CIRSE 2019 – Barcelona
Sunday, September 8, 2019

PICK UP CONGRESS NEWS EVERY DAY!

Today sees the start of one of our most popular features – the Interdisciplinary Endovascular Aortic Symposium (IDEAS), a congress-within-a-congress that opens the way for cross-specialty debate and collaboration. Be sure to visit the dedicated Learning Village in the exhibition area! This year also sees aortic interventions take centre stage in our honorary lectures, with today's Gruentzig Lecture devoted to EVAR; its origins and it future.

Join us for IDEAS!

IDEAS 2019

25 years of endovascular therapy for AAA repair: where do we stand now?

Werner Jaschke, EBIR

It was known as 'the silent killer', and it's not hard to see why. Until the early '90s, the only treatment for abdominal aortic aneurysms (AAA) was open surgical repair (OSR), and for decades, diagnosis and indication for treatment of AAA (which is frequently asymptomatic until on the verge of rupture) relied on a single parameter, the maximum diameter of the abdominal aorta.

With the introduction and wide availability of cross-sectional imaging, it became possible to measure the true diameter of AAA; subsequent improvements in post-processing software, diameter measurements based on multiplanar reconstructions and center-line measurements have been largely superseded by the adoption of three-dimensional reformatting software to obtain curved multiplanar reformatted images providing true perpendicular diameters of the aorta.

However, no standardisation exists as to whether measurements should be taken from outer to outer; inner to inner; or anterior outer to posterior inner wall. A maximum diameter of 5.5 cm is associated with an increased risk of rupture in male patients. The adoption of maximum diameter as a measure of rupture risk was based, in part, on a retrospective review of 24,000 consecutive autopsies performed during 23 years at a single institution [1]. However, aortic aneurysms smaller than 5.5 cm may also rupture: finding additional indicators of impeding aortic rupture is thus a significant unmet need in the assessment of AAA disease.

The evolution of EVAR

In 1991 Juan Parodi [2] first described endovascular aneurysm repair (EVAR) using a Dacron prosthetic tube endograft fixed with Gianturco stents in an aorto-aortic configuration. After some years, the aorto-aortic reconstruction gave way to an aorto-monoiliac configuration, owing to the instability of the former at the distal aortic end. Following this, Chute [3] described the aorto-bi-iliac reconstruction employing a uni-body homemade prosthesis. Meanwhile, Claude Miahle [4] ntroduced the modern modular two-piece device requiring cannulation of the short or stubby limb via the contralateral iliac artery. The earliest manufactured endografts were developed by Mintec, Inc., Nassau, Bahamas [4] as a modular bi-iliac device based on Miahle's work in 1994, followed in 1996 by the second generation stent graft, the Vanguard endograft (Vanguard Endovascular Aortic Graft/Boston Scientific) [6].

EVAR comes to Innsbruck

In December 1994, we encountered a patient, 70 years old, who suffered from an aorto-arterial embolism with an acute ischaemia of his right leg. Blood flow to his right leg was restored by surgical embolectomy. The diagnostic work-up demonstrated an abdominal aortic aneurysm (AAA) with a diameter of 5.8 cm and a high intraluminal thrombus load. The patient was in fragile health with severe COPD and atherosclerosis. We felt that our patient would be a good candidate for a brand new method of treatment for AAA, namely endovascular aortic aneurysm repair (EVAR). I called my friend and colleague, Christoph Düber from Mainz, Germany, since I heard that he had treated a few patients suffering from AAA with the Stentor endograft in 1994. He agreed to come to Innsbruck to help us perform the first EVAR in Innsbruck.

On December 28, 1994, we successfully treated our patient in Innsbruck with a good technical and clinical result (Fig. 1). The whole procedure took more than 5 hours. Handling of the Stenor endograft was quite a challenge, because the Stentor device had to be cooled prior to implantation, meaning that the endograft had to be implanted rather fast, otherwise release of the stent graft was difficult or even impossible. Accidental coverage of the renal arteries and difficulties in catheterisation of the contralateral leg were our major concern at that time. To be honest, we did not worry much about the long-term outcome and we did not consider radiation to be a real problem. We were all just happy when the case was finished; nobody looked at the fluoroscopy time or the number of images. The patient recovered very fast, read the daily newspaper on the same evening of the procedure and had a glass of champagne to celebrate the New Year! He was discharged a couple of days later, and eventually died a few of years later without any reinterventions and a stable size of his aneurysm.

Don't miss it !

25 years of endovascular therapy of abdominal aortic aneurysms: where do we stand now?
Andreas Gruentzig Lecture
Sunday, September 8, 14:30-15:00
Auditorium 1

Werner Jaschke
(EBIR)
Medical University Innsbruck, Austria

Werner Jaschke began his career in Heidelberg, Germany, completing his medical studies at Heidelberg University. Since 1986, Prof. Jaschke has been a senior physician at the Institute for Clinical Radiology at the Mannheim University Hospital, where he has also been appointed chief senior physician and vice-chair. He became the director of the First and Second Departments of Radiology at the University Clinic for Radiology Innsbruck in 2007. A prolific researcher, he has authored or co-authored more than 200 papers, articles and books on an impressive range of topics. He served as president of the Austrian Radiological Society from 2012 until 2014, and maintains membership with several notable societies, both national and international.
He is a keen advocate of radiation protection, and has been a key figure in CIRSE's dose awareness programmes.

>>

The learning curve – kaizen in action

Our first patient taught us a lot. In contrast to open surgical repair, our patient was back to daily routine the evening following the procedure. He recovered fast despite severe COPD and other risk factors. We also felt that EVAR is feasible and a competitive treatment of AAA. Needless to say, only a few years later we discovered that the first- and second-generation endografts had a high rate of failure (transverse and longitudinal instability; fabric tears; perigraft inflammatory reactions, etc.) and that EVAR was associated with specific technical problems such as endoleaks, sac expansion despite successful treatment and higher rate of secondary aneurysm ruptures compared with OSR.

Both endografts and pre- and intra-procedural imaging have continuously improved over the last 25 years. We learned that treatment of hostile necks with standard EVAR implies a considerable risk of failure. With the introduction of endosutures (ESAR), endosealing (EVAS), chimney & periscope techniques, and fenestrated & branched endografts, more abdominal aortic aneurysms with very short or no neck or pararenal involvement can be treated by EVAR. However, we still do not know why patients develop aortic aneurysms and why certain aneurysms are more prone to rupture than others.

Why do we encounter sac growth although we cannot find an endoleak? Why are some type 2 endoleaks harmless and others associated with higher risk of late rupture? Obviously, there are some mechanisms involved beyond fluid mechanics and pressure (Fig.2).

In the late 1990s, an increasing number of radiation-induced tissue injuries were reported [7]. Also, some reports raised concern that radiation exposure for diagnosis, management and follow-up of patients with abdominal aortic aneurysms is too high for the operator and the patient [8,9]. In 2011, ICRP recommended lowering the dose to the eye of the operator considerably to 20 mSv/a [9]. This stimulated increased efforts to improve radiation safety for both operators performing and patients undergoing EVAR.

EVAR represents an important but complex area of IR: it has faced many challenges since its inception, some touched on above. Despite this, it remains a clinical field that inspires the enthusiasm of IRs, vascular surgeons and patients alike. Defining the levels of risk, the ideal (and less than ideal) circumstances for pursuing EVAR over open repair, improving durability and controlling radiation dosage is something that the whole community needs to actively embrace. I hope to touch on these points during today's lecture, and warmly invite you to attend!

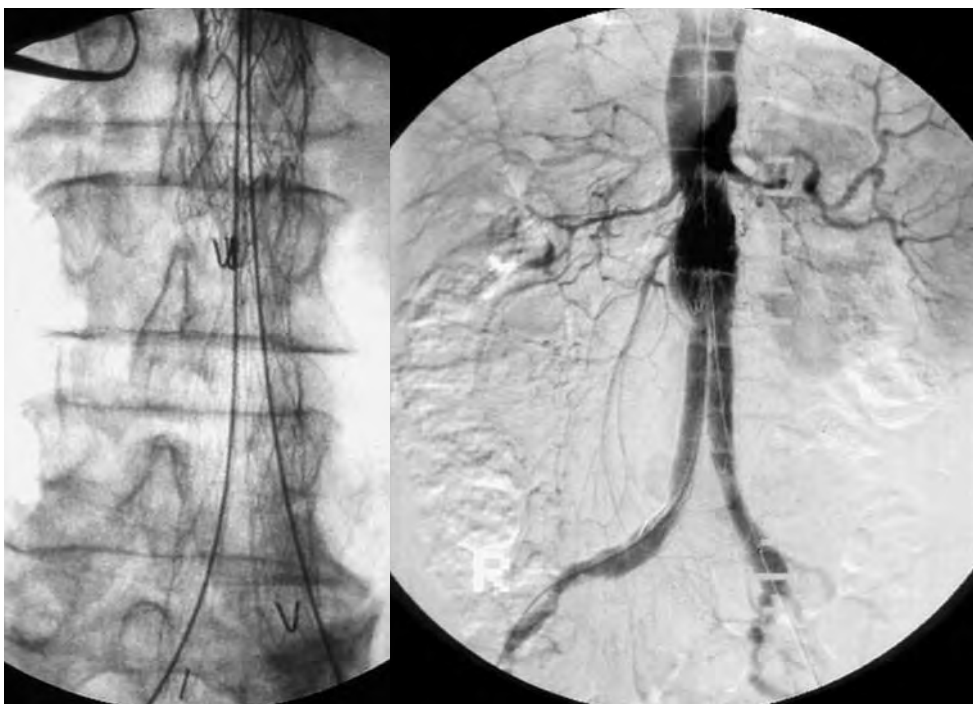


Fig. 1: First patients with AAA treated in Innsbruck on Dec 28,1994 using a MinTec device

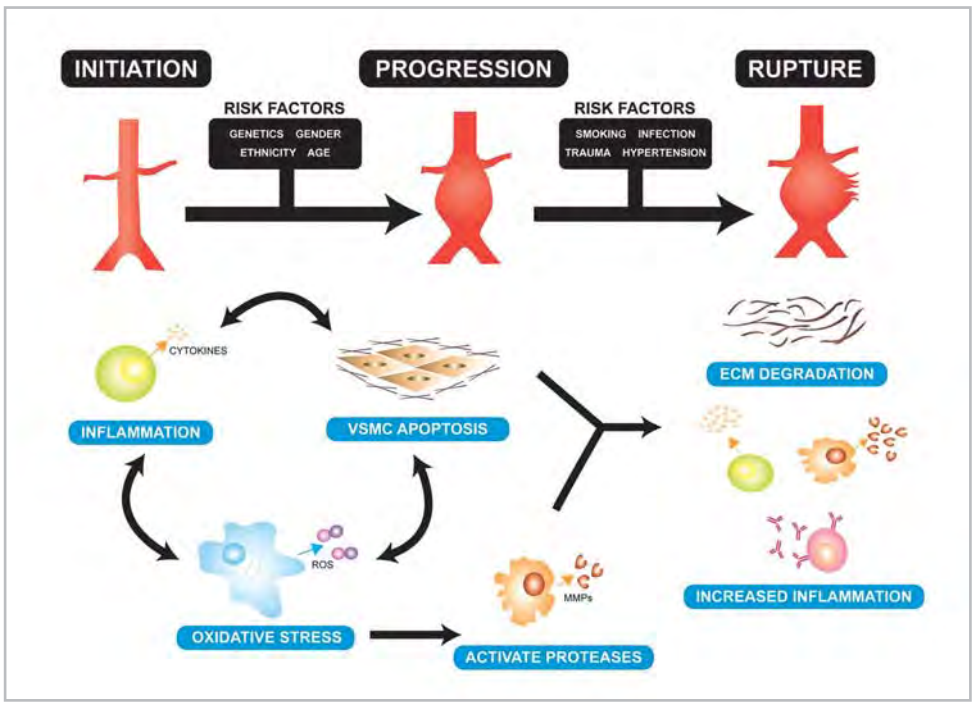


Fig. 2: The pathogenesis of AAA developement

References:

1. Limet R, Sakalihassan N, Albert A. Determination of the expansion rate and incidence of rupture of abdominal aortic aneurysms. J Vasc Surg 1991;14:540-8.
2. C. Parodi, J.C. Palmaz, H.D. Barone: Transfemoral intraluminal graft implantation for abdominal aortic aneurysms; Ann Vasc Surg, 5 (1991), 491-499
3. T.A. Chuter, R.M. Green, K. Ouriel, W.M. Fiore, J.A. DeWeese: Transfemoral endovascular aortic graft placement; J Vasc Surg, 18 (1993), 185-195
4. R. Guidoin, Y. Marois, Y. Douville, M.W. King, M. Castonguay, A. Traoré, et al.: First-generation aortic endografts: analysis of explanted Stentor devices from the EUROSTAR Registry; J Endovasc Ther, 7 (2000), 105-122
5. P.L. Harris: Endovascular grafting for abdominal aortic aneurysms; Ann R Coll Surg Engl, 78 (1 Suppl) (1996), 23-24
6. John A.Kaufman, Stuart C.Geller, David C.Brewster et al: The vanguard stent-graft: practical approach. Techniques in Vascular and Interventional Radiology ,2 (3), 1999, 145-164
7. Werner Jaschke; Matthias Schmuth; Annalisa Trianni; Gabriel Bartal: Radiation-Induced Skin Injuries to Patients: What the Interventional Radiologist Needs to Know. Cardiovasc Intervent Radiol (2017) 40:1131–1140
8. Frank A. Lederle, M.D.,* Tassos C. Kyriakides, Ph.D., Kevin T. Stroupe, Ph.D. et al. Open versus Endovascular Repair of Abdominal Aortic Aneurysm. N Engl J Med 2019; 380:2126-35
9. Rohit Philip Thomas, Mathias Grau, Osama Eldergash,Tobias Kowald, Johannes Schnabel, Marcin Szczechowicz, Ajay Chavan: Will X-ray Safety Glasses Become Mandatory for Radiological Vascular Interventions? Cardiovasc Intervent Radiol (2018) 41:1074–1080

IDEAS 2019

Why NICE (draft guidelines on AAA management) cannot be implemented

Michael Jenkins

In the summer of 2018, the National Institute for Health and Care Excellence (NICE) issued draft guidelines on the management of abdominal aortic aneurysms for consultation. This has resulted in an unprecedented response from individuals, hospitals, specialist societies (including the Vascular Society of Great Britain and Ireland, the British Society for Endovascular Therapy and the British Society of Interventional Radiology) and industry partners.

The main reason for the magnitude of the response was the controversial recommendation that elective EVAR (endovascular aneurysm repair) should not be offered in any circumstances. The draft guidance suggests that patients deemed fit for open surgery should undergo such surgery, but those thought to be unfit (not actually defined), should not be treated at all, other than control of risk factors. Amongst other recommendations, it was also suggested that post-EVAR surveillance should be by annual CT scan, even though the majority of institutions employ non-invasive duplex surveillance as first line. Both of these recommendations are out of tune with guidelines from both the ESVS and SVS, and contrary to the direction of travel for surgical intervention in general. Over the last three decades there has been a sustained drive towards minimally invasive treatment which has been welcomed by an increasingly aged population base allowing a reduced length of hospital stay, faster recovery and improved early mortality and morbidity. This has occurred as a result of technological advance and has influenced all surgical specialities in one way or another.

So where are we now? At the time of writing, the draft guidelines have still not been ratified and published. Deadlines for publication in November, December and January have come and gone. The latest information would suggest publication in early July (now also missed), but it is unclear if the feedback during the consultation period has influenced the committee or not. The subject has been commented on and debated extensively with various criticisms largely centred on the advice being a retrograde step, the findings being based on out-of-date data and that the experts on the committee were not actually experts in the field of aortic intervention.

The concerns

So what is the main concern? The feeling is that the narrow-minded approach of the committee in only considering evidence from RCTs (randomised controlled trials) has meant it has relied on the late findings of the EVAR trials (which revealed an increase in aortic-related mortality in the EVAR group compared with the open group) and has extrapolated this to modern-day practice. Crucially they have ignored the better results in patients with good anatomy within the IFU (instructions for use) of most EVAR devices where durability is much improved. Although it may be argued that the patients randomised within this trial were "within IFU" of the devices available at the time, it is doubtful whether the imaging equipment of the time combined with the accuracy of device deployment allowed the pre-intervention landing zones to be actually achieved.

Additionally, patient's wishes have been ignored and the recommendations in their current form do not take into account patient choice and the greater importance an elderly population attaches to early benefit compared with what might happen in a decade's time. In a world where global information is available instantly, patients will no doubt feel they are entitled to at least consider treatment modalities not only available, but often first choice in most European countries, Australia and the USA.

