Transcatheter embolisation techniques play a significant role in today’s treatment of traumatic vascular injuries, providing a minimally invasive, life-saving alternative to traditional treatment modalities. During this Hot Topic Symposium, several experts will discuss the particularities of embolisation, detailing techniques and the best materials to be used in the treatment of trauma patients. The session will be moderated by Prof. de Gregorio and Prof. Stojanovic and will include Dr. Scheurig-Muenkler, Dr. Citone, Dr. Karnabatidis and Dr. Siskin giving lectures on trauma embolisation, based on their specific area of expertise. The session will be comprised of talks on splenic, liver, pelvic fracture and renal embolisation.

Splenectomy

Many cases of spleen injury are low-grade and are, as such, managed in a conservative manner. However, higher grade injuries (AAST III-V) or any injury with active bleeding or a post-traumatic vascular pathology face a considerably higher risk of re-bleeding, putting the patient at significant risk. Dr. Scheurig-Muenkler notes that, in such cases, splenic artery embolisation is recommended as an organ preserving treatment strategy. IIs can help by reducing blood perfusion and pressure in the spleen, through proximal occlusion of the splenic artery distally to the dorsal pancreatic artery, using vascular plugs or coils. Additionally, distal embolisation can be considered in cases where the damage to the spleen has caused visible active bleeding or post-traumatic vascular pathology.

Liver embolisation

Despite the fact that the treatment of most cases of low-grade liver trauma is grounded on observation and medical therapy alone, in cases of active arterial bleeding (contrast blush detected at MDCT scan), angiography is the treatment of choice regardless of trauma grade (according to AAST classification). The technique has also shown efficacy as an adjunctive tool after damage control surgery in case of persistent arterial bleeding seen at MDCT after surgery. When indicated, IIs should perform angiography as soon as possible. Dr. Citone also points out that distal catheterisation (micro-catheter) is recommended when occluding bleeding vessels, in order to preserve the arterial tree of the liver and reduce possible complications, such as liver necrosis and gall bladder injury. Embolic agents that are most used by IIs in this instance include coils or gel foam particles.

Pelvic fracture embolisation

The endovascular treatment of renal trauma can be more complex than many people think. An expert in the field of renal trauma, Dr. Siskin attributes this to the fact that many patients have multiple vessels and a large number of overlapping branches arising from each renal artery which, in turn, can make it difficult to identify the source of arterial bleeding. Consequently, good diagnostic angiography with multiple projections, used in conjunction with cone-beam CT as an adjunctive tool, is necessary, in order to accurately locate and treat the affected area. As with other embolisation procedures, Dr. Siskin points out that there are difficult decisions which need to be made during renal embolisation, including the amount of renal parenchyma to be sacrificed. Such considerations will be the focus of this particular talk.

Renal embolisation

The technique has also shown efficacy as an adjunctive tool after damage control surgery in case of persistent arterial bleeding seen at MDCT after surgery. When indicated, IIs should perform angiography as soon as possible. Dr. Citone also points out that distal catheterisation (micro-catheter) is recommended when occluding bleeding vessels, in order to preserve the arterial tree of the liver and reduce possible complications, such as liver necrosis and gall bladder injury. Embolic agents that are most used by IIs in this instance include coils or gel foam particles.
How to accomplish a 24/7 thrombectomy service
Andrew Clifton

A meta-analysis of five major randomised trials (MR CLEAN, ESCAPE, REVASCAT, SWIFT PRIME and EXTEND IA) analysed by the HERMES collaboration [1] showed without doubt that thrombectomy is the standard of care for patients with acute stroke due to embolic or occlusion of the carotid T1M segment middle cerebral artery. It is one of the most effective new treatments in stroke medicine with the number needed to treat fewer than 3 for improved functional outcome.

In April 2017, the National Health Service (NHS England) announced that it would commission mechanical thrombectomy, particularly working with England’s 24 Neurosciences Centres. The UK/England’s challenge will be to deliver this service safely and effectively to provide the additional doctors, nurses, radiographers and other staff to be able to treat the 8,000 or so patients eligible for this treatment in the UK. Currently, the only doctors trained for this treatment in the UK are neuroradiologists, interventional radiologists, and other specialists, such as cardiologists and neurologists may need to be trained to perform this procedure [2,3,4,5].

At St. George’s Hospital we started a 24/7 thrombectomy service in July 2016. Our service is combined with a 7/7 service to coil acutely ruptured aneurysms. Services needed include: immediate neurosurgical and neurocritical care on site; hyperacute stroke unit arrangements to facilitate discussion of all subarachnoid aneurysm cases with a consultant neurosurgeon, MDT review of all SAH cases; anaesthetic/support; two angiography suites, which can be staffed as necessary during the daytime to allow for competing cases; and 24-hour access to diagnostic modalities including multi-slice CT and a scanning resource on site to cope with down time and increased demand. One of the main challenges is staff. It is vital to have sufficient staff, with necessary competencies to deliver 24/7 service with staffing as mentioned above. It is very important to have a robust pathway (see flowchart) from the patient or member of public calling the ambulance to the patient at the end of treatment. Co-operation between all staff groups and managers is vital if this process is to be successful. There are two ways to deliver thrombectomy, either ‘drop and ship’ or ‘mother ship’ with direct transfer to a specialist centre. Either method may be appropriate depending on geography. One of the challenges of the ‘drop and ship’ model is the ambulance transfer between a district hospital and the thrombectomy centre [6]. This can cause delays. Another challenge is obtaining the appropriate imaging in the district hospital. Currently, there are too few staff trained and available to do this. Stroke physicians are currently being trained to do this and read the scans accurately. It is important that data is submitted and that regular audits/mortality and morbidity meetings are carried out involving all staff. Measurements of all aspects of the pathway must be made to improve efficiency.

In conclusion, the challenges of setting up a 24/7 service are sufficient staff with necessary competencies to deliver 24/7 service, a smooth ambulance transfer for ‘drop and ship’ including possible helicopter transfer, appropriate beds and repatriation. Whether the patient is admitted to the thrombectomy centre or a hospital with a stroke unit, the initial investigations using CT and CT angiography must be performed promptly and reviewed by an interventional neuroradiologist or stroke physician. Where appropriate, treatment with IV/TPA should be started before critical transfer to the nearest thrombectomy centre.

References:
2. Clifton A. Mechanical Thrombectomy Services can the UK meet the challenge. Pract Neurol. 2017;17:250-251.
5. Clifton A. Mechanical Thrombectomy Services can the UK meet the challenge. Pract Neurol. 2017;17:250-251.
Irreversible electroporation (IRE) is a new image-guided technique which induces the formation of small defects (nanopores) in the cell membrane by the application of high-voltage electric pulses. Depending on the amplitude and duration of the electric pulses, electroporation of the cell membrane is reversible, after which the cell survives, or irreversible, causing loss of homeostatic properties of the cell and leading to cell death through apoptosis [1, 2]. Due to its primarily non-reversible mechanism of action, IRE leaves the structural integrity of inflating and adjacent accessory tissue structures, like blood vessels, intact [1]. This allows for the selective ablation of diffusely growing malignancies that surround such structures, as is typically the case for example with locally advanced pancreatic cancer (LAPC), and provides a promising alternative to heat-induced tumour ablation (Fig. 1). 

Minimally invasive interventional techniques for in situ tumour destruction are gaining ground clinically. Unlike surgery, the treated malignancy is not removed from the body, but apoptotic or necrotic cell remnants, induced by the ablative technique, remain available to be taken up by phagocytes. During apoptosis, infiltrating antigen-presenting cells (APCs) will become activated and transport tumour fragments to draining lymph nodes where apoptotic or necrotic cell remnants, induced by the ablative technique, remain available to be phagocytosed by lymph node resident antigen-presenting cells, the main role of which is to present those antigens to T-cells (Fig. 1). 

The use of IRE in LAPC results in apoptosis and a decrease in tumour load, which may lead to a reduction in tumour-associated immune suppression and the simultaneous release of immunogenic apoptotic tumour fragments (Fig. 2) This could conceivably lead to the generation of anti-tumour immunity. To test this hypothesis, we monitored Tregs and activation of (tissue-specific) effecter T-cells in the peripheral blood of the IRE-treated LAPC patients (Scheffer et al. submitted). Our findings are encouraging in that they confirm a transient and moderate decrease in systemic Treg rates (immune suppressor). The post-IRE systemic decrease in Treg rates also coincided with systemic T-cell responses to Wilm’s tumour type 1 (WT-1), which in turn were more prominent in patients with above median overall survival (OS) (Scheffer et al. submitted, Fig. 3). WT-1 has been reported to be expressed in 75% of pancreatic tumours and not at all in healthy pancreatic tissues, confirming its relevance as an immune target antigen. Although caution is warranted due to the small number of studied patients, the seeming relationship between WT-1 expression and overall OS is particularly exciting. It suggests a relationship between (induced) anti-tumour immunity and a measure of protection against outgrowth of local and distant micrometastases. 

