Standards of Practice in Interventional Neuroradiology

Consensus document from the ESNR/ESMINT/UEMS

Purpose

This is a consensus document, which provides recommendations based on expert opinions and best available evidence, in relation to the optimal conditions for the safe practice of Interventional Neuroradiology.

Art. 1

Interventional Neuroradiology involves percutaneous and endovascular procedures to treat disorders of the brain, sensory organs, head, neck, spinal cord, vertebral column, adjacent structures and the peripheral nervous system in adults and children.

Commonly utilized Interventional Neuroradiology techniques include:

- Embolization techniques
- Devices implantation (stents, coils, etc.)
- Recanalization techniques including Angioplasty, Thrombectomy, Aspiration
- Percutaneous spinal / head and neck procedures
- Image guided administration of drugs

Site conditions

Art. 2

The practice of Interventional Neuroradiology should only take place in healthcare institutions that routinely provide services and treatments to patients with neurological and other disorders (as defined in Art. 1).

Facilities that must be available on site include:

- Emergency department
- Inpatient hospital wards/beds.
- A suitable (see Art. 3) interventional angiography suite(s), which is part of a Radiology/Neuroradiology/Neurointerventional Department. A team of trained Interventional Neuroradiologists/Neuro-interventionists, which is part of a Radiology/Neuroradiology/Neuro-interventional Department.
- Accordingly, to each country regulations and for acute ischemic stroke treatment, other trained endovascular specialists, such as interventional radiologists, after completion of an endovascular treatment of ischemic stroke training, could participate of the neurointerventional team, if there are too few (two or less) local interventional neuroradiologists/neuro-interventionists available to provide a 24/7 service. Quality assurance has to be in line with each country's guidelines for acute ischemic stroke treatment.
- A dedicated and comprehensive Diagnostic Neuroradiology or Radiology Department/Section that comprises state of the art CT and MRI facilities.
- A department of Neurosurgery and Neurology with neurovascular expertise. For acute ischemic stroke treatment, a department of Neurosurgery is highly recommended but not mandatory, (eg. in those situations, in which transportation of the patients to a center with a department of Neurosurgery produces an unacceptable delay for the adequate endovascular treatment). In those centers without a department of Neurosurgery, a written agreement must exist between the stroke unit and the closest hospital with a department of Neurosurgery, which includes a transfer plan for those patients who may need neurosurgical services
- Intensive Care Unit.

Art. 3

A suitable interventional angiographic suite implies the ability to routinely accommodate general anaesthesia under aseptic conditions similar to an operating theatre.

Optimally, procedures should be carried preferentially under the image guidance of a bi-plane digital angiography unit with three-dimensional image reconstruction including flat panel-CT capabilities.

As a minimum, each suite should comprise of a single plane high-resolution C-arm with digital subtraction. 3D imaging should be available in all diagnostic modalities, i.e. CT, MRI, catheter angiography.

Radiation protection measures in accordance with national and European regulations should be in place with designated individuals responsible for carrying out the necessary checks and audits.

Art. 4

A suitable Interventional Neuro/ radiology facility (as defined in art.3) should be able to provide the services defined in Art. 1, on a full-time basis, 24/7, all year around (as a single institution or organized in a network of centers)

Art. 5

There needs to be a minimum workload met (for individual operators and the institution overall) in order for a center to be recognized in the practice of Interventional Neuroradiology. These numbers should follow the local/national neuroradiology/neurointerventional recommendations, and should be consistent with quality assurance guidelines.

Art. 6

Interventional Neuroradiology should ideally be practiced in Neuro-interventional teams in which exchange of experience, knowledge and research is possible and encouraged. A suitably trained clinician should be able to perform procedures as defined in Art. 1, with the support of other Interventional Neuroradiologists. For the treatment of stroke see Art 2. The solitary practice of Interventional Neuroradiology is strongly discouraged.

Operational guidelines

Art. 7

It is recommended that Interventional Neuroradiologists/Neuro-interventionists carry out outpatient clinics and have admitting privileges either in units/beds dedicated to Interventional Neuroradiology or in other appropriate inpatient facilities. A sufficient number of these inpatient beds (intensive care or continually monitored beds) should be available, to accommodate Interventional Neuroradiology patients at any time.
The Interventional Neuroradiologist/Neuro-interventionist should share responsibility for pre- and post-operative patient care with the appropriate specialities. This should include pre-operative examination and consultation, documented informed consent, operative and post-operative management as well as follow up consultation in outpatients.
Sites should have a complete registry that includes the outcomes, morbidity and mortality of all interventional procedures

Art. 8

In order to provide a comprehensive service as defined in Art. 1, the following overall medical staff should be available to carry it out:

- A minimum of two, for an optimal service at least four, physicians with particular training and qualification in Interventional Neuroradiology.
- Anaesthetists with experience in caring for patients undergoing Interventional Neuroradiology procedures.

Art. 9

With regards to individual procedures, it is recommended that the following staff are present for each case:

- A lead Interventional Neuroradiologist/Neuro-interventionist
- A second scrubbed individual (i.e. supporting Interventional Neuroradiologist/Neuro-interventionist, scrub nurse or radiographer)
  (For the treatment of stroke see Art. 2).
- A radiographer
- A nurse or nurse assistant
- An anaesthetist if required, according to local regulations.