
Volume 11 - Issue 3, 2011 - Cirse 2011: Interventional Radiology at the Fore

Solutions to Stroke at CIRSE 2011

Authors

Ciara Madden

*Cardiovascular and Interventional Radiological Society of Europe (CIRSE)
Vienna, Austria*

Prof. Klaus Hausegger

*Interventional Radiologist, General Hospital
Klagenfurt, Austria*

Tochi Ugbor

*Cardiovascular and Interventional Radiological Society of Europe
Vienna, Austria*

Research aimed at increased understanding of stroke and its therapy has made huge strides, but the attendant time-window between the incident and the initiation of treatment remains one of the most significant challenges for those who seek to make effective treatment available to all. Thankfully, interventional radiologists, along with their diagnostic, neurologist and management colleagues, have come up with solutions to these problems, and accordingly, stroke therapy will once again form a central theme for this year's annual CIRSE congress.

Emergency Imaging is Vital

As any radiologist knows, the most pressing thing in a stroke emergency is to diagnose the type, location and severity of the stroke, and CIRSE will devote several sessions during the congress to imaging and diagnostics. Strokes can manifest as either ischaemic or haemorrhagic stroke, and each requires a distinct treatment pathway. High quality imaging modalities can give further clues as to the location and impact of an ischaemic event, and how best to salvage as much brain tissue as possible. It is widely agreed that CT imaging must be available for the normal functioning of any stroke unit, and MRI may be beneficial in some cases. Modalities such as these allow for accurate risk/benefit calculation and good patient selection.

Also at the CIRSE congress, a number of lectures and discussions will take place on imaging and indications in stroke management, as well as the detection of vulnerable plaques of the carotid arteries, which might be a cause of stroke. The benefits of different imaging modalities, such as diffusion and perfusion-weighted MRI and perfusion- and angio-CT, will be discussed at sessions that cater for interventionists, diagnostic radiologists and radiographers.

Imaging Sessions

- RWS 2906 Interventional Neuroradiology – the role of the radiographer
- SS 1604 Introduction to acute stroke management
- SS 3103 Preventative stroke management
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Recent research has shown that combining diffusion (DWI) and perfusion (PWI) imaging can show which areas of the damaged tissue are still salvageable, allowing doctors to streamline their treatment. However, other data suggests that a CT/CT-angio combination can provide all the information necessary to define the most appropriate therapeutic strategy, along with patient history and clinical symptoms.

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Preventative Measures

According to the WHO, treating hypertension can reduce the risk of stroke by up to 40 percent. Being aware of the modifiable risk factors (such as smoking, poor diet and lack of exercise) and taking appropriate measures can help people lower their risk of stroke. Medications such as antihypertensive drugs, antiplatelets, anticoagulants and lipid-lowering drugs can also help reduce the risk of stroke.

For patients exhibiting significant carotid stenosis, mechanical unblocking of the artery may be needed to counter the risk of stroke. While carotid endarterectomy is widely used to great effect, trial data released in early 2010 indicates that stenting is a safe and efficacious alternative, and many patients have benefitted from this therapy.

CIRSE 2011 will dedicate a multitude of sessions to recanalisation and/or restoration of the arteries supplying the brain by means of angioplasty

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and stenting. Sessions will discuss the evidence for and application of not only carotid stenting, but also the infant field of intracranial stenting, as well as management of intracranial aneurysms. A cliché it may be, but "prevention is better than cure" is as relevant today as it ever was, and CIRSE will highlight the role IRs can play in stroke prevention.

Prevention Measures

- WS 503 Endovascular treatment of intracranial aneurysms and AVMs
- SS 1005 Carotid lesions
- WS 2904 CAS for carotid lesions
- Rösch lecture – Evidence-based medicine and carotid stenosis treatment
- SS 3103 Preventative stroke management (intra- and extracranial stenting)

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Time is Brain

Of course, not all strokes are preventable, and very few are predictable. Effective treatment must be on hand to treat acute stroke cases, and thanks to interdisciplinary cooperation, a number of options now present themselves. CIRSE 2011 will offer a wide range of sessions and workshops addressing the tools and techniques used in these therapies, as well as clinical evidence supporting them.