Harnessing the immune system in combination with local tumour ablation is an approach that may effectively marry local with systemic anticancer efficacy. To optimally leverage the immune response triggered by local tumour ablation techniques like IRE, it is important to attract an immune infiltrate to the primary and metastatic tumour sites and to ensure efficient T-cell priming in the lymph nodes draining the tumour ablation site. IRE has the added advantage over thermal ablation techniques of post-ablative preservation of the blood and lymph vasculature, thus ensuring effective immune infiltration and lymph drainage to and from the tumour ablation site. In conclusion, future exploration of clinical strategies combining IRE with local immune potentiation may ultimately yield a very effective in vivo vaccination approach.

Targeted electro-immune-therapy: a potential perspective?

Irreversible electroporation (IRE) is a new image-guided technique which induces the formation of small defects (nanopores) in the cell membrane by the application of high-voltage electric pulses. Depending on the amplitude and duration of the electric pulses, electroporation of the cell membrane is reversible, after which the cell survives, or irreversible, causing loss of homeostatic properties of the cell and leading to cell death through apoptosis [1, 2]. Due to its primarily non-reversible mechanism of action, IRE leaves the structural integrity of inflating and adjacent accessory tissue structures, like blood vessels, intact [1]. This allows for the selective ablation of diffusely growing malignancies that surround such structures, as is typically the case for example with locally advanced pancreatic cancer (LAPC), and provides a promising alternative to heat-induced tumour ablation (Fig. 1). 

Minimally invasive interventional techniques for in situ tumour destruction are gaining ground clinically. Unlike surgery, the treated malignancy is not removed from the body, but apoptotic or necrotic cell remnants, induced by the ablative technique, remain available to be taken up by phagocytes. During apoptosis, infiltrating antigen-presenting cells (APCs) will become activated and transport tumour fragments to draining lymph nodes where adaptive immune activation can take place (3-5). In effect, local ablation thus serves to induce local and systemic immune suppression [8, 9]. The use of IRE in LAPC results in apoptosis and a decrease in tumour load, which may lead to a reduction in tumour-associated immune suppression and the simultaneous release of immunogenic apoptotic tumour fragments (Fig. 2) This could conceivably lead to the generation of anti-tumour immunity. To test this hypothesis, we monitored Tregs and activation of (tissue-specific) effecter T-cells in the peripheral blood of the IRE-treated LAPC patients (Scheffer et al. submitted). Our findings are encouraging in that they confirm a transient and moderate decrease in systemic Treg rates (immune suppressor). The post-IRE systemic decrease in Treg rates also coincided with systemic T-cell responses to Wilm’s tumour type 1 (WT-1), which in turn were more prominent in patients with above median overall survival (OS) (Scheffer et al. submitted, Fig. 3). WT-1 has been reported to be expressed in 75% of pancreatic tumours and not at all in healthy pancreatic tissues, confirming its relevance as an immune target antigen. Although caution is warranted due to the small number of studied patients, the seeming relationship between WT-1 expression and overall OS is particularly exciting. It suggests a relationship between (induced) anti-tumour immunity and a measure of protection against outgrowth of local and distant micrometastases. 

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Fig. 1: Pancreatic IRE. Percutaneously inserted needle electrodes (A) unenhanced CT scans show needle electrode configuration in axial (b) and coronal (c) plane (6).

Fig. 2: Anti-tumour immunity induced by IRE. Irreversible electroporation (IRE) may help generate effective anti-tumour immunity. An essentially immune suppressed tumour microenvironment pre-IRE may be converted to an immune permissive environment through the induction of immunogenic tumour cell death leading to decreased immune suppression and an influx of pro-inflammatory immune effector cells. Systemic tumour-specific T-cell immunity may eventually be achieved through (1) the release of immunogenic apoptotic tumour cell remnants caused by IRE, (2) reduction of tumour-associated immune suppression and recruitment of pro-inflammatory immune effector cells, including DCs, (3) antigen uptake and activation of infiltrating DCs, (4) subsequent generation of anti-tumour T-cell immunity in the draining lymph nodes resulting either from passive drainage of immunogenic apoptotic remnants (subsequently taken up by lymph node resident DCs) or active transport from the tumour site by DCs, and (5) primed killer T-cells homing back to the treated tumour site to eliminate remaining tumour cells or providing systemic protection against outgrowth of distant metastases. The captured legend shows the upregulation induced immunogenic suppressive or permissive immune subsets and immune suppressive cytokines (10).

Fig. 3: Induced WT-1 T-cell reactivity in the PANKRE trial. A positive WT-1 T-cell response is related to improved overall survival (p<0.055).

References:
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SEE THE EVIDENCE AT THE BD BOOTH #31
This presentation will cover the classification and relevance of endoleaks, when there is a need for the treatment of endoleaks and the different options that are available for treating the different types of endoleaks.

Endovascular aneurysm repair (EVAR) became an established minimally invasive method to treat abdominal aortic aneurysms (AAA) soon after the first implantations in endoleaks were documented in the early 1990s. An endoleak is defined as persistent blood flow in the aneurysm sac outside the stent graft. It was originally categorised into four types by White et al. and subsequently a fifth type was added by Gilling-Smith et al. [1, 2]. Type I endoleaks refer to an inadequate seal in the proximal (type Ia) or distal (type Ib) landing zone. Type II endoleaks are characterised by retrograde flow into the aneurysm sac through collateral (inferior mesenteric artery and/or iliac arteries). Type IIa endoleaks refer to endoleaks caused by a single feeder and type IIb to the presence of multiple feeders. Type III endoleaks are leaks, which stem directly from a defect in the stent graft into the aneurysm sac, either caused by separation of modular components (type IIIa) or a fabric tear itself (type IIIb). Type IV endoleaks refer to an inadequate seal in the aneurysm neck, endo-anchor placement and chimney grafts. The (distal) type IIb endoleaks are typically treated with distal endograft extension as an alternative, transcatheter embolisation of the ‘gutter’ can be performed either using Onyx, detachable coils or a vascular plug, detachable coils or a vascular plug. Type V endoleaks are type III endoleaks (relining) [3].

There is an important difference between the different types of endoleaks, both from a pathophysiological point of view as well as from a clinical point of view, that all have implications for surveillance and treatment. Endoleaks range from low-pressure endoleaks (type II and V) to high-pressure endoleaks (type I, III and IV) that mandate intervention to protect from imminent aneurysm-related morbidity and mortality [3].

Type II endoleaks can be safely monitored of a (demonstrable) extravasation of contrast. Expanding aneurysm sac >5 mm as seen on follow-up CTA scans; aneurysms that show syrniotic aneurysm sac expansion and those patients with an aneurysm rupture.

Type I and III are considered to be “dangerous” endoleaks. The communication between the high-pressure aortic lumen and the perigraft space results in increased sac pressurisation and can lead to sac expansion. Immediate treatment of these endoleaks is advocated because of the increased risk of rupture (9.5 times higher) and lack of spontaneous resolution [4].

Keeping the beforementioned aspects in mind, treatment of endoleaks can be performed in several ways.

Type I endoleaks are the second leading cause for intervention after EVAR and are reported in up to 10% of EVAR cases [5]. Accepted treatment options for a type Ia endoleak include proximal balloon dilatation, placement of proximal aortic cuffs (either standard, branched or fenestrated), large-caliber balloon-expandable (non-covered) stents in the aneurysm neck, endo-anchor placement and chimney grafts. The (distal) type IIb endoleaks are typically treated with distal endograft extension as an alternative, transcatheter embolisation of the ‘gutter’ can be performed either using Onyx, detachable coils or a vascular plug, detachable coils or a vascular plug.

Type II endoleaks are the most frequent and occur in approximately up to 40% of cases after endograft placement. The management of type II endoleaks continues to be a topic of debate and the optimal method of management remains controversial. Embolisation of the inflow and outflow arteries with or without sac embolisation is considered the treatment of choice, although results have been very variable [3]. Access to the type II endoleak nidus can be obtained by the transarterial route (superior mesenteric artery and arc of Riolan for an inferior mesenteric artery endoleak; internal iliac artery and iliolumbar artery for lumbar artery endoleaks), the trans-lumbar route, a trans-ovarian approach and a trans-iliac paraendograft approach [7]. Embolisation can be performed with (detachable) coils and glue-like substances (e.g. Onyx). Prior to conversion to open surgery with explantation of the stent graft, laparoscopic clipping and saccotomy with ligation can be performed.

Type III endoleaks have been described with almost all commercially available devices and the incidence of type III endoleaks is lower with newer devices. The occurrence is reported between 0.9%–2.7% [6]. The treatment of a type IIIa endoleak can consist of interposition of a modular component or complete relining with a bifurcated graft or an aortoiliac prosthesis [6]. In cases of a type IIB endoleak the following treatment options are available: relining of the stent graft or sealing of the fabric tear itself. Relining may be challenging, especially when the fabric tear is close to the flow divider. Relining can be done with an aortic cuff, an iliac limb or as, in some type III endoleaks, with complete relining using a bifurcated or aortoiliac graft. The use of an endovascular sealing (EVS) has been described but it is off-label. Sealing of the fabric tear itself can be done with a vascular plug, saccotomy and a graft can be sutured on the tear (open surgery) [9].

The treatment of type IV and V endoleaks is similar to that of type III endoleaks (relining) [3].

