable because an extensive collateral arterial network in the upper GI tract diminishes the risk of ischaemic complications. However, due to these collaterals, there is the need to embolise the bleeding point from both the proximal and the distal vessel to prevent retrograde blood flow. This is essential in the embolisation of the gastroduodenal artery and of the inferior and superior pancreaticoduodenal arteries [11].

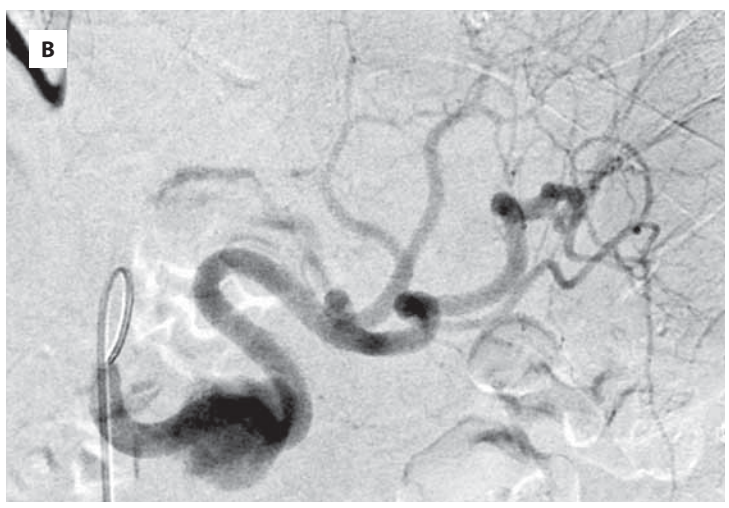
Lower GI bleeding

Chronic lower GI bleeding may originate in the small bowel, colon or rectum. Among the most common causes of bleeding are diverticulas that contribute to blood loss in 30–60% of patients, and angiodysplasia diagnosed in up to 40% of cases. Haemorrhoids, colitis, colorectal cancer and polyps are responsible for bleeding in 5–20% of patients [12]. Multiple diagnostic procedures can be used to detect the source of bleeding. Endoscopic methods are the first-line diagnostic and, often, therapeutic procedures. They include colonoscopy, deep enteroscopy and capsule endoscopy.

Patients without anaemia and with negative colonoscopy do not require further diagnostic investigations, whereas those with anaemia should be referred for a small bowel examination, preferably with wireless capsule endoscopy. This method is less appropriate to assess colonic sources of bleeding, due to poor vision caused by retained stool and the colon's large diameter. Capsule endoscopy provides very good visualisation of the small bowel mucosa, but CT enterography gives better visualisation of the entire wall [13].

Among radiological investigations are CT colonography, CT and MR enterography, CTA and catheter angiography. CTA is most frequently exploited. It can identify the underlying lesion as diverticular, vascular, neoplastic or inflammatory. The accuracy of CTA for detecting the cause of bleeding exceeds 80%. In patients with chronic GI bleeding, demonstration of the site of haemorrhage is very rarely possible (requires active bleeding), but contrast enhancement of the bowel wall, its thickening, spontaneous hyperdensity of the peri-intestinal fat or vascular dilatations are valuable indirect signs [14].





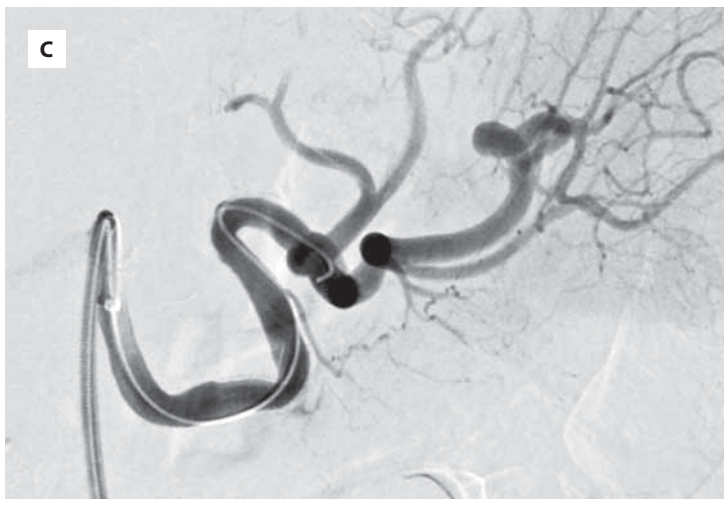


Fig. 1: Patient with chronic GI bleeding in the course of chronic pancreatitis.

A: Abdominal CT: saccular aneurysm in the pancreatic segment of the splenic artery
B: Angiography of the splenic artery: saccular aneurysm of the splenic artery (arrow)
C: The splenic artery aneurysm completely excluded with the stentgraft

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Catheter angiography should be considered in patients in whom endoscopic examination has failed. The superior mesenteric artery and the inferior mesenteric artery are first to be visualised. If no bleeding is found, the internal iliac artery and rectal arteries are to be explored [15].

In cases of unsuccessful endoscopic treatment, embolisation should be considered as the next step [12]. A variety of materials can be used to occlude the bleeding vessel. Coils, particles and liquid materials are most frequently used [10]. In the lower GI tract, where there are fewer collaterals and is a higher risk of ischaemia, attempts should be made to position the catheter as close to the bleeding site as possible. In case of the interior mesenteric artery, the catheter should be advanced to the marginal artery or the terminal artery, whereas in the superior mesenteric artery to the vasa recta. However, even superselective embolisation is associated with a risk of ischaemic complications in 5–10% of cases [11].

