IR congress news

CIRSE 2019 – Barcelona
Tuesday, September 10, 2019

As the congress draws to a close, it's time to start looking forward to our next meeting, which will take place right in the heart of Europe. Munich, the "cosmopolitan city with a heart", last hosted us in 2011, and offered far more than the spectacular Oktoberfest for which it is famous: easily accessible for all by car, train and plane, the expansive city is also serviced by an extensive transport network, as well as several thousand taxis.

This efficiency is set against a backdrop of architectural beauty, rich cultural institutes and famous cuisine.
With this and its fame for technological prowess, the locals would be perhaps justified in feeling superior; and yet Munich is famous for its laid-back atmosphere and friendly charm.
This will no doubt set the scene for open and enthusiastic exchange at CIRSE 2020! But before then, we invite you to make the most of your last day and a half in Barcelona – there is still much to explore!

Pathways & Challenges in IO

Govindarajan Narayanan

Don't miss it !
Josef Roesch Lecture
Honorary Lecture
Tuesday, September 10, 14:30-15:00
Auditorium 1

Interventional oncology (IO) has evolved into its own subspecialty in IR and the fourth pillar in cancer care. Locoregional treatments in oncology have grown from a last resort treatment option to becoming the standard of care for some cancers. This growth has its own set of challenges and successes.

Standardisation

IO has seen major advances in two main forms of locoregional treatments: ablation and embolisation. Alcohol ablation led the way to RFA, microwave, cryoablation and irreversible electroporation. Transarterial chemoembolisation was followed by drug-eluting embolics and selective internal radiation therapy. Combination treatments using some of the ablation and arterial treatments are also used. However, the variations in regional practices make it challenging to combine our experiences and come up with large data pools that could help us draw meaningful conclusions in a timely fashion. A Whipple procedure is done the same way in any part of the world; contrast that with a TACE procedure where you can have variations even within the s ame institution.

Data acquisition

Many IO technologies receive regulatory approvals without a specific indication, and consequently are used in an off-label fashion. As clinical adoption and data evolve, some of them have received specific indications; however, this process can take years. Insurance reimbursement for IO procedures usually requires an indication for a particular type of cancer with reimbursement codes, which in turn requires data from trials. Lack of data has insurance providers dismissing promising technologies as experimental, leading to scant usage or even an early demise of some of them.

In the past, adoption of new IO technology was based mostly on anecdotal evidence, case series or retrospective studies. A few randomised controlled trials (RCT) were completed, but none in the scope or size of medical oncology trials. Today, getting an IO trial off the ground requires a tremendous effort and investment, and once a trial is up and running, it tends to have some unique challenges. While a medical oncology trial will not have trouble recruiting patients, since they are primarily managed by them, the interventional oncologist has to rely on the primary oncology specialists for referrals, which can slow the accruals in the study. Outcomes in device trials have a significant component of operator experience, which is not the case in medical oncology trials, where usually one drug is being tested against the drug that is the current standard of care.

Pace of change

The introduction of new and improved versions of existing technologies at break-neck speed takes away our ability to study them in a meaningful fashion and produce robust data. Finally, the treatment costs have also been a stumbling block to global adoption. Other specialties that deal with the oncology patient have also had significant improvements. Robotic surgery, combination chemotherapy and checkpoint inhibitors in medical oncology, advances in immuno-oncology, MR Linac and Iroton-beam therapy in radiation oncology all have the potential to revolutionise the way cancer is managed.

Finding time for clinical work

While the clinical model has been widely accepted, explaining the value proposition and setting up one can be a daunting task. The time spent in tumour boards has no reimbursement and the time spent in the clinic tends to have low to poor reimbursement compared to time spent in the lab. With the added pressure to read diagnostic imaging studies in between procedures, the desire of an IR to participate in several tumour boards can be impacted negatively.

Possible solutions

So how does IO compete with these challenges, stay relevant and make progress? Embracing the clinical model and being a part of multidisciplinary tumour boards is a start. Collaborations with other specialists to find treatment synergies and improve outcomes will help broaden the spectrum of treatment

Govindarajan Narayanan
Miami Cancer Institute
Miami, Florida, USA

Raj Narayanan studied medicine at the Medical College and Government General Hospital in Chennai, India and thereafter participated in residency programmes at New York Methodist Hospital and Memorial Sloan Kettering Cancer Center as well as fellowships at MUSC-Charleston and Stony Brook University Hospital. Dr. Narayanan is currently an interventional radiologist and the acting chief of interventional oncology at the Miami Cancer Institute. He is also the founder and active programme chair at SYNERGY, an annual conference that is the only interventional oncology meeting endorsed by the American Society of Medical Oncology. As a prominent researcher and presenter, he has received two SIR awards and is CIRSE 2019's distinguished Roesch Lecturer.

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options. Exciting new signals from bench studies regarding abscopal effects and immune modulation following ablations open new avenues for research and clinical applications. Virtual reality and artifical intelligence are adding new dimensions to our field.

Standardising protocols and recording outcome measures for the care we deliver will be key in not only demonstrating our ability to all the health care players, but also in having the data to back up the claims. Well-planned registries right from when a technology is introduced will allow us to collect more data points to understand capabilities, pitfalls and outcomes. Positive RCTs will pave the way for approvals for specific indications and move IO treatments into national treatment guidelines.

We still remain a relatively undiscovered jewel to many of our potential patients and reaching out through all available channels to propagate the information about IO is critical. Our societies have helped create mentorship programmes for medical students, and being an IR/IO mentor is necessary for the continued success of these programmes.

More procedures are being shifted to the outpatient centres, and several of our treatments can be performed safely in an outpatient setting, which helps reduce costs while improving patient comfort and convenience. Medicine is moving towards precise, cutting-edge, minimally invasive treatment solutions with good outcomes, less morbidity and shorter hospital stays. Interventional oncology delivers just that. The future of IO is truly bright.

Haematuria

Christian Scheurig-Muenkler, EBIR

Modern radiological imaging plays a central role in the diagnostic work-up of the various possible causes of haematuria, while the great majority of affected patients will afterwards not be treated by interventional radiologists. But nevertheless, there are certain indications for embolotherapy, ranging from palliative to acute life-saving, which are important to know.

The invisible microscopic haematuria is distinguished from the more concerning macroscopic haematuria with visible discoloration of the urine, ranging from as little as 1 ml blood in 1,000 ml urine up to a massive and possibly life-threatening haemorrhage with urinary tract tamponade. The usually asymptomatic microscopic haematuria has a worldwide prevalence ranging from 2-31%, in Europe usually around 5%. However, a high sensitivity of urine dipstick tests not distinguishing between pathologic haematuria and transient physiological erythrocyturia, mild myoglobinuria after physical exercise and bacterial contamination cause a high number of false positives.

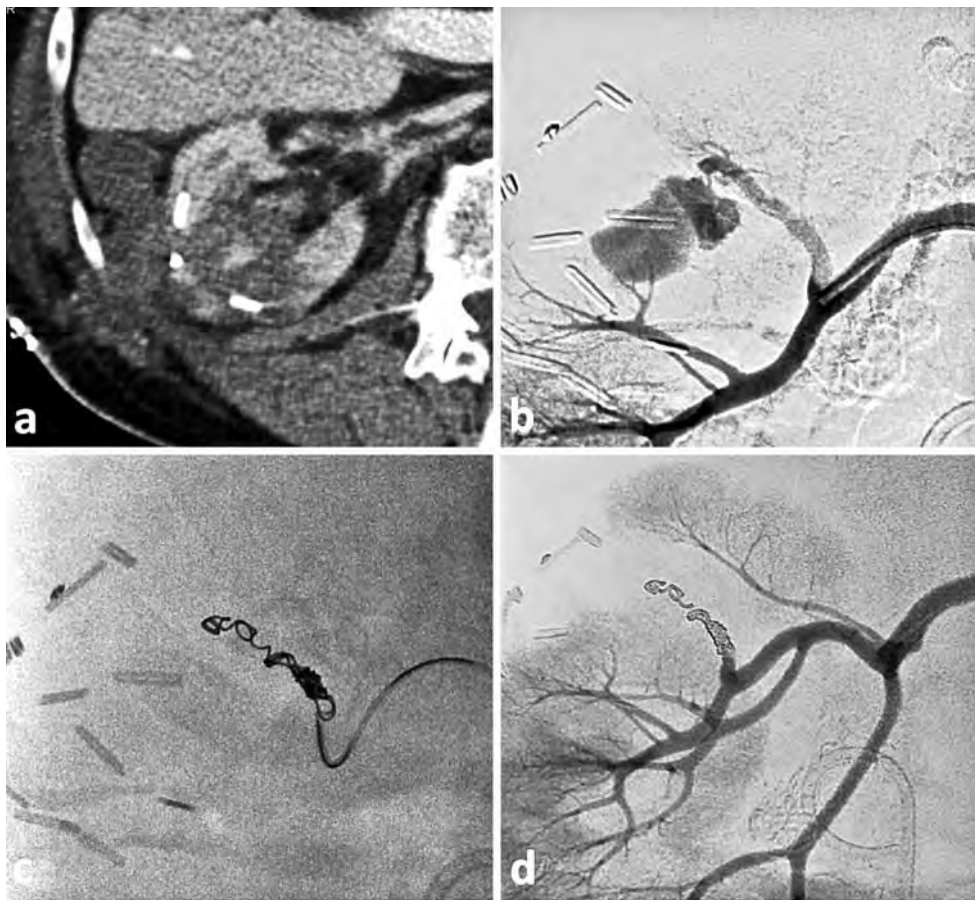

Fig. 1: Male patient with intermittent severe macroscopic haematuria following partial tumour nephrectomy on the right side. Axial CT (a) showing the haemorrhagic defect in the upper third of the right kidney. Invasive angiography (b) revealing a massive bleed from a large side-branch of the renal artery, which was successfully occluded using six microcoils (c) with no further bleeding in the completion angiography (d) and during follow-up.