The implications

So what would the impact be if published in their current format and endorsed by commissioners? The current ratio of EVAR to open surgery for infra-renal AAA treatment in the UK is about 70/30 from the latest NVR (National Vascular Registry) report and about 50/50 for screen-detected patients, who tend to be up to a decade younger and therefore fitter. If we concentrate on the group currently undergoing elective EVAR (and indeed FEVAR), then a proportion of them would be turned down for open treatment. An objective tool to accurately estimate peri-operative mortality and longevity (treated or untreated) is lacking, but extrapolating the findings of NAAASP (National Abdominal Aortic Screening Programme), I would estimate that 20-30% of these patients would not be offered open surgery. The cost of this would be measured in two ways – the decrease in quality of life amongst those diagnosed with a potentially fatal condition for which no treatment can be offered and the increased fiscal cost and poorer outcomes of the emergency treatment necessary when a proportion of them (perhaps 50%) present with a ruptured aneurysm in the future. Moreover, this policy is likely to render the NAAASP redundant. The hallmark of any successful screening programme is that there is an acceptable and effective treatment modality for the disease screened for. Already, up to 20% of screen-detected AAA patients do not undergo intervention, mostly as a result of fitness. If this was increased further (inevitable with the guidelines in their current form), the utility, not to mention the cost-effectiveness, of the NAAASP would have to be reconsidered.

The Montgomery ruling on valid consent would also be in jeopardy. In a global world where many patients are well attuned to available treatments, to deny them the consideration of an endovascular approach would seem to breach the principles of consent for treatment currently used in the UK. From a legal perspective, the proposed guidelines are just that – practice guidelines and not mandatory. However, the previous high-quality and evidence-based publications from NICE (across a wide-range of health conditions) mean that they have been viewed as a marker of best practice and a lack of adherence to them has sometimes been seen by the legal profession as a breach of duty. Whether commissioners will decide to apply them in this case is uncertain. A difference of opinion could result in piecemeal adoption and a postcode lottery for patients who could then attempt to procure treatment outside their immediate area.

The impact on hospitals would be enormous. Many currently struggle with both bed and critical care capacity and the conversion of even a proportion of AAA patients from EVAR to open surgery is likely to impact significantly on length of stay and critical care use of these patients. A potential increase in emergency presentations both by those turned down for surgery and potentially by those with undetected aneurysms as a result of the demise of the screening programme would add to this problem. Moreover, the advised changes to surveillance imaging – CTA to replace duplex – would increase the pressure on CT lists and increase the radiation burden for the patient at a time when there are already concerns regarding an increased risk of abdominal cancers following EVAR treatment.

Patient advocacy

The main reason that these guidelines could not be implemented in their current form, however, is the nature of the doctor-patient relationship. In the austerity-minded climate of health provision, even if one accepted that EVAR was not cost-effective for elderly patients (unlikely to live long enough for QALYs to look reasonable) on a population perspective, translating that ethos to the individual consultation between a clinician and patient would be impossible. The clinician's duty of care to a patient based on what was in their best interest, combined with MDT decision making would mean that NICE recommendations could be justifiably ignored if felt not to represent the requirements of an individual patient. This approach on a wide scale could render the guidelines toothless.

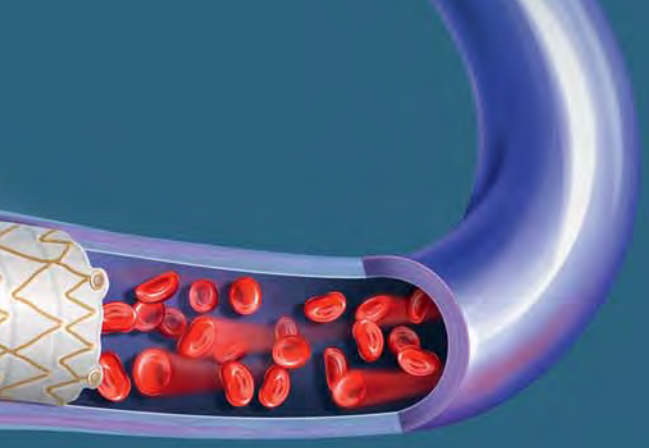
I therefore believe, for the reasons outlined above, that the draft guidelines, if published unabridged, cannot be implemented in the UK. I suspect that the many other countries around the world that use NICE guidelines will watch with interest how the UK responds to them should they eventually be published.

Don't miss it!

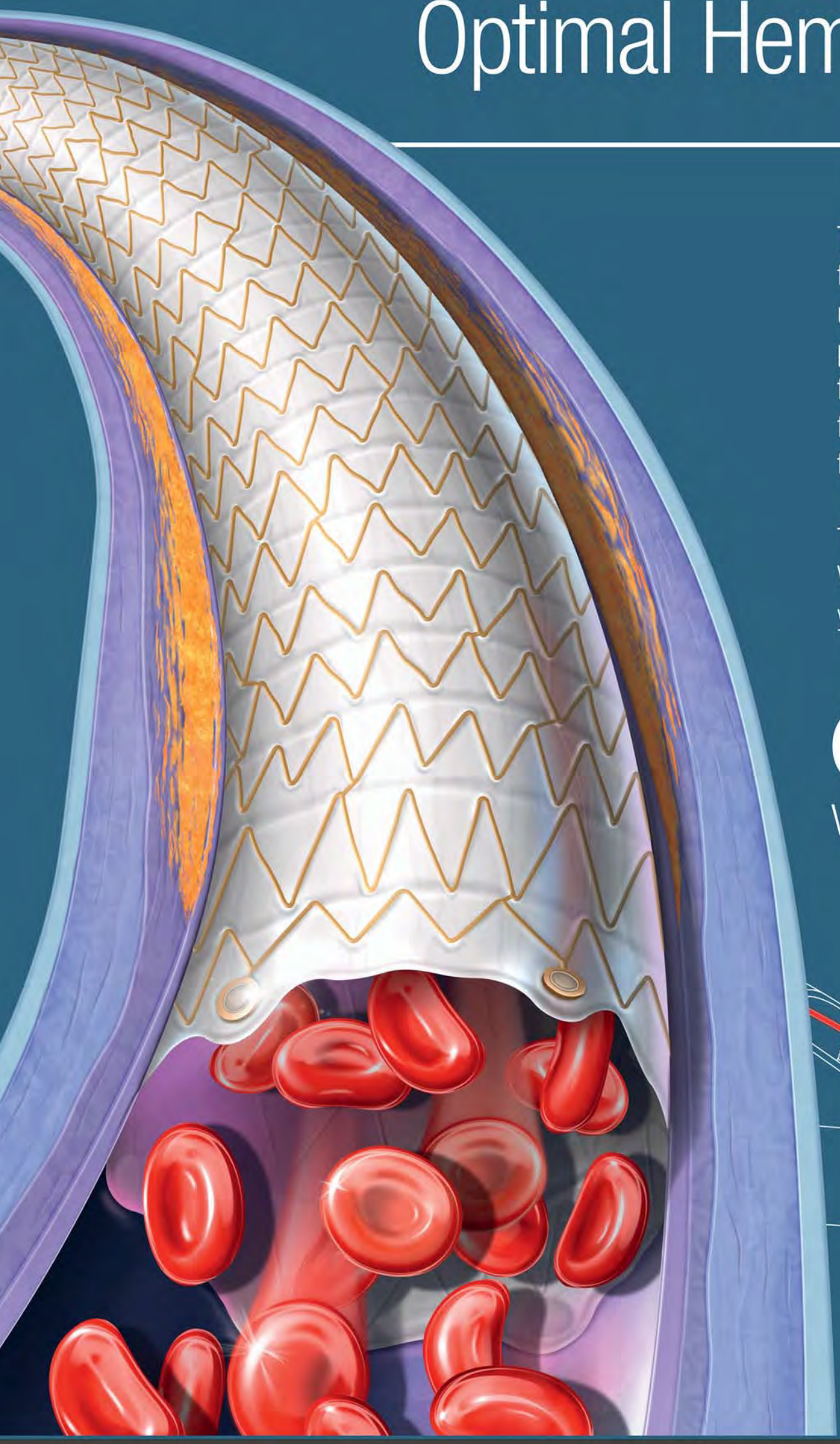
The NICE guidelines: nice or not so nice?
Focus Session
Sunday, September 8, 08:30-09:30
Auditorium 2

Michael P. Jenkins
St. Mary's Hospital and Imperial College London, United Kingdom

Michael Jenkins has been a consultant vascular surgeon at St. Mary's Hospital since 2001 and is currently President Elect of the Vascular Society of Great Britain and Ireland and Chair of the Circulation Foundation. Previous appointments include Director of AAA screening in NW London, Director of the Major Trauma Centre at Imperial and President of the British Society of Endovascular Therapy (BSET). His interests include thoracic and aortic aneurysm, aortic dissection and endovascular surgery. He is a highly regarded teacher and examines for the European vascular exit exam, FEBVS. He was a faculty member for IDEAS 2016.



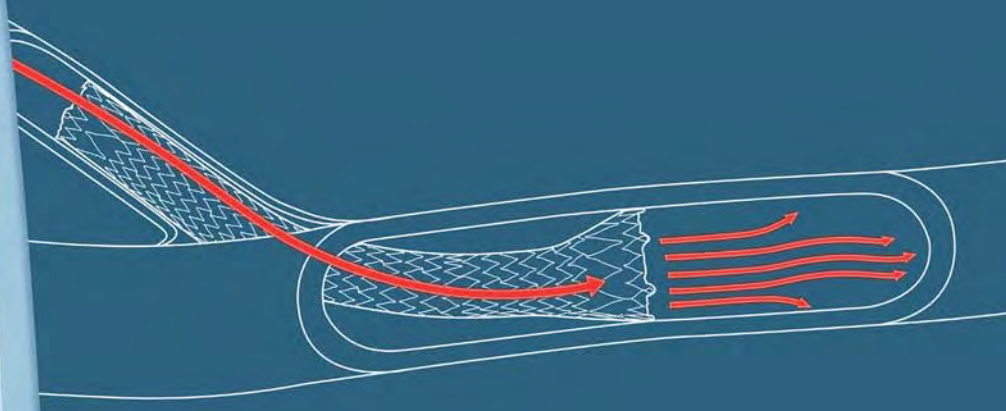
DESIGNED TO DELIVER
Optimal Hemodynamic Flow



The COVERA™ Vascular Covered Stent is designed to optimize flow in your patients' anatomy. The unique, contoured edges are engineered to provide wall apposition and promote laminar flow, while the option of either a straight or flared configuration provides optimized flow at the venous anastomosis.

To find out more about how the COVERA™ Vascular Covered Stent was designed to help you deliver results, visit www.bardpv.com.

COVERA™
Vascular Covered Stent



BD

BARD
has joined BD

IR salvage for kidney transplantation

Gerard S. Goh (EBIR)

Renal transplantation has greater long-term survival over haemodialysis in patients with end-stage renal disease [1]. Interventional radiology has an important role in preserving long-term transplant kidney function as well as in the management of kidney transplantation complications, despite advances in surgical techniques and immunosuppressive therapies. Although transplant rejection remains the most common complication after renal transplantation, further complications occur in approximately 12–20% of renal transplant recipients, which are mainly represented by urological and vascular complications [2].

Vascular complications include transplant renal artery stenosis, arteriovenous fistulae, intra-renal pseudoaneurysms following transplant renal biopsy, extra renal pseudoaneursyms, iliac artery dissection, graft thrombosis and renal vascular kinking. Non-vascular complications include urinary tract obstruction, urine leak and perigraft collections (e.g. haematoma, abscess, urinoma and lymphocoele).

Vascular complications

The incidence of transplant renal artery stenosis (TRAS) is reported to be approx. 3-23% [3]. TRAS can lead to renal ischaemia and subsequent renal-induced hypertension which, if left untreated, can lead to severe renal dysfunction and graft deterioration. Unsurprisingly TRAS is associated with decreased renal transplant survival [4,5] and reduced overall patient survival [5]. TRAS may present as clinical deterioration in renal function due to a decline in transplant renal function or be detected on surveillance scanning. Diagnosis and assessment can be performed with Doppler ultrasound, CT angiography or digital subtraction angiography and, in some instances, MR angiography.

The causes of TRAS include vessel clamp injury, anastomotic strictures, intimal dissection, atherosclerotic disease, immune-modulating vascular injury/intimal hyperplasia, extrinsic compression due to fibrosis or structural kinking of the transplant renal artery.

Endovascular options to treat TRAS depend on the underlying cause, and for endoluminal stenosis, options for treatment include angioplasty and stenting. A recent systematic review of endovascular treatment for TRAS reported a reduction in serum creatinine to 3 years [6] which can be translatable to improvement in renal transplant function. Outcomes for primary stenting and primary angioplasty demonstrate an overall high technical success rate of >90% [6] and the restenosis rates following angioplasty have been reported between 0-65% (27% on pooled analysis) compared with stenting: 0-22% (9.6% on pooled analysis) [7]. Restenosis after angioplasty commonly occurs 9 months after the procedure [8]. Fig 1a and 1b demonstrate stenting of a stenosed accessory renal transplant artery.

Complications following renal transplant biopsies occur in up to 17% of cases [9] and these include the development of arterial pseudoaneurysms or arteriovenous and arteriocalyceal fistulae with associated haemorrhage or haematuria. In up to 30% of cases, arteriovenous fistulae and pseudoaneurysms co-exist [10,11]. Treatment with endovascular embolisation has technical success rates of 71-100% [11].

Extra-renal pseudoaneursyms mainly occur at the anastomosis of the transplant renal artery and native target anastamosis artery (commonly the iliac artery). These are rare and occur in approximately 1% of renal transplants [12]. Treatment can be performed with stent grafts, ultrasound-guided thrombin injection or coil embolisation.

Iliac artery dissection is a rare complication and has occasionally been reported in the literature to cause renal transplant hypoperfusion. Treatment via endovascular prolonged balloon angioplasty or stenting is used to treat the dissection and to improve arterial flow.

Vascular thrombosis is a major cause of early renal transplant loss [13]. The incidence of renal arterial and renal venous thrombosis after transplant have been reported as 0.2-7.5% and 0.1%-8.2% respectively [14] and most likely occur up to 10 days after transplantation [15]. Urgent treatment with surgical thrombectomy is usually performed.

Arterial and venous kinks occur from vascular redundancy at the time of transplantation or may arise after shifting of the graft/pelvic structures over time. Surgery is the treatment of choice for kinks as endovascular techniques are often ineffective and may result in vasospasm and/or dissection.

Urological complications

Ureteral stenosis and strictures occur in approx. 2-10% of all transplanted kidneys and are generally classified into early (≤3 months) or late (≥3 months) depending on the time of onset after transplantation; they have relatively different causes and prognoses [16].

Early stenoses are usually caused by mechanical issues such as ureteric kinks, intra-ureteric blood clots or ureteral oedema and are usually located at the vesico-ureteric junction. Late stenoses are most commonly caused by fibrosis resulting from ischaemia or rejection and are often located more proximally.

Interventional management depends on the underlying cause; however, in the treatment of ureteric strictures a nephrostomy for decompression, balloon dilatation of the stricture and/or placement of a JJ stent results in good outcomes. Fig. 2a shows an ultrasound of an obstructed renal transplant with subsequent stenting and nephrostomy placement (Fig. 2b).

Several perigraft fluid collections can arise following renal transplantation, which includes lymphocoeles, haematoma, abscesses and urinomas. Haematoma, abscesses and urinomas present early in the post-transplantation period, while lymphocoeles generally occur later. Perigraft fluid collections are very common in the post-transplantation period, with a reported incidence up to 50% of all renal transplants in some series; 15-20% of them are symptomatic [17]. Treatment depends on the nature of the collection and if the collection causes symptoms such as pain or obstruction, percutaneous ultrasound- and CT-guided drainage are standard treatment.

Conclusion

Transplant rejection is the most common complication after renal transplantation. Even with the recent advances of surgical techniques and immunosuppressive therapies, further complications occur in 12-20% of renal transplant patients, which are mainly represented by urological complication and vascular complications. Interventional radiology plays an important role in the salvage of renal transplants with complications.

Don't miss it !