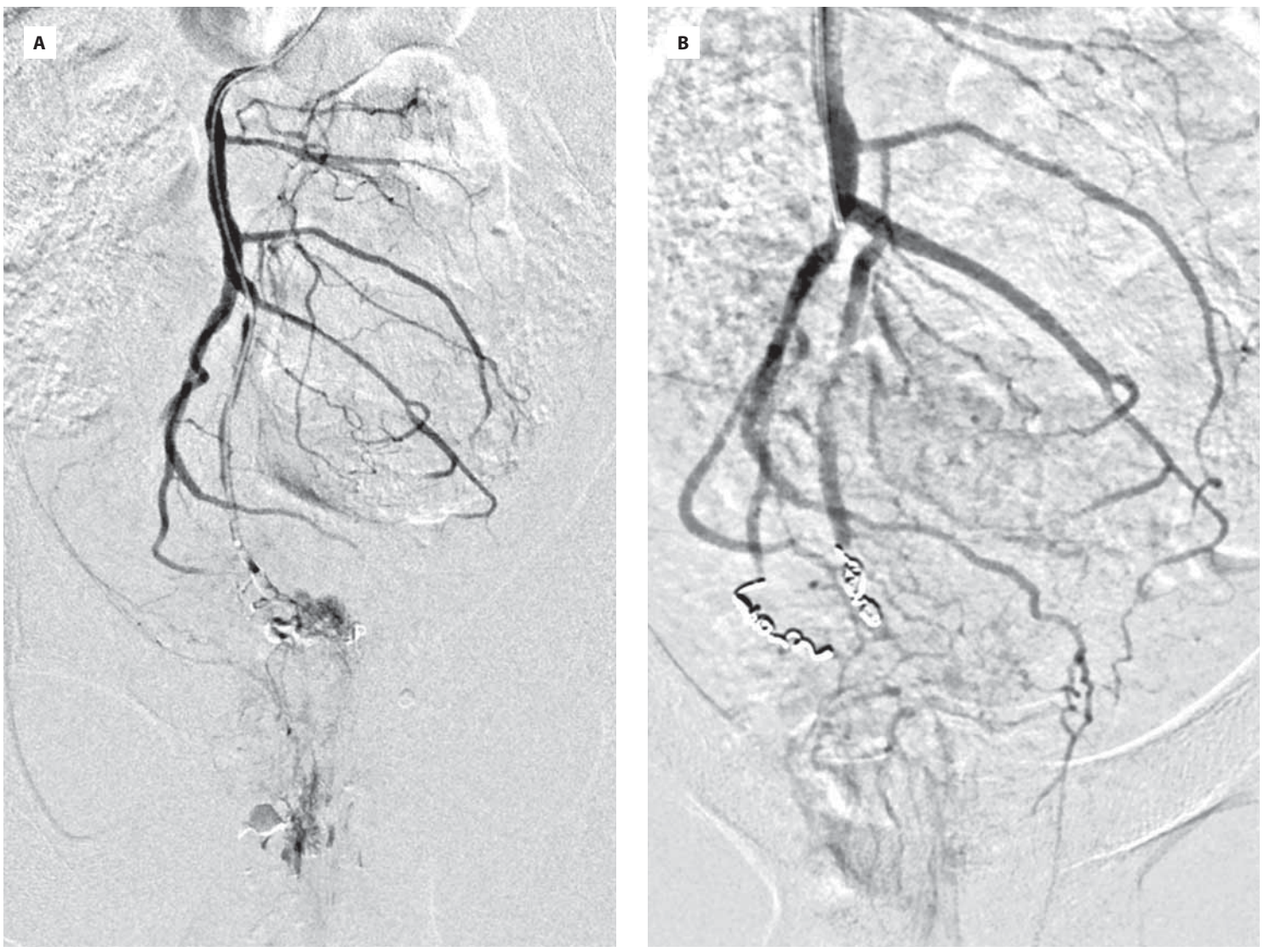


Fig. 2: Patient with chronic haemorrhoidal bleeding; haemorrhoid embolisation.

A: Arteriography of the superior rectal arteries arising from the inferior mesenteric artery. Characteristic hypervascularisation at the level of rectum.
B: Control angiogram after microcoil embolisation. There is no visible hypervascularisation at the level of rectum.

STUDENT CORNER

Risha Rose, CIRSE Office

The CIRSE Student Programme: be inspIRed!

Eight years after the CIRSE Annual Congress first opened its doors to medical students, the ever-popular Student Programme continues to welcome undergraduate medical students to Europe's premier meeting for interventional radiology. With over 1,200 students who have benefited from this beloved initiative to date, CIRSE is committed to investing in the future generation of IR, including offering students an unforgettable first congress experience here at CIRSE 2018.

6 Things to Look Forward to at CIRSE 2018

1. The best of IR is at your fingertips…
With over 6,800 participants, 250 hours of education, and 5,800 m2 of technical exhibition, CIRSE 2018 is rich in opportunities to learn about interventional radiology. With this incredible array of activities, it is also a bit overwhelming for the IR newcomer, so the CIRSE Student Programme has put together a recommended sessions guide to help medical students navigate this exciting event. From the student-exclusive session Introducing IR, to workshops, fundamental courses, special sessions, expert round tables and expert case discussions, the student-recommended sessions will be nothing short of inspiring!

2. Networking and finding an IR Mentor
Building and expanding your professional presence can be heavily influenced by who you know and who you meet along the way. CIRSE 2018 offers students incredible opportunities to build their network, find mentors, and perhaps even meet their future supervisors and colleagues. Two of these opportunities include the Student Mentoring Breakfast, where students and professionals come together in a relaxed environment to meet and socialise, and the European Trainee Forum (ETF). The ETF represents CIRSE's Junior Members and young IRs in training and will hold onsite sessions and activities throughout the congress.

3. Building new relationships
CIRSE's Student Programme is here not only to introduce medical students to the fascinating field of IR, but also to encourage future generations of interventional radiologists to build relationships and create a community with one another at an early stage in their career. This is why students can find their own exclusive Students' Lounge where they can hang out, eat lunch, plan their day, or simply use as a meeting place before going to the best socialising event of the week – the Students' Evening. The Students' Evening is the perfect opportunity to party, drink (each student gets a free drink voucher), and experience Lisbon's legendary nightlife.

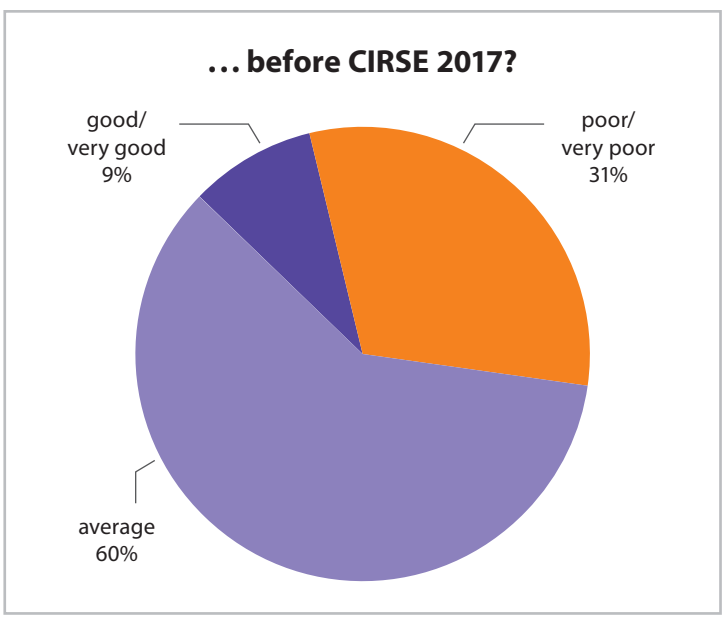
4. Getting your hands dirty
One of the best ways of learning is by doing, and CIRSE 2018 is once again offering students the opportunity to experience IR procedures first-hand with three different types of student-exclusive sessions: hands-on device trainings, simulation sessions and company learning centres. Each session will focus on separate topics and students will have the chance to use devices and perform mock procedures. Participation is free, and session details can be found in the student recommended sessions. Advance registration for these sessions is required, so students wishing to attend sessions they are not registered for can arrive 20 minutes early to add their name to the waitlist.