Thus, up to two thirds of cases of initially diagnosed microscopic haematuria remain unresolved. The remaining cases can usually be assigned to a urinary tract infection (4-22%), a bleed from the prostate in the setting of benign prostatic hyperplasia (10-13%), a urinary tract stone (5%), bladder cancer (3%), renal cystic disease (2-3%) or a glomerular nephropathy (2%; e.g. IgA-nephropathy, thin basement membrane nephropathy, Alport-syndrome, post-infectious glomerulonephritis, mesangioproliferative glomerulonephritis). With a prevalence of less than 1%, renal cell cancer and prostate cancer each play a minor role as a differential diagnosis in microscopic haematuria. With ultrasound, computed and magnetic resonance tomography as well as modern fusion imaging techniques, diagnostic radiology provides a variety of imaging methods for the elective diagnostic clarification and targeted biopsy. With the exception of prostatic artery embolisation in the treatment of symptomatic benign prostatic hyperplasia as a possible cause for microscopic as well as macroscopic haematuria, interventional radiological therapies play a minor role in causal treatment of microscopic haematuria.

At first sight, the differential diagnoses in patients presenting with macroscopic haematuria don't differ too much from those in microscopic haematuria; however, the higher likelihood of malignancy and the possible life-threatening course increase the importance in clinical practice. In up to 50% of cases of macroscopic haematuria, diagnosis remains unclear. However, as in patients with microscopic haematuria, malignancies of the kidney, the urothelium or the prostate are much more likely and, according to the literature, are found in up to 19-30% of cases and demand thorough clarification. Further causes of macroscopic haematuria are diverse and include benign tumours, such as angiomyolipomas and oncocytomas, urinary tract stones and strictures, infections, renal infarction, renal vein thrombosis, trauma, glomerular nephropathies and iatrogenic

Don't miss it !

Urinary tract embolisation
Focus Session
Tuesday, September 10, 08:30-09:30
Room 116

Christian Scheurig-Muenkler
(EBIR)
University Clinic Augsburg
Augsburg, Germany

Dr. Scheurig-Muenkler started his career as radiologist at the renowned Charité-Universitaetsmedizin Berlin with early specialization in IR. In 2013 he achieved the EBIR certificate and in the same year completed his postdoctoral thesis entitled "uterine artery embolization in the treatment of symptomatic uterine myomas and adenomyosis" before moving to Augsburg in 2015 to become the executive senior consultant and deputy chairman of the Clinic for Diagnostic and Interventional Radiology at the newly established University Clinic Augsburg. In 2017 he completed his postgraduate studies on health business administrations (MHBA). His current fields of research are local tumor therapy, emergency embolization and peripheral artery disease.

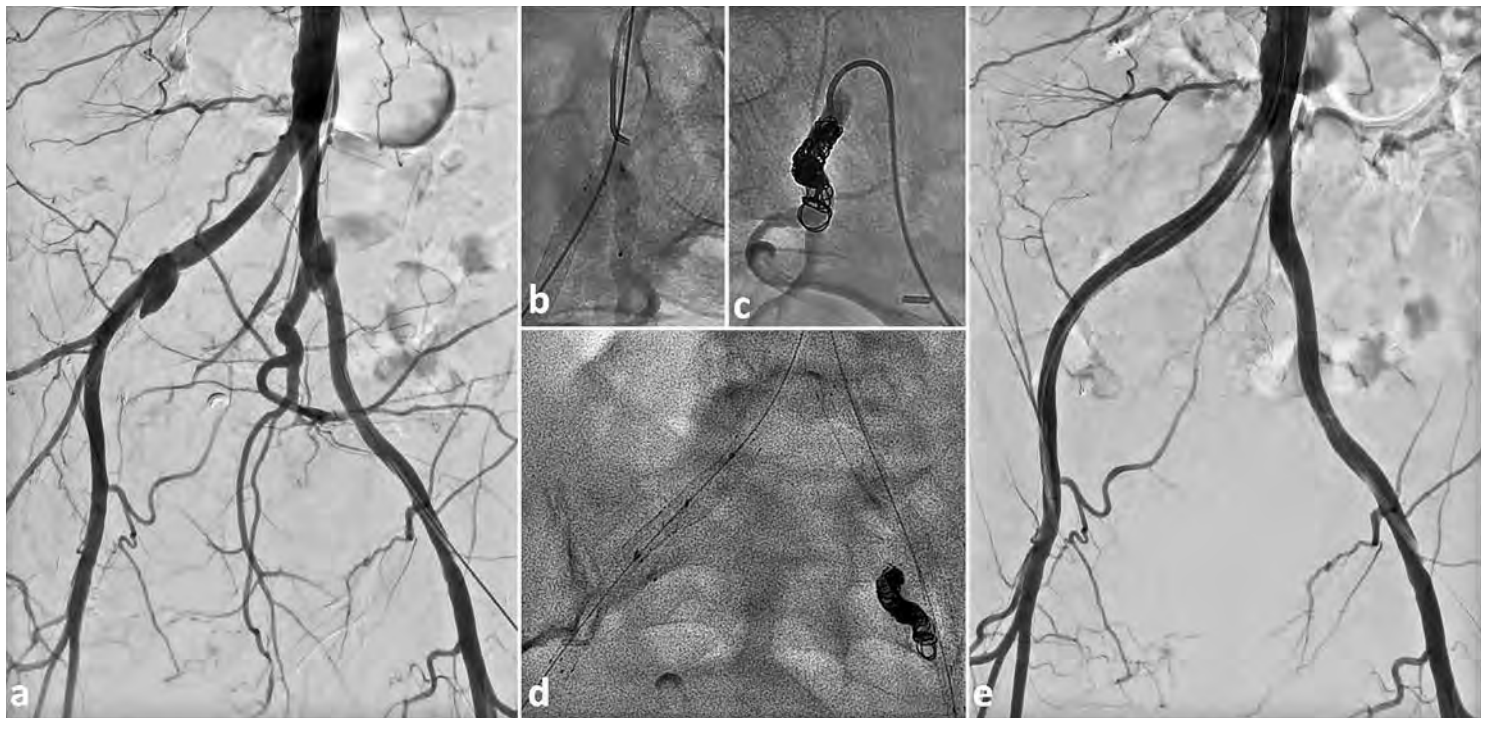

Fig. 2: Female patient with cervical carcinoma after pelvic surgery and radiation therapy in combination with long-time bilateral ureteral stenting presenting with repeated episodes of gross haematuria with consecutive bladder tamponade. Pelvic angiography (a) revealing bilateral large pseudoaeurysms of the iliac arteries at the crossing points of the ureters close to the iliac bifurcations. Occlusion of the right hypogastric artery using an Amplatzer vascular plug (b) and the left hypogastric arteries using pushable macrocoils (0.035 inch coils), (c) to prevent retrograde perfusion of the affected vessel segments. Liberal lining of the iliac arteries using long Gore Viabahn Endoprostheses (d) with angiographically (e) and clinically successful cessation of bleeding.

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causes, e.g. following biopsies, renal-preserving surgery, catheterisation, radiation therapy or extracorporeal shockwave lithotripsy.

Patients under oral anticoagulation within therapeutic range face no higher risk for haematuria than other patients and therefore require the same diagnostic work-up. This starts after positive urine dipstick with urine microscopy and culture to rule out possible infectious causes of haematuria, which should be treated empirically. Additional urine cytology may show malignant cells with the highest sensitivity for lower urinary tract tumours. However, a normal cytology does not exclude a malignancy, which is why it is usually used as an adjunct to routinely performed cystoscopy only. Computed tomography, including low-dose non-enhanced acquisitions as well as multi-phasic protocols including a late-phase urography, is given a key role in the process of diagnostic clarification.

Regarding the topic of this focus session, the following three groups of indications for embolisation therapy can be highlighted as the most important ones to be kept in mind.

Each group thereby reflects a different endovascular treatment strategy.

I) Haematuria following trauma, partial nephrectomy and biopsy

Renal trauma is usually blunt trauma following motor vehicle accidents and falls. Gunshot and stab wounds causing penetrating trauma of the kidneys are less frequent. Both blunt and penetrating trauma are currently managed non-operatively when haemodynamically stable, with angioembolisation in case of active bleeding as an adjunct. Bleeding from the urethra or the prostate after pelvic trauma is rare but can also be addressed by super-selective angioembolisation in the acute trauma management. Partial nephrectomies, biopsies as well as penetrating trauma of the kidneys may lead to relevant injury of renal vessels with parenchymal pseudoaneurysm, vessel truncations or AV fistulas causing intermittent bleeding and thus haematuria. All these pathologies can be safely and effectively treated by super-selective angioembolisation, predominantly with the use of microcoils, but also particles or glue.

II) Massive haematuria as a late complication after pelvic surgery and pelvic radiation therapy (usually in combination with chronic ureteral stenting)

With about 100 cases described in the literature, it is not highly frequent; however, due to the potentially life-threatening magnitude of bleeding it has to be highlighted when talking about haematuria. Fistulas can occur uni- or bilaterally, usually along the course of the common iliac arteries close to the iliac bifurcation at the crossover of the ureter. Active bleeding from the arteries into the ureter can hardly ever be documented and also relevant alterations of the vessel walls, like the usual pseudoaneurysm, may be subtle on computed tomography angiography and invasive angiography. For a good technical and durable clinical result, it is of great importance to liberally cover the iliac arteries over a long distance with stent grafts, usually after prior embolisation of the internal iliac (aka hypogastric) artery using coils or vascular plugs to prevent retrograde filling of presumably excluded pseudoaneurysm.

III) Haematuria in connection with benign and malignant tumours

These include angiomyolipomas and oncocytomas, but also renal cell carcinomas, which may be embolised with palliative intent or pre-operatively in large hypervascular tumour burden. A benign prostatic hyperplasia causing lower urinary tract symptoms and concomitant haematuria as well as an actively bleeding prostatic cancer previously treated with radiotherapy can effectively be addressed with prostatic artery embolisation. Tumour embolisation is mainly realised with the use of particles and, in certain situations, glue.

In conclusion, diagnostic radiology plays a key role in the diagnostic work-up of patients with haematuria, both microscopic and macroscopic. In addition, interventional radiology can effectively and safely treat various causes of debilitating and potentially life-threatening haematuria.