IR salvage for abdominal surgical disasters
Case-based Discussion
Sunday, September 8, 17:30-18:30
Room 116

Gerard S. Goh
(EBIR)
Alfred Hospital
Melbourne, Australia

Dr Gerard Goh is an IR at the Alfred Hospital in Melbourne, Australia and an Adjunct Senior Lecturer for Monash University. He completed his radiology training in Adelaide, Australia and IR training in Dublin, Ireland. Previously he worked at St. George's Hospital, London, UK where he was also an honorary senior lecturer for the St. George's University of London.
He is a fellow of CIRSE, the president of the Interventional Radiology Society of Australasia, a council member of the European Board of IR (EBIR), an executive committee member of the Asia Pacific Society of Cardiovascular and Interventional Radiology (APSCVIR) and an associate editor for the Journal of Medical Imaging and Radiation Oncology.
In addition to a strong interest in research he is a regularly invited speaker at international conferences.

References:
1. Wolfe RA, Ashby VB, Milford EL, Ojo AO, Ettenger RE, Agodoa LY, Held PJ, Port FK. Comparison of mortality in all patients on dialysis, patients on dialysis awaiting transplantation, and recipients of a first cadaveric transplant. N Engl J Med. 1999 341:1725-1730.
2. Lezzi R, Fabio Ia Torre M, Santoro M, Dattesi R, Nestola M, Posa A, Romagnoli J, Citterio F, Bonomo L. Interventional radiological treatment of renal transplant complications: a pictorial review. Korean J Radiol. 2015 16(3):593-603.
3. Patel NH, Jindal RM, Wilkin T, Rose S, Johnson MS, Shah H, Namyslowski J, Moresco JP, Tretorola SO. Renal arterial stenosis in renal allografts: retrospective study of predisposing factors and outcome after percutaneous transluminal angioplasty. Radiology 2001 219:663-667.
4. Hurst FP, Abbott KC, Neff RT, Elster EA, Falta EM, Lentine KL, Agodoa LY, Jindal RM. Incidence, predictors and outcomes of transplant renal artery stenosis after kidney transplantation: analysis of USRDS. Am J Nephrol. 2009 30:459-467.
5. Willicombe M, Sandhu B, Brookes P, Gedroyc W, Hakim N, Hamady M, Hill P, McLean AG, Moser S, Papalois V, Tait P, Wilcock M, Taube D. Post anastomotic transplant renal artery stenosis: association with denovo class II donor-specific antibodies. Am J Transplant. 2014 14:133-143.
6. Ngo AT, Markar SR, De Lijster MS, Duncan N, Taube D, Hamady MS. A systematic review of outcomes following percutaneous transluminal angioplasty and stenting in the treatment of transplant renal artery stenosis. Cardiovasc Intervent Radiol. 2015 38: 1573-1588.
7. Biederman DM, Fischman AM, Titano JJ, Kim E, Patel RS, Nowakoswki FS, Florman S, Lookstein RA. Tailoring the endovascular management of transplant renal artery stenosis. Am J Transplant. 2015 15:1039-1049.
8. Salvadori M, Di Maria L, Rosati A, Larti A, Piperno R, Becherelli P, Bandini S, Biagini M, Filocamo MT, Gallo M, Bertoni E. Efficacy and safety of Palmaz stent implantation in the treatment of renal artery stenosis in renal transplantation. Transplant Proc. 2005 37:1047-1048.
9. Morgan TA, Chandran S, Burger IM, Zhang CA, Goldstein RB. Complications of ultrasound guided renal transplant biopsies. Am J Transplant. 2016 16(4):1298-1305.
10. Grenier N, Claudon M, Trillaud H, Douws C, Levantal O. Noninvasive radiology of vascular complications in renal transplantation. Eur Radiol 1997 7:385-391 12.
11. Maleux G, Messiaen T, Stockx L, Vanrenterghem Y, Wilms G. Transcatheter embolization of biopsy-related vascular injuries in renal allografts. Long-term technical, clinical and biochemical results. Acta Radiol 2003 44(1):13-17.
12. Dimitroulis D, Bokos J, Zavos G, Nikiteas N, Karidis NP, Katsaronis P, Kostakis A. Vascular complications in renal transplantation: a single-center experience in 1367 renal transplantations and review of the literature. Transplant Proc. 2009 41:1609-1614.
13. Hamed MO, Chen Y, Pasea L, Watson CJ, Torpey N, Bradley JA, Pettigrew G, Saeb-Parsy K. Early graft loss after kidney transplantation: Risk factors and consequences. Am J Transplant. 2015 15:1632-1643.
14. Keller AK, Jorgensen TM, Jespersen B: Identification of risk factors for vascular thrombosis may reduce early renal graft loss : a review of recent literature. J Transplant 2012 2012:793461.
15. Ojo AO, Hanson JA, Wolfe RA, Agodoa LY, Leavey SF, Leichtman A, Young EW, Port FK. Dialysis modality and the risk of allograft thrombosis in adult renal transplant recipients. Kidney Int. 1999 55:1952-1960.
16. Kaskarelis I, Koukoulaki M, Georgantas T, Bairamidis E, Kokkinos C, Ieronymou M, Vougas V, Drakopoulos S. Ureteral complications in renal transplant recipients successfully treated with interventional radiology. Transplant Proc. 2008 40:3170-3172.
17. Yap R, Madrazo B, Oh HK, Dienst SG. Perirenal fluid collection after renal transplant. Am Surg. 1981 47:287-290.

Fig. 1a: Renal transplant accessory artery stenosis.

Fig. 1b: Stenting of the renal transplant accessory artery.

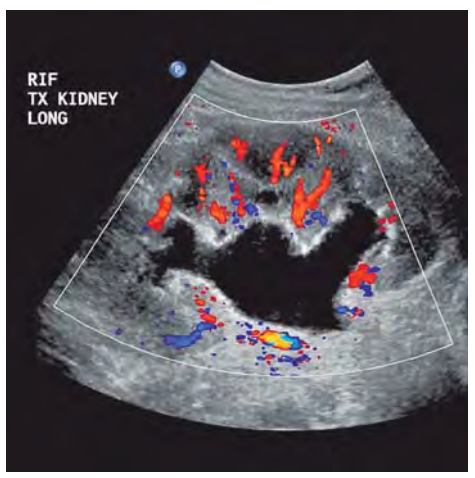


Fig. 2a: Hydronephrosis of a right iliac fossa transplant kidney.

Fig. 2b: Stenting and nephrostomy placed in a right iliac fossa transplant kidney.

BURNING ISSUES

CIRSE **Radiation Protection**

Burning issues in radiation protection: critical dose levels and substantial radiation dose

Interventional radiologists are exposed to high levels of radiation in daily practice and therefore face particular health risks. Join us at the Radiation Protection Pavilion and learn how to reduce and protect against exposure as well as the health hazards linked to high levels of occupational exposure to radiation with our best-practice guides and information materials; or take a seat and listen to a brief talk hosted by our Subcommittee or industry partners.

Today's RPP Radiation Safety Talks

	Time	Radiation Safety Talks	Speaker
SUN SEPT 8	09:30 – 09:45	Radiation dose in prostatic artery embolization using CBCT and 3D-Roadmap	M. Katoh *(Krefeld/DE)*
	09:45 – 10:00	Radiation protection lead cap – go and get it or forget it?	R. Adamus *(Nuremberg/DE)*
	11:00 – 11:15	The role of artificial intelligence in radiation protection and interventional radiology	E. Efstathopoulos *(Athens/GR)*
	11:15 – 11:30	Image fusion/confusion: Best practices	L. Lönn *(Copenhagen/DK)*
	12:30 – 12:45	Computational dosimetry & pitfalls in personal dosimetry	M. Ginjaume *(Barcelona/ES)*
	12:45 – 13:00	Sterile Radiation Shielding During CINE and DSA imaging	E. Radtke *(Leawood, KS/US)*
	13:00 – 13:15	Difficulties for the practical implementation of the BSS European Directive	E. Vano *(Madrid/ES)*
	13:30 – 13:45	Taking the weight off clinicians' bodies while significantly improving their radiation protection	P. Reimer *(Karlsruhe/DE)*
	13:45 – 14:00	National and European Diagnostic Reference Levels for interventional procedures in Europe	G. Paulo *(Coimbra/PT)*
	14:00 – 14:15	„Visualise It!" – Translational Radiation Protection during TIPS and Biliary Drainage Procedures	M. Freund/ M. Steurer *(Innsbruck/AT)*

Burning issues in radiation protection – CIRSE 2019's Radiation Protection Pavilion

Emily Beaven, CIRSE Office

Over the last 20 years, innovations in digital imaging and minimally-invasive technology have expanded the possibilities of image-guided treatments. However, these advancements were also accompanied with increased risks, as interventional procedures can deliver high radiation doses to both administrators and patients. Radiation exposure has the potential to cause both somatic effects (i.e. radiation-induced cancer, sterility, lens opacification) and genetic or hereditary effects. While these consequences can be quite severe, there are many tools, techniques and protocols that can drastically reduce these dangers, if not mitigate, them entirely. It is therefore essential for IRs to have sufficient knowledge and training in order to reduce the risks of harmful exposure for themselves, the team and the patient.

CIRSE is dedicated to providing comprehensive education and practical advice on these issues through different initiatives and across its online and live educational portfolio, in order to optimally raise awareness about radiation protection amongst the IR community. CIRSE's Radiation Protection Subcommittee, a group of internationally renowned experts in the field, was formed in 2012 to help address this need, specifically regarding the risks of occupational radiation for IRs. The Subcommittee also represents CIRSE in the EuroSafe Imaging campaign and in other relevant European Commission tenders.

The Radiation Protection Pavilion

One of the Subcommittee's most steadfast contributions has been its Radiation Protection Pavilion (RPP), which has provided an optimal space, year after year, to increase understanding about radiation risks through an interactive and engaging programme during the CIRSE annual meeting. The 2019 RPP programme includes 30 interesting Radiation Safety Talks led by various experts in the field – guaranteeing another great year for the pavilion. The Subcommittee sought to bring even more experts to the table this year as well as engage with a greater number of other societies. In addition, strong industry support also gives visitors a chance to speak with vendors face to face and learn about the latest optimisation technologies.

2019 Programme Highlights

Under the theme, "Burning issues in radiation protection: critical dose levels and substantial radiation dose", the RPP 2019 will provide important insights into the transposition process and impact of the 2018 Basic Safety Standards Directive, which required all EU countries, the radiology community and the industry to adapt their regulations, procedures and equipment to new standards of radiation safety – making this a hot topic for all medical professionals working under ionising radiation.

As in previous years, the 2019 RPP programme will cover a wide range of scientific radiation-safety topics and will take an in-depth look into the future directions of radiation protection in fluoroscopy-guided interventions, as well as unintended exposures, critical dose levels and substantial radiation doses. The Radiation Safety Talk, "What you do affects your radiation exposure", asks participants to look introspectively and consider how the location of where you stand and how you behave within the interventional lab can have an impact on the radiation dose, and additionally how real-time dose monitoring can help to optimise both. Other key topics covered in the Radiation Safety Talks include electronic occupational dosimetry, radiation protection lead caps, IAEA perspectives on protection, fusion imaging, the role of artificial intelligence and much more.

Engaging with industry

Attendees will also have the chance to discuss and explore the latest products for protection and dose management with industry partners, who will share their experiences on the potential application of validated tools and discuss how behaviour within the interventional lab can impact dosage and monitoring. Industry partners will not only lead various Radiation Safety Talks, but will also be on hand each day of the congress to discuss the various tools available and answer any questions.

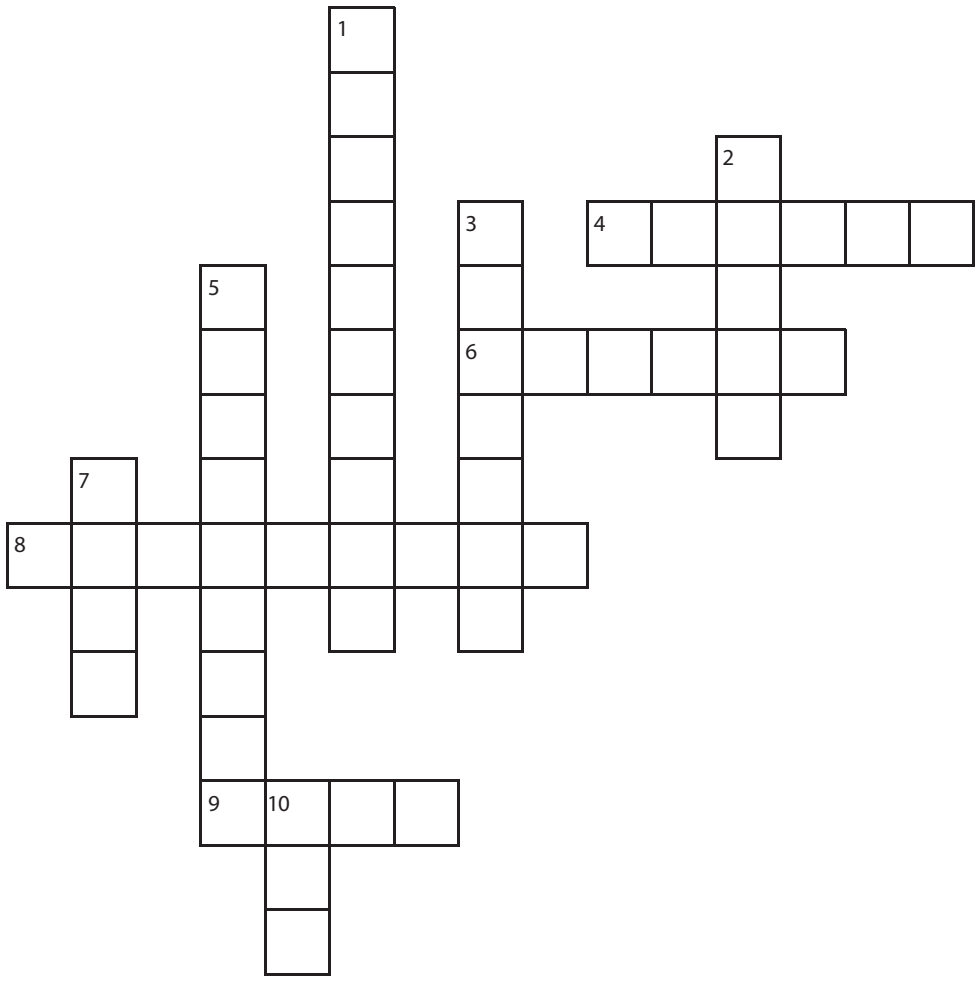
The 2019 Radiation Protection Pavilion is proudly supported by:

New this year – juice bar!

As a new feature this year, the RPP will offer participants the opportunity to enjoy fresh juices during the Radiation Safety Talks. Top up on your daily supply of antioxidants and learn more about the RPP initative today!

How's your radiation protection know-how?

Use this fun crossword to assess your knowledge on radiation protection! For a more comprehensive way to test your knowledge, check out CIRSE's radiation protection quiz at www.cirse.org/education/radiation-protection. And of course, visit the Radiation Protection Pavilion to learn more and engage in a wide range of interactive activities.



Crossword Puzzle

Across

4. The . . . . . dose of an occupationally-exposed person shall never exceed 20 mSv effective dose.
6. Protective . . . . . provide a significant shielding/protection outside the direct X-ray beam.
8. A collimator opening . . . . . radiation dose to staff.
9. An increase in tube potential usually decreases patient . . . . . dose

Down

1. During a . . . . . beam direction, staff should stand at the image director side of the patient.
2. The recommended positioning of a finger ring dosimeter is the . . . . . finger of the non-dominant hand.
3. Lead . . . . . should always be worn to optimise protection if the expected dose to the lens is significant.
5. Radiation-induced . . . . . show a certain degree of specificity.
7. The specialist's . . . . . receive the highest rate of radiation if the xray is under the table.
10. Patient skin dose generally decreases with increasing . . . . . .

Check your answers on page 23!