References:

Jos C. van den Berg
Ospedale Regionale di Lugano
Lugano, Switzerland

Jos van den Berg began his work as an R in 1994 at St. Antonius Hospital in Nieuwegein, The Netherlands, becoming Head of their Department of Radiology in 2001. In 2004 he accepted the post of Head of the Service of Interventional Radiology in the Ospedale Regionale di Lugano, Switzerland. He also acts as an Associate Professor of Radiology at the Medical Faculty of the University of Bern. Dr. van den Berg is a past-president of the Dutch Endovascular Forum, and an active member of the Dutch Society of Radiology, CIRSE, SIR and the Swiss Society of Cardiovascular and Interventional Radiology.
How to make your angio suite smart and safe!
Visit the Radiation Protection Pavilion

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

Today’s RPP Mini-Talks, which feature short expert presentations, cover a wide range of topics delving further into various aspects of radiation safety.
We hope to see you there!

Today’s RPP Mini-Talks

<table>
<thead>
<tr>
<th>Time</th>
<th>Mini-Talk</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>MON SEPT 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>09:30 – 09:45</td>
<td>Radiation dose management in prostatic artery embolisation (Philips)</td>
<td>P. Schott (Krefeld/DE)</td>
</tr>
<tr>
<td>09:45 – 10:00</td>
<td>High dose procedures: how to manage dose in renal embolisation</td>
<td>B. Gebauer (Berlin/DE)</td>
</tr>
<tr>
<td>11:00 – 11:15</td>
<td>C-arm management and radiation safety in the angiosuite (Mentice)</td>
<td>L. Lönn (Copenhagen/DK)</td>
</tr>
<tr>
<td>11:15 – 11:30</td>
<td>High dose procedures: how to manage dose in IAT</td>
<td>T. Struffert (Erlangen/DE)</td>
</tr>
<tr>
<td>12:30 – 12:45</td>
<td>Key elements in reducing and limiting radiation dose in EVAR/TEVAR (Siemens Healthineers)</td>
<td>G. Richter (Stuttgart/DE)</td>
</tr>
<tr>
<td>12:45 – 13:00</td>
<td>How to optimise dose in stroke treatment</td>
<td>A. Krajina (Hradec Králové/CZ)</td>
</tr>
<tr>
<td>13:00 – 13:15</td>
<td>How to choose your equipment</td>
<td>P. Reimer (Karlsruhe/DE)</td>
</tr>
<tr>
<td>13:15 – 13:30</td>
<td>Scatter radiation reduction in the interventional suite (Radpad)</td>
<td>E. Radtke (Kansas City, KS/US)</td>
</tr>
<tr>
<td>13:30 – 13:45</td>
<td>High dose procedures: how to manage dose in EVAR/TEVAR</td>
<td>A. Chavan (Oldenburg/DE)</td>
</tr>
</tbody>
</table>
Welcoming the Malaysian Society of Interventional Radiology (MYSIR) to CIRSE

To celebrate the Malaysian Society of Interventional Radiology (MYSIR) joining CIRSE, we caught up with current President, Dr. Alex Tang, and past President, Dr. Jayaladhayumah Mahadevan, to find out more about MYSIR and the current status of IR in Malaysia.

CIRSE: MYSIR recently became a CIRSE Group Member, how would you like to see these two societies working together?

Tang: MYSIR is a young society and we are making efforts to enhance our presence domestically and internationally. CIRSE is a well-established society with large resources and a clearly defined operational framework, which includes its comprehensive guidelines and standards of practice documents. MYSIR would be grateful to receive assistance from CIRSE in helping to strengthen and optimise its own operational framework in order to not only help our young IRs and trainees, but also improve the standards and safety of IR treatments in Malaysia. Regular academic support, intersociety collaboration, training workshops and fellowship training for MYSIR’s young fellows are also sought after by MYSIR.

CIRSE: In what ways does MYSIR currently collaborate with other IR societies on a regional and/or global level?

Tang: MYSIR is gearing up its regional collaborations. Being a member of the Asia Pacific Society of Cardiovascular and Interventional Radiology (APS CVIR), the society is looking for a more enhanced presence regionally, as well as more academic exchanges with the regional IR communities. MYSIR is also looking forward to more fruitful participation in regional exercises, namely the APICO and ACTA. The society has also taken the task of organising the upcoming 6th Asia Pacific Conference in Interventional Oncology (APCIO) in Kuala Lumpur, in October 2019 and has made a substantial contribution to many regional events.

CIRSE: There is currently a significant gender gap in IR throughout Europe. Is this also true for Malaysia? If so, how is the gap reflected?

Mahadevan: We addressed this topic during the last ASM and AARTN 2018 meeting, talking about some of the questions that were included in Prof. Anna Belli’s questionnaire. The existing gender gap in IR in Europe is clearly not positive and something must be done to eradicate it, because attracting more women to IR is crucial if we want to achieve a continuous expansion of the subspecialty. On a more positive note, Malaysia differs in this respect as we currently do not have a gender gap among IR practitioners. However, some concerns among women who think about entering IR in Malaysia do exist, and are often very similar to those echoed by their European counterparts, including the impact of radiation on fertility and the work/life balance question.

CIRSE: How does MYSIR inform patients about IR treatments?

Mahadevan: The awareness of IR in Malaysia is still relatively low, not just among the public but also other medical disciplines. MYSIR has been working very hard to change this through actively promoting IR via newspaper articles, the internet and various engagement programmes. We also have other plans to expand the reach and scope of our promotional campaigns, so even more people can discover what IR has to offer in terms of treatment options. Additionally, intersociety meetings are also being conducted to raise awareness of MYSIR and encourage multidisciplinary collaboration.

CIRSE: What can be done to further develop and promote the field of IR in Malaysia?

Tang: IR was established in Malaysia way back in the 80s, largely pioneered by Dr. Abdul Samad Sakjian who was a Professor of Radiology at the National University of Malaysia. He laid a strong groundwork and stimulated the interest among the young fellows in taking up the specialty. Currently, there are multiple academic training centres in radiology and IR locally, promoting and training new practitioners. MYSIR also organises and collaborates with various local institutions in numerous academic exercises and programmes. MYSIR is also looking forward to a more cohesive collaboration with CIRSE, SQ, APSCVI, APA/TO and ACTA in promoting its services and conducting training workshops for the local IRs and trainees.

CIRSE: What are the biggest challenges for IR in Malaysia?

Mahadevan: From my perspective, one of the biggest challenges is the lack of support from other medical specialties which makes multidisciplinary collaboration very hard to achieve. Unfortunately, it also means that medical practitioners from other disciplines often find new innovative treatments offered by IRs hard to accept, which in practice results in a lower patient uptake of such treatments and this really is a shame. The other key challenge is limited funding, which again makes it difficult to actively promote IR in the country.

CIRSE: What are some of the primary areas of research and practice in IR in Malaysia?

Tang: Most IRs in Malaysia practice interventional oncology as their primary service, apart from the general and specific IR procedures. There is some ongoing research locally in IR pertaining to new treatment strategies in large liver cancer, transaortal management of liver metastases, LutoneoR Lower Limb Extremity Global (LEG) Registry and the Arterial Biodegradable Stent Safety and Outcomes Study, to name a few.

CIRSE: How do you envision the future of IR in Malaysia and globally?

Tang: MYSIR envisions a positive growth of IR services in Malaysia and globally. Being a minimally invasive subspecialty, IR offers a safer and less invasive alternative treatment solution in many clinical entities. With more awareness and acceptance of the IR technology in the other clinical fields, IR should grow and should become a part of the clinical management work flow. With the upcoming national healthcare scheme, IR will be stronger and its presence should have more impact in the practice of medicine, locally and globally.
Join us at the Film interpretation Quiz!

Monday, September 24, 14:30-15:15, Auditorium 1

Coordinators: I.J. McCafferty (Birmingham/UK), O.M. van Delden (Amsterdam/NL)

The Film Interpretation Quiz is one of CIRSE’s most popular sessions and consists of two teams who will compete against each other. Since the introduction of this quiz over 10 years ago, it has become a much-loved feature of the congress!

The participating teams will be given cases to diagnose and then asked to suggest treatment. The film panel will then demonstrate the approach an expert would take towards the solution of a diagnostic/therapeutic problem.
Paediatric urinary tract intervention

Alex M. Barnacle

Urinary tract interventions are some of the most commonly requested procedures in children; it is not too unusual for a general intervention radiologist to be asked to place a nephrostomy or perform a renal biopsy on a child. Most of the urinary tract interventions developed in adults are highly transferable to paediatric practice, from simple drain or stent insertions to more complex renal stone interventions, though there are some key pitfalls to be aware of.

Renal biopsy

The indications for renal biopsy in children are very similar to those in adults. In older children and teenagers, biopsy is often well tolerated with simple sedation such as inhaled nitrous oxide and oxygen, which gives both analgesic and anxiolytic effects. Although a longitudinal biopsy trajectory via the lower pole is common in adults, in children a transverse inter-polar approach is often easiest and almost always provides a high yield of glomeruli. In our centre, a member of the histopathology team attends the IR suite to assess the adequacy of the biopsy under a low power microscope; this ensures that all of our procedures deliver adequate sampling. It is important to know that adult transplanted kidneys are often sited intraperitoneally in small children, so that a lateral flank approach to biopsy is vital in order to avoid crossing the peritoneal cavity [1]. The risk of a major complications after renal biopsy in a child is low, the most common complication being haemorrhage requiring transfusion. However, as with adult practice, the literature almost certainly underestimates the risk of a major complications after renal biopsy. Nephrostomy insertion is often more straight forward in small children, so that adult transplanted kidneys are often sited intraperitoneally in small children, so that a lateral flank approach to biopsy is vital in order to avoid crossing the peritoneal cavity [1].