Further reading

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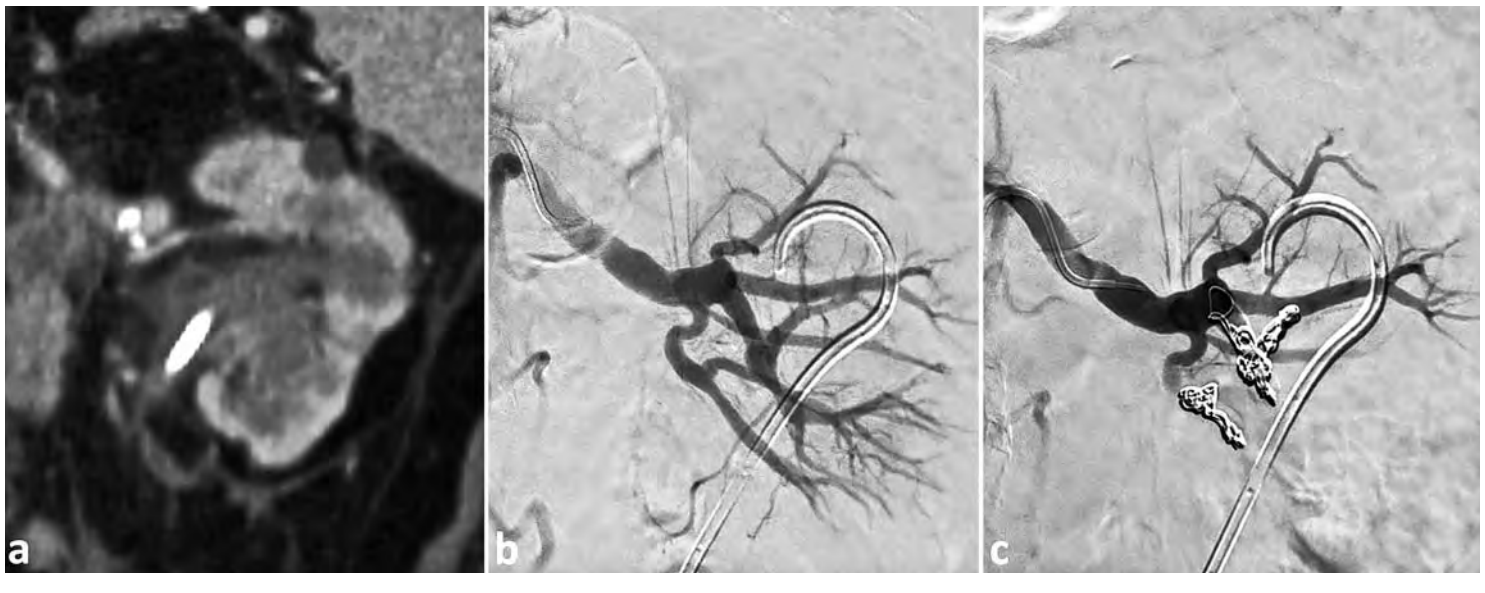

Fig. 3: Male patient with repetitive macroscopic haematuria and chronic anaemia caused by a renal pelvis tumour on the left side. (a) Coronal CT view of the typically hypoperfused tumour in the lower and mid-third of the left kidney. Invasive angiography showing no remarkable tumoir enhancement (b). Complete devascularisation of the tumour-feeding arteries of the lower and mid-third of the left kidney using PVA-particles and additional microcoils (c) with successful termination of haematuria and stabilisation of the haemoglobin level.

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
TUE SEPT 10	11:00 – 11:15	The value of Medical simulation in management of patient and staff exposure	G. Bartal *(Kfar-Saba/IL)*
	11:15 – 11:30	Stereotactic navigation enables highly accurate, CT-guided ablation without radiation exposure for clinicians	M. Peterhans *(Bern/CH)*
	13:00 – 13:15	Radiation exposure using radial vs. femoral vs. brachial access	E. Brountzos *(Athens/GR)*
	13:30 – 13:45	Online resources of ESR dealing with radiation protection (Eurosafe Imaging)	W. Jaschke *(Innsbruck/AT)*

Radiation Protection Quiz

Don't forget to test your radiation protection skills with our electronic quiz, which you can fill out via the CIRSE app!

Cardiovascular and Interventional Radiological Society of Europe

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.

Tuesday, September 10, 13:15-14:15, News on Stage Area

News on Stage: From science to practice

Moderators: Y. Arai (Tokyo/JP), M.D. Darcy (St. Louis, MO/US)

2802.1 Perfusion imaging with 320-slice spiral computed tomography and color-coded digital subtraction angiography for assessing acute skeletal muscle ischemia-reperfusion injury in a rabbit model
C. Li; Guangzhou/CN

2802.2 Radiation exposure during transarterial chemoembolization: angio-CT versus cone-beam CT
L. Piron[1], J. Le Roy[1], C. Cassinotto[1], J. Delicque[1], A. Belgour[1], C. Allimant[1], J.-P. Beregi[2], J. Greffier[2], N. Molinari[1], B. Guiu[1]; [1]Montpellier/FR, [2]Nîmes/FR

2802.3 A randomized and controlled study comparing patient controlled and radiologist controlled intra-procedural conscious sedation, using midazolam and fentanyl, for patients undergoing insertion of a central venous line
W. Clements[1], D. Sneddon[1], H. Kavnoudias[1], T. Joseph[1], G.S. Goh[1], J. Koukounaras[1], T.M. Snow[2]; [1]Melbourne, VIC/AU, [2]Brisbane, QLD/AU

2802.4 Left distal Percutaneous Radial hEmostasis using a Truncated dEflation Algorithm; ldPROTEA: safety and nursing impact assessment
D. Klass, L. Cardarelli-Leite, A. Hadjivassiliou, J. Chung, D.M. Liu, S. Ho; Vancouver, BC/CA

2802.5 Women in interventional radiology: Australia's gender gap
M. Foo[1], J. Maingard[2], M. Wang[1], K. Phan[3], R. Lim[4], H.K. Kok[5], R. Chandra[2], M.J. Lee[6], H. Asadi[2], M. Brooks[1]; [1]Heidelberg, VIC/AU, [2]Clayton, VIC/AU, [3]Liverpool, NSW/AU, [4]Frankston, VIC/AU, [5]Melbourne, VIC/AU, [6]Dublin/IE

2802.6 Platform for preclinical MRI-guided focused ultrasound hyperthermia
U. Roy[1], M. Fournelle[2], S. Greiser[1], R.V. Gorkum[3], D. Speicher[2], T. Grunwald[1], S. Kozerke[3], S. Tretbar[2], L. Landgraf[1], A. Melzer[1]; [1]Leipzig/DE, [2]St. Ingbert/DE, [3]Zurich/CH

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

Experience and lessons learned in a stroke endovascular thrombectomy programme

Alexandre Menard

Since 2014, five major randomised controlled trials and associated meta-analysis have solidified endovascular mechanical thrombectomy [EVT] as the standard of care for acute stroke associated with large vessel occlusion (1-5). More recent trials have extended therapy for acute large vessel occlusion up to 24 hours from onset of symptoms [6-7].

Various societies have published standards for the delivery of this life-saving procedure. Neuro-interventional international societies have taken the lead, insisting on a one-year neuro-interventional fellowship, and bi-plane imaging to allow delivery of this time-critical procedure [8]. Other recommendations have concentrated on delivery metrics and patient outcomes [9]. Unfortunately, there is a lack of formal training objectives, and vague and inconsistent performance targets.

The delivery of EVT in Canada is geographically challenging. The geographic expense of Canada is twice the size of Europe (9.985 km^2 vs 4.476 km^2). Canada's population is much smaller, spreading a population comparable to California (37 million) into a vast territory. When compared to Europe, we are significantly less dense (29 Canadians/km^2 vs 144 Europeans/km^2). In the few years after the large EVT trials, delivery of such care was limited to approximately a dozen academic centres across Canada. Neuro-interventional radiologists and endovascular-trained neurosurgeons exclusively provided this care. This left a large segment of the population without timely access to EVT. Geographic constraints prevented the timely transfer of patients to centres with neuro-interventional radiologists.

Although neuro-interventional radiologists mostly led the EVT research and delivery, we saw an opportunity for vascular and interventional radiologists to contribute to this care. Queen's University is one of the smaller medical academic centres in Canada, centred in a town of 125,000 people, but responsible for a population of 500,000 patients scattered over a driving distance of up to 2 hours. We embarked on a structured approach to delivering this procedure safely and rapidly, with a planning stage spread over nine months.

In the first phase, we evaluated our existing resources and abilities. An audit of all interventional radiology procedures between 2005 and 2016 identified over 450 carotid/intracranial angiograms, with approximately 80 procedures (carotid stent, epistaxis embolisation, intracranial stroke tPA infusion) spread among three fellowship-trained vascular and interventional radiologists. Two on-site stroke neurologists provided excellent acute stroke care, with door-to-needle tPA infusion times consistently near 30 minutes. Our institution performs all of its angiographic procedures on two biplane machines.

In the second phase, we mapped out all elements of care delivery, through monthly meetings involving all departments that may be participating, including paramedic services, emergency, internal medicine, intensive care and anaesthesia. A common care delivery pathway was then mapped out and agreed to by all services.

Training of the interventional radiologists, interventional radiology technologists and nurses became our third area of focus. We received mentoring and one-on-one teaching from an endovascular-trained neurologist who had vast experience in EVT delivery at another Ontario academic centre. The IR team practiced the procedure on phantoms. We performed practice runs, from the emergency door, through the IR suite, to the intensive care unit, to identify possible sites of delay and confusion.

Quality measurement and continued improvement became the fourth area of focus. We instituted a novel preceptorship model. Given the low volume and unpredictable timing of acute stroke/EVT, keeping an on-site preceptor was not feasible. We utilised an existing tele-medicine network in the province of Ontario. The video feed of the angiographic suite, as well as an in-room camera, were connected to this network. This telecommunications arrangement allowed our training preceptor over 350 km away, to directly supervise and communicate with us from his institution, on a laptop, smartphone or tablet. The communication system was similar to Skype or Facetime. We labelled this method of remote precepting "tele-fluoroscopy". We believe this tool could become a crucial component of future implementation of EVT or other new time-critical interventional procedures in a safe and supervised fashion.

All participants of the first fifteen cases debriefed within 48 hours. We itemised areas for improvement, decided on action plans and wrote reports, sharing them with all care providers involved in the case. We measured performance metrics such as door-to-puncture and door-to-reperfusion times, 90-day modified Rankin score (mRs), TICI scores and 90-day mortality. We compared our metrics to all other centres in the province of Ontario that are providing EVT. Two years into our programme, we perform favourably when compared to the other centres in our province, with the fastest door-to-reperfusion times and mortality outcomes slightly better than the average in our province. We achieved these results despite having single-plane equipment, no neuro-interventional fellowships and being a junior programme.