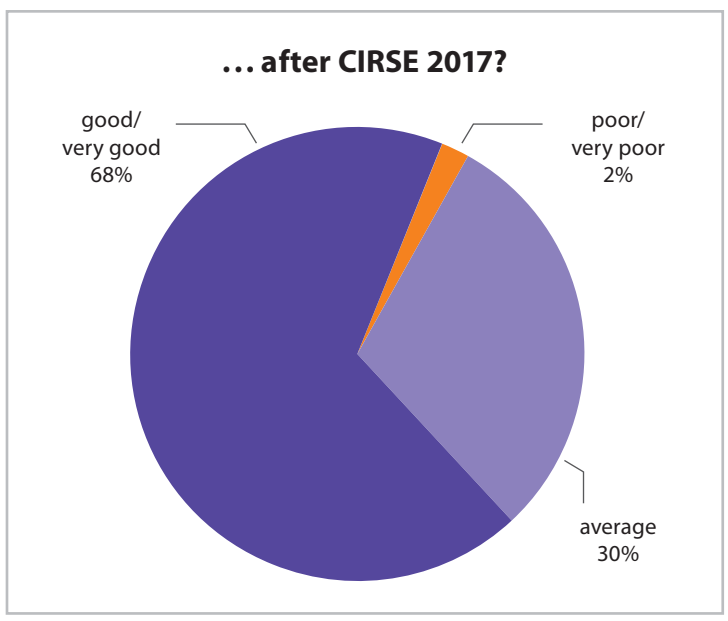
5. Showing off your IR knowledge
Last year, students' IR knowledge increased profoundly from the beginning to the end of the congress (see chart), and 95% of participants stated that, because of this new knowledge, interventional radiology had become more attractive as a career choice for them. This year, to continue the excellence in learning and information retention, students are encouraged to participate in the Student Corner Questions of the Day challenge (read below for full contest details) and the Students' Quiz – a fun, pub-style, team-based IR quiz. Students will have the opportunity to show off everything they learned, and the three winning teams will receive prizes.

6. Taking your passion for IR with you!
Don't say we didn't warn you – these four congress days will fly by, and the IR knowledge acquired will saturate your mind and inspire a longing to learn even more. When you return back to the rhythms of your undergraduate studies, however, a lack of interventional radiology exposure may await. Don't let that discourage you; be active and communicate your interests to your universities and national societies, connect with CIRSE's online platforms and take advantage of online resources and publications. Make your voices heard and let CIRSE support your efforts. Get connected, involved, and, above all, inspired!

How would you judge your knowledge of interventional radiology…

We spoke to students at CIRSE 2017 about how the programme impacted their knowledge of the subspecialty (n=86).





QUESTIONS OF THE DAY

Saturday, September 22, 2018

Be in with a chance to win daily prizes by sending your correctly answered questions to **students@cirse.org** by 18:00 tonight!

Answers to the below questions can be found within today's Congress News.

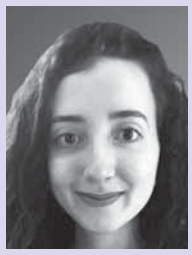
The first three correct responses will win €25 Amazon vouchers. Ready… set… GO!

1. Three different groups of **uterine adenomyosis** are easily identified with MRI. What are they?
2. Which three **IR Trainee Sessions** at CIRSE 2018 shouldn't be missed?
3. Planning of the percutaneous bone biopsy procedure is mandatory in order to avoid complications but also to choose the best lesion for biopsy. What **type of lesions** were recommended by Dr. Eyheremendy in his article? Lytic or blastic lesions?
4. Clinical evidence of the efficacy of combined chemotherapies and IO have been reported in various prospective randomised trials, mostly in patients with these **two cancers:**
5. While chronic upper GI bleeding can originate in the oesophagus, stomach and duodenum, where may chronic **lower GI bleeding** originate?

be inspIRed...

Students in the Spotlight

We had a chance to speak with some of your peers about their interest in medicine and experiences studying throughout Europe. Meet today's students from Greece and Switzerland.



Styliani Ioakeimidou
Greece

CIRSE: How did you hear about interventional radiology and the CIRSE Congress?

Styliani: Interventional radiology was unknown to me until my fourth year of studies when I had two brilliant interventional radiologists as professors in radiology, who introduced us to a variety of clinical cases and allowed us to observe real procedures and handle the special equipment. We were surprised to hear about something so innovative! When a friend of my sister excitedly informed me of CIRSE and his experience attending the congress twice, I was eager to also attend and learn more about interventional radiology.

CIRSE: Why did you choose to study medicine in Greece? Did you consider going to medical university in any other countries?

Styliani: I chose to study medicine in Greece because it is my homeland, but more importantly, it is the birthplace of medicine. If I were to study in another country, it would be at a university either in Germany, Austria, Sweden or the USA, and factors such as worldwide ranking of the university and development of medical research would be considered.

