



## LECTURE

# Decision of neurosurgical intervention in intracerebral haemorrhage

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### Abstract

Spontaneous intracerebral haemorrhage (ICH) is an important cause of morbidity and mortality. It has an early fatality rate, poor functional outcome and the role of surgery remains controversial. In the recent guidelines, there are few strong recommendations and most of decisions are based on observational studies and authors' experience. For that reason, there is great variability between neurosurgeons, departments and countries. It is agreed that the best treatment for these patients involves a multidisciplinary work with the coordination of stroke or intensive care units, with collaboration of neurosurgery departments in some patients. For most patients with supratentorial ICH, the usefulness of surgery is not well established, and most do not benefit from it.

In which situations neurosurgery can and should act? We can subdivide ICH into several types of haemorrhage (supratentorial; infratentorial or intraventricular) that will be indicated for different neurosurgical treatments.

Monitoring of intracranial pressure and cerebral perfusion pressure may be necessary, usually in patients with GCS score of  $\leq 8$  that is presumed to be related to hematoma mass effect, with clinical evidence of transtentorial herniation, or with significant intraventricular haemorrhage (IVH) or hydrocephalus.

CSF drainage may also be considered, in patients with CSF outflow obstruction caused by hydrocephalus or a trapped ventricle, and with decreased level of consciousness.

Decompressive craniectomy, with or without drainage of haemorrhage is a possibility, in cases of deep haemorrhage with medically uncontrolled intracranial hypertension.

It is agreed that cases of neurological deterioration with lobar haemorrhages less than 1 cm deep from the cortical surface, might benefit from craniotomy with haemorrhage drainage. Supratentorial haematoma evacuation in deteriorating patients might be considered as a life-saving measure. Although controversial, it is generally accepted that the surgery should be performed early when patients have a GCS between 9 and 12.

Cerebellar haemorrhages who are deteriorating neurologically or who have brainstem compression and/or hydrocephalus from ventricular obstruction should undergo surgical removal of the haemorrhage as soon as possible. Initial treatment of these patients with ventricular drainage rather than surgical evacuation is not recommended. GCS score less than 14, haemorrhage size greater than 30–40 mm, and haematoma volume not less than 7 cm<sup>3</sup> are usually indications for surgery.

Less invasive treatments, namely stereotactic or endoscopic, with or without fibrinolytics, are mostly indicated in deeper or intraventricular haemorrhages. The effectiveness of minimally invasive clot evacuation with stereotactic or endoscopic aspiration with or without thrombolytic usage is uncertain.

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The Minimally Invasive Surgery plus Recombinant Tissue Plasminogen Activator (MISTIE) II RCT, found reductions in haematoma and oedema volume in the intervention group, but no overall difference in clinical outcomes.

The Neurosurgical treatment also implies risks with the possibility of deficits induced by the neurosurgical intervention.

It is always important to assess individual risk for each patient. Despite factors in favour or against neurosurgical treatment, the final decision of a surgical intervention is based in a multidisciplinary evaluation that takes into account all those factors.