Most societies are concentrating on fellowship training, equipment standards and volume/outcome standards for the delivery of EVT. It is the belief at our centre that the processes utilised early in the implementation, the active participation of all caregivers, the measurements of outcomes, the debriefs and the continual improvement processes are far more critical. One standardised EVT programme approach would be to delineate the implementation and continued evaluation of a programme into four stages:

1. Prep to first delivery: In this stage, the centre identifies leaders from the appropriate services. Through planning meetings, practice sessions and discussions, a clinical itemised care pathway is identified. Crucially, a team from an experienced external centre, including stroke neurologists, interventional radiologists and lead tech/nurses can participate in this stage, bringing in suggestions and lessons learned.
2. Early delivery phase: A direct supervision model is utilised to allow for safe preceptor guidance. The same team that assisted in the first phase can directly supervise the first cases with tele-fluoroscopy. Post-care debriefs can also be performed with the outside team to review possible mistakes and suggest alternative actions in future cases. A software programme can accomplish this phase without the inconvenience of travel and taking a care team away from their institution.
3. Delivery phase with indirect supervision: The external team can participate in post-case debriefs, and review the actions taken, the angiographic images and the early clinical outcomes, with performance improvement adjustments suggested.
4. Audited independent practice: An external centre team reviews metrics (door to puncture, door to reperfusion, TICI scores) and outcomes (modified Rankin score at 90 days, mortality rates), ensuring that there is an improvement plan towards the recommended society guideline metrics.

The expending techniques, improved equipment and continued research will likely result in expanded indications for EVT in acute stroke care. Given the volume of EVT procedures required, the time limitation in patient transfer and the limited number of neuro-interventional radiologists available, vascular and interventional radiologists are best suited to participate in this care. We believe that a structured approach to programme implementation, with graduated levels of supervision and continued quality improvement is essential to achieve success.

Don't miss it !
CIRSE meets CAIR
CIRSE meets…
Tuesday, September 10, 11:30-12:30
Room 113

Alexandre Menard
Kingston General Hospital
Kingston, Ontario, Canada

Dr. Alexandre Menard completed his medical studies at the University of Ottawa in 2003 before carrying out postgraduate studies and a clinical fellowship in diagnostic radiology at the University of Toronto. He is currently a radiologist specialising in diagnostic radiology at Kingston General Hospital, and is also the undergraduate programme director of the department of diagnostic radiology at the Queen's University School of Medicine in Kingston, Ontario.

References:
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5. Jovin TG, Chamorro A, Cobo E, et al. Thrombectomy within 8 hours after symptom onset in ischemic stroke. N Engl J Med 2015; 372: 2296–306.
6. Nogueira RG, Jadhav AP, Haussen DC, et al. Thrombectomy 6 to 24 hours after stroke with a mismatch between deficit and infarct. N Engl J Med 2018; 378:11-21.
7. Albers GW, Marks MP, Kemp S, et al. Thrombectomy for stroke at 6 to 16 hours with selection by perfusion imaging. N Engl J Med 2018; 378: 708-718.
8. Lavine SD, Cockroft K, Hoh B, et al. Training guidelines for endovascular ischemic stroke intervention: an international multi-society consensus document. AJNR 2016; 37:E31-E34.
9. Powers WJ, Rabinstein AA, Ackerson T, et al. 2018 Guidelines for the early management of patients with acute ischemic stroke: A guidline for healthcare professionals from the American Heart Association/ American Stroke Association. Stroke 2018; 49:e46-e99.

Find out more about IR in Canada: join us today at 11:30 for the CIRSE meets CAIR session!

Featured talks:

From CIRA to CAIR, the evolution of IR in Canada
CAIR President: R. Abraham (Halifax, NS/CA)

Endovascular stroke therapy: a Canadian perspective
M. Eesa (Calgary, AB/CA)

Experience and lessons learned in a stroke endovascular thrombectomy programme performed by IRs
A. Menard (Kingston, ON/CA)

Important Travel Notice: September 11

Please note that September 11 is Catalonia's national holiday. It may be more difficult than usual to get around the city, as public ceremonies will be going on throughout the day.

Traditional celebrations will take place throughout the morning in the area surrounding the Arc de Triomf.

Additionally, a mass demonstration will take place in the afternoon between approximately 15:30-19:00 in the Plaça d'Espanya area, including Paral·lel, Creu Coberta, Tarragona, Mª Cristina, Gran Via and Passeig de Gràcia. The flow of traffic and density of public transit in these areas and their surroundings will be significantly impacted.

The city police recommend using the ring route to more easily get around during this time. Delegates should allow ample transport time if they plan to connect to the airport on September 11.

PAE complications and management

Inigo Insausti Gorbea

Don't miss it !
Prostate artery embolisation: 360°
Focus Session
Wednesday, September 11, 08:30-09:30
Room 115

Inigo Insausti Gorbea
University Clinic of Narvarra
Pamplona, Spain

Dr. Insausti studied medicine at the Universidad del País Vasco in Leioa, Spain and primarily specialises in prostatic embolisation, however has various other specialisations. He is currently a vascular and interventional radiologist at the University Clinic of Narvarra (CUN Pamplona). With more than 12 years of comprehensive experience, Dr. Insausti teaches courses on PAE to at various workshops as well as presenting at both national and international conferences. In addition to CIRSE, he is also a member of various societies including the Spanish Society of Medical Radiology (SERAM), the European Society of Radiology (ESR) and the Spanish Society of Vascular and Interventional Radiology (SERVEI).

Prostatic artery embolisation (PAE) is emerging globally as a minimally invasive alternative to surgical therapy for the treatment of bladder outlet obstruction (BOO) caused by benign prostatic hyperplasia (BPH). As of today, the published data obtained from more than 2,000 PAE procedures has shown its efficacy in treating lower urinary symptoms (LUTS) secondary to BPH, with a favourable side effect profile and short recovery times [1]. Recently, PAE was added to the NICE guidelines as an accepted technique for the treatment of BPH [2]. Based on current evidence, these guidelines define PAE as an effective and safe technique. The procedure has certain advantages: it can be done on an outpatient basis, there is no need for urinary catheterisation, it is a painless procedure, and there are no surgical limitations (anticoagulant/anti-aggregant therapy, size of prostate, etc.). However, PAE has not yet been recognised by the European Association of Urology (EAU) nor the American Urological Association (AUA) [3,4].

To date, only three randomised clinical trials have been published comparing the efficacy and safety of PAE versus TURP for BPH [5-7]. Gao et al. [5] published the first clinical trial, and had a significantly higher percentage of complications in the PAE group in comparison to the TURP group. This clinical trial was criticised for under-reporting the complications in the TURP group and overstating the clinical outcome with PAE. The other two clinical trials, Carnevale et al. [6] and Abt et al. [7], reported a higher number of complications in the TURP group than in the PAE group, being also more serious. Russo et al. published a randomised clinical trial comparing PAE and open prostatectomy (OP) [8], with a complication rate of 31.2% in the OP group and 8.8% in the PAE group.

Complications should be graded with the modified Clavien-Dindo classification system [9], with grades I and II considered minor complications and grades III and IV considered major complications. PAE has a low complication rate, and most of these complications are not clinically significant. Major complications are rare, and only 7 major complications have been reported in 1,800 patients. Pisco et al. [10] published long-term outcomes in 630 patients with a minor complication rate of less than 10% and a major complication rate of less than 1%.

Post-embolisation syndrome (PES) is one of the most common complications after PAE, presenting as pain, irritation, temporary worsening of previous symptoms, fever, etc. It usually disappears within a week, and it should be managed with symptomatic treatment. In a recently published meta-analysis, Malling et al. [11] reported a PES rate of 3.6%.

Acute urinary retention (AUR) is caused by urethral compression due to edema, and often disappears within the first 3 days [12]. Pisco et al. reported an AUR rate of 2.4%, whereas Gao et al. [5] reported an AUR rate of 25.9%.

Non-target embolisation (NTE) is the most serious complication interventional radiologists have to deal with, but it is generally self-limiting and is resolved with conservative management. Two cases of **bladder wall ischaemia** requiring partial surgical resection have been published [7,12], and Moreira et al. [13] described in 2013 transient **ischaemic rectitis,** which was successfully treated with conservative management. Another important NTE is **ischaemic balanitis (penile ischaemia),** which usually occurs due to the presence of an accessory pudendal artery or penile anastomosis, presenting as local pain, erythema, ulcerations and sexual dysfunction. Carnevale et al. reported a case of **pubic ischaemia** observed on MRI at 3-month follow-up, but bone or skin ischaemia is rare because of their rich vascular network. Zhang et al. [14] in 2018 reported **seminal vesical abnormalities** (ischaemia and haemorrhage) observed in MRI during follow-up in 6.5% of the patients. Clinically, patients with seminal vesical haemorrhage or ischaemia usually present with haematospermia.

Transient haematuria, haematospermia and **rectal bleeding** are minor adverse events which disappear within the first week and are reported in 7.6 %, 8 %, and 5.9% of cases, respectively [10].

Ejaculatory disorders are rare after PAE, but Abt et al. [7] encountered this complication in their series in a 56% of patients. Although this is less than with TURP, it was unexpected for them, and they cannot provide an explanation for it. The UK-ROPE study reported a 24.1% rate of retrograde ejaculation after PAE, and 48% post-TURP. However, most patients in the PAE group reported that the problem had resulted from the medication and had existed prior to embolisation.

The radiation exposure of patients who underwent PAE is similar to that reported for other complex interventional procedures [15]. Laborda et al. [16] published a case of radiodermitis after PAE, necessitating 72 minutes of fluoroscopy with a dose-area product of 8,023.1Gy-cm2.

So far there has been no mortality or urinary incontinence reported after PAE.

There are some important points to consider when endeavouring to minimise post-PAE complications:

- Pre-procedural CT angiography (CTA): CTA prior to PAE delineates the arterial anatomy and possible anastomosis, and facilitates procedural planning. This results in a reduction of procedural time and radiation, as well as NTE complications.

- Use of cone-beam CT: Modern angiographic equipment with cone-beam CT is vital for the visualisation of potential non-target vessels. May be used in case of doubt, as it may occasionally show small anastomoses to the rectum or penis, better than with DSA.