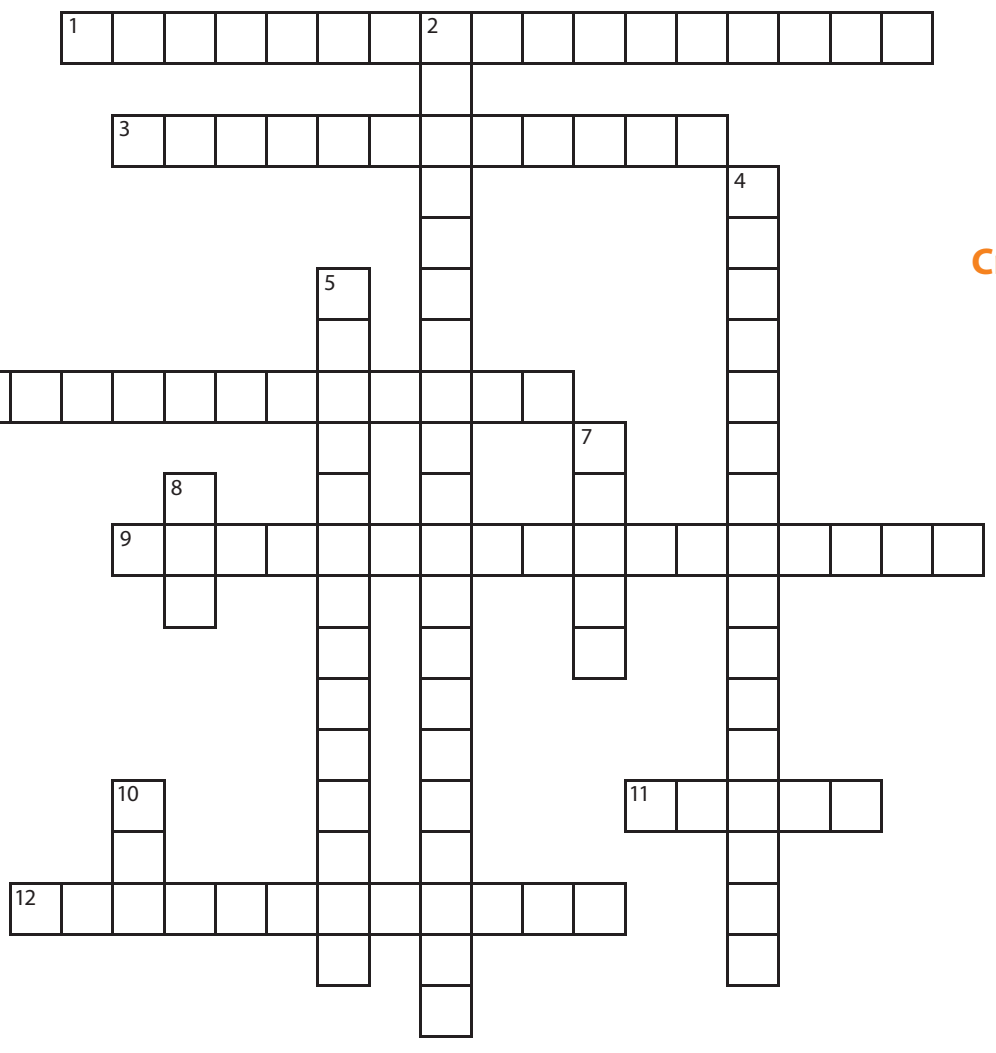
Jan Schönhofen
Switzerland

CIRSE: How did you hear about IR and what kind of exposure do you get to IR at your university?

Jan: I first heard of interventional radiology before starting my medical studies. Only then I didn't know exactly what it was or what it was called. I only knew that "new ways of treating patients with minimally invasive methods" existed. I thought it sounded like a nice concept. Later, during lectures on general radiology, interventional radiology was mentioned a few times. It wasn't until I attended CIRSE in 2017 after hearing about it from an interventional radiologist at my university that I learned what an immense field of medicine IR is and will be!

CIRSE: If you could practice medicine anywhere in the world, where would that be?

Jan: I would practice medicine in Switzerland. I think Switzerland has a lot to offer in medicine and is still very actively participating in advancing different fields, like IR.



Crossword Puzzle

FIND OUT THE ANSWERS IN TOMORROW'S NEWSPAPER!

Across

1. Open access journal that debuted at CIRSE 2017
3. Innovation, Education, ...
6. Side effect of PAD
9. Be inspIRed...
11. Where aortic interventions are discussed
12. Chronic high blood pressure

Down

2. Result of blood clots, most common in the legs
4. CIRSE 2018 Gold Medallist
5. Father of interventional radiology
7. Anagram: Cries
8. The CIRSE initiative empowering trainees, residents, and young IRs (acronym)
10. Where you can learn "How to make your angio suite smart and safe!" at CIRSE 2018 (acronym)

Coming up tomorrow!

- **Your guide to the must-dos, sees, and eats while visiting Lisbon**
- **Get your facts straight on the occupational radiation hazards everyone is talking about**
- **Meet your peers from Latvia and the United Kingdom**
- **Another Questions of the Day challenge awaits**

Don't miss it !
New perspectives for musculoskeletal tumours
Focus Session
Saturday, September 22, 10:00-11:00
Auditorium 6

Bone biopsy: a new perspective for the molecular era?

Eduardo P. Eyheremendy, EBIR

Eduardo P. Eyheremendy
(EBIR)
Hospital Aleman
Buenos Aires, Argentina

Dr. Eyheremendy has been the Head of the Diagnostic Imaging Service at Hospital Aleman in Buenos Aires since 2016. He joined this hospital as an IR in 1997 and has experience in vascular and non-vascular procedures and also focuses on interventional oncology. Dr. Eyheremendy is a member of 12 national and international scientific societies as well as a board member of the Argentine Society of Radiology (SAR) and the Iberoamerican Society of Interventional Radiology (SIDI). Throughout his career, he has presented 72 abstracts at national and international meetings in South America, Europe, Asia and the USA, and has written 27 scientific papers.

Percutaneous bone biopsy is a challenging procedure, not only due to difficulties in accessing the target lesion but mainly due to problems in obtaining successful samples for histologically diagnosis. This is why bones are not usually our first target of choice for biopsies in metastatic disease. In addition, oncologic treatments have changed and an advanced-stage cancer with metastatic disease in most types of cancers is not considered an end-stage pathology anymore. Molecularly targeted drugs have emerged as viable therapeutic options in patients with advanced and, therefore, inoperable cancer. The goal of cancer biopsies used to be to obtain enough samples to allow the pathologist to confirm their diagnosis. We need to shift this paradigm in the era of precision medicine to address both diagnostic and molecular needs. The particularities of the lesion types and specimens must determine procedural plans and techniques as well as how to handle difficulties in order to obtain the best diagnostic yield.

Accuracy of bone biopsy

The goal of biopsy is to obtain diagnostic specimens while minimising the risk of morbidity. CIRSE's Guidelines on Percutaneous Needle Biopsy define technical success as the procurement of sufficient material to establish a diagnosis and/or guide treatment decisions [1]. Tissue sampling could be obtained using open surgical biopsy, fine needle aspiration (FNA) [2], or core needle biopsy (CNB) [3]. The accuracy rate for open surgical biopsy is 98%, CNB ranges from 77% to 97% and FNA was reported as 63% [2-8].