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Nephrostomy insertion

Nephrostomy insertion is often more straightforward in small children, so that adult transplanted kidneys are often sited intraperitoneally in small children, so that a lateral flank approach to biopsy is vital in order to avoid crossing the peritoneal cavity [1]. The risk of a major complications after renal biopsy in a child is low, the most common complication being haemorrhage requiring transfusion. However, as with adult practice, the literature almost certainly underestimates the risk of a major complications after renal biopsy.

Ureteric stenting

The antegrade approach to ureteric stenting is essentially the same as that in adults but operators should note that upper pole puncture is often not a safe option in children, as the kidney lies high in the abdomen and the upper pole can often only be accessed from above the 11th or even 10th rib. Crossing tight or tortuous upper ureters may require the initial use of an 0.014- or 0.010-inch hydrophilic guidewire. Ureteric strictures can be treated using conventional angioplasty balloons, though cutting balloons can also be considered. Remember that ureters are very short in small children; the use of variable length silicone stents means that the ureteric length does not need to be measured, using this device saves significant time.

Percutaneous nephrolithotomy PCNL

Renal stone disease is uncommon in children but its incidence is increasing. Frustratingly, the diagnosis is often made very late as children present with highly non-specific symptoms and radiologists seem to forget that children can get renal stones, too, so that the imaging features are often underrecognised [4]. This means that children often have a very large stone burden and significant compromise in renal function when their disease is finally recognised and relatively urgent intervention is required. Small stones and debris often respond very well to extra-corporeal shock wave lithotripsy (ESWL) but children with multiple, dense stones or with staghorn calculi require a more invasive approach. As in adults, minimally invasive percutaneous nephrolithotomy (PCNL) is the gold standard of care but far too few centres are offering this option to families [3]. Having said that, PCNL is a complex procedure in small children and should only be undertaken in a specialist centre with an experienced team.

The procedure itself is similar to that used in adults and stone-free rates are comparable. Traditionally, track size is usually 24 Fr. though, as with adult PCNL, there is an increasing trend towards micro- and ultra-micro PCNL techniques [6]. The unique challenges of paediatric PCNL include the reduced range of endoscopic instruments available for paediatric use and the greater significance of haemorrhage and hypothermia in small children. The risks mean that operative times should be kept to a minimum and many centres still argue that a larger balloon, allowing quicker stone retrieval, is still the safest option for children in many cases. Balloon-based single-dilatation systems used in adults are often less useful in children as it can be impossible to get a sufficient proportion of the system into the collecting system to allow stable balloon inflation. Because children’s collecting systems are small and the angles are tight, multi-track PCNLs are not uncommon to achieve complete stone clearance. Paediatric renal units tolerate multiple tracks very well but again, this approach requires expertise and experience. There is a trend for tubeless and stentless PCNL in children but this approach depends very much on the underlying aetiology of the child’s urolithiasis and the complexity of the PCNL procedure itself, children with a high propensity for stone formation, such as those with cystineuria and those with scattered collecting systems benefit from well-draining clot-free systems post-operatively and this often requires repeated irrigation via a drain for 2-3 days [7].

We know that all these procedures are both safe and effective in children and that image-guided procedures are the gold standard of care, both urologists and radiologists should be encouraged to offer such minimally invasive options to children and their families.
Update on randomised trials with drug-coated balloons and drug-eluting stents

Alessandro Cannavale, EBIR

The infrapopliteal area is one of the most resistant to treatment, as restenosis of lesions in this territory is high, ranging from 42% to 69% in the first 12 months after angioplasty alone. We certainly face an environment that is completely different from others as aorto-iliac or femoropopliteal segments. The main difference is related to the multiple factors that have a role in infrapopliteal disease, including patient selection, foot care, concurrent vein disease, diabetes, calcifications, medical therapy and follow-up.

All these factors may lead to very different results across randomised controlled trials, real-world registries and investigative studies. Holding onto the recent favourable results in other vascular districts, drug-eluting stents and drug-coated balloons have paved their way through the harsh infrapopliteal environment. However equivocal results from RCTs have mined the clinical application of these devices, with special focus on drug-eluting stents and drug-coated balloons in the peripheral vasculature.

Clinical endpoints such as the target lesion revascularisation (TLR), clinical improvement of Rutherford class (wound healing/pain relief), amputation rate and overall survival, represent the main outcomes analysed in studies and trials. TLR is particularly important as a prognostic value in CLI patients because early failure of endovascular recanalisation was found to predict limb loss and poor prognosis and repeat interventions with multiple contrast exposures are harmful in these sick patients with frequent life-threatening comorbidities.

If we look at patient selection in RCTs, we must commonly face male diabetic patients with hyperlipemia and hypertension (>50% of selected patients). With regards to the clinical stage of patients, Rutherford class 4 and 5 are the most reported, although some RCTs also selected patients with Rutherford class 2 and 3 (BLOULIX P, YUKON-BTK, ACHILLES) and some RCTs also included Rutherford class 6 (major tissue loss; DEBATE-ITK, 18.3%; IN.PACT DEEP 1.7%). Transcutaneous capillary pressure of oxygen (TcPO2) was only used in the In.PACT DEEP trial and the new WITT [wound, ischaemia and foot infection] system was not considered in any trial.

Another crucial point to consider is the lesion’s characteristics. In general, RCTs on drug-eluting stents selected patients with lesions about 40 mm or less. On the other hand, in RCTs on DCB much longer lesions were treated measuring about 110 mm (mean length). Severe calcifications are variably present across DCB and DES RCTs. After the initial encouraging results from earlier trials (DEBELLUM, DEBATE BTK, the In.PACT PDEP trial of In.PACT Amphinor® Drug Eluting Balloon vs. Standard PTA for the Treatment of Below the Knee Critical Limb Ischaemia), failed to demonstrate the superiority of drug-coated balloons (DCB) over plain angioplasty (PTA). Unfortunately, this well-designed study showed no significant differences between the two groups in 6-month clinically-driven target lesion revascularisation (CD-TLR) or angiographic late lumen loss. There were also more complications in the DCB arm and a trend toward more major amputations (8.8% vs. 3.6%, P = 0.083) and lower amputation-free survival (81.1% vs. 89.2%, P = 0.007).

Accordingly, the IDEAS trial confirmed the lack of a mid-term advantage of DCB over DES in the treatment of long infrapopliteal lesions (mean lesion length: 137.5 mm): DCB did not perform better in terms of Rutherford class, binary restenosis or TLR (i.e. 6-month TLR 7.7% vs. 13.6%; P = 0.65). Despite these adverse results, several considerations should be made on the specific DCB platform (i.e. In.PACT Amphinor has non-uniform drug-coating), study power, endpoints and multidisciplinary wound/foot care.

For these reasons, the impact of DCB on clinical and angiographic improvement still remains controversial, hence DCB are not yet recommended to be used as an alternative to PTA in the BTK arteries, as there is no satisfactory supporting evidence. Further trials on DCB in the below the knee arteries are ongoing and the results are highly anticipated.

On the other hand, clinical effectiveness of DES has been tested in several trials and long term studies.

In fact, infragenicular-limus DES seems to have stronger evidence on clinical effectiveness than DCB. Most recent trials and studies reported enthusiastic limb salvage rates (i.e. SES 98.7% at 1 year (YUKON) also sustained at 3 years and low TLR rates of 8.7% (DESTINY)) and 13.8% (YUKON). Longer term results (4-year follow-up) from the PADDY trial, demonstrated amputation- and event-free survival rates were significantly higher in the DES arm than in the PTA/BMS arm (31.8% vs. 20.4%, P = 0.043), and 26.2% vs. 15.3%, P = 0.041 respectively. Only the PES-BTK-70 trial explored the paclitaxel-eluting stents Stentys (coronary), finding satisfactory results with freedom from TLR of 79.1% at 1 year and limb salvage of 98.5%.

According to the most recent metaanalysis, the risk of target lesion revascularisation (TLR, odds ratio [OR] = 0.38, 95% confidence interval [CI] = 0.23-0.63, P = 0.01), restenosis rate (OR = 0.50, 95% CI: 0.18-0.50, P < 0.01) and amputation rate (OR = 0.49, 95% CI: 0.29-0.83, P < 0.01) were significantly decreased in the DES group vs. PTA/BMS. TLR rates in relation to lesion length are reported in chart 1 and 2 for DCB and DES RCTs respectively.

Otherwise, DCB did not show a significant difference in risk of restenosis rate (i.e. OR = 0.49, 95% CI: 0.11-2.14, P = 0.30), amputation rate (i.e. OR = 1.32, 95% CI: 0.51-3.40, P = 0.57) and overall survival (OR = 1.40, 95% CI: 0.72-2.71, P = 0.32) vs PTA group.