Abbott

KEEP ON walking

425 MM

DIABETES IS AFFECTING 425 MILLION PEOPLE AROUND THE WORLD[1]

141 MILLION 25-64 YEARS

61 MILLION 65-90 YEARS

IT IS ESTIMATED THAT OVER 200 MILLION PEOPLE SUFFER FROM PAD[2]

30 SEC

EVERY 30 SECONDS PAD IS LEADING TO AMPUTATIONS WORLDWIDE[3]

MANY AMPUTATIONS CAN BE AVOIDED

Diabetes Mellitus is the fastest growing health problem worldwide[1] and raises the risk of **Peripheral Artery Disease (PAD)**[2], which can lead to lower limb amputations[4]. Abbott offers a **comprehensive portfolio** of products that can help avoid many amputations and guide patients on a path to **keep on walking.**

ABBOTT STEP BY STEP SOLUTIONS FOR PAD TREATMENT

ACCESS & CROSS → **DILATE** → **PRESERVE** → **CLOSE**

INTRODUCERS
Engage

GUIDE WIRES
HT Command™ 14/18
HT Winn

BALLOONS
Armada™ 14/18/35

SELF-EXPANDING STENTS
Absolute Pro™
Xpert Pro™

VASCULAR MIMETIC IMPLANT
Supera™ Stent

VESSEL CLOSURE
Perclose Proglide™
Suture Mediated Closure System

ASSISTED COMPRESSION
FemoStop

1. International Diabetes Federation, Diabetes Atlas - 8th edition 2017. 2. Fowkes F. G. et al Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis. Lancet 382, 1329-1340 (2013). 3. Yazdanpanah. et al Literature review on the management of diabetic foot ulcer. World J Diabetes, 6(1):37-53 (2015). 4. Moxey P.W. et al Lower extremity amputations: a review of global variability in incidence. Diabet. Med. 28, 1144–1153 (2011).

Abbott International BVBA
Park Lane, Culliganlaan 2B, 1831 Diegem, Belgium, Tel: 32.2.714.14.11
www.cardiovascular.abbott

IDEAS 2019

Treatment of Craniofacial Arteriovenous Malformations

René van den Berg

Don't miss it !
Arteriovenous malformations and lymphatics
Case-based Discussion
Sunday, September 8, 16:15-17:15
Room 116

René van den Berg
Academic Medical Centre of the University of Amsterdam
Amsterdam, The Netherlands

René van den Berg is on the faculty of the Department of Radiology at the Academic Medical Center of the University of Amsterdam (AMC), where he specialises in neuroradiology and interventional radiology. He is author or co-author of well over 100 academic works, with research focuses including intra- and extra-cranial aneurysms, intra- and extra-cranial arteriovenous and other vascular malformations, and spinal vascular malformations.

Development

The most difficult decision to make when a patient presents with a craniofacial arteriovenous malformation (CF-AVM) is when to treat. These CF-AVMs can be dormant for a long time, not causing many symptoms. However, a triggering factor (e.g. trauma or hormonal changes) can prompt rapid growth. Incomplete treatment can also act as a triggering factor resulting in an increase, instead of a decrease, in size of the CF-AVM. Indications for treatment are growth of the AVM leading to functional problems, vascular steal resulting in ulceration and possible bleeding, and cosmetic problems.

The treating physician should therefore have a "total treatment plan" to minimise the chance of regrowth, which should be made in consultation with other physicians at multidisciplinary meetings and, of course, with patient consultation.

Imaging and pre-treatment work-up

The more superficially located CF-AVMs can be diagnosed clinically with ease. The pulsatile nature of the lesions differentiates it from the no-flow or very slow-flow lesions such as venous and (veno-) lymphatic malformations. With deeper localisations, cross-sectional imaging is required to make the proper diagnosis, but even for the more superficially located malformations, imaging plays an important role in determining if there is deeper extension of the lesion. Magnetic resonance imaging (MRI) is superior to other cross-sectional techniques as it can reveal the soft tissue component and its extension, but also enables depiction of the arterial supply (best appreciated with 3D time-of-flight MR angiography) and AVM haemodynamics using dynamic contrast-enhanced MR angiography. The diagnostic value of digital subtraction angiography (DSA) is still high, especially for more detailed analysis of the nidus of the AVM, but for treatment planning, the combination of MRI and MR angiography is usually sufficient.

When the decision to treat has been made, a DSA will show in much more detail the vascularisation pattern, not only the major supply vessels but also the more subtle ones. An extensive angiographic protocol with selective injection of the external carotid artery branches as well as the internal carotid and, if applicable, the vertebral artery is required for this.

The arterial supply of CF-AVMs is linked to its location in the maxillo-facial region, in which collateral supply to the malformation can be extensive and complex. Especially at the level of the skull base and in the frontal area, additional supply can be expected from the internal carotid artery and its branches in the carotid siphon. The infero-lateral trunk and the ophthalmic artery encompass well known and potentially dangerous anastomosis, with branch arteries from the maxillary artery such as the accessory meningeal and ethmoidal arteries. When there is extension of the CF-AVM into the bone, additional supply can come from the inside of the skull through the (middle) meningeal arteries.

The venous drainage pattern also depends on the location: osseous lesions can drain through diploic veins, but the more superficially located malformations usually use the extensive subcutaneous venous network. The initial venous drainage might initially enter a limited number of veins. Lesions in the orbito-frontal region typically use the local drainage pattern connecting to the cavernous sinus either through the superior or inferior ophthalmic vein.

Treatment

The goal of any kind of treatment is complete occlusion of the nidus of the AVM. This can be accomplished endovascularly, surgically or by a combined treatment effort. The goal is complete obliteration of the nidus of the AVM including the origin of the venous outlet(s). For endovascular treatment, this implicates the deposition of the liquid embolic material (a combination of lipiodol and histoacryl, onyx or similar agents) in the nidus with complete blockage of the draining vein. The surgical equivalent is complete removal of the nidus with ligation of the draining veins. When flow reduction prior to surgical removal is the main goal, a more proximal arterial occlusion is acceptable, with the requisite that surgery needs to be performed rapidly before collaterals can develop.

Endovascular treatment can be performed through an arterial route, a retrograde venous route, or through direct puncture. For transarterial treatment, a microcatheter position in close proximity to the nidus is required to allow safe and successful embolisation. A wedged catheter-tip position can be very beneficial under these circumstances. A retrograde venous approach can be considered when the arterial supply is too wide spread or indirect, and the drainage of the AVM is through a very limited number of veins. Direct puncture of the arterial/nidal or venous compartment of the AVM, either under fluoroscopy-roadmap or with ultrasound guidance, can be used when arterial or venous access is difficult. Control of the venous outflow when using liquid embolic agents is mandatory. This can be obtained with local (circular) compression.

If complete occlusion is seen immediately after embolisation, long-term MRI follow-up including dynamic MR angiography is advised for confirmation of occlusion in the long term. When, despite all endovascular efforts, the AVM is not completely occluded, rapid consultation with the surgeon is warranted to discuss additional treatment.

Join us at the Film Interpretation Quiz!

Monday, September 9, 14:30-15:15, Auditorium 1

Coordinators: L. Crocetti (Pisa/IT), G.J. O'Sullivan (Galway/IE)

The Film Interpretation Quiz is one of CIRSE's most popular sessions and will consist of two teams who will compete against each other.

The teams will be given cases to diagnose and suggest treatment. One of the principle aims of the film panel is to demonstrate the approach an expert takes towards the solution of a diagnostic/therapeutic problem. This will be undertaken in an entertaining fashion and is not to be missed! The process will be a team effort.

Team A:
N. McEniff (Dublin/IE) – Team leader
A.M. Barnacle (London/UK)
M. Casares Santiago (Palma de Mallorca/ES)
S. Kee (Los Angeles, CA/US)

Team B:
R. Iezzi (Rome/IT) – Team leader
G. Eldem (Ankara/TR)
J. Garnon (Strasbourg/FR)
M.R. Meijerink (Amsterdam/NL)

The latest data on percutaneous vertebroplasty

Anthony G. Ryan

Don't miss it !
Vertebral augmentation: alive and kicking
Expert Round Table
Sunday, September 8, 10:00-11:00
Auditorium 1

Anthony G. Ryan
University Hospital Waterford
Waterford, Ireland

Prof. Anthony Ryan is a consultant IR at University Hospital Waterford and UPMC Hillman Cancer Centre. He currently serves CIRSE as the chairperson of the Patient Information Brochure Task Force, a CIRSE Academy author, a member of CIRSE's Education Grant Reviewing Committee and an incoming member of the Standards of Practice Committee (2018-20). A regular faculty member of CIRSE and ECIO, he served as a member of the local host committee for ECIO 2016 and co-ordinated the Morbidity and Mortality session at CIRSE 2019.
Prof. Ryan is the current treasurer of the UEMS IR division. He is the content lead for IR on the ESR e-learning editorial board and the Irish national delegate on the ESR Education committee.

Subsequent to its introduction in the early 1970s [1], vertebroplasty rapidly gained popularity and application for pathologic conditions causing vertebral collapse, initially in the setting of malignant collapse and subsequently in the management of osteoporotic vertebral compression fractures.

The procedure was adopted enthusiastically by those performing the procedure and referring physicians alike, many of whom witnessed first-hand extremely gratifying clinical results. Subsequently, multiple open-label studies demonstrated the procedure's safety and apparent efficacy.

Two randomised controlled trials published in 2009 by Buchbinder [2] and Kallmes [3], and almost immediately combined in a meta-analysis (Staples et al. [4]), caused consternation and controversy by casting major doubts on the actual efficacy of the procedure, purporting to prove that it was no more beneficial than placebo. This conclusion was unfortunately absorbed by the wider medical community following its publication in the august New England Journal of Medicine. Whilst the authors were commended for their initiative and the trials were an initial contribution to assessing vertebroplasty via the randomised control trial tool, the methodology in each failed to stand up to subsequent critical examination, each having broad inclusion criteria, a broad spectrum of fracture ages and significant exclusions, opt-outs and crossovers.

As a result, these trials did the procedure a disservice in dramatically reducing referrals from clinicians who believed their conclusions without an adequate awareness of the trials' deficits. Although it was acknowledged by some critics that the earlier RCTs raised 'important questions that other studies with more appropriate selection criteria might be able to answer', the reduction in procedure volumes globally slowed progress in vertebroplasty's scientific evaluation and reduced the opportunity to address the challenges of the reports, namely the performance of further randomised controlled trials with more specific inclusion and procedure criteria. Appropriate conclusions which may be drawn from Kallmes' and Buchbinder's studies is that vertebroplasty is not an appropriate treatment for chronic osteoporotic compression fractures, and if this was their 'headline', the studies would not have attracted so much controversy, as many practitioners had reached this conclusion in practice.

Unfortunately, these studies were designed such that almost none of the fractures treated were acute, and thus no meaningful conclusions could be drawn from either of these studies with regards to this patient cohort. Also, with regards to pain-severity, as previously observed by Smith and Vlahos [5], Ryu and Park [6] had previously demonstrated that patients with such low scores as those included in Kallmes' study are expected to experience less improvement post-vertebroplasty.

Despite the reduction in global procedure volumes, the challenge posed by these early RCTs was met elegantly by the authors of the VAPOUR study (Vertebroplasty for Acute Painful Osteoporotic fractures) [7] who defined strict entry criteria for a defined patient population (57% of whom were inpatients) and fracture age (< 6 weeks old), with a defined level of severe pre-procedural pain (NRS > or equal to 7/10), and found a statistically significant difference favouring vertebroplasty over a sham procedure which included cutaneous lidocaine and a skin incision, but no periosteal contact or Bupivacaine. The benefits trended towards a greater effect in fractures < 3 weeks old (which comprised 77% of the patient population). 44% of patients treated with vertebroplasty had a Numeric Rating Scale (NRS) < 4 at 10-14 days versus 22% in the conservative group. Less analgesia was required at 6 weeks in the vertebroplasty group at 3 and 6 months, there was a significant disease-specific improvement in quality of life at 14 days, sustained at 6 months, and a median reduction of in-hospital stay of 5.5 days.

Of note, larger volumes of cement were used (mean PMMA volume 7.5mls compared to 4.5 in VERTOS II) [8]. The authors describe a 'maximal-fill' technique (Fig. 1a-d), filling from superior to inferior endplates, from mid-pedicle to mid-pedicle on an AP view and from anterior cortex to posterior third on the lateral, stopping in the event of extravasation. The ability to fill the vertebra in the presence of an acute fracture reflects the greater ability of cement to disperse between the innumerable fracture planes, in contradistinction to older fractures where, as healing has commenced, there is less "potential space" for the cement to disperse, and the likelihood of extravasation is consequently increased.

In the pyramid of evidence, systematic reviews and meta-analyses trump individual randomised controlled trials, conferring a major responsibility on the authors and the publishers of the reviews. Cochrane has established itself in the publishing market as the conveyor of evidence-based medicine reviews of import, achieving this status by setting high standards and stringent criteria for the methodology, performance and reporting of such reviews. It is thus regrettable that the most recent Cochrane review of vertebroplasty [9], which included the VAPOUR subjects, failed to identify the VAPOUR study as a 'stand-alone' and combined it with the previous RCTs, resulting in a markedly heterogenous study population, and masking the benefits shown by VAPOUR. Work unpublished in a peer-reviewed journal was included (VOPE – published abstract only). These issues cast significant doubt on the conclusions of the reviews, which found no benefit arising from vertebroplasty over 'placebo'. Following these criticisms of the initial review, it was subsequently reprinted with a minor correction (Nov 2018) [10] but the latter failed to address this most important issue (i.e. failing to identify VAPOUR as a stand-alone).

Complications of inadequately treated VCFs

Major potential complications of untreated fractures include collapse with kyphosis and cord compression. More commonly, it the long list of lesser complications related to immobility and medications, especially in the elderly, that lead to progressive decline and earlier demise. The corollary of this is the benefit to patients in terms of saving and prolonging lives by treating acute fractures aggressively. It has been estimated that for every 15 patients treated, 1 life is saved. It has been suggested that the reduction in referrals and procedures following the publication of the 2009 trials and subsequent meta-analysis led to an increased mortality in this patient population [11].

As a result of the clear clinical need in patients with osteoporotic fragility fractures (VFFs) and the difficulty translating the available data into clinically useful information, a real-world solution has been developed, based on the RAND/UCLA Appropriateness Method (RUAM) [12], whereby a multi-specialty panel developed a clinical care pathway based on as many of the possible criteria relevant to this patient population as could be defined (20 signs and symptoms, input from 5 diagnostic procedures, appropriateness of vertebroplasty vs conservative management in 576 clinical scenarios and the adequacy of 6 aspects of follow-up care), subsequently distilled to 10 signs and symptoms deemed specific for VFFs. The consensus concluded that vertebral augmentation was appropriate in patients whose symptoms had worsened, with 2-4 unfavourable conditions (e.g. progression of height loss and severe functional disability, and in whom imaging was positive (preferably MRI). Studies based on this pathway will be required to evaluate its utility in clinical practice.

>>

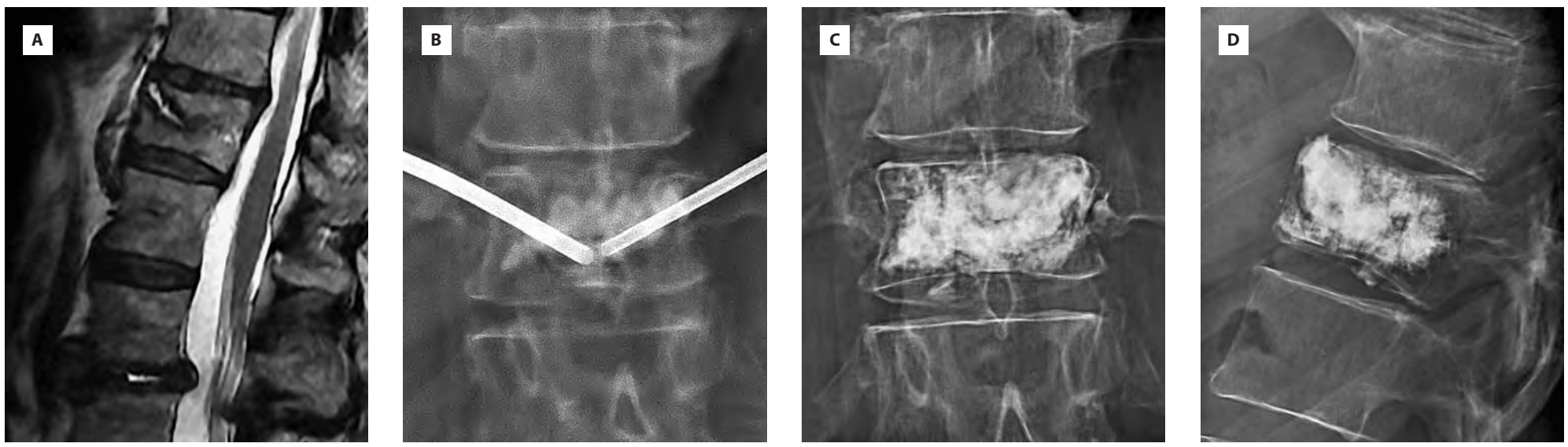


Fig. 1: Maximal fill aims to consolidate both a cleft (if present, as in this example) and the non-fractured, adjacent trabecular bone into a coherent structure. 73-year-old woman in unremitting pain with a 2.5-week old T11 fracture following a fall. Fig. 1a: MRI, sagittal T2 sequence demonstrating a prominent cleft. 1b: Early filling at vertebroplasty shows cleft filling. Final images (1c, AP and 1d, lateral) show dense cement in the cleft and a fluffier pattern of filling in the adjacent trabecular bone. Images courtesy of Dr. Bill Clark, Department of Interventional Radiology, St. George Private Hospital, Kogarah, New South Wales, Australia.