These numbers manifest diagnostic yield in terms of histologic confirmation of tumour cells, however, in clinical practice, successful extraction of molecular material is an increasingly important goal of these biopsy procedures.

Bone biopsy is considered a challenging form of biopsy because many factors can influence its accuracy. Certain anatomic locations and histologic types are associated with diagnostic difficulties. Accuracy of vertebral biopsies is reported to be 61%, lower than non-spinal sites 75% ($p<0.008$). Similarly, the accuracy rate for pelvic biopsies of 81% is higher than 68% for non-pelvic biopsies ($p<0.02$) [5]. On the other hand, the accuracy rate for low-grade malignant and benign tumours was 80% and drops to 50% if infections are present [4].

Another factor is lesion size. Wu et al. reported differences in diagnostic yields for lesions smaller than 2 cm (54%), between 2 and 5 cm (75%) and larger than 5 cm (86%) [3]. Perhaps the most important difficulty is bone lesion composition, bringing significantly lower diagnostic yields for sclerotic (57%) versus lytic (87%) bone lesions. This may be due to a masking of the underlying lesion by reactive sclerosis but also because of the process needed for histologic diagnosis that could alter the result [3].

Primary bone tumours

Primary benign and malignant bone tumours vary widely in their clinical behaviour and pathological features. Imaging plays a key role in indicating and planning a bone biopsy. Any musculoskeletal lesion can be confidently diagnosed as benign and should not be biopsied, and follow-up could be performed in cases where lesions do not satisfy all the imaging criteria [9].

To avoid jeopardising the patient´s chances for successful surgery, nearly all bone lesions that are solitary should be deemed "possible sarcomas". The needle tract will breach the tumour pseudo-capsuleand could theoretically increase the risk of tumour dissemination.

Although there are reports that conclude that a retained core needle biopsy tract does not increase the risk of local recurrence or metastatic rates [10, 11], Barrientos-Ruiz et al. reported a 12% contaminated biopsy tract. They also reported that pathologists found tumour cell nests in the resected biopsy tract at the time of definitive resection on 180 samples with 0.8% from percutaneous biopsy and 32% from open biopsy. Local recurrence-free survival was longer for patients without contaminated tracts (mean: 107 months; 95% CI, 74–141 months) than in those with biopsy tract seeding (mean: 11 months; 95% CI, 120 months; $p = 0.001$) [6].

Biopsy tracks should be located along the plane of the planned incision for the definitive resection surgery. IRs should focus on avoiding three main points: neurovascular bundles, non-affected muscle compartments and joints.

The shortest distance to the lesion is not necessarily the optimal route. Minimising compartmental tumoural contamination is important. Contamination of major neurovascular structures can necessitate surgical removal and disqualify the patient from limb-sparing surgery. Invasion of adjacent muscle will necessitate resection of a large portion of the muscle, but not necessarily amputation. Joint involvement introduces increased complexity to surgery by necessitating a total arthroplasty [12, 13]. Histologic findings should be followed by an ancillary investigation like immunohistochemistry that is particularly valuable in the differential diagnosis of primary and secondary malignant bone tumours.

For haematologic malignancies, bone involvement can also be extensive in patients with multiple myeloma, and bone may be a primary or secondary site of disease involvement in patients with lymphoma. If lymphoma is suspected, additional samples in saline should be separated for flow cytometry. Monoclonal kappa or lambda light chain expression can be identified in myeloma or plasmocytoma. Expression of CD99 is useful in confirming the diagnosis of Ewing´s sarcoma. Cytogenetic abnormalities have also been noted in other bone tumours including osteochondroma, osteofibrous dysplasia, fibrous dysplasia, giant cell tumour, osteosarcoma, chondrosaercoma and chordoma [14]. Currently the gold standard in the diagnosis of Ewing sarcoma family tumours (ESFT) is confirmation of histological diagnosis by cytogenetics/molecular studies. The improvement of ESFT therapy is linked to the discovery of new strategies to select patients with poor and good prognoses. The elucidation of the cell of origin is crucial for discovering the mechanisms involved in the genesis of ESFT and for the identification of reliable molecular markers and possible therapeutic agents [15]. Cytogenetic analysis and molecular tests are currently valuable for diagnoses and prognoses, primary in bone tumours.

Metastatic disease

The incidence of bone metastasis is more prevalent than primary bone tumours. Bone is the third most common organ affected by metastasis, surpassed only by the lungs and liver.

Several malignancies have propensities to metastasise to bone including multiple myeloma, breast, thyroid, prostate and lung cancers [16]. Under normal circumstances, bones undergo continuous remodelling – osteoblasts contribute to bone deposition and osteoclasts mediate bone resorption, thereby maintaining appropriate bone structure. Osteotropic malignancies that metastasise to bone upset this balance, causing lesions that are either osteoblastic, osteolytic or both.

Molecularly targeted drugs have emerged as viable therapeutic options in advanced cancers from different aetiologies. Biopsy of recurrent or metastatic disease should be undertaken for screening patients for targeted drug therapy in the advanced disease setting. This includes: (1) patients with non-small cell lung cancer (NSCLC) who have epidermal growth factor receptor (EGFR) mutations for treatment with EGFR tyrosine kinase inhibitors (gefitinib and erlotinib); (2) patients with anaplastic lymphoma kinase (ALK) translocations for treatment with the ALK tyrosine kinase inhibitor (crizotinib); (3) patients with melanoma who have v-Raf murine sarcoma viral oncogene homolog B (BRAF) codon 600 mutations for treatment with selective BRAF inhibitors (vemurafenib and dabrafenib) and mitogen-activated protein kinase (MEK) inhibitor (trametinib); (4) patients with colorectal carcinoma who have neither KRAS nor neuroblastoma v-Ras oncogene homolog (NRAS) mutations for treatment with anti-EGFR monoclonal antibodies (cetuximab and panitumumab) [2, 17] and (5) treatment with the polyadenosine diphosphate [ADP] ribose polymerase (PARP) inhibitor (olaparib) for patients whose prostate cancers are no longer responding to standard treatments and whose defects in DNA repair genes led to a high response rate [18].