Conclusion

There is level 1 evidence for DES (4 RCTs and 4 metaanalyses) on the superior effectiveness of DES in the treatment of short lesions (< 43 mm) in below the knee arteries in patients with critical limb ischaemia. These results in particular support primary or bailout use of DES.

DCBs are promising but, as they were tested against longer calcified lesions and results from different RCTs were equivocal, further evidence is strongly needed. The main characteristics of RCTs are summarised in Table 1 and 2. To date the results from RCTs still support plain balloon angioplasty as a workhorse technique and bail-out or spot stenting using DES.

References:

Chart 1: Column graph shows TLR rates and lesion length in current RCTs on DCB.

Chart 2: Column graph shows TLR rates and lesion length in current RCTs on DES.
### Table 1: Resuming the main features and outcomes of RCTs comparing DES to PTA ± bail out BMS. *IDEAS compared DES vs DCB. ^DESTINY trial compared DES vs BMS.

<table>
<thead>
<tr>
<th>Study</th>
<th>Rutherford class</th>
<th>Stent used</th>
<th>Lesion length (mm)</th>
<th>Severe calcifications</th>
<th>Medical therapy</th>
<th>Outcome at 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACHILLES</td>
<td>3 to 5</td>
<td>Cypher Select (sirolimus)</td>
<td>26.9 ± 20.9</td>
<td>15%</td>
<td>Dual antiplatelet for 6 mos</td>
<td>SES had significantly greater freedom from death, TLR bypass, amputation, and Rutherford class &gt;4</td>
</tr>
<tr>
<td>YUKON BTK</td>
<td>2 to 5</td>
<td>Polymer free-sirolimus eluting stent</td>
<td>31±9</td>
<td>N/R</td>
<td>Dual antiplatelet for 6 mos</td>
<td>SES had significantly better event-free survival, amputation rates, and changes in Rutherford-Becker class</td>
</tr>
<tr>
<td>DESTINY^</td>
<td>4 (39%)</td>
<td>XIENCE V (everolimus)</td>
<td>18.9 ± 10.0</td>
<td>77%</td>
<td>Dual antiplatelet for 12 mos at least</td>
<td>Reduce need of re-intervention in DES (freedom from TLR 91% vs 66%)</td>
</tr>
<tr>
<td>PES-BTK-70</td>
<td>4 (52.9%)</td>
<td>Stentys (paclitaxel)</td>
<td>17.2±8.5</td>
<td>N/R</td>
<td>Dual antiplatelet for 12 mos at least</td>
<td>TLR 79.1% Limb salvage 98.5%</td>
</tr>
<tr>
<td>IDEAS*</td>
<td>4 and 5</td>
<td>• Resolute (zotarolimus) • Chypher (sirolimus) • Promus (everolimus)</td>
<td>127±46.5 mm</td>
<td>50%</td>
<td>Dual antiplatelet for 6 mos</td>
<td>TLR and amputation similar Lower BR for DES</td>
</tr>
<tr>
<td>PADI</td>
<td>4 to 6</td>
<td>Taxus (paclitaxel)</td>
<td>21.1±19.3</td>
<td>N/R (TASC D) 93.9%</td>
<td>100 mg of carbazate calcium daily indefinitely and Clopidogrel 75 mg/daily ≥ 6 months</td>
<td>Vessel restenosis, major amputation, or CLI-related death worse in PTA vs DES (up to by follow-up)</td>
</tr>
</tbody>
</table>

### Table 2: Resuming the main features and outcomes of RCTs comparing DCB versus PTA ± bail out BMS.

<table>
<thead>
<tr>
<th>Study</th>
<th>Rutherford class</th>
<th>DCB used</th>
<th>Lesion length (mm)</th>
<th>Severe calcifications</th>
<th>Medical therapy</th>
<th>Outcome at 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBATE BTK</td>
<td>4 to 6</td>
<td>IN.PACT Amphirion (paclitaxel)</td>
<td>129±83</td>
<td>25%</td>
<td>• Aspirin 100 mg lifelong</td>
<td>Drug-eluting balloons compared with PTA strikingly reduce 1-year restenosis, target lesion revascularization, and target vessel occlusion</td>
</tr>
<tr>
<td>BOLUX PII</td>
<td>2 to 5</td>
<td>Passeo-18 Lux (paclitaxel)</td>
<td>113.1±88.1</td>
<td>26.5%</td>
<td>Dual antiplatelet for 1 month</td>
<td>DBC results (amputation, TLR) comparable to PTA+BMS</td>
</tr>
<tr>
<td>DEBELLUM</td>
<td>3 to 5</td>
<td>IN.PACT Amphirion (paclitaxel)</td>
<td>77±18</td>
<td>N/R</td>
<td>• Aspirin 100 mg lifelong</td>
<td>Significant reduced LLL, restenosis and TLR in DCB vs PTA group</td>
</tr>
<tr>
<td>In.PACT Deep</td>
<td>4 to 6</td>
<td>IN.PACT Amphirion (paclitaxel)</td>
<td>101.5±91.0</td>
<td>13.7%</td>
<td>N/R</td>
<td>DBC comparable to PTA</td>
</tr>
<tr>
<td>IDEAS*</td>
<td>4 and 5</td>
<td>IN.PACT Amphirion (paclitaxel)</td>
<td>127±46.5 mm</td>
<td>50%</td>
<td>Dual antiplatelet for 6 mos</td>
<td>TLR and amputation similar Lower BR for DES</td>
</tr>
</tbody>
</table>

Join us in the Members’ Lounge!

As a special service to members, CIRSE is offering a Members’ Lounge at Lisbon 2018.

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Cardiovascular and Interventional Radiological Society of Europe
A landmark quality assurance paper published in 2017 is helping the IR community to move towards a uniform framework for complication reporting.

As interventional radiologists continue to move towards a more explicitly clinical role within their hospitals, the focus of their research is also starting to shift. While it remains as important as ever to ensure that innovative or updated procedures are safe and effective, a more nuanced approach to patient management has crept in – a move most certainly for the better.

CIRSE has been supporting this shift, with the congresses of the last decade featuring increasing numbers of sessions incorporating clinical practice, multidisciplinary decision-making, and complication management and avoidance. A dedicated mini-congress, the International Congress on Complications in IR (ICCIR) is held every two years, and provides an open forum for the frank discussion of cases that didn’t go as expected.

As part of this movement, a CIRSE quality assurance document was published in CardioVascular and Interventional Radiology in the summer of 2017: ‘CIRSE Quality Assurance Document and Standards for Classification of Complications: The CIRSE Classification System’. Written by Dr. Dimitrios Filippadis and other CIRSE colleagues from across mainland Europe, this Standards of Practice document serves as a classification system of medical complications, combining outcome and severity of sequela.

Up until now, there has never been a uniform method for reporting complications within Europe, and this paper thus bridges a big gap in IR literature. It addresses definition and grading, and will be vastly helpful in both improving patient outcomes at a local level as well as providing a robust European data framework.

Outcomes for the diverse spectrum of IR procedures are necessary not only for enhanced care of the individual patient; accurate figures are also crucial for hospitals, insurance companies and government agencies – anybody which is committed to implementing a high-quality health care policy. The information is also hugely valuable for devising reimbursement strategies and cost-effective treatment paradigms. Thus, having uniform data from across a large region will be of major benefit in widening patient access to minimally invasive therapies.

The importance of this paper is plain to see: despite being published midway through the year, the paper made CVIR’s 2017 listing for all-time Top 5 Downloads, with an astonishing 1,738 downloads by the end of the year. The paper itself states: “The ultimate challenge will be the adoption of this system by practitioners in different countries and health economies within the European Union and beyond.” However, the huge interest already shown would indicate that the IR community, at any rate, are fully behind this decisive move towards quality assurance.

CIRSE Members enjoy a complimentary subscription to CVIR, and can access the full paper at www.cvironline.org.
IR has always been a discipline on the forefront of technological advancement, resulting in the need for sufficient scientific publication possibilities on these advancements. What are your thoughts on IR scientific publishing, particularly for technical notes and other short communications?

Kok: As our specialty matures, the output and quality of scientific research in IR is also growing in tandem. This is good for our specialty as the need for high-level scientific evidence to both support the use of current image-guided therapies and to identify gaps in our knowledge is necessary for continued advancement for both patients and the medical community. Undoubtedly, the demands on established IR journals far outweigh the capacity to publish.

Short communications and technical notes have always been important to IRs, as they provide a avenue to share a new technique or interesting clinical situation with other colleagues and the educational value of such articles should not be underestimated. However, it has been increasingly difficult to submit such pieces to established IR journals due to lack of space and competition from sources outside the specialty. Ten years ago, it would have been relatively easy to submit a case report to a mainstream journal but now, it is very difficult to do so, if not almost impossible.

What has your experience with open access been like, particularly with publishing in CVIR Endovascular?

Kok: We were careful early on in the era of open access to publish with reputable journals as there can be a very wide variation in editorial quality between journals. I found the submission experience with CVIR Endovascular very professional and transparent, with a good Springer online submission platform and an internationally renowned Editorial Board. These are all hallmarks of a high-quality journal.

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?