>>

Conclusion

We can derive some clinically useful conclusions from the existing data, however. The available evidence supports the performance of vertebroplasty in patients with acute osteoporotic compression fractures and uncontrolled pain and/or progressive functional decline (VAPOUR) [7]. Once the decision is made that the patient has failed a trial of conservative therapy, the earlier vertebroplasty is performed (< 3 weeks), the better.

The evidence does not support the claim that adjacent or distant VCFs are more frequent post-vertebroplasty, VERTOS IV, showing that vertebroplasty protects against progressive vertebral height loss [13].

The evidence does not support vertebroplasty in the population with subacute, healing/ healed fractures (> 6 weeks) (Buchbinder, Kallmes and VERTOS IV) [2, 3 and 13]. Despite this apparent clarity, the debate regarding the procedures' appropriateness will continue. Further, preferably multi-centre randomised controlled trials to redemonstrate, or indeed refute, the findings of the VAPOUR trial will be required to further clarify the appropriateness criteria for vertebroplasty.

References:

1. Galibert P, Deramond H, Rosat P, Le Gars D. Preliminary note on the treatment of vertebral angioma by percutaneous acrylic vertebroplasty. Neurochirurgie. 1987;33(2):166-8. French.
2. Buchbinder R, Osborne RH, Ebeling PR, Wark JD, Mitchell P, Wriedt C, Graves S, Staples MP, Murphy B. A randomized trial of vertebroplasty for painful osteoporotic vertebral fractures. N. Engl J Med. 2009 Aug 6;361(6):557-68. doi: 10.1056/NEJMoa0900429.
3. Kallmes DF, Comstock BA, Heagerty PJ, Turner JA,Wilson DJ, Diamond TH, Edwards R, Gray LA, Stout L, Owen S, Hollingworth W, Ghdoke B, Annesley-Williams DJ, Ralston SH, Jarvik JG. A randomized trial of vertebroplasty for osteoporotic spinal fractures. N Engl J Med. 2012 Mar 8; 366(10):970.
4. Staples MP, Kallmes DF, Comstock BA, Jarvik JG, Osborne RH, Heagerty PJ, Buchbinder R. Effectiveness of vertebroplasty using individual patient data from two randomised placebo controlled trials: Meta-analysis. BMJ. 2011; 343(7815).
5. Steven J. Smith, Athanasios Vlahos, Luke E. Sewall. An Objection to the New England Journal of Medicine Vertebroplasty articles. Canadian Association of Radiologists Journal, April 2010. Vol. 61, Issue 2, p121–122
6. Ryu KS, Park CK. The prognostic factors influencing on the therapeutic effect of percutaneous vertebroplasty in treating osteoporotic vertebral compression fractures. J Korean Neurosurg Soc. 2009 Jan; 45(1):16-23. doi: 10.3340/jkns.2009.45.1.16. Epub 2009 Jan 31.
7. Clark W, Bird P, Gonski P, Diamond TH, Smerdely P, McNeil HP, Schlaphoff G, Bryant C, Barnes E, Gebski V. Safety and efficacy of vertebroplasty for acute painful osteoporotic fractures (VAPOUR): a multicentre, randomised, double-blind, placebo-controlled trial. Lancet. 2016 Oct 1; 388(10052):1408-1416. doi: 10.1016/S0140-6736(16)31341-1. Epub 2016 Aug 17.
8. Klazen CAH, Verhaar HJJ, Lampmann LEH, Juttmann JR, Blonk MC, Jansen FH, Tielbeek AV, Schoemaker MC, Buskens E, van der Graaf Y, Janssens X, Fransen H, van Everdingen KJ, Muller AF, Mali WPThM, Lohle PNM. VERTOS II: Percutaneous vertebroplasty versus conservative therapy in patients with painful osteoporotic vertebral compression fractures; rationale, objectives and design of a multicenter randomized controlled trial. Trials. 2007; 8: 33. Published online 2007 Oct 31. doi: 10.1186/1745-6215-8-33
9. Buchbinder R, Johnston RV, Rischin KJ, Homik J, Jones CA, Golmohammadi K, Kallmes DF. Percutaneous vertebroplasty for osteoporotic vertebral compression fracture. Cochrane Database Syst Rev. 2018 Apr 4; 4:CD006349. doi: 10.1002/14651858.CD006349.pub3. Review. Update in: Cochrane Database Syst Rev. 2018 Nov 06;11:CD006349.
10. Buchbinder R, Johnston RV, Rischin KJ, Homik J, Jones CA, Golmohammadi K, Kallmes DF. Percutaneous vertebroplasty for osteoporotic vertebral compression fracture. Cochrane Database Syst Rev. 2018 Nov 6; 11:CD006349. doi: 10.1002/14651858.CD006349.pub4. PMID: 30399208
11. Ong KL, Beall DP, Frohbergh M, Lau E, Hirsch JA. Were VCF patients at higher risk of mortality following the 2009 publication of the vertebroplasty"sham" trials? Osteoporos Int. 2018 Feb; 29(2):375-383. doi: 10.1007/s00198-017-4281-z. Epub 2017 Oct 24.
12. Joshua A. Hirsch, Douglas P. Beall, M. Renée Chambers, Thomas G. Andreshak, Allan L. Brook, Brian M. Bruel, H. Gordon Deen, Peter C. Gerszten, et al. Management of vertebral fragility fractures: a clinical care pathway developed by a multispecialty panel using the RAND/UCLA Appropriateness Method. The Spine Journal. 2018. Vol. 18, Issue 11, p2152–2161.
13. Firanescu CE, de Vries J, Lodder P, Venmans A, Schoemaker MC, Smeet AJ,Donga E, Juttmann JR, Klazen CAH, Elgersma OEH, Jansen FH, Tielbeek AV, Boukrab I, Schonenberg K, van Rooij WJJ, Hirsch, JA, Lohle PNM. Vertebroplasty versus sham procedure for painful acute osteoporotic vertebral compression fractures (VERTOS IV): randomised sham controlled clinical trial. BMJ 2018; 361 doi: https://doi.org/10.1136/bmj.k1551 (Published 09 May 2018)

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.

Sunday, September 8, 13:15-14:15, News on Stage Area

News on Stage: Embolisation

Moderators: M. Bezzi (Rome/IT), J.E. Jackson (London/UK)

1204.1 Ethylene vinyl alcohol copolymer (Onyx) for treatment of large venous vascular malformations: long term results and histology
A.S. Gomes, P.A. Monteleone, S.V. Bukata, J.W. Sayre; Los Angeles, CA/US

1204.2 Bronchial artery embolization for massive hemoptysis: experience from a tertiary referral center in Cape Town, South Africa
H. Chung[1], M. Wojno[2], K.-L. Pool[3]; [1]Palo Alto, CA/US, [2]Cape Town/ZA, [3]Los Angeles, CA/US

1204.3 Retrospective multivariate study of the clinical outcomes in patients affected by different grades of varicocele treated using different endovascular approaches
G. Bianchi, M.V.M. Micelli, P. Palumbo, A. Izzo, A.V. Giordano, S. Carducci, M. Varrassi, A. Barile, C. Masciocchi; L'Aquila/IT

1204.4 Treatment of high-flow priapism: superselective arterial embolization
G. de Magistris[1], F. Pane[1], F. Corvino[1], F. Giurazza[1], F. Amodio[1], M. Coppola[1], E. Cavaglià[1], M. Silvestre[1], G. Cangiano[1], A. Borzelli[1], A. Paladini[2], R. Niola[1]; [1]Naples/IT, [2]Novara/IT

1204.5 Diagnosis and management of thoracic and shoulder arteriovenous malformations
W.F. Yakes; Englewood, CO/US

1204.6 Percutaneous glue embolisation as a primary treatment for visceral pseudoaneurysms
U. Gorsi, V. Bhatia, N. Kalra, M. Kang, M.S. Sandhu; Chandigarh/IN

The News on Stage Area is located next to Auditorium 2, opposite the Members Lounge.

Colorectal cancer lung metastases: where does IR currently stand?

Jean Palussière

Don't miss it !
Colorectal cancer lung metastasis
Expert Round Table
Sunday, September 8, 08:30-09:30
Room 112

Different features of metastatic disease

Metastatic disease can range from a widely diffuse disease to a more limited one. 'Oligometastasis' has been defined as a state of low-volume disease, with one to five tumours being accepted as a cut-off, at up to two sites. Due to the advent of sensitive imaging technologies, patients are increasingly being diagnosed with oligometastatic disease. Therefore the definition of oligometastases has progressively evolved to encompass 'induced oligometastases', corresponding to a low tumour burden achieved after a systemic treatment and 'oligoprogression', corresponding to a limited focal tumour progression with control of the remaining metastatic disease while continuing on systemic therapy.

What about local treatment for metastatic disease – thermal ablation (TA)?

The most successful data on the usefulness of local treatment of metastases comes from metastatic colorectal cancer (CRC). Resection of liver metastases from CRC is considered the standard of care for select patients with liver-only metastases.

Despite a lack of randomised data, aggressive local control in the oligometastatic setting (that is, achieving complete TA of all tumour masses) has progressively demonstrated long-term cures for this population of patients (5-year OS of 35-45% and up to 60%). A similar approach can be proposed for lung metastases and, as with surgery, 5-year OS rates are obtained after percutaneous image-guided thermal ablation (TA) performed in these patients. One of the largest published series of 566 patients with 1,037 lung metastases treated with radiofrequency ablation (RFA) has shown similar survival results compared to surgery [1]. A median OS of 62 months was obtained after RFA, and 5-year OS was 51.5%. This improvement is likely due to a combination of factors (improved chemotherapy, radiation and surgery) as well as better patient selection and better follow-up in identifying patients with truly limited metastatic disease with the use of modern imaging (CT, MRI).

In this series, like in others, tumour size was predictive of local tumour progression. TA is considered a good option for the treatment of lung metastases <2–3 cm with a local tumour progression rate per tumour of 11.0% at 4 years [1]. Local tumour progression after TA of lung metastases is known to be independent of the origin of the primary cancer. Currently the option of adding adjuvant chemotherapy after a curative local treatment of lung-limited metastasis from CRC has not been resolved through a prospective study.

One of the strengths of TA is its ability to be repeated after a first session. Interestingly, in the above mentioned series, 24% of the initially treated patients were retreated by RF up to four times, resulting in a 44.1% 4-year control rate of metastatic lung disease. In the case of oligorecurrent disease, good tolerance of thermal ablation with few complications (acute and delayed, local and remote) may allow multiple sessions of treatment in order to delay resumption of systemic treatment.

The indication for local treatment might be proposed not only to patients with a very slow-evolving disease (oligometastatic disease), but also for more advanced disease following systemic treatment with a good response. The current priority in the management of metastatic patients is to improve the patient's quality of life while trying to prolong their survival. To this effect, a therapeutic de-escalation that includes the provision of a therapeutic pause ("watch and wait"), sequential approach or maintenance therapy may be appropriate [2], and has demonstrated no deleterious impact on survival. For these patients, local treatment could maintain therapeutic holidays and lengthen the period without systemic treatment. Until now, prospective randomised studies have not been conducted to demonstrate the benefit of local treatment in this indication, but in a retrospective study it was demonstrated that aggressive TA enabled a therapeutic break with a chemotherapy-free survival of 12.2 months [3]. Patients who are good candidates for this are patients who respond well to induction therapy (a period of 3-6 months). As a result, the decision to perform a local treatment in these advanced stages should be carefully discussed in multidisplinary boards and reserved to excellent responders.

Nevertheless, it is also important to consider that CRC is a heterogeneous disease with various outcomes and drug responses; molecular differences are likely to be responsible for different outcomes (RAS and BRAF mutations have worse clinical outcomes).

Interestingly, when using a TA technique, a biopsy of the metastases before heating or freezing makes it possible to identify and analyse mutations, in order to investigate if there is a biomarker concordance between the primary CRC cancer and its metastases, with pulmonary metastases being able to harbour a variety of conserved and de novo mutations.

Without randomised studies, it is impossible to know with certainty if local treatment of oligometastatic disease helps the patient; nevertheless, even in the absence of randomised trials, the fact that interventional oncology allows image-guided treatments which are relatively non-invasive, repeatable, with few side effects and good efficacy has led to more interest in treating oligometastatic disease. In appropriately selected patients, locally treating metastases helps to prevent further evolution of genetically unstable clones and metastatic spread, to improve overall disease control and to delay more toxic systemic treatment. Apart from patients with more extensive disease, a multimodal therapy approach combining systemic therapy and local treatment has become relevant.

Tumour ablation, surgery and stereotactic radiotherapy are different options of local treatment; the best should be selected according to disease localisation, patient comorbidities and treatment-related morbidity.

Jean Palussière
Institut Bergonié
Bordeaux, France

Dr. Jean Palussière is an interventional radiologist at the Institute Bergonié in Bordeaux, France. After completing his medical studies at Bordeaux University, he spent a one-year sabbatical in northern Congo, before working as an assistant for two years in the vascular radiological department in Bordeaux once again. While there, he also worked to develop IR at the Institute Bergonié and in 1999, the first angiosuite was installed. In 2002, Palussière and his team began treating their first patients with radiofrequency ablation for lung tumours. Due to his expertise in thermal lung and breast tumour ablation, Dr. Palussière has been a guest speaker at different universities and conferences across Europe and the USA, and even served as the ECIO 2016 Honorary Lecturer.

References:
1. de Baere et al Annals of Oncology 2015 May;26(5):987-91
2. Van Cutsem et al Annals of Oncology 2016 August;27(8):1386–1422
3. Fonck M et al. Cardiovasc Intervent Radiol. 2018 Nov;41(11):1727-1734

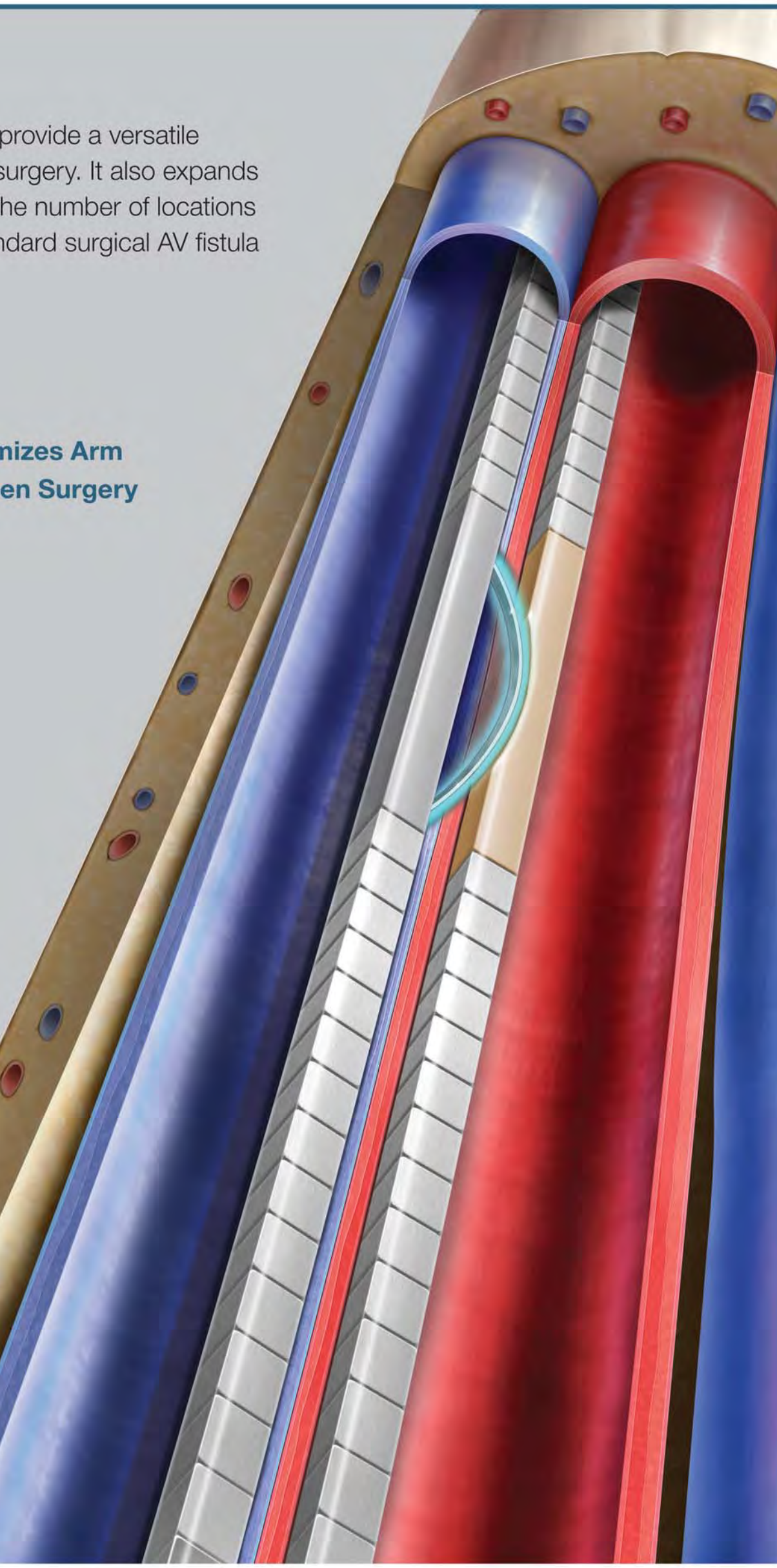
Maximize Your AV Fistula Options
With WAVELINQ™ 4F EndoAVF System

The WAVELINQ™ 4F EndoAVF System is designed to provide a versatile endovascular AV fistula creation alternative to open surgery. It also expands your anatomic options for creation sites, increasing the number of locations an AV fistula can be created while leaving future standard surgical AV fistula creation options open.