Bones are the most frequent site of metastasis in breast cancer patients. Systemic treatment in these patients is chosen on the basis of ostrogen receptor (ER) and progesterone receptor (PR) status and overexpression/ amplification of the human epidermal growth factor receptor 2 (HER2). It is well recognised that metastases from breast cancer could have hormonal receptors and/or HER2 discordance with the primary tumour at a range of 8–23% [19]

These changes could be due to tumour heterogeneity and the biological evolution of the tumour. Yeung et al. [20] found that the discordance is higher in bone metastasis when compared to all other sites (lymph node, lung, liver, brain and gastrointestinal tract), perhaps because decalcification of bone biopsy material for the analysis of ER, PR and HER2 may alter the outcome of tumour analysis. The National Comprehensive Cancer Network (NSSN) recommended doing a biopsy

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to confirm recurrence and repeating ER/PR and HER2 at the metastatic site. Shachar et al.[19] found that having a biopsy upon recurrence was associated with longer survival. Improved survival for patients whose metastases retained hormone receptor (HR) expression as compared to those with loss of expression was shown.

In this study, 8% of patients who were initially HR- became HR+, suggesting that endocrine therapy should be considered. At the same time, 15% of patients who were HR+ became HR- at biopsy and would likely not have benefitted from endocrine therapy, in which case chemotherapy would have been a better choice.

Biopsy samples handling for pathology and molecular testing; importance of lesion composition

Bone samples are difficult tissues to work with histologically. Problems arise in cutting sections of bone marrow biopsy samples, bone tumour samples or biopsies of metastases to the bone because of the unique mixture of hard tissue and soft tissue (marrow, fat or neoplastic tissue).

To cut adequate intact sections, one can either make the tissue uniformly hard by freezing fresh material or one can make the tissue uniformly soft by decalcification followed by paraffin embedding. Although cryostat sectioning allows optimal antigen preservation, this method has not gained widespread acceptance because the poor morphological preservation severely hampers histological evaluation. To obtain satisfactory paraffin sections of bone-containing samples, it is necessary to soften the tissue by removing the mineral. This is carried out by treatment with reagents that react with calcium: acids to form soluble calcium salts or chelating agents to take up calcium ions. Strong acids such as nitric and hydrochloric acid as well as many hydrochloric acid-containing proprietary decalcifiers (e.g.: RDO) decalcify rapidly. However, if they are used for longer periods of time, serious deterioration of stainability can cause damage to nucleic acids, resulting in degraded DNA that is incompatible with molecular testing [2]. It was also demonstrated that the decalcification of breast tumours had an overall negative impact on receptor markers [21]. Using chelating agents for decalcification, such as EDTA (ethylenediamine tetra-acetic acid), might circumvent this problem.

Decalcification in EDTA has little or no effect on tissues other than the bone mineral itself. However, the major disadvantage is that decalcification with EDTA proceeds only slowly, with incubation times up to several weeks depending on the extent of mineralisation [22].

In two different series of prostate bone metastases, one group defined lytic lesions if they were more than 50% more lucent than the surrounding normal bone or blastic if they were more than 50% denser [3]. The other group used an empirical cut-off value of 475 Hounsfield units to divide high- and low-density lesions [7]. The first group had a diagnostic yield of 87% for lytic lesions and the second 79% for lower density lesions and for sclerotic (dense) lesions, it was 57% and 33% respectively.

Technique to avoid factors that affect diagnostic yield of bone biopsy

When accessing an intraosseous lesion, a coaxial technique is preferred, trephine bone biopsy needles are used to sample dense osseous/chondroid lesions and cutting needles are used to biopsy any soft tissue component of the osseous lesion. Core biopsy specimens should be grossly examined for the presence or absence of bones. A well-trained histotechnologist who cuts the tissue blocks then decides the duration of surface decalcification, if needed.

Thin trabecular bone fragments, if present and easily removed, can be submitted for surface decalcification and the remaining thick cortical bones are submitted for EDTA-based decalcification. FNA smear slides can provide alternative sources for the mutational profiling of bone metastasis [2].

Conclusion

Procedure planning is mandatory in order to avoid complications but also to choose the best lesion for biopsy. These include: (1) lytic or mixed lesions rather than blastic; (2) lesions that showed radiotracer uptake on bone scan or avid 18F-FDG on PET/CT; (3) also lesions that increased in diameter compared with prior exams.

Trainees, residents and young IRs at CIRSE 2018

ETF European Trainee Forum

Training to become an IR or at the start of your IR career?
Building on the success of previous years, CIRSE 2018 will offer IR trainees, residents and young IRs a number of special events and sessions hosted by CIRSE's European Trainee Forum. These exciting events are great opportunities to boost your career by expanding your network and gaining new insights into the interventional radiology profession:

IR Trainee Session: Future IR technologies
Saturday, September 22, 10:00-11:00

IR Trainee Session: Building an IR career
Monday, September 24, 10:00-11:00

IR Trainee Session: Clinical know-how
Tuesday, September 25, 10:00-11:00

Please join us in Room 3.A for these sessions!

European Trainee Forum Networking Brunch
This is a chance to meet peers and community leaders from across Europe at an informal brunch event. Relax, have a chat and enjoy a coffee while getting to know other young IRs from all across Europe!
Sunday, September 23, 11:00-12:00 in Room 1.08

ETF Quiz
The ETF Quiz is a fun opportunity for IRs-in-training to meet their peers from around Europe, show off their knowledge and compete for prizes.
Tuesday, September 25, 11:30-13:00 in the AIP Auditorium

European Trainee Forum Short Talks
The ETF Short Talks were a very successful feature introduced in 2017, and they will be continued and expanded in 2018. The talks will again take place around lunchtime at the News-on-Stage area. Topics will include: grants, international mobility, preparing for the EBIR Exam as well as international research cooperation.

Training and career opportunities in Australia
Saturday, September 22, 12:15-12:30

Grants and European mobility
Saturday, September 22, 12:30-12:45

Career opportunities as an MD in the device industry
Sunday, September 23, 12:15-12:30

Taking the EBIR: Practical advice
Sunday, September 23, 12:30-12:45

Training and career opportunities in the USA
Monday, September 24, 12:15-12:45

Be part of IR's next generation!

We look forward to seeing you there!

Cardiovascular and Interventional Radiological Society of Europe

Adenomyosis: Is UAE the best alternative?

Paul N.M. Lohle

Don't miss it !
Uterine artery embolisation
Expert Round Table
Saturday, September 22, 16:15-17:15
Auditorium 8

Dear colleagues, it is time for a wake-up call!

Of course, interventional radiologists are familiar with uterine artery embolisation (UAE) for symptomatic uterine fibroids, a minimally invasive treatment with world-wide acceptance and endorsed by professional societies such as the American Congress of Obstetricians and Gynecologists. **But, just as important is the next in line; namely, UAE for women with symptomatic uterine adenomyosis.** The safety and efficacy of this procedure has been investigated in various retrospective and prospective studies, including systematic reviews and meta-analyses, demonstrating encouraging positive results [1-5].

