

Evolving role of surgical intervention in spontaneous intracerebral haemorrhage: evidence from the STICH, MISTIE II / III, and ENRICH trials

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Spontaneous intracerebral haemorrhage (ICH) remains one of the most devastating forms of stroke, as it is associated with high mortality and significant long-term disability, while optimal ICH management strategies continue to be debated. Historically, the surgical evacuation of the haematoma has been widely practiced in ICH cases; however, the landmark Surgical Trial in Intracerebral Haemorrhage (STICH) has demonstrated no overall benefit of early open craniotomy over initial conservative treatment in patients with supratentorial ICH, resulting in a major shift away from surgical intervention in routine clinical practice [1]. Subsequently, attention has shifted toward minimally invasive surgical techniques aiming to reduce the ICH-associated secondary brain injury while minimizing operative morbidity. The Minimally Invasive Surgery with Thrombolysis in Intracerebral Haemorrhage Evacuation (MISTIE) project, including the MISTIE II and MISTIE III trials, has evaluated the effects of catheter-based haematoma evacuation combined with intraleSIONAL thrombolysis through the use of recombinant tissue plasminogen activator. While these trials have demonstrated that minimally invasive approaches can achieve a significant haematoma volume reduction and are generally safe, they have failed to demonstrate any statistically significant improvement in terms of functional outcomes at 180 days in the overall patient popu-

lation, thereby maintaining uncertainty regarding their clinical utility [2]. More recently, the Early Minimally Invasive Removal of Intracerebral Haemorrhage (ENRICH) trial has provided new insights and has demonstrated that the early minimally invasive parafascicular surgical evacuation, particularly when performed within 24 h of the symptoms' onset, is associated with improved functional outcomes (compared to those of the standard medical management) in selected patients with lobar haemorrhages [3]. These findings suggest that the benefit of surgical intervention in ICH is highly dependent on appropriate patient selection, the ICH location, the timing of the intervention, and the specific surgical technique employed. The emerging paradigm indicates a transition from generalized scepticism toward a more refined and individualized surgical strategy in the surgical management of ICH. Although conventional open craniotomy remains of limited value in unselected ICH cases, the early minimally invasive evacuation appears to offer meaningful functional benefits in carefully selected patients. Future studies should prioritize a focus on the integration of advanced imaging biomarkers, the optimization of surgical timing, and the development of standardized selection criteria allowing us to further define the role of surgery in the management of ICH.

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Keywords

ENRICH trial; intracerebral haemorrhage; minimally invasive neurosurgery; MISTIE trials; STICH

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Conflicts of interest statement

None to declare.

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