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Management of Diabetes Complications at CIRSE 2011

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CIRSE's coming annual congress in Munich will explore interventional radiology's growing role in reversing the effects of diabetic complications. Diabetes mellitus is a pandemic of our time. There are more than 220 million people with the illness worldwide and this number is increasing. The systemic nature of the disease produces wide-ranging complications that are responsible for incalculable loss in quality of life and a tragic number of deaths. While lifestyle changes and medication may be effective in alleviating symptoms or preventing them from worsening, the long-term consequences of diabetes, particularly if poorly managed, mean high costs for healthcare systems and much suffering for patients.

IR's Role in Diabetes Management

One of the most serious complications in patients with diabetes is the development of peripheral arterial disease. In combination with neuropathy, another severe complication of the disease, this can lead to a diabetic foot, which requires emergency treatment to prevent eventual amputation of the foot or even the leg. It is now clear from the literature that minimally invasive revascularisation by an IR has the same outcome as bypass surgery in preventing amputation. Moreover, the IR technique is low-cost, much less invasive and does not entail long hospitalisation. Diabetic teams in which IR is included, can potentially reduce the number of amputations by 50 percent.

For diabetic foot conditions in particular, interventional radiology can help salvage a limb, where it may otherwise be sacrificed. This can be done by specially trained IRs using advanced image guidance, allowing accurate recanalisation in vessels below the knee of less than 3mm diameter. Patients prefer IR as it is minimally invasive, and they experience shorter recovery times and fewer negative sideeffects. IR is also valuable for those in a weakened condition, when open surgery may be physically impossible.

Treating Diabetes: On Show at CIRSE

For all these reasons, CIRSE recognises the vital importance of including sessions in its annual congress on the prevention and treatment of diabetic complications. As well as supporting the growth of the IR community and informing attendees of the latest updates in minimally invasive therapies, CIRSE 2011 offers experienced IRs refreshers on practical techniques and training for IRs looking to enhance their experience. The hands-on masterclasses in particular, focusing on small group interactive training, are a superb opportunity to build skills and competence using life-like simulations.

Featured Sessions at CIRSE

- The diabetic foot: An integrated IR approach
- BTK recanalisation
- Imaging of the BTK circulation: State of the art
- Conceptual approach to recanalisation of crural arteries
- Treatment of pedal occlusive disease
- Retrograde tibial artery recanalisation
- BTK vascular interventions
- Techniques and new tools for the skilled and the novice
- Outcomes of BTK recanalisations
- Outcomes of angioplasty and bare stents
- Outcomes of drug eluting balloons and stents
- How to manage complications
- Guidelines for management of the diabetic foot

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Making a Difference

In diabetic vascular disease, amputation can be the all-toooften consequence that may have been prevented by earlier intervention. It is estimated that every 30 seconds a leg is lost somewhere in the world due to diabetes. Those who undergo below-the-knee amputation have a poor prognosis. 10 percent of below-the-knee amputees die in the perioperative period and 30 percent die after two years. In many cases IR can offer a solid alternative.

A Wide Range of Options

Some of the main vascular complications of diabetes can be treated with the following minimally invasive image-guided methods:

- Percutaneous transluminal angioplasty (PTA) employs a balloon-tipped catheter which is guided to a narrowed artery through a small puncture in the patient's groin. The balloon is inflated to expand the blocked artery and then removed. A stent may be inserted to hold the vessel open if needed.
- Subintimal angioplasty uses the loop-wire technique to create a new passage through the vessel wall, as opposed to re-opening an existing vessel blockage. With this technique longer occlusions can be treated.
- Percutaneous endarterectomy (atherectomy) may be used to re-open larger vessels by removing atheroma with the aid of specially designed catheters.
- Cryoplasty combines the technique of angioplasty with a cooling effect. The balloon is inflated with liquid nitrous oxide rather than saline. The cooling is thought to prevent some of the complications of angioplasty such as vessel scarring.
- Laser recanalisation uses laser light to widen vascular occlusions. The optical fibre delivers the laser to the required location through a catheter.
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Although specialised in the treatment of vascular complications, IR also features in other areas of diabetes management. For patients with brittle diabetes, islet cell transplantation, though still experimental, may offer stabilisation of blood glucose control and allow improved quality of life. This promising procedure, in which pancreatic islet cells are infused into the liver through the portal vein, will be one of the topics discussed at CIRSE 2011 in the special session, "Ongoing Research in IR" (SS 304). This is not yet a curative option, the desired outcome being better diabetic control and reduced insulin dose. Although the transplanted islet cells do secrete insulin, they often need support from a daily dose of the hormone, albeit a smaller amount than the patient previously needed. Emphysematous pyelonephritis (EPN) is a rare but potentially fatal renal infection in which the build-up of toxic gas can eventually lead to multiple organ failure. The condition is more common in diabetics. Formerly, nephrectomy was the standard treatment, but percutaneous drainage is possible in some cases, allowing kidney salvage if performed in time.

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Economic Advantages

The economic evaluations of current therapies may only examine procedural costs, and can omit the associated expenses. A great proportion of the costs of diabetes are attributable to prolonged hospitalisation and amputation. Over 10 million Type 2 diabetics in Europe produce 29 billion euros of associated costs (see figures).

Multidisciplinary diabetic foot clinics are available in some European countries and have proven to be the most effective way of treating diabetic foot disorders, the most costly of all diabetic complications. However, in many European countries the organisation of diabetic foot care is regrettably still poor. The Foot and Ankle Clinic of the Abano Polyclinic, Italy is one example of an effective multidisciplinary set-up where the first choice is a minimally invasive technique whenever possible: treating the complication from within the blood vessel and minimising collateral damage.

This has sound economic advantages for the clinic. Dr. Manzi, Director of its interventional radiology unit, calculates that the average cost-per-patient of materials used in revascularisation is 1,170 euros, whereas in the U.S., an elective amputation alone costs 6,000 dollars (around 4,300 euros), and one following a bypass failure will cost 28,000 dollars (around 20,000 euros), without taking into account any wider socioeconomic costs.

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The Future

With diabetes affecting an ever-growing segment of the population, the solutions that IR offers are more relevant than ever. For individuals, this means a chance to avoid disability and ultimately death. For wider society and healthcare providers it means lower long-term costs and a reduced burden of disease. IR is a continuing source of innovation and, as the natural progression of medicine will logically favour less invasive procedures, these techniques are becoming more prevalent in the management of an increasing range of diabetic complications.

The value of IR is being recognised on all fronts with the discipline now included in guidelines for the treatment of diabetic complications. For example, during the 2011 meeting of the International Working Group on the Diabetic Foot (IWGDF), which establishes the consensus guidelines for diabetic foot management, there was a strong IR presence.

In these new guidelines IR is recognised as a true alternative to bypass surgery. Also, the multidisciplinary approach to the disease, with teams in specialised foot clinics offering the latest techniques, is mandatory for better patient care and preventing amputation. Every patient with diabetes and a foot ulcer should join a complete diagnostic pathway to look for peripheral arterial disease as early revascularisation may be essential to prevent later sequelae. It is vitally important that the benefits of these treatments are recognised, developed and made available to patients.

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