Ischaemic Stroke

For ischaemic stroke, intravenous thrombolysis (IVT) has proven an enormous boon, but it is still hampered by a restrictive time-window, and some patients will require additional or alternative treatments. Luckily, interventional radiologists have adapted their catheter delivery systems to allow for local delivery of clot-busting drugs, which can be administered very precisely thanks to image-guidance. This method of delivery has a longer window of opportunity, as it can be effective up to six hours after the initial event, as opposed to the maximum 4.5-hour window of intravenous delivery. Many centres also use bridging - a two-step thrombolytic treatment where the first dose is delivered intravenously and the remaining one intra-arterially.

Recent clinical experience has shown that intra-arterial thrombolysis (IAT) more efficiently removes the large clots occluding basal cerebral arteries compared with IVT. In addition, it has also been shown that mechanical clot removal is more effective and probably less risky than IAT. Consequently, many centres use mechanical clot removal as the first interventional step in patients with middle cerebral artery occlusion who would be candidates for IVT.

Other clots prove impervious to any thrombolytics at all. Large clots are particularly hard to break down, and while many centres routinely deliver IVT before deciding upon follow-up options, some centres will immediately embark upon mechanical clot removal should the clot be deemed unlikely to respond. This treatment method has been found to be effective up to eight hours following the initial infarction. Interventional radiologists have a number of options for mechanically removing a clot, including retrievable stents, balloon thrombectomy, aspiration thrombectomy (using special suction catheters) and pincer equipment that can grab the clot, allowing it to be pulled out along with the instrument.

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Haemorrhagic Stroke

Haemorrhages within the skull are difficult for any specialty to treat, but treatment of subarachnoid haemorrhage has greatly improved in recent years. The traditional surgical method of cutting off the blood flow to the aneurysm with a metal clip has been all but replaced by the interventional alternative of coil embolisation. While coil embolisation is a more costly alternative, studies such as the ISAT trial clearly demonstrate a clinical advantage to the minimally invasive procedure. Surgery performed on the brain region is risky and entails a long recovery process, but delivering devices such as coils via catheter to block the blood flow gives the patient a less invasive option. Further research in the field has also developed a promising new liquid embolic agent.

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Treatment Sessions

- ICS 1005 Stroke management
- WS 1402 Revascularisation tips in acute stroke management
- SS 1704 How to treat an acute stroke patient
- ST-HoW1/ST-HoW2 Stroke therapy
- WS 503 Endovascular treatment of intracranial aneurysms and AVMs

Clinical Set-ups: How Best to Manage Stroke patients

With time being of the essence, it is essential that clear and straightforward protocols exist for diagnosis and referral. Awareness campaigns informing the public, GPs and paramedics of the need to treat stroke as an emergency have led to an increase in patients seeking emergency attention. These increased patient volumes have enabled hospitals to dedicate resources to this patient population. Many hospitals are establishing dedicated stroke units, which adhere to increasingly uniform treatment protocols and standards for ensuring swift and suitable treatment.

Larger hospitals often offer IR techniques such as intraarterial thrombolysis and thrombectomy as part of this treatment protocol, but smaller hospitals will, understandably, often lack the appropriate staff to enable 24- hour coverage. To ensure that as many patients as possible can access appropriate treatment, a Comprehensive Stroke Centre (CSC) concept was introduced in 1995, allowing for a more cost-effective and productive use of IR manpower resources. The "time is brain" imperative demands that stroke care occurs as swiftly as possible. For this reason, CSCs should ideally be located in a centralised geographic location to allow for multiple stroke centres to efficiently transfer such patients after local evaluation.

It goes without saying that patient outcomes improve in centres that receive a case volume that ensures a threshold level of technical and clinical experience. Of the total number of stroke patients who present to a stroke centre for acute therapy, an estimated 10 – 20 percent require IR intervention – a sizable minority that underlines that importance of round-the-clock access to these brain-saving active treatments. The CIRSE annual conference will address many of the issues surrounding clinical management of stroke, including how best to set up protocols with colleagues in other departments, and how an interventionist can become involved in this life-saving branch of IR.

Clinical Advice Sessions

- *WS 2202 How to get started in stroke management - Interactive discussion*
- *SS 1604 Introduction to acute stroke management*

Stroke-Related Ir Treatments:

- *Carotid artery stenting*
- *Intra-arterial thrombolysis*
- *Clot retrieval (pincers, cork-screw devices, retrievable stents)*
- *Intracranial stenting*
- *oil embolisation (for haemorrhagic stroke)*
- *Hypothermic neuroprotective therapy (intravascular cooling – still in development)*

Published on : Wed, 7 Dec 2011