Avoids Surgical Scarring and Minimizes Arm Disfigurement Associated With Open Surgery

Additional Anatomical AV Fistula Locations

Multiple Procedural Approaches



WAVELINQ™ | 4F
EndoAVF System

The WAVELINQ™ 4F EndoAVF System is intended for the cutting and coagulation of blood vessel tissue in the peripheral vasculature for the creation of an arteriovenous fistula used for hemodialysis.
Please consult product labels and instructions for use for indications, contraindications, hazards, warnings and precautions.

BD

BARD
has joined BD

What Is Wrong With the ATTRACT Trial?

Gerard J. O'Sullivan, EBIR

Catheter-directed intervention in deep vein thrombosis has been performed for many years. Up until quite recently, the evidence base for this was relatively weak.

Standard anticoagulation was introduced in the late 1950s and it was confirmed on the basis of a single trial showing a lower incidence of pulmonary embolus in patients who were put on anticoagulation as opposed to those who were not.

With the introduction of streptokinase and other thrombolytic agents in the 1960s and 1970s, interventionalists and haematologists felt that there might be some benefit in treating patients with systemic thrombolysis; and while the results in terms of vein-opening were excellent, the side effects (chiefly bleeding) were not.

Later, large cardiology trials for acute myocardial infarction demonstrated impressive survival benefits in patients put on thrombolytic standard therapy. Interventionalists again felt that there might be benefit in performing a similar procedure in patients with deep vein thrombosis. This lead to the widely referenced Venous Registry (1998) from the United States based on the experience in the early 1990s. Briefly, patients with acute DVT were treated with catheter-directed thrombolysis; it was found that the patency of vessels on follow-up ultrasound in those patients with iliofemoral venous occlusion did far better than those with femoro-popliteal venous thrombosis.

A number of small trials were then performed over the next two decades, before the first multi-centre CaVenT trial from southern Norway (about 210 patients) was published with 2-year follow-up in 2011, and 5-year follow-up in 2016. The focus of this trial was the rate of post-thrombotic syndrome (PTS) on follow-up – a significant shift from simple vessel patency. Both groups received standard anticoagulation and compression stockings; one group also received catheter-directed thrombolysis. This latter group had a lower rate of post-thrombotic syndrome at two years, and even more impressively at five years. The number needed to treat (NNT) at 2 years was seven patients (i.e. to achieve one patient with lower rate of post-thrombotic syndrome. However at 5 years, the number had dropped to 4; indicating continuing and increasing benefit with CDT vs. anticoagulation alone.

The ATTRACT trial was conceived in the United States in the early 2000s and extremely experienced practitioners undertook its design.

In summary, almost seven hundred patients were split into two groups, one received catheter-directed thrombolysis and or ancillary methods of treatment and the other group was treated by standard anticoagulation alone; both groups received compression stockings.

There was no difference in the overall rate of post-thrombotic syndrome, at nearly 50 percent between the two groups.

This was surprising to those of us performing this on a routine basis, as we feel fairly convinced that catheter-based therapies do offer huge benefits compared with those that do not.

As always, the devil is in the detail.
The ATTRACT trial had a number of serious flaws including:

- delayed study recruitment
- lack of follow-up ultrasound
- inclusion of femoral popliteal patients (which been already proven a generation earlier not to do as well as those with iliofemoral deep vein thrombosis),
- lack of dedicated venous stents, which are now widely available
- lack of intravascular ultrasound, again now widely used, and a relatively short duration of thrombolysis
- use of the Villalta scale (which does not capture many of the symptoms that our patients typically see; for instance, there is no measure of venous claudication).

The issue of recruitment is a thorny one. Trial recruitment had fallen behind in 2009 and 2010, and so the decision was made to double the number of centres and to open the inclusion criteria to include patients with femoral popliteal disease as opposed to those with just iliofemoral deep vein thrombosis. This had the desired effect of increasing the numbers and speeding up inclusion, but vastly decreased the quality of information derived, as the trial was no longer powered to show a difference in post-thrombotic syndrome for the patients as the iliofemoral group was significantly diluted.

A subsequent follow-up article by one of the authors of the ATTRACT trial in circulations published in December 2018 showed that in iliofemoral deep-vein thrombosis patients, using a different scoring method, that catheter-based therapies **were** more successful in preventing post-thrombotic syndrome.

This state-of-the-art venous session will go into significantly more detail on this very important topic and hopefully should help those attending better understand the ins and outs, and so better guide therapy for their patients.

Don't miss it!

Does ATTRACT change our DVT management practice?
Hot Topic Symposium
Sunday, September 8, 15:00-16:00
Auditorium 1

Gerard J. O'Sullivan
(EBIR)
University College Hospital Galway
Galway, Ireland

Prof. Gerry O'Sullivan is a consultant interventional radiologist at the University College Hospital, Galway. He completed his basic training in radiology in Plymouth and St. George's, London, before completing an IR fellowship in Stanford under Mike Dake, and worked as a consultant in Chicago before moving to Galway in 2002. He specialises in vascular procedures, and is particularly well known for his expertise in the venous field, especially DVT. In this respect, Dr. O'Sullivan has been a regular faculty member at CIRSE meetings, actively participating in debates, lectures, panel discussions and workshops each year since 2006. Following tomorrow's General Assembly, he will assume the role of Chairperson of the Membership Committee.

Join us at 15:00 in Auditorium 1 for one of the hottest debates of the congress:

Does ATTRACT change our DVT management practice?

What is ATTRACT?
Wael Saad (Ann Arbor, VA/US)

What is wrong with ATTRACT?
Gerry O'Sullivan (Galway/IE)

Has ATTRACT affected my practice?
Rick de Graaf (Friedrichshafen/DE)

Where will we be in five years' time?
Stephen Black (London/UK)

Publishing with CVIR Endovascular: The Author Experience

Sarah Henry, CIRSE Office

CVIR Endovascular is CIRSE's open-access journal, set up to cater for the rising amount of endovascular research and in response to the previous lack of publication possibilities for researchers. It was launched in September 2017, with its first articles published in June 2018. Since then around 60 articles have been published online, with over 15,000 article downloads.

We spoke with some authors who have recently published their research in CVIR Endovascular to find out about their experience.

CVIR ENDOVASCULAR

Why did you choose CVIR Endovascular to publish this case report?

Tullius: When I was attempting to publish our case report, I struggled to find an appropriate place to publish. Multiple journals offered to publish the case report as a much briefer 'Letter to the Editor'; however, I believed that this was a case that needed more exposure, with detailed explanation and analysis. I was encouraged to submit to CVIR Endovascular, which has provided a wonderful avenue for publication.

Have you had any experience of open access publishing before? Would you do it again?

Tullius: This was my first experience with open access. The submission website was very user-friendly and the entire process was seamless. The review of the article was prompt and the comments from the reviewers helped to improve the content of the manuscript.

Impact factor is still an important scientific parameter in many institutions, although other parameters like citation index are becoming more important. How is this in your institution and what is your opinion about this?

Tullius: While impact factor is an important component when deciding where to publish, there are many other considerations. In my mind, the goal of publishing is to share your work with other like-minded individuals and open-access journals can give great exposure to your work while improving citation index.

Do you think CVIR Endovascular can play a role in helping young scientists publish their first papers?

Tullius: CVIR Endovascular will be instrumental for many young scientists and physicians. Experiencing and learning from the publishing process of your first paper is a rite of passage and many journals no longer even consider valuable articles like case reports and technical notes. I would definitely recommend CVIR Endovascular to my colleagues who want exposure for their manuscript.

This case report, which was published in April 2019, documents a novel case of intervention following right hepatic resection for metastatic lesion. The remnant left hepatic lobe vacated the space left by the right hepatic lobe and subsequently induced torsion and complete thrombosis of the IVC. Using completely endovascular treatment, an Angiovac suction thombectomy device and stenting created sustained patency of the IVC.

Thomas G. Tullius Jr
University of Chicago Medical Center, USA

Article type: Case Report

Authors: Thuong G. Van Ha, Thomas G. Tullius Jr, Rakesh Navuluri, J. Michael Millis and Jeffrey A. Leef

Title: Percutaneous treatment of IVC obstruction due to post-resection hepatic torsion associated with IVC thrombosis

Reference:
Van Ha, T.G., Tullius, T.G., Navuluri, R. et al. CVIR Endovasc (2019) 2: 14.

Do you think there are currently enough easily accessible interventional radiology publication possibilities for case reports, short communications, technical notes, etc.?

Najafi: I believe that the additional possibility of publishing in CVIR Endovascular is certainly enhancing the options of our scientific community. Interventional radiology is a specialty that is developing incredibly quickly and there are so many different aspects that have not yet been investigated. With the growth of our specialty there will automatically be demand for further publishing options, underlining the importance of having possibilities to publish early findings (such as our observation with the Nellix stent graft) outside of prospective study settings.

At your institution, how important is impact factor for publishing?

Najafi: At our institute, the primary goal is to do clinical research about new developments that benefit our patients and we like to share these insights in journals that are read frequently by CIRSE members. The impact factor is certainly still an important parameter that is used to assess scientific papers, and it is something that is always on one's mind when choosing the appropriate journal for publication. However, I very much believe it should not be the only criterion.

Young scientists find it more and more difficult to get their first papers published. What would be your advice for them?

Najafi: If we want to keep up the growth in IR, we need to provide researchers with platforms to publish their work. I think it is important, now more than ever, to closely work with experienced and accomplished peers. A study needs to be carefully evaluated and planned from the beginning to avoid pitfalls further down the road that can hinder possible publication.

Arash Najafi and his co-authors shared their experience with the Nellix stent graft in their paper which was published in April 2019. They focus on complications that necessitated secondary interventions, including proximal angulation, limb separation, caudal migration and type Ia endoleak. The paper provides possible endovascular salvage options that worked well for their patients.

Arash Najafi
Canton Hospital Winterthur, Switzerland

Article type: Original Article

Authors: Arash Najafi, Gabriel Tobias Sheikh, Pius Wigger and Christoph A. Binkert

Title: Outcome of Nellix-EVAS: single center mid-term results

Reference:
Najafi, A., Sheikh, G.T., Wigger, P. et al. CVIR Endovasc (2019) 2: 13.

What is your opinion on open-access publications and what has been your experience in publishing this way?

de Bruijn: I certainly think that there should be more open-access publications. They stimulate evidence-based medicine, promote good clinical practice and, in our case, contribute to the growth and exposure of interventional radiology. I have published open-access in the past, as the Vrije Universiteit Amsterdam has agreements with multiple journals. I believe that open-access helps information reach a greater audience and make the biggest impact possible.

What is important to your institute – impact factor or citation index? What is your view?

de Bruijn: In my institution, impact factor is considered the most important scientific parameter. However, in my opinion, impact factor is void because it results in a publication bias. I believe that using a citation index would be a better solution, since it reflects what physicians find most important in daily practice.

Published in June 2019, this paper evaluates the implementation of uterine artery embolisation for symptomatic uterine fibroids in the Netherlands, as well as looking into gynaecologists' preferences and other factors that can influence the speed of implementation.

Annefleur M. de Bruijn
Amsterdam University Medical Center, Vrije Universiteit Amsterdam, The Netherlands

Article type: Original Article

Authors: Annefleur M. de Bruijn, Jolijn Huisman, Wouter J. K. Hehenkamp, Paul N. M. Lohle, Jim A. Reekers, Anne Timmermans and Andries R. H. Twijnstra

Title: Implementation of uterine artery embolization for symptomatic fibroids in the Netherlands: an inventory and preference study

Reference:
de Bruijn, A.M., Huisman, J., Hehenkamp, W.J.K. et al. CVIR Endovasc (2019) 2: 18.

SERVEI – our local hosts in Spain

Fernando López Zárraga, Local Host Committee Chairperson

The Spanish Vascular and Interventional Radiology Society (SERVEI) has been going from strength to strength these last few years, with a number of notable events taking place. Its numbers have been steadily increasing and now include over 320 members, ranking it as one of the "big five" European interventional radiology societies.

2019 is also a very special year, as many important interventional events have taken place in our country.

First of all, in March, SERVEI´s Strategic and Technical Plan was officially presented in Madrid. This plan is a key document for coordinating the next five years' work in improving recognition, visibility and development of our subspecialty, not only in terms of the Health Ministry but also the general Spanish population. The presentation was supported by the Spanish Health Ministry's General Director of Specialties and the President of the Spanish Medical Radiology Society (SERAM). This year will also be critical because of the new Spanish Specialties Law that will be discussed by the Health Ministry and the Spanish Autonomous Communities. SERVEI has begun an information campaign, sending documents to both administrations, with the intention of taking a big step towards obtaining subspecialty recognition.

Furthermore, two important meetings have taken place in Spain:

SERVEI´s national congress was hosted in Seville in May. With the participation of 171 medical attendants and 30 medical device companies, and featuring more than 90 oral and electronic communications, this was a very successful meeting; however, we feel that the most important point was the participation of 61 medical residents in a pre-congress course.

In July, Valencia hosted the first European Conference on Embolotherapy (ET). Around 800 attendants participated in this meeting, enjoying the unique opportunity to discuss state-of-the-art embolisation techniques and technologies.

For ET and the CIRSE congress, SERVEI and the Local Host Committee have engaged in a very intense visibility and communication campaign. Seven core messages divided in two blocks have been sent through social media (Instagram, Twitter, LinkedIn), targeting both medical and non-medical audiences at informational and educational levels, respectively. Both creativity lines were well accepted and transmitted by both target groups, helping promote our work in a very high-tech yet organic manner. The effectiveness of the campaign was due to expanding beyond traditional IR communications.

In addition, a powerful communication campaign announcing the grants available for both conferences was conducted in different medical universities throughout the country. We hope that this will encourage many undergraduate and post-graduate medical students to join us in Barcelona and learn more about the specialty – this will be key to securing the future of Spanish IR.

And now, here we are again in Barcelona for CIRSE 2019!

For all of these reasons, Spain and Spanish interventional radiology seem to be fashionable among the interventional world. We hope to keep the momentum going, and build on this year's achievements still further. But more than that, we wish you all a wonderful stay in Barcelona, and look forward to welcoming you all again to future events! Should you need any assistance or advice regarding your stay in the city, please contact the Hotels | Social Events | City Information desk located in the in the entrance hall of the congress centre. Kuoni Congress, CIRSE's official travel partner, will be pleased to help you.

I wish you a pleasant stay!

Supporting Education – the CIRSE Academy and Curricula

CIRSE academy

Elizabeth Wenzel, CIRSE Office

CIRSE is committed to enriching the world of IR learning by making high-quality, standardised, up-to-date materials easily and readily available for those to wish to learn more about interventional radiology, from the general to the specialised.

With the goal of supporting IRs with CME-certified courses, CIRSE launched the CIRSE Academy in late 2018. The Academy aims to provide comprehensive knowledge of IR procedures through online courses based on the *European Curriculum and Syllabus for IR*. Each course provides a theoretical component, example cases and teaching videos, all peer-reviewed by experts.