Adenomyosis is a benign gynaecological condition characterised by the abnormal presence of endometrial tissue (the inner lining of the uterus) within the myometrium (the thick, muscular layer of the uterus). The clinical diagnosis is challenging, as the presenting symptoms overlap with other benign pelvic diseases (e.g. leiomyomata or endometriosis). Adenomyosis is often underdiagnosed and is responsible for symptoms such as heavy menstrual bleeding and pain, with or without bulk-related symptoms and fertility issues in premenopausal women. The reported occurrence of adenomyosis varies significantly. The prevalence of adenomyosis in tissues obtained from hysterectomy is reported between 8.8% and 31%. Using broad criteria for the diagnosis of adenomyosis, a prevalence as high as 70% in women between 40 and 50 years of age is suggested. Of women with clinical manifestations of adenomyosis, about one-fifth are under 40, but the vast majority are between 40 and 50 years.

Magnetic resonance imaging (MRI) is particularly useful, both in doubtful transvaginal ultrasound (TVUS) cases and in providing a complete evaluation of the disease with its panoramic views. With T2-weighted images and contrast-enhanced T1-weighted MRI, the thickness of the junction zone can reliably be measured; a thickness ≥12 mm is considered diagnostic for adenomyosis. The presence of foci of high signal intensity within the myometrium constitutes an additional, but not a mandatory criterion (Fig. 1). MRI is a reliable modality for diagnosing adenomyosis, with a sensitivity varying in the literature between 78% and 88%, and a specificity of 67–100%. MRI can categorise adenomyosis as focal or diffuse, and can be repeated in time to evaluate the effect of treatment. Three different groups of uterine adenomyosis are easily identified with MRI: 1) pure adenomyosis, 2) adenomyosis with fibroid predominance and 3) uterine fibroids with adenomyosis predominance. Adenomyosis may be subdivided into diffuse or focal. Focal adenomyosis is also known as adenomyoma. From personal experience, ~70% of women with symptomatic adenomyosis have pure adenomyosis and ~30% mixed with fibroids. The estimated ratio in a UAE practice for symptomatic fibroids and adenomyosis is 7 fibroid cases: 2 pure adenomyosis cases: 1 mixed case of adenomyosis accompanied by fibroids.

Conservative medical treatment of adenomyosis ranges from local treatment with the release of medications by an intrauterine device (IUD) to systemically administered treatment. IUD-released progestogens are used to reduce heavy menstrual bleedings in women with adenomyosis. Medications available for systemic administration include gonadotropin-releasing hormone (GnRH) agonists.

Surgical management consists of excision or enucleation in focal adenomyosis, or hysterectomy in case of deep myometrial involvement. Although hysterectomy is an absolute cure for women with symptomatic adenomyosis, some drawbacks need to be considered; the desire of some patients to preserve their uterus, vaginal vault prolapse, incontinence, recovery time after hysterectomy (ranging between 6-8 weeks with high healthcare-related expenses) and lost time at work render hysterectomy an option associated with high costs.

For these reasons, alternative treatments such as UAE have been explored. Although the first results of UAE for adenomyosis were disappointing, later studies showed substantial clinical improvement in the majority of treated women with adenomyosis. The targeted embolisation, with occlusion of uterine artery vessel branches with embolic material, induced cessation of arterial blood flow to the adenomyosis. Intentional infarction of adenomyosis will result in relief of symptoms (Fig. 2a,b). The UAE catheterisation technique for symptomatic adenomyosis is no different from the technique for symptomatic fibroids. Embolisation is performed using an embolic agent such as particles or microspheres; the currently available data do not seem to indicate a preferred embolic agent for use. Although in part based on speculation, deep penetration with the embolic agent seems to be needed for optimal infarction of adenomyosis. Calibrated microspheres are able to selectively occlude the tiny arterial branches of adenomyosis, deep in the uterine stroma creating adequate tissue infarction.

Two complete and detailed meta-analyses on UAE for the treatment of adenomyosis have been published. The systematic review by Popovic et al. included 15 studies with a total of 511 patients, published between 1999 and 2010. Clinical improvement of bleeding, pain and bulk-related symptoms were reported by three quarters of the women included, with a median follow-up of 26.9 months. The systematic review by de Bruijn et al. included 30 studies: 22 prospective cohorts and 8 retrospective cohorts with a total of 1,037 women with symptomatic pure adenomyosis or adenomyosis mixed with fibroids. Duration of follow-up was a mean of 22.8 months, ranging between 3-60 months. The studies were executed in 10 different countries: China (n=9), Korea (n=7), USA (n=4), Netherlands (n=3), Australia (n=1), France (n=1), Germany (n=2), Canada (n=1) and UK (n=1). **This systematic review reported improvement of clinical symptoms in 84% of patients, with reduction of uterine volume, decrease in junctional zone thickness and increased infarction rates in patients after UAE.** Combined adenomyosis seemed to respond better to UAE compared to pure adenomyosis.

This review reported positive and encouraging results, but emphasised that randomised controlled trials (RCTs) are unfortunately still lacking.

As a result of the positive outcomes after UAE in women with adenomyosis, Dutch gynaecologists and IRs have embraced UAE for adenomyosis in the Official National Guidelines for heavy menstrual bleeding (HMB). Dutch gynaecologists and IRs have created a flowchart with "state of the art" therapy for HMB, including UAE for adenomyosis. Gynaecologists are obliged to discuss and offer the patient UAE for symptomatic adenomyosis in their daily practice.

Based on the currently available Level 2 evidence, and awaiting RCT Level 1 results, UAE seems to be an attractive and useful treatment option. It seems unjustified to withhold UAE for symptomatic adenomyosis.

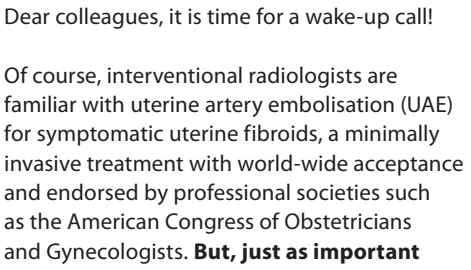

Fig. 1: Pure adenomyosis depicted on a sagittal T2-weighted MR image, with broadening of the junctional zone, exceeding 12mm thickness, with high-intensity foci and an enlarged uterus, causing heavy menstrual bleeding, pain and bulk-related symptoms.