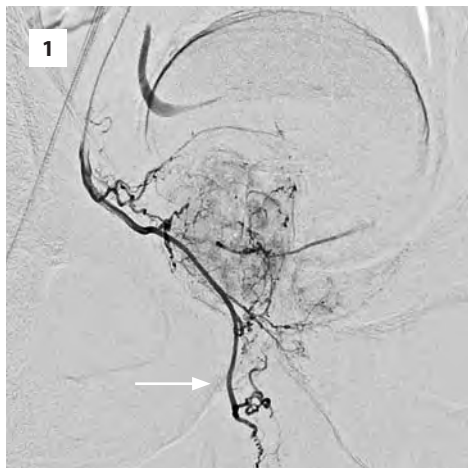
- Coil embolisation of anastomosis: We should coil-embolise the anastomosis from the prostate arteries to rectum, penis or bladder, to avoid NTE (Figs. 1 and 2).

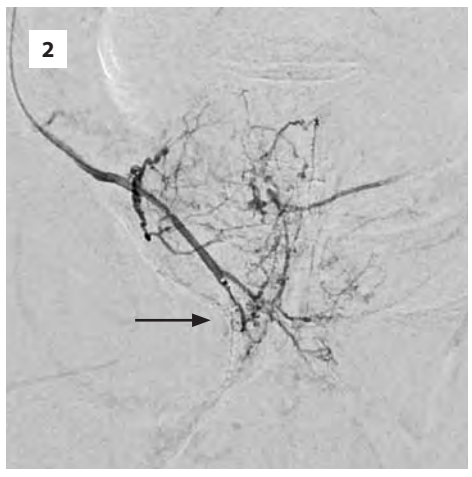
- Radiation reduction protocols: Using low-dose settings, limiting DSA runs to 1 frame/sec and fluoroscopy to 7.5 pulses/sec is advisable. An attempt to reduce the number of DSA runs and employ road mapping or superposition settings should be made.

- Training (proctorship, workshops, simulators): IRs need to be experienced in embolisation, know the pelvic arterial anatomy, have attended training courses, and be properly trained and proctored for at least 4-5 cases. The use of PAE simulators can also be helpful for training.

- Work closely with urologists: Some potential complications related to PAE may require a urologist´s assistance: non-target embolisation (bladder, penile), post-embolisation syndrome, urinary-tract infection, urinary acute retention, etc.

Case report





DSA of the right prostatic artery (Fig. 1) demonstrates an anastomosis with penile artery (white arrow). DSA after coil embolisation of the anastomosis (dark arrow) shows contrast staining of the right prostatic lobe (Fig. 2). Cone-beam CT (Fig. 3) is vital to avoid NTE.

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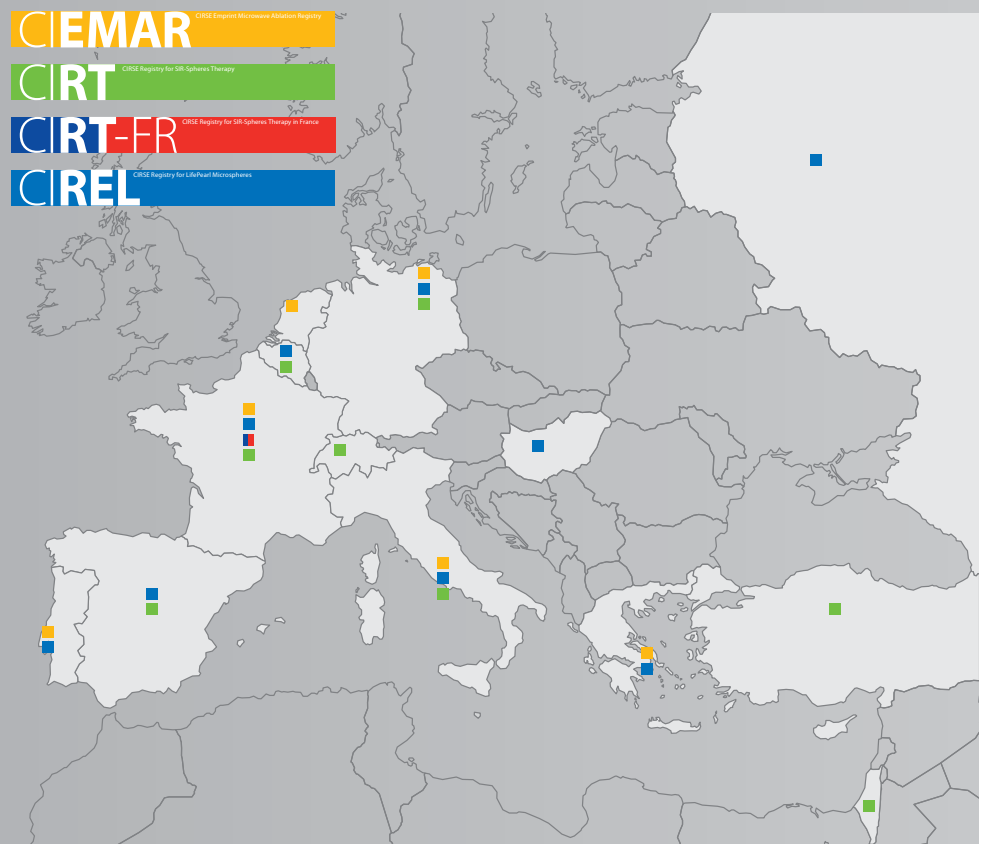
Initiative Overview



Don't miss the Morbidity & Mortality Conference tomorrow at 11:30 in Room 112

The 2019 Morbidity & Mortality Conference will analyse vascular and non-vascular IR cases which have led to complications or deaths that could have been avoided. This provides a valuable learning experience for attendees, who can benefit from the experience and insights of their colleagues, allowing them to avoid the same pitfalls.

Once presented with a case, audience members will be asked to vote on their preferred course of action – allowing you to see how you might have fared when faced with that difficult decision.

Don't miss this golden opportunity to learn from someone else's mistakes!

MM 3401 11:30-12:30
Moderators: A. Hatzidakis (Iraklion/GR), A.G. Ryan (Waterford City/IE)

Treatments in metastatic thyroid cancer

Roberto L. Cazzato

Don't miss it !
Thyroid management of nodular diseases
Focus Session
Wednesday, September 11, 10:00-11:00
Room 116

Even though the lifetime risk of developing thyroid carcinoma (TC) is less than 1%, its incidence has almost tri¬pled within the last few decades [1]; this is thought to be mostly due to the increased detection rate of TC offered by the large use of high-resolution ultrasonography.

TCs can be categorised by histotype, with the papillary (PTC) and the follicular (FTC) ones representing 90% of all TCs [2]. PTC and FTC share the same therapeutic strategies and have similar prognoses; for this reason, they are categorised within the same group known as differentiated thyroid carcinoma (DTC). The medullary TC (MTC) represents the third most common histotype.

According to the American Thyroid Association (ATA) guidelines [3], total thyroidectomy with or without subsequent remnant ablation with radioiodine therapy (RIT) is adequate to control the disease in 90% of patients presenting with a DTC; however, the remaining 10% of patients will develop a metastatic disease (especially affecting lung, liver and bones), thus needing further treatments including interventional radiological ones. In fact, in the setting of TC metastatic disease, the ATA guidelines [3] recommend local treatments including IR ones in two different scenarios:

- Prior to systemic treatments when a distant metastasis is symptomatic or at high risk of local complication;
- In case of a solitary metastatic lesion exhibiting an evolution despite systemic therapy.

Notwithstanding these relatively simple indications, therapeutic decision-making is often challenging due to the rarity, complexity and diversity of the real-life clinical scenario. Therefore, treatment selection often takes place following a deep per-case analysis performed by multi-disciplinary tumour boards in tertiary referral centres. Several factors are taken into consideration by the tumour board before referring the metastatic patient for treatment; these factors include the evaluation of the metastatic burden, its location and the associated cohort of symptoms, as well as the assessment of tumour sensibility to the RIT, 18-FDG uptake, patients' life expectancy, systemic disease progression rate, and local availability of physicians able to perform the treatment. Once the need for an interventional treatment and its purpose is established, the interventional radiologist in charge of such treatment may choose one or more percutaneous techniques including transarterial embolisation (TAE), percutaneous ablation and bone consolidation performed through percutaneous osteoplasty and osteosynthesis [4]. Although these techniques have long been widely applied in the field of interventional oncology, a substantial lack of experience exists with these techniques in the specific setting of metastatic TC. Therefore, current practice is still somehow empirical, derived from experiences achieved with other tumour histotypes or from a few small retrospective case series dedicated to metastatic TCs.

Nevertheless, there are some specific metastatic TC scenarios that may be reasonably suitable for interventional treatments. In fact, a slow-evolving, macro-nodular (< 3 cm) lung disease [5] may reasonably benefit from percutaneous ablation performed with a curative intent. Similarly, percutaneous ablation may be proposed in oligometastatic small-sized liver disease. On the contrary, in the case of diffuse liver disease, lipiodol-doxorubicin TAE has been proposed with promising results [6]. Concerning metastatic bone disease, a more extensive literature is available as compared to that regarding the lung and the liver; and such literature has highlighted that all the available interventional techniques may be applied alone or in combination with other treatments in patients with metastatic bone disease [4]. In particular, TAE has been largely applied for the treatment of painful bone metastases, and good clinical results in terms of symptomatic control and serum tireoglobulin decrease were noted, especially when TAE was combined with radiation therapy, surgery and RIT [7,8]. On the other hand, bone consolidation has also been largely applied to treat the weakened, often lytic, metastatic bone with good clinical results reported [4].

In conclusion, the metastatic disease from TC represents a rare but complex clinical scenario, often requiring a deep per-case analysis in multi-disciplinary tumour boards from tertiary referral centres. Direct localised treatments including interventional radiology procedures may play a key role in providing a timely palliative or curative treatment in accordance with patients' clinical status. However, due to the substantial lack of data validating the interventional therapies in the specific setting of metastatic TC disease, dedicated prospective series are desirable to establish the exact role of interventional therapies with particular regard to percutaneous ablation applied with a curative intent in oligo-metastatic patients.