Since the initial launch of 14 courses in November of last year, the Academy has expanded continually and now includes 26 courses on oncology, embolisation, arterial, venous and non-vascular interventions as well as neurointervention.

All online courses go through a rigorous process of drafting and three review cycles with re-drafting before seeking UEMS accreditation. The selected authors are leaders in their respective IR fields and are supported by the CIRSE Online Education Committee. The courses are ideal for IR trainees aiming to gain fundamental knowledge of a topic, particularly when preparing for the EBIR exam, and experts will also find the courses to be a useful tool for expanding their knowledge of different interventional topics.

The content offers a comprehensive overview of various aspects ranging from anatomy and pathophysiology to techniques for treatment and post-procedural management. These are presented through a combination of informative texts, graphics, videos and a multiple choice final exam/quiz. Courses are fully accredited by the UEMS and awarded with one or two CME points on successful completion of a course.

The most popular courses so far include *Biliary drainage and stenting, Fundamentals of PTA and stenting for peripheral arterial disease, Management of acute arterial gastrointestinal haemorrhage, Hepatocellular carcinoma* and *Vascular access and closure.*

Comprehensive Curricula

CIRSE also maintains curricula designed to support IRs throughout their careers. To reach as wide an audience as possible, CIRSE has made the curricula freely avaliable on the CIRSE website.

Now in its second edition, the *European Curriculum and Syllabus for Interventional Radiology* is a standardised interventional radiology guideline that covers objectives, learning methods, outcomes, supervision and assessments. It includes a syllabus which aims to facilitate the development of the clinical and technical skills necessary to carry out safe and effective IR treatments. This document serves as the basis for the EBIR examination.

In March of this year, CIRSE also released a *European Curriculum and Syllabus for Interventional Oncology.* This curriculum is a supplementary document that is dedicated specifically to interventional oncology, intended to be used with the *European Curriculum and Syllabus for Interventional Radiology.* It provides recommendations and guidelines for the knowledge, skills and competencies essential to attaining proficiency in IO and providing optimal IO care to cancer patients.

Most recently, CIRSE has released a new version of *IR Curriculum for Medical Students,* which is designed to introduce students to the most common conditions handled by IRs early in their careers. This will not only increase awareness of IR as a future career option, but also benefit students who will go on to participate in a multidisciplinary approach to patient care in the future.

The value of continued medical education in interventional radiology cannot be understated. The Academy and Curricula both support education that can be tailored to busy personal schedules, as keeping abreast of this continually evolving field is vital for further progress. These resources offer a great opportunity for IRs of all levels to expand their knowledge, and also aid in raising awareness of the field. By providing standardised guidelines for training and practice in Europe, patients can have the assurance that their provider has the knowledge and competence to provide a safe, high-quality service.

STUDENT CORNER

Romana Šumpichová, CIRSE Office

Interview with Greg Makris, Chairperson of the European Trainee Forum Subcommittee

CIRSE: Recently, you were part of the task force responsible for revising the IR Curriculum for Medical Students. Why was a revision needed?

Makris: Interventional radiology is changing faster than ever, with new procedures and new indications being introduced every year. We think it is important to update the student curriculum in such a way that it reflects these changes, and so that it can be used as a learning tool. I think that the new curriculum can be a great aid for students during their IR rotations since it can be used as a quick guide to the basics and, of course, it is FREE to download!

The new IR curriculum is more than just a list of topics. Students can use it in order to get a basic understanding of old and new IR procedures. Every topic has a very specific structure that focuses on clinical presentation, imaging findings, IR treatment options and post-operative care, with additional included references for further reading. New procedures like prostate and uterine fibroid embolisation are also included to represent the expanding armamentarium of IR procedures!

CIRSE: Is there any part of the new curriculum that you would like to highlight?

Makris: Most medical students think that IR is only vascular procedures and I think the new curriculum emphasises that while vascular is a big part of what we do, other areas are also growing and represent an increasing volume of procedures. For example interventional oncology (IO) has become the 4th pillar of oncological treatment with increased recognition in the international guidelines, and we tried to reflect that in the new curriculum. Medical students can get all the essential information around modern IO practices in order to be able to understand current applications and where IO stands in the modern management of cancer.

CIRSE: The curriculum is intended to raise awareness of IR during undergraduate studies. How do you think early exposure to IR impacts medical students?

Makris: Despite the fact that, nowadays, IR and diagnostic radiology play a very important role in patient management, both of these specialties are under-represented in most medical school curriculums. We tried to fill that gap by introducing an IR-specific curriculum for medical students in 2012 and we are improving on that with the current version. Early exposure of medical students is crucial in order to allow them to understand what IR is, how it can help their patients in the future and, of course, to help them decide if this a career path that they could see themselves in.

CIRSE: What else would you recommend medical students follow in order to stay informed about IR?

Makris: In the era of internet, there are so many different resources that a medical student can use to stay up-to-date with what is happening in IR. I would definitely recommend the following:

- Start a twitter account if you don't have one. There you can follow some great interventional radiologists who are sharing cases and their life as IRs in almost real time. You can also follow CIRSE and other societies, as well as your local IR team and find out more about how they're pushing the boundaries of image-guided minimally invasive surgery.
- You can follow the European Trainee Forum page on Facebook to find out more about the work we are doing to improve IR training in Europe.
- Become a student member of CIRSE so you can get access to the CVIR journal, which can give you a great taste of ongoing IR, related research and what the future might hold for new IR procedures.
- Last but not least... Make sure you visit your local IR department and try to do a taster week with them to see what IR is really like. I promise you will not regret it!

CIRSE: Can you briefly share with us your study experience and describe your pathway to becoming an interventional radiologist? When did you first come across IR during your own education?

Makris: As with most things in life, becoming an IR happened quite unexpectedly! After medical school (University of Athens) I decided that I wanted to do more research and I started a PhD in vascular surgery at the Imperial College of London. At that point, my exposure to IR was very limited. However, during my work there I had the opportunity to work with some great IRs and realised that this specialty is probably a better fit for me. So many cool devices, so many opportunities for research and, of course, the opportunity to perform surgery through tiny pinholes captured my imagination about what the future holds for this specialty. This was enough for me to make me apply for a diagnostic radiology training post at Cambridge University (3 years), which was followed by an IR fellowship at Oxford University Hospitals (3 years). I had the opportunity to train and learn from some great IRs in two of the oldest universities in the world and I can only be grateful for my good luck! It was a definitely a dream come true!

CIRSE: What steps would you advise a medical student take in order to pursue his/her career in IR? What activities, student workshops and training abroad would you recommend they participate in?

Makris: Getting a training post in IR is becoming an increasingly competitive, which is great for the specialty, because it means that we are attracting the best possible talent. This means that if you are a medical student and you are interested in a career in IR, you have to start preparing early. The first step would be to do a taster week at your local IR department and, if you enjoy that, then try to engage more and participate in the work they are doing. We are always looking for motivated medical students to help us with audits, research work and papers we are working on. In addition, make sure you participate in your local/national IR student events and if there aren't any, why not start your own! You can start by initiating an IR society in medical school to attract other like-minded medical students and work on projects together. Finally, attending conferences like CIRSE is great way to network, meet some great mentors and learn about cutting-edge IR research!

CIRSE: As you are currently Chairperson of CIRSE´s European Trainee Forum Subcommittee; can you tell us more how the European Trainee Forum was established? What are some of its achievements?

Makris: It has been an incredible honour and responsibility for me to be the first chairman of the CIRSE ETF. We started working on the concept of the ETF back in 2014 and we had our inaugural meeting at ECIO in Dublin in 2016 with representatives from five countries. The aim of this subcommittee is to allow trainees to become more involved in the shaping of the future of our speciality in Europe and enable the development of future IR leaders. CIRSE believes in the energy, passion and enthusiasm that trainees can bring to the society. During the last 3 years we have grown significantly and we are proud of the following:

- Bringing together representatives of more than 20 European countries.
- Creating a network of IR trainees with a focus on IR education and promotion of the specialty.
- Creating a dedicated programme for IR trainees, junior doctors and students focusing on career-building, mentoring, soft skills and entrepreneurship. This programme consists of lectures, short talks and networking events that take place during the annual CIRSE event and aim to enhance the educational experience for the more junior members of the society, while at the same time creating a hub for networking for trainees from different countries and levels of experience.
- Supporting the introduction of the CIRSE travel support programme for trainees who submit abstracts to the conferences.
- Supporting the development of the Student IR programme during CIRSE and the revision of the student IR curriculum.
- Drafting the first report on the status of IR training in Europe focusing on the need for more homogenous IR training in Europe, which will hopefully be published soon.

CIRSE: Which ETF activities at CIRSE 2019 would you recommend students attend and why?

Makris: I know that a conference as busy as CIRSE can be a bit intimidating for medical students and this is why we have sessions that are specifically marked as trainee/junior-friendly. These sessions are specifically designed to cover their educational needs and can serve as a good introduction for medical students, too. I would also definitely recommend attending as many of the ETF lectures and short talks as possible. These talks are designed by trainees for trainees and cover topics such as career-building, artificial intelligence and robots in IR, as well as topics on how to found your own start-up and how you can work for the industry while being an IR. We will also have trainees from outside the EU telling us about training opportunities in the USA, Australia and even the Middle East, and what it is like to perform IR procedures in low-income countries such as Tanzania and Uganda! We have so many amazing speakers coming from all over the world…. From IRs who practice in Tanzania, IRs who fly on helicopters while vlogging about IR and even venture capital analysts advising us on how to navigate the complicated world of start-ups… just in case you're thinking of becoming the next Steve Jobs of IR! This is going to be the most exciting CIRSE conference yet!

ETF

Info about the ETF

Not only is CIRSE catering for undergraduates, it is also engaged in supporting young IRs who are in training and pursuing their future IR career! In 2015, CIRSE established the European Trainee Forum, which is currently represented by 26 young IRs from different European countries, and which has become the voice of IRs-in-training who provide important input on IR training pathways across European countries.

The European Trainee Forum Subcommittee puts together a scientific programme tailored especially to IR trainees and invites all young IRs as well as the medical students to attend all the sessions which will discuss topics such as future IR technologies, building an IR career, clinical practice, working with medical devices or building an own start-up as IR. It also offers a series of Short Talks, which are spread across three days according to their topics. Those attending can look forward to learning more about clinical and academic opportunities in and outside the EU, getting practical career advice or obtaining insight into using social media to promote IR and their practice.

Are you about to finish your undergraduate medical degree and thinking which way you should go next? Join the ETF community and get involved in the field of IR!

www.cirse.org/trainees

be inspIRed...

Feeling inspIRed yet?

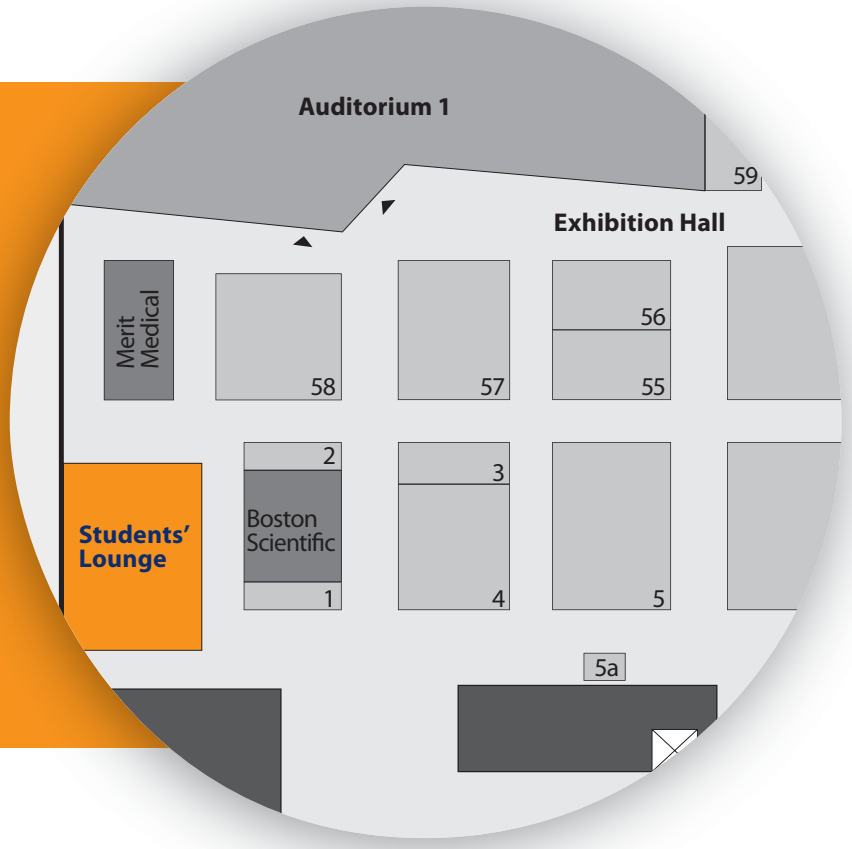
Welcome to Day 2 of CIRSE 2019!

We hope you all enjoyed yesterday's lectures, especially the dedicated introductory session for students.

Today's programme offers plenty more opportunities to get better aquainted with both IR and those who work in the field!

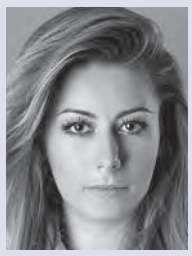
The day starts of bright and early with a Mentoring Breakfast, held in the Student Lounge at 08:30. Not only will a nutritious breakfast set you up for a day of learning, the event will let you meet experienced IR practitioners and ask them about career opportunities in European countries, as well as what day-to-day practice looks like in their institute.

Be sure to start your day right!



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 student studying in Italy.



Anna Cykowska
Turin/Italy
Università degli Studi di Torino

CIRSE: Why did you decide to study medicine and why are you interested in IR?

Cykowska: Unlike many of my friends, I can't remember exactly why or when I became interested in medicine. I do remember, however, medicine being already my career goal in high school. Applying to medicine was a logical rather than an emotional decision – I enjoy science, critical thinking, the human body, research; I work and think better under pressure and stress. I also like working hard. Before I was a medical student, I had an opportunity to try all different kinds of jobs (waitress, insurance consultant, support worker, healthcare assistant, lab assistant). I was unhappy in 9-5 jobs. Except for the social interactions with my clients or patients, it just didn't feel like these jobs could be my final destination.

The first time I thought about something to do with radiology was before I even started my medical degree. I had an opportunity to undertake a work placement in the Royal Liverpool Hospital. From many different options, I chose the IR unit. I guess back then it was a feeling that IR just seems like such an interesting field, but I thought that "liking IR" will probably change once I start the med school. Then when I took surgery and radiology during the second year, I started considering IR as a possible training option. I hope that CIRSE 2019 will be a great opportunity to network with the professionals and become better oriented in the field!

CIRSE: How did you hear about CIRSE?

Cykowska: I have been searching conferences for medical students on a Facebook page dedicated to medical conferences only. I was impressed by the student programme and decided to apply.

CIRSE: Why did you decide to attend the Student Programme?

Cykowska: Personally, I am most interested in the mentoring and networking events. I know from experience that there is nothing more valuable than a good mentor. Networking is extremely important in medicine, especially if one is looking for opportunities for research projects or internships. Secondly, the hands-on training sessions and workshops seem like a perfect opportunity to learn some practical skills. Access to a trainee forum, scientific sessions and the exhibition was also important to me; it's a perfect way to update my knowledge regarding current news, innovations and interesting projects in IR.

CIRSE: Why did you choose to study medicine in your country? And have you ever thought about studying medicine in any other country?

Cykowska: Currently I study in Italy, but am originally from Poland. I also have a BSc degree in medical sciences from the University of Liverpool in the UK. Choosing Italy to study medicine wasn't my first choice; in fact, it was the UK. I was preparing to apply to a graduate medicine programme after completing my BSc degree. It was a conscious choice to "take a long pathway", as I wanted to have two degrees and I was always interested in research. In my plan, however, I didn't consider that Britain may leave the European Union. As I am an independent student, after Brexit it would no longer be financially feasible to continue studying in the UK. Then I thought – why don't I learn an extra language, get to know yet another culture, and have a bit more sun in my life? Italian universities are well renowned, the level of medicine is very high (although more theoretical than what I was expecting), the course is taught fully in English and is inexpensive... and perspectives after graduation are as wide as if I graduated from the UK medical school. For a brief period of time I considered Poland; however, I decided that Italy is a better option career-wise.