Kok: I think metrics such as impact factor and citation index are important as they provide some (albeit imperfect) measure of the importance and influence of published work. Nevertheless, I do not think that excessive emphasis should be placed on this as it does not necessarily equate to high-quality work or relevance to the specialty. For example, the leading IR journals – CVIR and JIR – are “high impact” within the IR circle with a lot of work relevant to daily practice, but the impact factor of each would not be anywhere near the New England Journal of Medicine.

Young scientists find it more and more difficult to get their first papers published. Do you think that CVIR Endovascular can play a role in improving the situation?

Kok: Absolutely, I think CVIR Endovascular will provide a valuable avenue to those starting out in their research career by providing a path to robust and high-quality output for their work. It will provide some peace of mind to young investigators in that as long as they focus on producing high-quality and scientifically robust work, there will be a journal that will consider their work favourably.

Would you consider submitting your scientific work to CVIR Endovascular again and if so, why?

Kok: Certainly, I think CVIR Endovascular will grow from strength to strength and I know any submitted work will be subjected to a transparent and rigorous review process from internationally established experts in the field, many of whom are also regular reviewers for CVIR. I look forward to the continued success of the journal.

Aljarrah: In the current era of endovascular tools and techniques, published literature must be in line with advanced technology. Currently, the publication of high-quality and reliable research is limited to certain journals. International conferences provide an important platform to invite prominent experts to publish their technical tips and tricks in CVIR Endovascular.

Open access is the future of scientific publishing. What has your experience with open access been like, particularly with publishing in CVIR Endovascular?

Aljarrah: Open access publications provide a valuable source for daily clinical practice, which is readily available for clinicians especially when dealing with new technologies and techniques in surgical therapy. I have published work in open access journals and am pleased that they are globally accessible at no cost. The publishing process with CVIR Endovascular was thorough and resulted in feedback that was helpful and valid.

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?

Aljarrah: Impact factor provides an insight regarding the quality of published work and therefore provides a reliability index of published data. At our institution our work must be published in Q1 or Q2 journals otherwise the work is not counted for promotional purposes. In my opinion, strict publication criteria are important to guaranteeing high-quality research. However, for case reports the publication criteria should be less strict to allow experts from all over the globe to provide important data regarding rare pathologies and their appropriate management.

Young scientists find it more and more difficult to get their first papers published. Do you think that CVIR Endovascular can play a role in improving the situation?

Aljarrah: In my opinion an interactive publication process, similar to that of the American Journal of Case Reports, can provide an easier submission, and therefore also publication, pathway. Moreover, the ability to check the status updates on your publication is a good tool and provides reassurance for the authors.

Would you consider submitting your scientific work to CVIR Endovascular again and if so, why?

Aljarrah: I would consider submitting work again if CVIR Endovascular gains the indexing of its mother journal, CVIR. I am sure that CVIR Endovascular will gain indexing at Scopus Thomson, PubMed Central and Web of Science (Clarivate Analytics), which will surely improve the recognition of the journal worldwide.

Reference:
IR has always been a discipline on the forefront of technological advancement, resulting in the need for sufficient scientific publication possibilities on these advancements. What are your thoughts on IR scientific publishing, particularly for technical notes and other short communications?

Grenon and Ramirez: With the rate of innovation and changes in technology, there is certainly a need to continue to exchange information. Brief reports and communications are key to spreading unique ideas, knowledge and experiences. High-quality cohort studies and clinical trials are often inspired by an idea or challenging case. Being able to share these ideas and cases is a very important aspect of providing excellent patient care and sharing clinical philosophies that have the ability to impact patient care worldwide and direct future research.

How did you find the editorial handling experience?

Grenon and Ramirez: Open access is crucial to ensuring that your work is shared adequately with peers, patients, the industry and innovators. We had an excellent experience with CVIR Endovascular and the editorial process was flawless.

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?

Grenon and Ramirez: Impact factor is important in the sense that it is a way to measure the amount of exposure an article is receiving. Within our group, we continue to aim to publish in journals with high impact factors. However, we need to recognise that this is one way of doing it and there are other ways of measuring the impact of an article. We expect such measures to keep evolving as we better understand what is needed to truly impact innovation and science.

Young scientists find it more and more difficult to get their first papers published. Do you think that CVIR Endovascular can play a role in improving the situation?

Grenon and Ramirez: Providing journals that are easily accessible and provide a fair and meaningful peer-review process is important, particularly for young scientists who have yet to produce a significant body of work. CVIR Endovascular may be able to play a role in this process. In the future, it would be nice to see discounted open access fees or fee waivers specifically for students, trainees and/or young faculty.

Would you consider submitting your scientific work to CVIR Endovascular again and if so, why?

Grenon and Ramirez: Yes, we had a positive experience with the submission, review and editorial process. As the journal becomes more established and gains a steady stream of readers it will become an excellent method for communicating ideas in vascular disease and endovascular techniques. The open access format and willingness to publish short communications and case reports will make CVIR Endovascular a unique journal with an important role in vascular and endovascular research.

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**Cook at CIRSE**

**Monday at the Cook booth**

Meet the Experts: 10:00-10:45

Drs. Gerry O’Sullivan and Rick de Graaf: Treatment of patients with chronic venous obstructions, our approach

EndoWars: 11:30-16:00

Fellows: Today is your last chance to compete in the SFA simulator challenge. Register at the Cook booth.

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**Reference:**

Grenon SM, Ramirez J. Depression and Peripheral Artery Disease: Why we should care and what we can do. CVIR Endovascular. 2018; DOI: 10.1186/s42155-018-0017-1

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**Authors:**

Marlene Grenon

University of California San Francisco, USA

Joel Ramirez

University of California San Francisco, USA

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**Article type:** Short Communication

**Title:** Depression and peripheral artery disease: Why we should care and what we can do

Marlene Grenon is presently an Associate Professor in the Department of Surgery at the University of California San Francisco, a staff surgeon at the VAMC San Francisco and an Adjunct Faculty at the International Space University. She is a member of many professional organisations and has been an invited lecturer at several regional, national and international meetings and conferences. Her current research program encompasses lifestyle modifications for peripheral arterial disease and adaptations to the gravitational mechanical unloading environment.

Joel Ramirez is a M.D. candidate at the University of California San Francisco. During medical school he spent a year conducting full-time research with the UCSF Division of Vascular and Endovascular Surgery under the guidance of Dr. Grenon and is currently applying to integrated vascular surgery residencies. He has authored many publications and has a demonstrated interest in translational research, medical education, and advocacy within surgery.
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Monday, September 24th, 2018
13:00 - 14:00 | Auditorium 8
Pushing boundaries in loco regional treatments of liver cancer
Chairs: Dr. R. Izzi, Prof. B. Guiu
Speakers: Prof. M. Bezzi, Dr. F. Veloso, Prof. M. Lam, Dr. L. Bargellini

PUSHING BOUNDARIES
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The prevalence of women radiologists has risen in the past decade [3, 2]. However, women are grossly underrepresented in interventional radiology (IR), and this may be partly due to fear of radiation exposure, particularly at child-bearing age. There is a growing body of literature on potential health effects associated with long-term exposure to low-level radiation, occupational exposure of pregnant and potentially pregnant women being of particular interest. Radiation exposure of the conceptus [3-10]. However, practical advice for women who plan a career in interventional radiology or interventional radiologists who train and counsel female residents is rare.

The basis for the control of the occupational exposure of women who are not pregnant is the same as that for men. The additive risk of developing cancer is considered to be very small [3, 10-15]. However, women of child-bearing age may have a heightened concern about the long-term genetic risks or in case of pregnancy the risks of their unborn child related to exposure of low-level radiation. This issue has been extensively discussed in the literature [4, 16, 17]. For example, according to the Report 174 of the National Council of Radiation Protection and Measurements (NCRP), there is little to no evidence among the offspring for an excess of cytogenetic syndromes, single-gene disorders, malformations, stillbirths, neonatal deaths, or cancer, or congenital malformations that would indicate an increase in heritable genetic mutations in the exposed parents [18]. At present, there is no evidence that exposures to the conceptus below 1 mSv during the whole pregnancy involve an additional risk to an unborn child [18, 19]. Based on this threshold, guidelines were established to minimize risk to patient and conceptus from diagnostic imaging (20, 21, 22). These guidelines help health-care workers in managing risks for pregnant patients and counselling pregnancy-related issues.

When appropriate steps are taken to establish a safe radiation environment in interventional radiology (IR), the occupational exposure is very low [14, 23]. Current data show that under appropriate personal dose equivalent Hp(10) measurements are typically of 0.01 mSv per case for the operator; the conceptus dose is generally <0.005 mSv per case [4]. Thus, the threshold for an increased risk to the conceptus of 1 mSv during pregnancy is not reached. Nevertheless, even if radiation dose to conceptus is lower than the limits, a strategy to reduce them to the lowest possible level has to be applied. Strategies to decrease dose to patients and staff do not differ if a pregnant or pregnant IR is performing the procedure. However, the female IR should wear an apron with an equivalent of 0.5 mm Pb or higher.

Summary

• Considering available risk evaluations, the dose limit for the conceptus of less than 1 mSv during the whole pregnancy is extremely conservative.

• Based on currently available knowledge, this limit is not reached in clinical practice and there is no need for pregnant or potentially pregnant interventional radiologists to be excluded from work on the grounds of radiation exposure.