Roberto L. Cazzato
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Roberto Luigi Cazzato studied medicine at the Universita Campus Bio-Medico di Roma and received training at the same University as well as at the Institute Bergonie in Bordeaux, France. Dr. Cazzato is currently an Associate Professor of Radiology in the Department of Interventional Radiology at Nouvel Hôpital Civil in Strasbourg, France and his primary research interest is non-vascular oncologic procedures. In his young yet impressive career, Dr. Cazzato has already authored or co-authored many published papers and is currently the section editor for the International Journal of Hyperthermia and an acting reviewer for many journals.

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16:15-17:15, Room 114
Free Paper Session

FP 3008 Super Tuesday

Moderators: M.S. Johnson (Indianapolis, IN/US), T.J. Kroencke (Augsburg/DE)

SUPER TUESDAY

3008.1 Impact of combined coiling and liquid sclerotherapy compared with coiling only on symptoms of pelvic congestion syndrome: a randomised controlled trial
M.A.H. Soliman; Mansoura/EG

3008.2 Randomised controlled trial comparing drug eluting balloon versus conventional balloon angioplasty for below the knee arteries in patients with critical limb ischemia
B.S. Tan[1], A. Patel[1], F.G. Irani[1], U. Pua[1], T.T. Chong[1], S. Leong[1], G. Tan[1], E. Chan[1], K. Damodharan[1], N.K. Karaddi[1], L.H.H. Quek[1], K.D. Zhuang[1], S.X.J.M. Chan[1], A. Gogna[1], C.W. Too[1], L. Toh[1], M.C. Burgmans[2], K. Gummalla[1], D. Matchar[1], S.P. Chng[1], H.H. Win[1], Y. Wei[1], S. Chandramohan[1], P. Kumar[1], J.M.E. Chua[1], R.H.G. Lo[1], K.-H. Tay[1]; [1]Singapore/SG, [2]Leiden/NL

3008.3 Totally percutaneous deep foot veins arterialization: a single centre experience
B. Migliara; Peschiera Del Garda/IT

3008.4 Viable allograft intervertebral disc augmentation: preliminary results and safety data in the first 24 patients
E. Yoon[1], D.P. Beall[2], D. Wagoner[1]; [1]Edmond, OK/US, [2]Oklahoma City, OK/US

3008.5 Intra-operative and post-operative pain management of conventional transarterial chemoembolization (cTACE) for hepoatocullar carcinoma (HCC) by different route of intraarterial lidocaine administration: a randomized controlled trial
Y.-D. Xiao; Changsha/CN

3008.6 A comparison of retrievability and indwelling complications of Celect and Denali infrarenal vena cava filters: a randomized controlled trial
S.H. Baek, K. Han, G.M. Kim, J.H. Kwon, J.Y. Won, M.D. Kim, D.Y. Lee, J. Lee; Seoul/KR

3008.7 MR-guided focused ultrasound (MRgFUS) versus external beam radiation therapy (EBRT) for the treatment of painful bone metastases: a multicenter, phase III, randomized case-control trial
S. Dababou, A. Napoli, C. Marrocchio, R. Scipione, G. Alfieri, D. Fierro, C. Catalano; Rome/IT

Massive pulmonary embolism during thrombectomy

Poul E. Andersen, EBIR

Don't miss it !
Venous mishaps, disasters and catastrophes: salvage approaches
Case-based Discussion
Wednesday, September 11, 10:00-11:00
Room 113

Poul E. Andersen
(EBIR)
University of Sothern Denmark
Odense, Denmark

Poul Erik Andersen received his medical degree from the University of Southern Denmark, Odense in 1974, and passed the Educational Council for Foreign Medical Graduates in 1975. He was certified as a specialist in radiology in 1982. Since 1983, Dr. Andersen has been Chief Radiologist/Consultant of the Department of Radiology, Cardiovascular Section at Odense University Hospital. His expertise is primarily in vascular interventions where he has introduced and developed many procedures. His significant experience and extensive scientific work has led to many posts in the Danish Society of Interventional Radiology and the European Society of Radiology. He is a distinguished fellow of CIRSE and an EBIR holder. Prof. Andersen was also the Local Host Committee Chairperson for CIRSE 2017 and CIRSE 2008.

Venous thromboembolism (VTE) includes deep vein thrombosis (DVT) and pulmonary embolism (PE) and is associated with a high morbidity and mortality. VTE may result in long-term complications including post-thrombotic syndrome (PTS) for DVT, post-pulmonary embolism syndrome and chronic thromboembolic pulmonary hypertension for PE, and death [1]. VTE is the third most common cardiovascular-related mortality after myocardial infarction and stroke [2].

The immediate risk from inferior vena cava (IVC) thrombosis is PE, which occurs in over 30% of cases [3], while long-term complications are chronic venous insufficiency and PTS, and occur in up to 20-50% of non-resolved thromboses.

Malignancies may cause tumour DVT. Enhance–ment of thrombus on CT, PET/CT or MRI may help make the diagnosis. A tumour thrombus is not expected to respond to anticoagulation (AC), whereas AC is the appropriate treatment for traditional or bland thrombi.

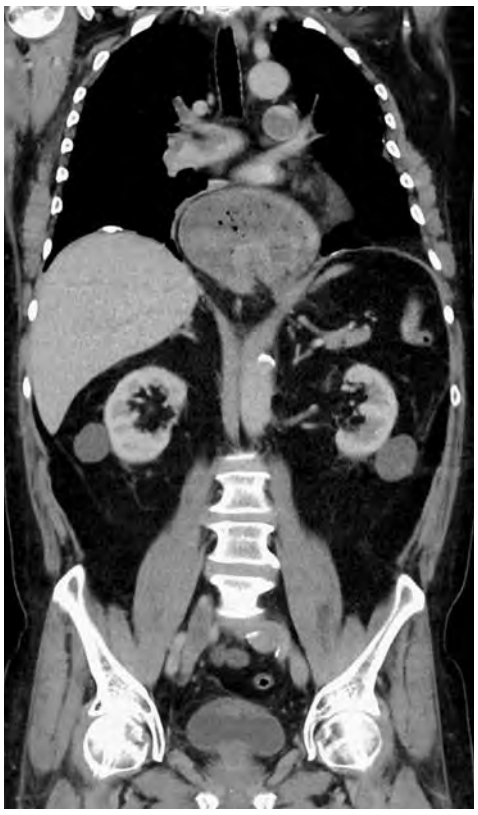
When VTE is suspected, anticoagulation with low-molecular heparin followed by oral AC should be initiated unless there is a contraindication like an increased bleeding risk, and a risk assessment should be performed before and during AC therapy [4]. In addition to AC, systemic thrombolysis in the case of PE, catheter-directed thrombolysis (CDT) or pharmaco-mechanical catheter-directed therapies (PMCT), surgical intervention (pulmonary embolectomy), or placement of inferior vena cava filter may be indicated.

Spontaneous recanalisation of iliofemoral deep-vein segments is very poor with AC alone [5] and the unfavourable risk/benefit ratio of systemic thrombolysis and surgical thrombectomy has led to the development and widespread utilisation of CDT with or without PMCT in the treatment. There are, however, no randomised trials or society guidelines for treatment of DVT, so careful case selection and local experience and technical expertise in CDT and PMCT are essential for successful endovascular management of IVC thrombosis [6]. There are no trials comparing the different catheter-based treatments, but each have shown reasonable efficacy.

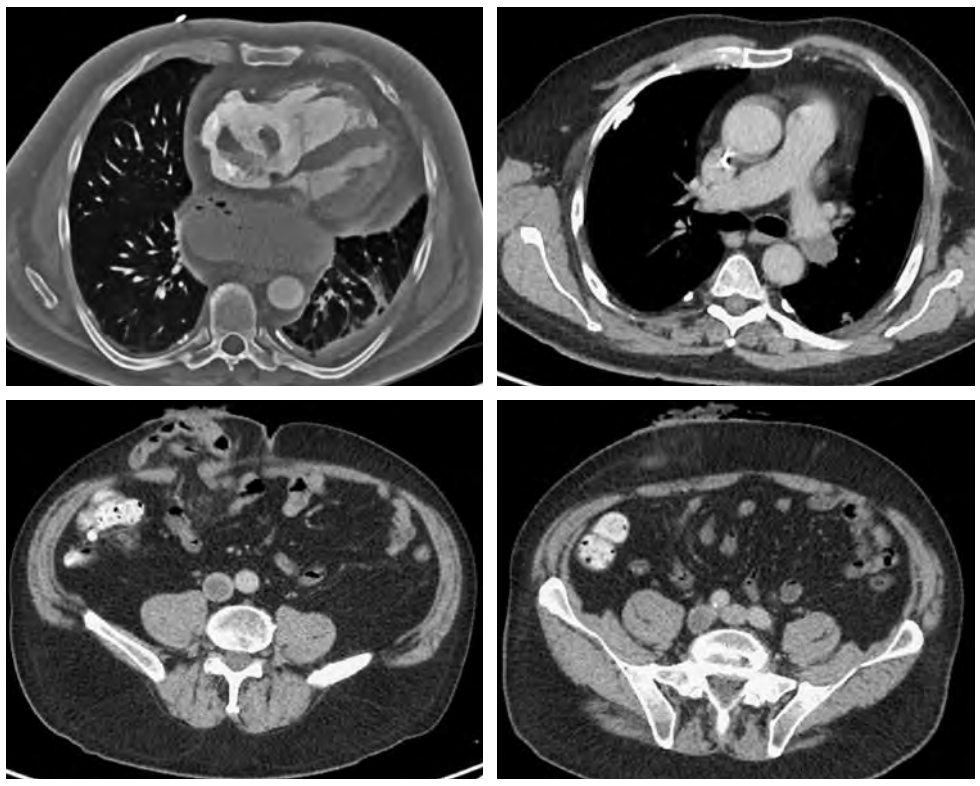
AC does not remove or destroy thrombus and the rationale for active rather than passive thrombus removal is that doing so improves luminal patency, restores valvular function and has the potential to reduce the severity of PTS [2]. The intention to treat DVT is to restore patency and preserve valvular function by removing the DVT and thereby avoid PTS. Thrombolysis and/or thrombectomy improves the rate of patency of the iliofemoral venous segment [7]. There is, however, no evidence that the addition of CDT or PMCT to AC results in a lower risk of PTS, but may result in a higher risk of major bleeding [8].