QUESTIONS OF THE DAY

Sunday, September 8, 2019

Read today's Congress News and make sure that you are one of the first two students to send the correct answers to **students@cirse.org** by **14:00 today!**

Get inspIRed by reading the articles and win a voucher allowing you to choose up to 4 CIRSE Academy online courses!

1. What condition was known as 'the silent killer' until the early 90s?
2. What is the most difficult decision to make when treating a craniofacial arteriovenous malformation?
3. Name at least two current CIRSE clinical registries.
4. When was percutaneous vertebroplasty first introduced?
5. What Society is acting as our local host in Spain?

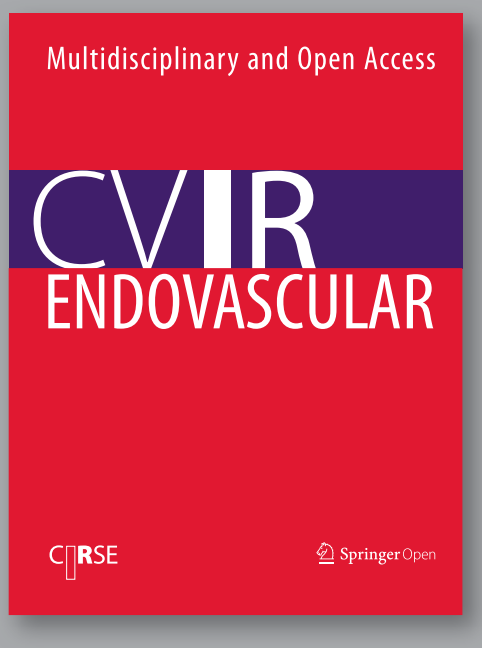
TODAY'S HIGHLIGHTS

Mentoring Breakfast
08:30-09:30, Students' Lounge

IRT: Building an IR career
10:00-11:00, Room 114

ETF Short Talks
11:45-12:45, News on Stage area

Students' Evening
20:30 at Slow Barcelona (Carrer de París, 186) –
Don't forget to bring your badge!



Join us for a meet & greet with CVIR Endovascular's Editor-in-Chief

CIRSE's journal publishing research in the field of endovascular therapy.

Stop by the journal's booth for a chat with Prof. Jim Reekers!
Today, September 8 at 13:00 – 14:00

The CVIR Endovascular booth is located in the exhibition hall, outside Auditorium 2.

www.cvirendovascular.org

CIRSE academy

Which CIRSE Academy course is depicted in the anagram below?

KOREST

Email the answer to **academy@cirse.org** by Thursday, September 12 for your chance to win a free CIRSE Academy course!

SOLVE THE CASE

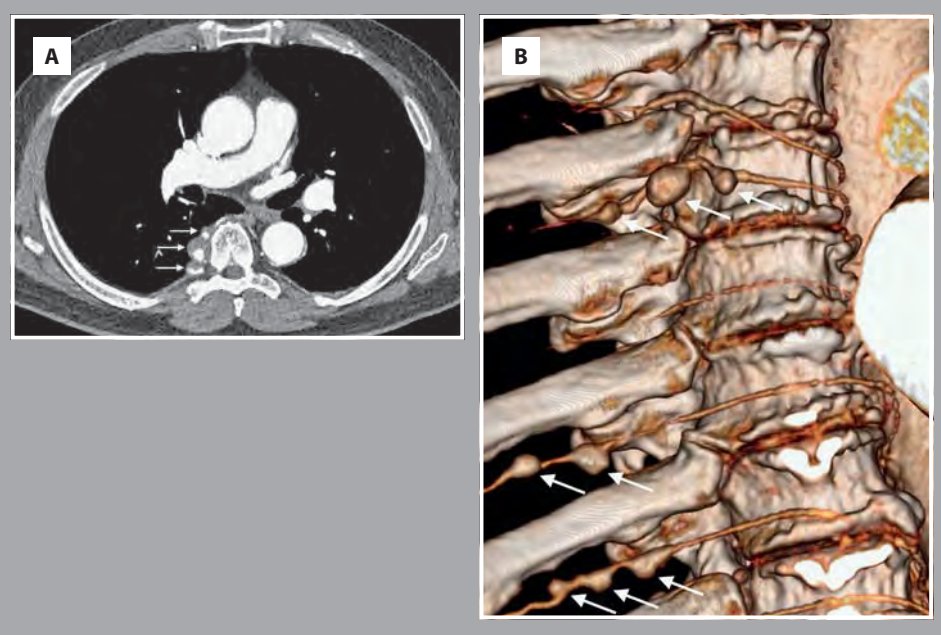
and win a ticket to the CIRSE Farewell Party!

Send your answer to info@cvirendovascular.org by 17:00 today to be in with the chance of winning a ticket to the CIRSE Farewell Party.

Find out more at **www.cvirendovascular.org**

CVIR ENDOVASCULAR

These images come from an article in CVIR Endovascular.
What is this case about?



RPP Crossword Answers (p.7)
Across: 4. annual; 6. gloves; 8. decreases; 9. skin
Down: 1. horizontal; 2. index; 3. goggles; 5. cataracts; 7. legs; 10. kvP

IR Congress News is published as an additional source of information for all CIRSE 2019 participants. The articles and advertorials in this newspaper reflect the authors' opinions. CIRSE does not accept any responsibility regarding their content.

Editors-in-Chief: *Fabrizio Fanelli and Thomas Kroencke*
Editorial Team: *CIRSE Office (publications@cirse.org)*
Graphics/Artwork: *LO O P. E N T E R P R I S E S media / www.loop-enterprises.com*

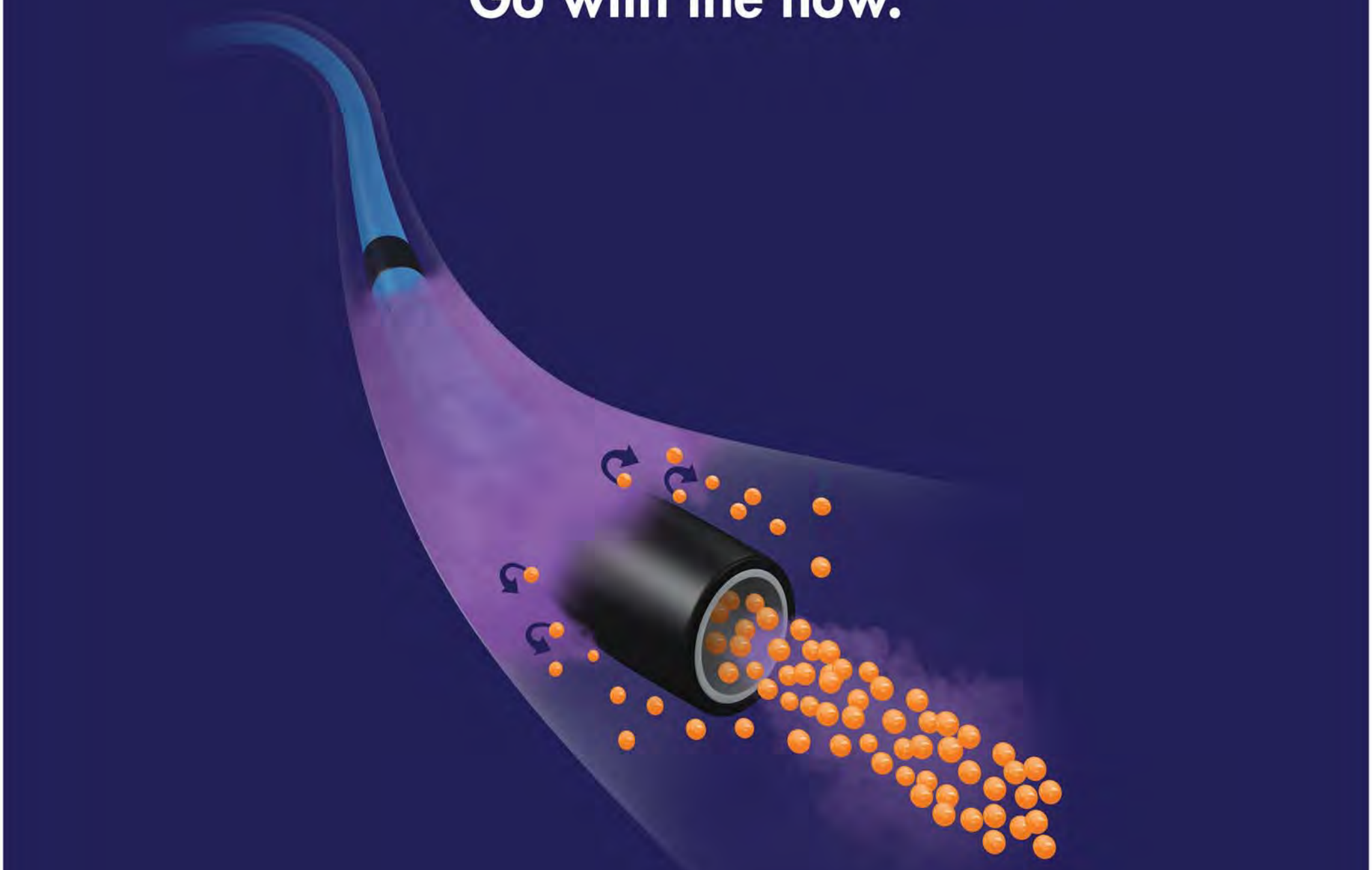
CIRSE

SEQURE®

Reflux Control Microcatheter

NOW CE MARKED

Reduce microspheres reflux[1].
Go with the flow.



Flow dynamics based technology. Contrast media fluid barrier.

Guerbet

P19 081 SEQ – June 2019 - Photo: Guerbet

1. Vessel Flow Dynamic Indication (Beads Reflux) Bench Test report TR-002.

SEQURE® is a class IIb medical device intended for use by interventional radiologists and interventional oncologists for the infusion of contrast media into all peripheral vessels and for drug infusion in intra-arterial therapy, and infusion of embolic materials. They should not be used in cerebral vessels. For complete information about precautions and optimal usage conditions for these medical devices, we recommend consulting the instructions for use supplied with each device or with your local Guerbet representative(s). Information for use only in countries with applicable health authority registrations. Notified Body: MedCert 0482. Manufacturer: Accurate Medical Therapeutics Ltd. EC Rep: Guerbet. Document creation date: May 2019. SEQURE® is a registered trademark of Guerbet Group or its affiliates.

IR congress news

New Product Launches CIRSE 2019

The CIRSE Annual Meeting has become the number one platform for minimally invasive image-guided procedures worldwide. Every year, key players in the field choose CIRSE to launch their innovative new products.

To find out more about the products being officially launched during CIRSE 2019, please visit the company booths in the Exhibition Hall. You will find a detailed floor plan overleaf! A full list of exhibitors and a floor plan can be found in your pocket guide, as well as via the CIRSE app.

Cardiovascular and Interventional Radiological Society of Europe

CIRSE

I

Cordis

MYNX CONTROL™ Vascular Closure Device: SECURE EXTRAVASCULAR CLOSURE

MYNX CONTROL™ VCD provides active extravascular sealing and resorbability properties with a next-generation delivery system to maximize predictability, safety, and ease of use in sealing 5-7F femoral arterial access sites.

Featuring:

- A next-generation deployment system designed for predictability and ease of use with a 2-button design to simplify procedural steps
- A sheath catch that is compatible with the procedural sheath
- A tension indicator that provides visual confirmation of device position for proper sealant deployment
- Available in 5F as well as 6/7F sizes

MYNX™ VCD has been clinically proven to reduce surgical complications, expedite recovery, shorten hospital stays, and increase patient comfort [1-5].

Visit Cordis at booth #52 to learn more!

1 Pruski MJ Jr et al. MynxGrip for closure of antegrade puncture after peripheral interventions with same-day discharge. Vasc Endovasc Surg. 2017 Feb;51(2):67-71.
2 Baker NC et al. Active versus passive anchoring vascular closure devices following percutaneous coronary intervention: a safety and efficacy comparative analysis. J Interv Cardiol. 2016 Feb; 29(1): 108-112.
3 Hutchings D et al. Success, safety, and efficacy of the Mynx femoral closure device in a real-world cohort: single-center experience. J Invasive Cardiol. 2016 Mar;28(3):104-108.
4 Noor S et al. Successful reduction of surgeries secondary to arterial access site complications: a retrospective review at a single center with an extravascular closure device. Vasc Endovascular Surg. 2010 Jul;44(5):345-349.
5 Fargen KM et al. A prospective randomized single-blind trial of patient comfort following vessel closure: extravascular synthetic sealant closure provides less pain than a self-tightening suture

II

Philips Image Guided Therapy

See clearly. Treat optimally.

Philips Azurion with FlexArm – the advanced suite that works around you. Philips Azurion 7 C20 with FlexArm is a revolutionary new approach to image-guided therapy, giving you the freedom to improve and grow your minimally invasive care.

This new ceiling-mounted system provides unlimited imaging flexibility for interventional radiology procedures, and exceptional positioning freedom for medical teams. All of this in a compact set-up, providing a highly cost-effective environment ready for the procedures of the future. By working around you, Philips Azurion with FlexArm helps optimize your suite performance, so you can deliver superior care.

Stop by the Philips booth to discover how Azurion with FlexArm empowers you to deliver better clinical outcomes in interventional radiology with:

- **SmartPerfusion** – perfusion imaging technology that provides you with an objective understanding of the impact of your patients' treatment, helping you determine the outcome of CLI procedures.
- **Philips Devices** – offering the world's first dedicated BTK IVUS platform to complement crossing solutions, atherectomy, drug-coated balloons and existing intravascular imaging (IVUS), for peripheral vascular, aorta, and deep venous procedures.

Join us at booth #3 and attend our Lunch Symposium on September 7th in Auditorium 2 (13:00 to 14:00) to discover more about FlexArm, SmartPerfusion, IVUS and many more.
www.philips.com/flexarm

III

Siemens Healthineers

Transforming care delivery in image-guided therapy

Minimally invasive interventions hold a vast potential for growth and innovation: the ARTIS icono family was designed to help you realize that potential.

Multi-disciplinary usage between different clinical specialties and procedural intelligence for efficient workflows will allow to transform care delivery and expand precision medicine. Optimize your clinical operations with Case Flows, a sequence of system settings matching the diagnostic steps and treatment path.

For an extraordinary visibility of details regardless of patient size and C-arm angulation, ARTIS icono features OPTIQ, a novel CNR-based image chain. Driven by intelligent, self-adjusting algorithms, it results in constant image quality independent of angulation. ARTIS icono allows you to fully focus on the procedure.

ARTIS icono. An icon of innovation.

siemens-healthineers.com/artis-icono

The ARTIS icono system and its features are not commercially available in all countries.
Future availability cannot be guaranteed.

IV

Terumo Interventional Systems

MEDSPHERE

MEDSPHERE is a complete Radiofrequency Ablation System that allows the physician to ablate soft tissue in organs such as Liver, Kidney, Lung, Thyroid, as well as bone (osteoid osteoma). The system can be used with or without cooling system.

The versatility of MEDPSHERE can expand RFA ablation options, supporting the physician in choosing the best solution to approach each lesion and organ.

In fact, MEDSPHERE offers a wide range of treatment options:

- Two ablation modalities: Power Mode and Temperature mode
- Two electrode shapes: retractable Umbrella electrodes and Straight Cooled electrodes
- Various Gauges: 15G and 17G for Umbrella electrodes; 16G, 17G, 18G and 19G for straight cooled electrodes.
- Various sizes: umbrella diameters 2cm, 3cm, 4cm, active tips from 5mm, 10mm, 15mm, 20mm, 30mm.
- Various lengths: 7cm, 10cm, 15cm, 20cm, 25cm

All electrodes have a detachable cable, for an easy positioning and management during CT operations.

An intelligent protection mechanism stops RF delivery in case of malfunctioning.

V

Terumo Interventional Systems

QuiremScout®

QuiremScout® is the first and only CE-marked SIRT work-up product that utilizes the same technology as the therapeutic microspheres which aims to optimize patient selection and advance treatment planning

QuiremScout® has been shown to be more accurate than the commonly used surrogate 99mTc-MAA at predicting lung shunting[1] and intrahepatic distribution[2]

It has also been proven to be clinically safe in a population of 82 patients[3]

1 Elschot et al. 2014 EJNMMI
2 Dassen et al, 2018 CIRSE Abstract
3 Braat et al, 2017 Eur Rad

Floor Plan

Discover more about these exciting new products:
visit the company booths in the Exhibition Hall!

Links to the company websites can be found on the CIRSE website, www.cirse.org, or via the CIRSE app.