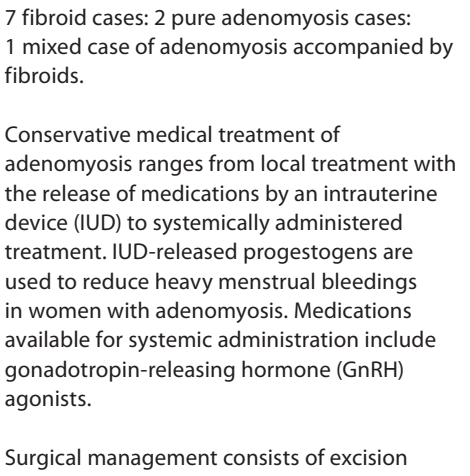

Fig. 2a: Angiographic picture before UAE demonstrating both uterine arteries and vessel branches penetrating deep into the adenomatous tissue surrounding the uterine cavity.

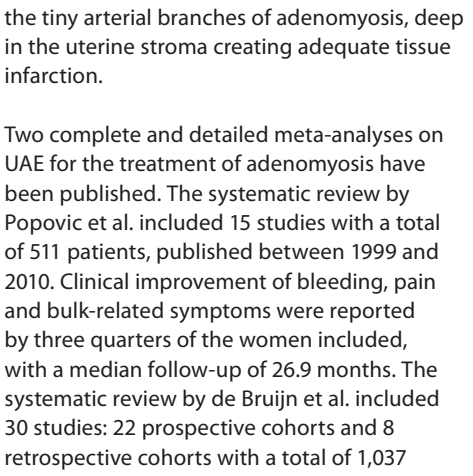

Fig. 2b: Angiographic picture after UAE demonstrating occlusion of uterine artery branches by embolic material with infarction of adenomyosis, which leads to relief of symptoms.

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Dr. Lohle is an interventional radiologist and the Head of Clinic at the Elisabeth Tweesteden Hospital in Tilburg, Netherlands. He studied medicine in the city of Groningen and then completed his radiology training in The Hague. He subsequently started at the EHZ as Head of Clinic, with interventional radiology as a key focus area. In his work as an IR, Dr. Lohle performs blood vessel interventions, in various parts of the body including the arms, abdomen and legs, using techniques such as percutaneous transluminal recanalisation, stenting and embolisation.

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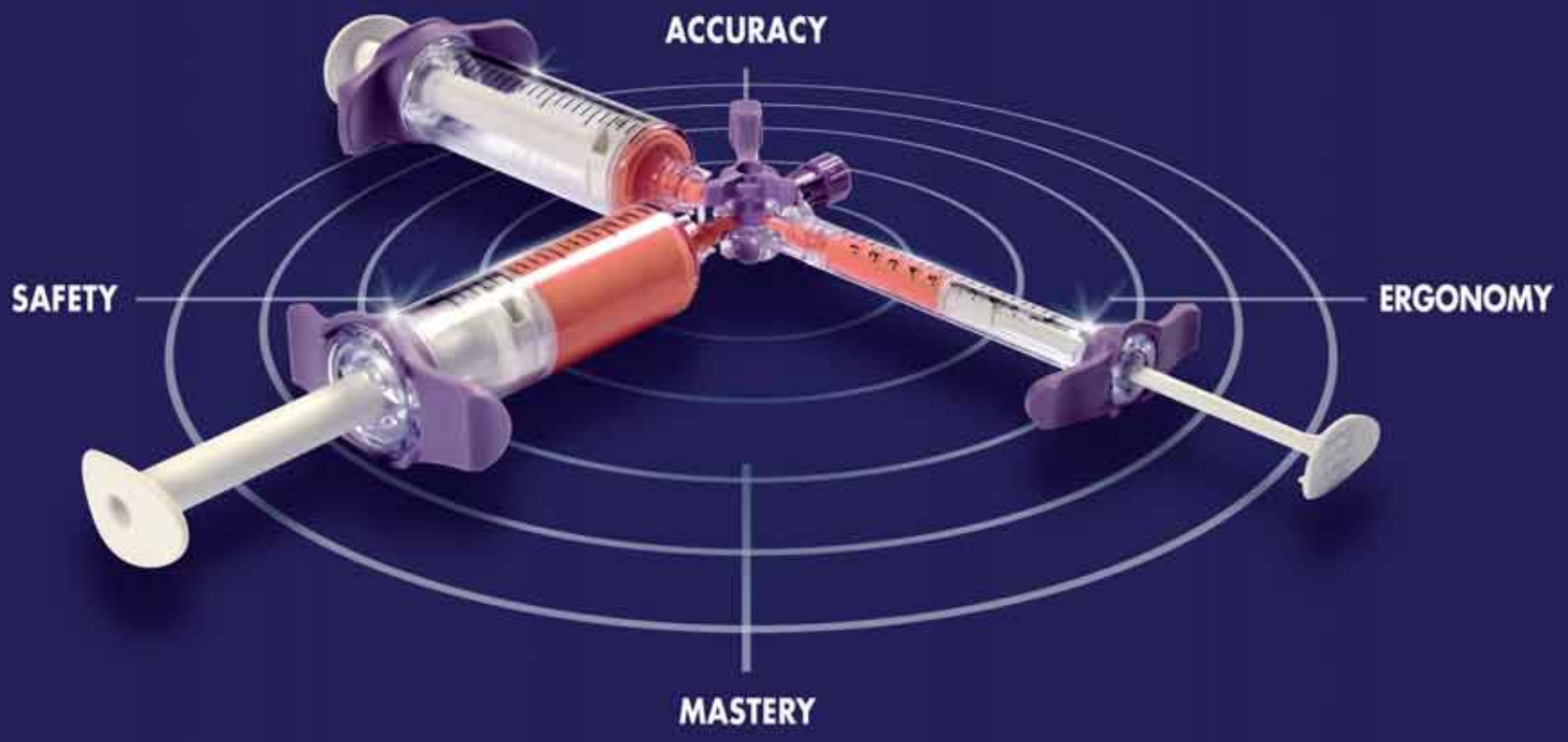

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VECTORIO® is a medical device of Class IIs (CE 0459) intended to be used by healthcare professionals only. Manufacturer: Medex, a Guerbet Group company. **Intended use: Lipiodol® Resistant Mixing & Injection System for conventional Trans-Arterial Chemo-Embolization (cTACE).**
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Countries in which cTACE indication is registered: France, Japan, South Korea, Austria, Peru, Turkey, Hungary, Czech Republic, Mongolia, Argentina, The Netherlands, Vietnam, Mexico, Thailand, Taiwan, Brazil, Cambodia, Portugal, Ireland, Hong Kong & Philippines.

For a copy of the SPC/ IFU, please contact a member of Guerbet.

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