It is intuitive to assume that use of mechanical thrombectomy devices will increase the risk of distal embolisation, but it has not been possible to find any increased thrombus embolisation into IVC filters during CDT for proximal deep-venous thrombosis [9]. Many operators will, however, place a retrievable IVC filter only in high-risk patients, such as those with large floating thrombus and those with reduced lung reserve. IVC filters may be beneficial during the early course of an acute DVT in patients that cannot be anticoagulated, but later on, the filter is more likely to cause thrombosis of the cava than to prevent PE [10].

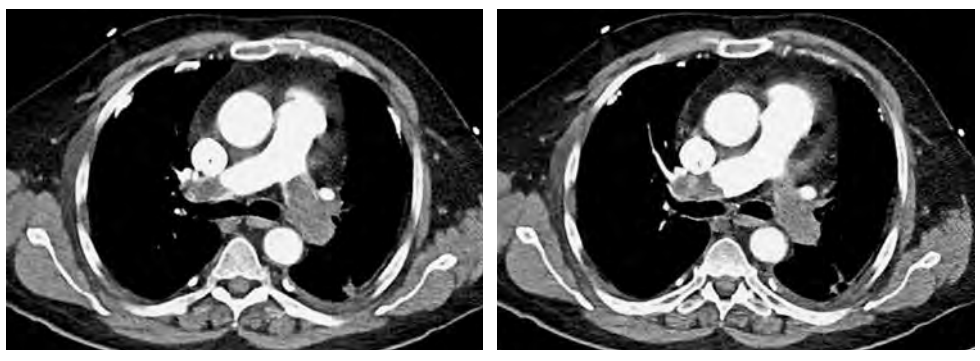
Surgical pulmonary embolectomy for the initial treatment of PE is reserved for patients with massive PE, shock despite heparin and resuscitation efforts, and failure of thrombolytic therapy or a contraindication to its use. There are no randomised trials evaluating this procedure. An operative mortality of 10-20% has been reported in these patients.



Massive bilateral pulmonary emboli and hypoperfusion of especially right lung



64-year ole male with rectum cancer st. T2N2 with 30/30 positive lymphnodes. Resection surgery with stomi. Had further a hiatus hernia. Six months control PET/CT showing left pulmonary mainstem emboli and right sided iliaco-caval thrombus



Mechanical thrombectomy with puls-spray was performed. Following this procedure progressive massive bilateral pulminary emboli were seen on CT

Temporary cava filter inserted infrarenal in inferior vena cava to protect from further pulmonary emboli. Further anticoagulation treatment.

Table 1:

Systemic AC	Indicated in all DVT
Systemic thrombolysis	Indicated in PE
Surgical thrombectomy (open or balloon)	Indicated in cases refractory to less invasive interventions
CDT	DVT with floating thrombus or big thrombus volume and/or PE
Mechanical thrombectomy	When thrombolytics are contraindicated
(combined) PMCT	Single-session treatment of DVT

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STUDENT CORNER

Elizabeth Wenzel, CIRSE Office

Building on yesterday's recommended session – an overview of trauma interventions

Traumatic injuries can arise from traffic accidents, violent encounters, falls or occupational injuries. They can affect anyone, regardless of age or health, and rapid treatment is often essential for survival. The best outcome depends on the speed, efficiency and skill of the trauma team, as well as the availability of the most appropriate medical technology. The role of IR's catheter-based techniques is crucial, and can help reduce the frequency of tragic outcomes. The following overview will explore how IR is becoming a front-line treatment for traumatic injuries.

How IR can help

IR plays various roles in trauma management. Interventional radiologists are uniquely prepared to both perform and interpret diagnostic scans, and if indicated, can then deliver minimally invasive treatments. IR makes it possible to perform life-saving techniques throughout the body, from damaged blood vessels to major organ groups. IR has been used to treat injuries of the abdomen, chest, limbs, neck, face and head, for both blunt and penetrating injuries.

Some injuries are more common than others, and some are more suited to IR treatment than others. IR is particularly well-suited to areas where it would be impossible or too risky to perform a surgical intervention, such as the pelvis, and many larger trauma units now include IR as a first-line treatment for certain injury categories.

Though the techniques offered are first-rate, many accident patients suffer with multiple injuries and may therefore need multiple therapies, including those outside of IR. Interventional radiologists must work together with traumatologists, surgeons and other specialists to ensure the best possible outcome for each individual situation.

Penetrating and blunt injuries

Across all ages, road traffic injuries are by far the most common cause of death from traumatic injuries in Europe, followed by violence and falls.

Traumatic injuries can broadly be broken into two categories: blunt and penetrating trauma. In Europe, blunt trauma is by far the most common injury type seen in accident and emergency departments, including any injury caused by blunt force, such falling from a height, or being hit by a car or blunt object. Penetrating trauma, which includes injuries such as bullet or stab wounds, is comparatively rarer in Europe, but still occurs frequently.

IR in solid organ trauma management

Solid abdominal organs, such as the liver, kidneys or spleen, are an essential area of specialisation for the trauma IR. Abdominal surgery is risky for patients, as there is an increased chance of infection and/or additional blood loss. Additionally, it's often just not suitable for the situation – if a force to the liver has caused blush-bleeding throughout the organ, a surgeon will not be able to do much solve the problem. An IR can use minimally invasive techniques to assess the problem, locate and selectively embolise the main source of bleeding.

Traumatic injuries to organs are graded in terms of AAST criteria (American Association of Surgery for Trauma), but these are not great for identifying patients who will rebleed, and these are exactly the patients who can benefit from IR. Even if surgical intervention is also needed, stabilising the bleeding is a critical priority. The aim of the trauma team should be to limit further damage. When possible, conservative treatment is best, and any active interventions should be as gentle as possible.

IR in the management of chest trauma

Trauma to the chest can often result in damage to the heart or its major blood vessels, particularly the aorta. Thoracic aortic injury (TAI) is the second most common cause of death in patients with blunt injury – and as it's such an essential vessel, it's estimated that up to 85% of patients with TAI die before reaching the hospital. For those who do make it, quick and effective treatment is vital for survival.

IR offers efficient treatment for this emergency. Using image guidance and catheters, IRs can deliver a stent graft to the site of the injury, providing support for the damaged vessel and obstructing the bleeding without interfering with the usual blood flow. In recent years, TEVAR (thoracic endovascular aortic repair) has shown to have a lower mortality and morbidity rate than traditional surgical therapies in the thoracic aorta.

IR in the management of pelvic trauma

Pelvic trauma is common after falls or traffic accidents, and can have serious implications, as many major organs sit within the bowl shape formed at the base of the spine. Vital organs and blood vessels can be damaged, and blood can easily pool in the hollow of the pelvis. This delicate, complicated area can be difficult or impossible to access surgically.

Most deaths that occur due to pelvic fractures are as a result of haemorrhage. Most patients experiencing haemorrhage as a result of pelvic fracture are stabilised by external fixation, and this is usually successful. It's the small group of patients in which bleeding continues that benefit from IR.

The roll of the IR is to perform the early angiography and embolisation, if needed. Rapid treatment can prevent a host of complications, and multi-slice CT with contrast enhancement is particularly useful in identifying the bleeding site. This is vastly more desirable than surgery, which brings risks of anaesthesia, sepsis, further blood loss and the possibility that the surgeon will be unable to locate the site of the bleeding.

IR in the management of peripheral trauma

Peripheral trauma may occur alone or as part of a multi-trauma incident. Vascular injuries of the extremities represent a large proportion of all vascular trauma cases, as the major arteries in these regions are closer to the skin and therefore more vulnerable. Severe injuries to these parts of the body can compromise blood flow to specific areas or lead to death as a result of haemorrhage. Ischaemia resulting from these injuries can mean that, even if the patient survives, the affected limb could require amputation if a speedy intervention is not carried out.

Covered stents are ideal for controlling haemorrhage of big trunk arteries, sealing off an arterial bleed while still preserving the blood flow through the vessel. Before the availability of IR, open surgery with invasive exploration of the traumatised area would have been the only option. Now endovascular repair through IR results in less blood loss and tissue damage, reduced operative time and morbidity, and overall quicker patient recovery.

IR in the management of penetrating trauma

Penetrating trauma is relatively rare in Europe, but is still a huge cause for concern in urban centres and less developed countries. Regardless, violence still ranks within the top ten causes of deaths for Europeans aged 5-44, and as such, it is essential to offer effective treatment for penetrating trauma, such as knife or gunshot wounds.

In trauma, many patients die from complications rather than the injury itself, so choosing the treatment method that involves the least number of complications is logical, and conservative treatment should be used if at all feasible. If a CT shows an enlarged haematoma or large vessel injury, IRs can block it off using coils and diagnostic catheters to treat puncture wounds.

To summarise!

Interventional radiology has a great deal to offer the field of trauma management. Not considering IR treatments for trauma patients can result in serious consequences and complications. If these benefits are to be realised, their use in common practice must become more widespread. It is crucial to have centres with full diagnostic and treatment capacity, and multidisciplinary teamwork with a planned workflow at the centre is vital in ensuring the best possible outcomes for patients.

Keep learning about IR after CIRSE 2019!

1. CIRSE Publications

Students can get acquainted with CIRSE and interventional radiology through CIRSE publications which are intended to inform the IR community about current happenings and support interventional radiologists in their daily practice. The society newsletter, IR News, is available to access online. Likewise, all current and past editions of the Congress Newspaper can be read online year-round.

2. CIRSE Journals

Founded in 1978, CardioVascular and Interventional Radiology (CVIR), is CIRSE's official journal. CIRSE student members enjoy free online access! Selected free articles are also available through CVIRonline.org. CVIR Endovascular, a new journal focusing on the growing endovascular field, is a multidisciplinary open access and open peer-reviewed journal. Articles from CVIR Endovascular can be read online at CVIRendovascular.org.

3. CIRSE's online educational resources

The CIRSE Library and CIRSE Academy provide online, on demand knowledge at your fingertips. CIRSE student members enjoy full access to the library, where they can review this year's congress and catch up on the previous years as well. They are also eligible for reduced fees on CME certified courses through the CIRSE Academy.

4. Social Media

Students can stay connected with the IR community by following CIRSE's many media channels. Facebook, Twitter, LinkedIn and YouTube will all provide up-to-date information on what's going on in the world of interventional radiology. CIRSE's YouTube channel engages audiences with special topic segments and commentaries on IR's newest innovations. Through Facebook, CIRSE also offers content tailored to students (CIRSE students) and residents (European Trainee Forum).

