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A Re(N)Al Step Forward: IR in the Kidneys

The kidneys are a work of engineering genius, regulating all manner of essential functions within the body: blood pressure, homeostasis and hormones, as well as filtering our blood. Nestled within the retroperitoneum, these small organs play a vital role.

Although well protected from external threats by our lower ribs, the muscles and fat of the abdominal wall, and the renal fascia, the kidney's complexity leaves it vulnerable to several disease entities.

However, their location within the abdominal cavity, not far from the skin's surface, mean that many conditions affecting the kidneys can be treated by a minimally invasive approach instead of open surgery, with obvious advantages in terms of reduced complications, the lack of a surgical scar and reduced time in hospital. Fortunately, interventional radiological solutions for many renal pathologies have already been developed. Many of these innovative renal therapies will be discussed at this year's CIRSE congress, allowing attendees to keep abreast of the latest data and outcomes.

- **Percutaneous Nephrostomy**

The most well-known job of the kidney is the filtration of the blood and production of urine, which then drains to the bladder. A blockage (whether caused by tumours, infection or kidney stones) can cause urine to build up, leading to increased pressure that may damage the kidneys. To relieve this pressure, interventional radiologists (IRs) insert a catheter through the skin and into the kidney under image-guidance, allowing the urine to be drained safely. This topic will be discussed during Paediatric interventions, Saturday, September 15, 10:00

- **Dialysis Access**

In patients suffering kidney failure, dialysis offers the vital blood filtration needed. IR plays a valuable role in placing and maintaining access shunts through which the blood can be filtered. Dialysis access management, Saturday, September 15, 11:30

- **Renal Tumours**

The kidney is no stranger to cancers, with renal cell carcinoma being the most common adult renal cancer. For small and multiple tumours, a range of IR treatments exist, notably the various forms of thermal ablation, such as radiofrequency, microwave and cryoablation. These techniques and follow-up imaging will be discussed at a wide range of sessions this year, such as Renal and lung tumour ablation, Sunday, September 16, 11:30 Imaging after ablation: what you need to know, Wednesday, September 19, 08:30

• Transplant Complications

Urological complications after renal transplantation are relatively rare, but can include urinary leaks and ureteric obstruction. In such cases, IRs offer percutaneous nephrostomy, balloon dilation of ureteric strictures, and placement of stents or drainage catheters to restore patency, either alone or as a precursor to repeat surgical intervention. How to manage renal transplant complications, Saturday, September 15, 08:30

• Renal Denervation (Hypertension)

One of the highlights of this year's CIRSE congress will be a Hot Topic Symposium dedicated to catheter-driven renal denervation. This is a novel treatment for patients with resistant hypertension, one of the most prevalent cardiovascular risk factors. While the mechanisms of systemic hypertension are not yet fully understood, it has been shown that activation of the sympathetic nervous system (SNS) is an important factor. The response of the kidneys to SNS activation is to alter the levels of renin and sodium produced, and to induce vasoconstriction, which leads to increased blood pressure. By selectively targeting the renal afferent and efferent nerves, which lie within the renal artery, IRs can reduce SNS activation. The effectiveness of this therapy has been shown at Randomised Control Trial level (the Symplicity HTN- 2 trial), and further trials are on-going. Interestingly, systolic decrease improves over time, with excellent results shown at 12 and 24 months, which also implies that regrowth of sympathetic nerves is unlikely. As sympathetic nerve activity also plays a role in disorders such as sleep apnea, ovarian cysts and insulin resistance, further studies are investigating the potential of renal denervation in these fields too. Renal denervation, Tuesday, September 18, 13:30

• Renal Artery Stenosis

In a world of poor diets, sedentary lifestyles and smoking, narrowing of the blood vessels is sadly common. When stenosis occurs in the renal artery, outcomes can be extreme: despite their relatively small size, the kidneys receive almost 20% of cardiac output. As with other stenotic events, (balloon) angioplasty and stenting can be valuable in re-establishing patency. Renal artery stenosis workshop, September 15 & 16, 17:30

• Trauma

Despite their protected location, severe trauma can cause bleeding within the kidney, or renal artery thrombosis. Transarterial embolisation is well established as a safe and effective method of stopping traumatic bleeding in the kidneys and retroperitoneum, while mechanical thrombectomy devices (tiny cathetermounted pincers or vacuums) have shown excellent results in retrieving the blood clots that can cause renal infarction. Trauma, Tuesday, September 18, 08:30

• Renal Artery Aneurysms

Aneurysms can also occur in the kidneys, and interventional radiologists can place stent grafts to bypass or stabilise the aneurysm. Visceral artery aneurysms and pseudoaneurysms, Sunday, September 16, 10:00

• Kidney Stones
In the mineral-rich environment of the urinary system, small crystallised "stones" can form. These are rarely dangerous, but can cause extreme pain for the patient. The condition and its symptoms can be relieved by means of stent placement (to bypass the obstruction) or percutaneous nephrolithotomy (removing the stones through a small puncture wound). Renal interventions workshop: stones, obstructions and leaks, Saturday, September 15, 17:30.

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