Comparative effectiveness of surgery for traumatic acute subdural hematoma

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Chapter 11

Acute subdural hematoma: answering the clinically relevant question

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In this chapter I respond to a letter to the editor in which concerns are raised on the validity of our results from the effectiveness study of acute surgery in ASDH (Chapter 10).

We appreciate the comments of Nathan Beucler on our Article,[1] which possibly also reflect concerns shared by other neurosurgeons. In response to the first point, we restated the Brain Trauma Foundation guidelines regarding when to operate when a patient is not comatose. These guidelines for patients with a large haematoma (ie, clot >10 mm thick or causing >5 mm midline shift) recommend to operate regardless of the patient's Glasgow Coma Scale (GCS) score. Nevertheless, uncertainty about the best approach continues.

Second, Beucler suggests that delayed surgery could be regarded as acute surgery and should not have been analysed in the conservative treatment group. Our research question was whether to immediately operate on a patient with an acute subdural haematoma (on CT). This question reflects clinical reality. Some patients will deteriorate and have surgery later which— obviously—is not known at the time of planning. Comparison of all early (<24 h) surgical procedures with all conservatively treated patients would be erroneous and probably show that surgery leads to a worse outcome compared with conservative treatment, due to confounding by indication and immortal time bias. The Subdural Hematoma in the Elderly (SHE) Score[2] is an example of a study with such biases, at least when interpreted as an intervention instead of a prediction study. The SHE score is a prediction tool that should not be used to triage treatment—the extensively validated IMPACT and CRASH-CT models are superior in this respect. Moreover, the SHE score has limited value as a prediction tool for acute subdural haematoma because 31% of the cohort in that study had mixed-acuity or chronic subdural haematoma.[2] Therefore, the SHE score does not support an approach to limit treatment for older patients with acute subdural haematoma, with best available evidence suggesting the opposite.[3-5]

Third, Beucler presumes a benefit of primary decompressive craniectomy over craniotomy to account for the absence of benefit of acute surgery. No definitive evidence is available to support this assumption (while awaiting the findings of RESCUE-ASDH. Further, the author highlights the high proportion of decompressive craniectomy procedures in the conservative treatment group of total non-acute decompressive craniectomies, yet this metric does not inform the point. Instead, we should look at the proportion of decompressive craniectomy procedures in the (initially) conservatively treated group (52 of 982 patients had a delayed operation with a decompressive craniectomy, thus 5% is the risk of early secondary deterioration requiring decompressive craniectomy) and the proportion of delayed decompressive craniectomy procedures after a primary craniotomy (51 of 245 patients had decompressive craniectomy after primary craniotomy, a risk of 21%).

Beucler also comments that our inclusion criteria were too broad, and the multiple neurosurgery centres made interpretation difficult. We understand the difficulty of interpreting a comparative effectiveness study using instrumental variable analysis.

Since treatment allocation was based on neurosurgeon preference, the effect estimate is applicable to patients for whom the neurosurgeon would consider both treatment options. Sensitivity analyses with smaller inclusion criteria showed similar findings. We consider the multicentre nature of our study a strength, because studies with sufficient sample sizes can generate reliable and generalisable results.

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