5. National IR Society

Looking to get involved in IR on a national level? CIRSE strives to forge strong partnerships with European and international IR societies, with the objective to advance interventional radiology worldwide. Medical students wishing to increase, improve, or get involved in the IR opportunities available to them in their country should reach out to their national society for support. For a list of national IR societies who are also CIRSE Group Members, please visit the CIRSE website.

QUESTIONS OF THE DAY

Tuesday, September 10

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. Dr. Alexandre Menard uses the abbreviation "EVT" when referencing the standard of care for acute stroke associated with large vessel occlusion. What does this stand for?
2. Today is a holiday in Catalonia! Which one?
3. What procedure is a minimally invasive alternative to surgery for treatment of bladder outlet obstruction caused by benign prostatatic hyperplasia?
4. Why are IRs uniquely suited to treat trauma management?
5. What was your favorite part of the Student Programme so far?

be inspIRed...

Students in the Spotlight

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

Maria Ioannidi
Athens, Greece
National and Kapodistrian University of Athens

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

Ioannidi: I chose medicine due to a variety of reasons! I was always keen on science and... challenges! I felt that I had the interpersonal skills required in order to work with and understand the needs of patients, and I was thrilled by the idea that medicine offers you the scientific basis to improve the healthcare of the population. Moreover, I believe that IR can offer a dynamic career, where 'cutting-edge' scientific innovations have a practical application in various medical conditions.

When did you hear about IR for the first time?

Ioannidi: I was informed about this medical specialty before I joined med school, but it was not until the 4th year of medical school and during my radiology rotation that I had the chance to become familiar with the applications of IR and visit the IR suite for the very first time! I still remember that there was a carotid arterial stenting procedure taking place at that moment, and I was more than excited!

How did you hear about CIRSE?

Ioannidi: During the 5th year of medical school, I decided that IR could be a potential specialty for me, so I tried to figure out how I can get involved as a student in this field. I reached out to my professors at the 2nd Department of Radiology of the General University Hospital "ATTIKON", who strongly advised me to join CIRSE and its annual conference. I think that the Student Programme especially is a great opportunity for medical students to get to know IR and its advantages as a future career.

Why did you choose to study medicine in your country? Have you ever considered studying medicine in any other country?

Ioannidi: The University of Athens is the largest public institution of higher education in Greece, and the Athens Medical School is considered to be among the best medical schools in Europe, with a strong tradition in the medical field and a very high research output. It is considered extremely challenging to enter the Athens Medical School, since candidates should achieve the highest grades possible at the final examinations.

So when I achieved a place at this medical school, no thought crossed my mind to study elsewhere! Needless to say, of course, that after concluding my studies in Athens, I will be more than willing to experience healthcare systems in other countries.

What fields or topics in IR do you find most interesting?

Ioannidi: Although I really admire every different field of IR, I am extremely interested in interventional oncology. Interventional oncology remains a disruptive innovation challenging the traditional methods of cancer treatment with minimally invasive, well-tolerated cancer treatments that rely on the most advanced medical technologies to precisely target tumours and have promised to change the status of current cancer therapy.

Sorin Nicolae Blaga
Cluj-Napoca/Romania
University of Medicine and Pharmacy "Iuliu Haţieganu"

When did you hear about IR for the first time?

Blaga: I heard about IR for the first time two years ago, at the Medicalis Congress of students and young doctors which takes place every year at my university. There was a doctor there who talked about IR, especially the techniques used in interventional neuroradiology, approach routes, materials used, the procedure itself, etc.

Why did you decide to attend the Student Programme?

Blaga: Colleagues informed me that the CIRSE Congress is the biggest meeting between interventional radiologists and doctors from other related specialties like interventional cardiology, interventional oncology, etc. I decided to attend the Student Programme because I'm a general medicine student, I want to gain more knowledge about this domain of IR, to get more practical skills, to meet experienced physicians in this field, to make new friends from all over the world and have a lot of fun in the incredible city of Barcelona.

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

Blaga: I choose to study medicine in my country because I live in a large university centre of Romania, Cluj-Napoca, whose university has a long medical tradition, marking 100 years this year. There are many foreign students in our university which creates an ample, unique multiculturalism in Eastern Europe. If I were to study in another country, I would like to do an internship in a French-speaking country like France, Belgium, Switzerland or even Canada.

What kind of exposure do you get to IR at your university and within your undergraduate studies?

Blaga: In my university, interventional cardiology has the largest exposure. There are 3 angiography laboratories at the Heart Institute of Cluj-Napoca, at the Emergency County Hospital of Cluj–Napoca and at the Rehabilitation County Hospital of Cluj-Napoca, where students are trainees or can go to summer internships. There are a wide range of interventions such as implantation of aortic endoprostheses, angioplasty on lower limb arteries, etc. TAVI is also practiced at the Heart Institute.

What would be the destination where you would like to do your IR training?

Blaga: As I said above, the main destination where I would like to do IR training is France, a country where there are a lot of IR centres, and where many IR techniques have been practiced for the first time, especially in the field of cardiology, such as introducing TAVI by the renowned professor Alain Cribier.

What fields or topics in IR do you find most interesting?

Blaga: The most interesting fields are arterial interventions and aortic interventions. Topics that I find very interesting are real-world endovascular management of claudication and diabetic foot, carotid artery disease, because today these pathologies are more and more common. EVAR-related topics are also very interesting to me, because I hope to be a cardiologist in the future and I want to find out more about the techniques behind these interventions.

BE SURE TO JOIN US FOR TENTH STUDENT PROGRAMME AT CIRSE 2020 IN MUNICH!

REGISTRATION WILL OPEN IN FEBRUARY 2020: WE LOOK FORWARD TO WELCOMING YOU AGAIN!

Don't leave without picking up your Certification of Attendance!

TODAY'S HIGHLIGHTS

IRT: IRs: From the angiosuite to industry boardrooms and the road to innovation
10:00-11:00, Room 114

FC 2704: Essential skills for a clinical interventional radiologist
11:30-12:30, Room 115

Students' Quiz
12:30-14:00, Students' Lounge

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.

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Cardiovascular and Interventional Radiological Society of Europe CIRSE

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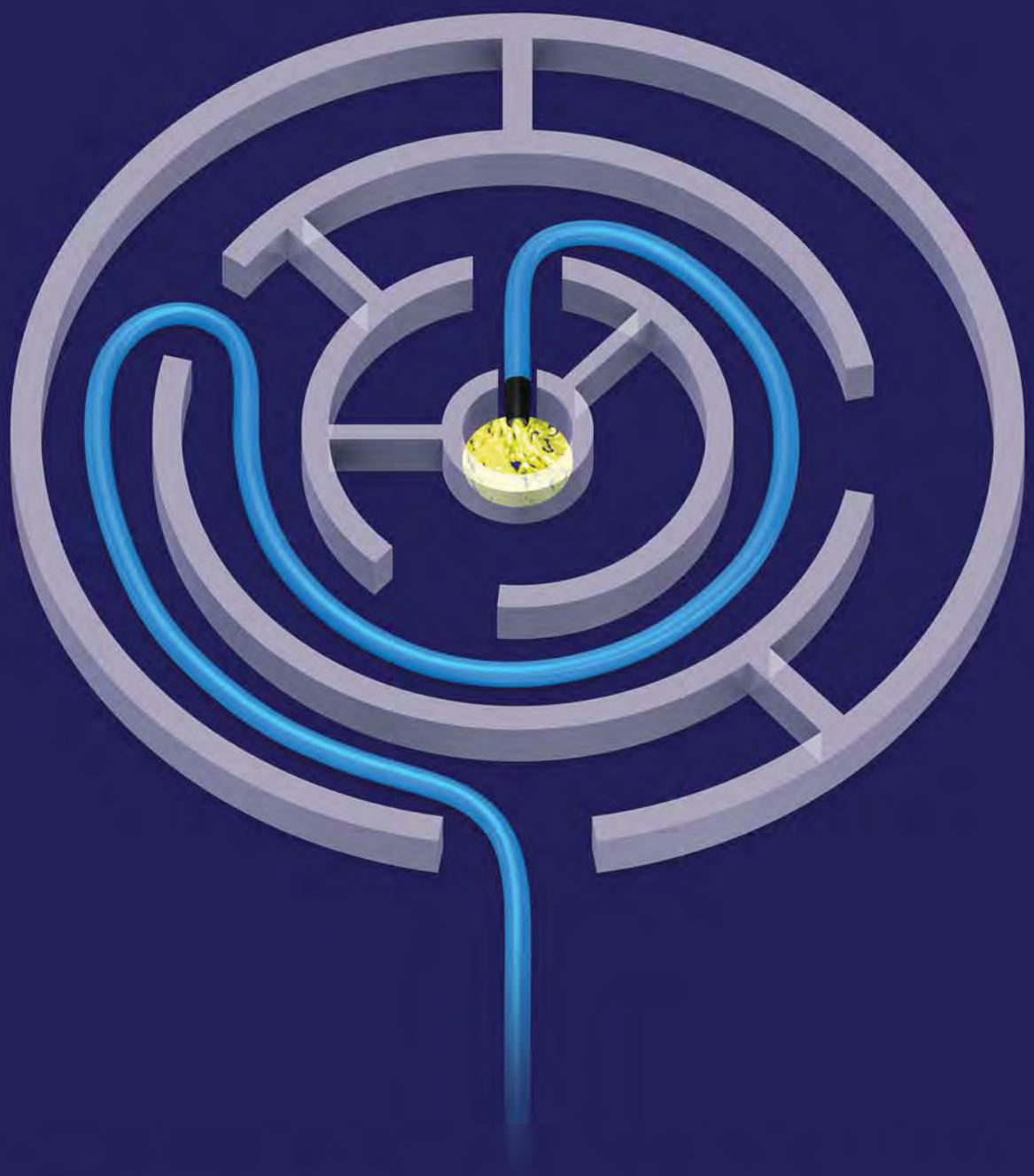

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Guerbet

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1. Flexibility test report Bench report TR025. Torque Transmission Bench Test report TR006. Trackability Bench Test report TR017.

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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

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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

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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.
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III

Siemens Healthineers

Transforming care delivery in image-guided therapy

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IV

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- Various lengths: 7cm, 10cm, 15cm, 20cm, 25cm

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V

Terumo Interventional Systems

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