• By keeping below the occupational dose limits, the risk of developing radiation-induced genetic defects in the offspring is negligible. Thus, women of child-bearing age should not be discouraged from entering the field of IR.

• With appropriate radiation protective measures in place, the risk of developing cancer for the unborn baby and the mother is not increased.

• Robust and appropriate standardised operating procedures must be in place to prevent unintentional overexposures during fluoroscopic-guided interventions (FGI).

• Interventional radiologists should be aware of how to minimise radiation dose and when extra protective measures may be required such as in complex procedures.

• It is the woman’s choice, based on the above information and her general health during pregnancy, whether to continue to perform FGIs.


Open access funding provided by University of Innsbruck and Medical University of Innsbruck.
Becoming an IR: Empowering the Future Generation

The European Trainee Forum (ETF), which was formed late in 2015 and is led by Chairperson Dr. Greg Makris, had its first official meeting during ECOI 2016. The main objective of the ETF is to bring the trainees closer together at the early stages of their careers, creating a dynamic community that shares the same values and aspirations. The Forum’s other key objective is to develop and support the new generation of IR trainees across Europe. Establishing this network early on is important for improving the quality of IR training in Europe, and raising public awareness of IR.

Creating opportunities for collaboration with other European societies and associations is also high on the ETF agenda.

We had a chance to ask ETF Subcommittee Member, Dr. Sara Protto, some questions about her perspectives on becoming an IR. Read on to find out what she had to say!

CIRSE: What inspired you to choose IR as a career?

Sara: When I began my medical studies, I wasn’t sure which specialisation I would choose: surgery, internal medicine, pathology? Ironically, I was confident radiology was not in my future! As a fourth-year medical student I considered becoming a cardiologist, but while on Erasmus, I saw some IR colleagues performing some BTK and aorta procedures and almost immediately fell in love with the field. I realised IR was way cooler than I thought and that the patients and the oncological patients and revolutionising their treatment.

CIRSE: The gender ratio in IR is currently quite significant; do you have any advice for females entering the discipline?

Sara: Let’s stop thinking about doctors as male or female! Let’s start thinking of ourselves as professionals working for the good of the patient. Our discipline is not different from any other, which means we all have the ability to do a great job if we really love what we do! Never let boundaries stop you because you are a woman, and more importantly, don’t build boundaries up against yourself. Believe in what you can do!

CIRSE: Can you comment on being a working mother in IR and your experiences with regards to the hot topic of myths on radiation risks?

Sara: In Finland, we are not allowed to perform radiation work while pregnant. I know that nine months plus a few months after delivery can feel never-ending when you love what you do, but, in the end, this is only a small proportion of the overall lifetime! I returned to work after five months and I felt that the absence didn’t affect my work or my career. While I was home, I took advantage of the extra time and finished my doctoral thesis.

CIRSE: You are an Italian native working in Finland – that’s a really interesting combination. Can you tell us how you ended up in Finland? Do you work in Finnish?

Sara: I actually discovered IR while in Finland on Erasmus. I really enjoyed working with my colleagues as well as the actual work environment. So, I returned every summer during the holidays to work in the hospital. I also met my husband in Finland, so when choosing where to work, the choice was easy. I use the Finnish language at work and I don’t even know if I could write a report in Italian!

CIRSE: What is the ETF doing to support IRs in training?

Sara: The ETF is within the process of building a network for young IRs throughout Europe. We organise lectures and events at the CIRSE congresses, have an active online Facebook presence where we share cases and articles, and we hope to organise opportunities for exchange and mobility for young IRs in the future.

CIRSE: What advice would you give to medical students throughout Europe who are choosing their medical specialisation?

Sara: During medical school try to learn about as many specialisations as possible. The idea you have in your mind could be really different from the actual everyday job! If you are lucky, you will find the field you love and there will be no doubt on what to do! Speaking practically, set your priorities in life and look for the job that best suits you.
Students in the Spotlight

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

CIRSE: Why did you decide to study in Slovenia?

Tajda: I decided to study in Slovenia because, although we are not as well-known or are as financially fortunate as other universities, we do have a great study programme that offers students a lot of theoretical knowledge and practical skills from the third year onwards. I always wanted to study abroad, so to complement my studies, I went on Erasmus Exchange in Innsbruck, Austria for a year and have also done clinical and research exchanges in Switzerland and Spain. I doubt I would have been able to go abroad as much if I studied in another country.

CIRSE: Tell us something unique that we don’t know about Slovenia.

Tajda: Slovenia is shaped like a chicken. It is one of the rare countries that have everything – mountains (higher than 2000m), coast and plains. You can get from the most north-east part (the head of the chicken) where most of the plains are located, to the most south-west, coastal part (leg of the chicken) in three hours. What more can one wish for?

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

Armin Dan: The city where I study does not have a specialised IR centre, so undergraduates receive some exposure to IR, as we are taught about several procedures, but generally there is little knowledge about IR as a specialty. I personally found out about IR when I heard about CIRSE and its Student Programme from an older colleague who attended in 2016. He had only good things to say about the congress, so I read up on IR, found it fascinating, and decided to submit my research and attend the congress in 2017, alongside a friend that I convinced to tag along. At first, he was quite reserved when I told him about CIRSE, but he changed his opinion after the first day of the congress!

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

Armin Dan: My dream would be to practice in Stockholm, Sweden, at the Karolinska Hospital, because it is one of the most prestigious hospitals in the world. I also admire the Swedish model, both as a society and as a medical system.

Crossword Puzzle

Across

4. Enjoy the view of Lisbon!
7. Technique involving the mechanical dilation of a narrowed or occluded vessel by means of a balloon catheter and a metal stent
8. Birthplace of the Portuguese custard tart
9. High blood pressure
10. A technique that can use microwave, laser, cryo-, radiofrequency, or high-intensity focused ultrasound

Down

1. Anagram: bail emotions
2. Meet, Share, . . . . . .
3. A common complication of percutaneous transhepatic lithotripsy
5. Inventor of balloon angioplasty
6. Take part in this Student Programme event tomorrow

Coming up tomorrow!

- Resources to stay involved in IR
- Learn about the new IR Curriculum for Medical Students from Dr. Roberto Cazzato
- Meet your peers from Germany and Italy
- Last chance to compete in the Questions of the Day challenge
ECIO 2019

European Conference on Interventional Oncology

April 8-11
Amsterdam, Netherlands

www.ecio.org

LEADERS IN ONCOLOGIC INTERVENTIONS

Submit your abstracts by October 29!
Collaborating Against Cancer Initiative:
Dr. Ayuso and Dr. Diaz-Gonzalez

As part of a new interview series, we spoke with a number of pairs from around the world who took part in the Collaborating Against Cancer Initiative during ECIO 2018.

Thanks to CIRSE’s popular Collaborating Against Cancer Initiative, hundreds of non-radiologist colleagues have received a travel grant and attended ECIO free of charge over the years. This grant option allows the colleague to see the variety of interventional oncology options available and for positive interdisciplinary relationships to be fostered.

We caught up with recipients of the initiative Dr. Carmen Ayuso, ECIO Faculty Member, and her gastroenterologist colleague, Dr. Alvaro Diaz-Gonzalez from the Hospital Clinic of Barcelona in Spain.

CIRSE: How does multidisciplinary teamwork function in your hospital?

Diaz-Gonzalez: It is not only about having a meeting every single week and talking about important issues, it’s about having the same philosophy. We don’t discuss every single case because we do 80-100 follow-up visits every week and we cannot discuss every single patient but we take time to discuss all the difficult cases.

CIRSE: Can you talk about the treatment pathway in your hospital?

Diaz-Gonzalez: At the first visit we have a complete review of the patient situation, not only the current situation but also the previous history about the liver disease and other comorbidities. Then, after a complete visit we do an ultrasound to make a first diagnosis and treatment plan. We also act as a referral centre. We receive many patients from other hospitals and so we, therefore, usually ask them to bring the images with them. We then review the case, despite the fact that they may have already been diagnosed, because we like to confirm it in order to offer the patient the best treatment option.

CIRSE: Why did you take part in the Collaborating Against Cancer Initiative?

Diaz-Gonzalez: It has allowed someone like me to attend these radiological meetings and to be open-minded. I mean that in the sense of listening to other people’s opinions. If we just go to the liver and oncological meetings and IIs just go to their own meetings, we cannot work as effectively in our daily practice. I think that different societies should be working together on an international level towards this effort.

CIRSE: Are there any particular highlights for you at ECIO?

Ayuso: I like to see the sessions on clinical management as well as new technologies being presented – ECIO provides a great platform for this. The conference is an ideal space to see how colleagues are using new techniques and what results they are achieving for patients.

CIRSE: What do you think interventional oncology needs to do to further evolve?

Ayuso: We need to continue working on new therapies and imaging techniques. What we originally thought we knew about liver cancer, for example, has now been broken. We, therefore, have to learn all together how to manage patients under systemic therapies, immunotherapies and anti-angiogenic therapies because there is a role to improve in the clinical scenario. It’s a very interesting time for IO.

Diaz-Gonzalez: I’m with Carmen on this. This should be true for all medical fields. We have to see the patient as a whole and know that everything we work on, such as developing a device, is for the sake of the patient and improving their survival time. We have to work together, not for fame or to be well known in the scientific field, but for every single patient that is suffering. They are the people who our work is devoted to, this is something that frequently is forgotten in medicine.

Find more about this initiative and our other oncology related projects on www.ecio.org
Cautious pre-procedural planning and intermittent intra-procedural monitoring of the ablation zone can help reduce neurological complications. Excellent knowledge of the relevant neuroanatomy based upon the tumour location is a prerequisite. Peri-treatment MRI can provide valuable information regarding the proximity of the nerve/spinal cord and the tumour. Whenever the distance between the ablation zone and the surrounding neural structures is less than 1.5 cm, some type of protective technique should be applied. Whenever there is a fear that the radicular and spinal arteries are within the zone of treatment, a pre-treatment angiography (CT or DSA) can provide the necessary information. In cases of spinal canal tumour extension, the use of immediate pre-treatment myelography can visualise the location of the spinal cord and nerve roots. It has been proven that thermal diffusion during RF ablation is well limited by thick (5 mm) cortical bone, while the surrounding temperature depends directly on the thickness of the cortical bone and the distance from the peristeme. When cortical bone thickness is <1 mm or when the posterior wall is ruptured, thermal ablation of spinal lesions can lead to hazardous consequences for the surrounding neurological structures. Temperatures >45°C or <8°C are neurotoxic to the spinal cord and the nerves. When using cryoablation, one should keep in mind that the ice-ball can extend through the cortical bone. Though all thermal ablation techniques can be used to treat musculoskeletal tumours, cryoablation has superior monitoring capabilities on multi-modal imaging. This is very important when treating tumours in proximity to vulnerable structures. The ablation zone ice ball is defined on CT as a hypodense area and on MRI as a signal void. Always keep in mind that the surface of the ice ball is 0°C, which can result in neural damage and is not lethal for tumour cells. Insulation techniques and thermal-electrophysiologic monitoring are mandatory to protect the surrounding neurologic structures during thermal ablation techniques. Hydro-dissection is one of the most commonly used insulation-displacement techniques. Saline is not suitable for RF ablation (due to its high electrical conductivity) and DW 5% should be preferred. Gas dissection creates an excellent insulation blanket by displacing the organs that may be affected away from the ablation zone, with minimal cooling or warming effect. CO₂ should be used, as room air may lead to gas embolism. Foraminial hydrodissection is safer than gas dissection. Similarly, gas epidural dissection should be avoided above the L1-L2 level. Thermal sensors (thermocouples) are inserted, coaxially through an 18-G spinal needle, in the epidural space (using a sublaminar approach) or the foramen. They can be placed near the neurologic structure in danger and provide crucial real-time temperature feedback. Whenever the indicated temperature is above 40-42°C or below 10°C the ablation should be disrupted. Special care is needed with RF ablation, as the tip of metal-based thermocouple should never be placed too close to the RF electrode (this could result in arcing and electrical conductivity). Always keep in mind that thermocouples give temperature information on a precise location and not the whole treated area. MRI offers the possibility of non-invasive thermal monitoring (MR thermal mapping) and may prove very promising for future use in this field.

Neurological physical examination can be used when treating patients under conscious sedation, in order to evaluate the relevant nerve pathways. Similarly, in cases of patients under general anaesthesia, electrostimulation of the spinal motor nerves roots can provide valuable information. Whenever the motor response decreases or more energy is needed in order to get the same muscle response, impending nerve damage should be feared and ablation should be resumed. Alternatively, neurophysiological monitoring may be performed with somatosensory and motor-evoked potentials. The above-mentioned techniques have shown high sensitivity and specificity in the detection of permanent post procedural nerve deficits. Both electrostimulation and neurophysiological monitoring provide valuable information regarding the integrity of the totality of the relevant nerve pathway. However, electrostimulation is easier to apply and does not require the presence of neurology specialists. Always inform the anaesthesiological team for the need of electrostimulation or neurophysiological monitoring before the treatment, as paralytic agents should be avoided during general anaesthesia induction. To conclude: over the past few years, the treatment of spinal and pelvic tumours with percutaneous thermal ablation techniques has increased and it seems that the proximity of the spinal nerves and spinal cord is no longer a limitation. However, cautious pre-procedural planning and the application of thermal insulation and temperature monitoring techniques is necessary to avoid major complications. Furthermore, electrostimulation and neurophysiological monitoring can make these challenging procedures safer.
The CIRSE Registry for LifePearl Microspheres

Nathalie Kaufmann, CIRSE Office

Clinical evidence is vital to increase our understanding of minimally invasive procedures and support their development and dissemination as oncological therapies. In its continuous efforts to meet these goals, CIRSE is conducting the CIRSE Registry for LifePearl Microspheres (CIREL), which included its first patient in February 2018. CIREL is a European-wide observational study that gathers data on transarterial chemoembolisation (TACE) using LifePearl Microspheres loaded with irinotecan (LP-IRI) in patients with colorectal cancer with liver metastatic disease (CRLM). The registry observes the real-life use of the device in the context of the patients’ entire cancer treatment and collects extensive data regarding safety and toxicity, efficacy and health-related quality of life. CIREL aims to create an extensive body of data on how drug-eluting microspheres are administered for CRLM as part of routine treatment across Europe from which conclusions can be drawn about when TACE may be most effective and which patients may benefit from this treatment the most.

Why CIREL matters

Although the mortality of CRLM with new systemic treatments has decreased in the last 20 years, treating liver metastases of colorectal cancer is still a major challenge, surgical resection and thermal ablation being the only curative options. However, only about 20% of CRC patients that present with liver metastases are eligible for surgical resection. New techniques, such as TACE with small beads delivering the chemotherapeutic drug to the tumour site, have been developed over the past two decades and show promising efficacy in a limited number of clinical studies. However, larger-scale cohorts representing real-life clinical data are still lacking. This is precisely what CIREL aims to address.

CIREL Objectives

The primary objective of the research project is to improve our understanding of the real-life clinical application of TACE with LP-IRI by prospectively collecting data on treatments and clinical follow-up to ultimately determine at which stage of the cancer treatment TACE is being used and with which intent (e.g. downsizing for surgical or ablative treatment). The secondary objectives of CIREL are to assess the observed treatment outcomes in terms of safety and efficacy as well as to explore predictive response factors.

Outlook

CIREL spans the continent and will enroll up to 500 patients over an initial period of three years and, with a minimum follow-up of 12 months, is projected to end in February 2022. A first exploratory interim analysis will be conducted after collection of 50 full patient datasets.

By collecting real-world data from experienced centres across Europe, the Steering Committee agrees that this registry will create an important dataset that could greatly impact patient selection in TACE. The high level of data quality achieved in CIREL will help indicate when the treatment may be most effective and which patients may benefit from this treatment the most. Interventional radiology is growing fast as a clinical discipline, and CIRSE continuously strives to support its evidence-based approach in every possible way.

New CIREL Steering Committee Member, Dr. Roberto Iezzi: Interventional radiology is my pasta!

Iezzi: It is quite obvious that data on safety and efficacy will be what we are principally looking for. However, as DEBIRI is offered as a palliative option for patients with colorectal metastases, I am also interested in the impact of the procedure on patients’ quality of life: essential knowledge for validating our role in the treatment of cancer patients. Due to technological innovations, new drugs, new techniques, we can obtain disease control for most cancers with an increase in terms of overall survival, highlighting the importance of health-related quality of life as an important endpoint in studies of outcomes in oncology.

In my opinion, information provided by cancer patients via quality-of-life measures is also very helpful for clinical decision-making and better patient management.

CIRSE: If you could only pick one Italian dish to take to your IR practice on Mars, what would it be and why?

Iezzi: As an Italian, I am obsessed with pasta. Furthermore, as a pasta addict, with time I have also become a hunter of unique tools to make fresh hand-made pasta. Making pasta is quite similar to the IR procedures: simple ingredients – flour and eggs – can produce amazing results depending on how you mix them and how you do with those two ingredients. You can really have endless amounts of results, depending on how stiff you make the dough, how long you knead it, what shapes you make, what thickness. I have just started to really know about that aspect of it, and the more I learn, the more I want to learn... interventional radiology is my pasta!
Symposium

AV Symposium: Stenosis in AV Access. Evidence-based Solutions

Date: Monday 24 September
Time: 11:30 - 12:30
Location: Auditorium 1

Agenda

<table>
<thead>
<tr>
<th>Presentation Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update on Stenosis in AV Access</td>
<td>Dr. Pedro Ponce Portugal</td>
</tr>
<tr>
<td>Lutonix® DCB in AV Access. Evidence. Global Registry</td>
<td>Dr. Tobias Steinke Germany</td>
</tr>
<tr>
<td>Covera® Vascular Covered Stent: Latest data and interesting cases</td>
<td>Dr. Bart Dolmatch USA</td>
</tr>
<tr>
<td>AV Treatment: An Algorithmic Approach</td>
<td>Dr. Panagiotis Kitrou Greece</td>
</tr>
<tr>
<td>Endovascular Fistula Creation with the WavelinQ EndoAVF System</td>
<td>Dr. Robert Shahverdyan Germany</td>
</tr>
</tbody>
</table>

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