

## Surgical management of chronic subdural hematomas: in need of better evidence

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**Response to:** *Minimally invasive decompression of chronic subdural haematomas using hollow screws: efficacy and safety in a consecutive series of 320 cases. Acta Neurochirurgica 2012;154(4):699–705. Krieg SM, Aldinger F, Stoffel M, Meyer B, Kreutzer J.*

Dear Sir,

As the proportion of people aged 65 years and older is expected to double worldwide between 2030 and 2030, a large rise in the incidence of chronic subdural hematoma (CSDH) is expected [1]. Ongoing refinement and evaluation of existing surgical techniques is essential for improving the care and outcomes of patients with CSDH. The paper by Krieg et al. is an important contribution and the authors need to be congratulated for their efforts.

Twist-drill craniostomy (TDC) involves drilling an approximately 5-mm hole and then placing a closed drainage system that allows the CSDH to drain over the first few post-operative days. TDC can be performed at the bedside under a local anesthetic. On the other hand, burr-hole craniostomy (BHC) involves drilling one or two larger holes (approximately 10–20 mm), irrigating the hematoma, and placing a closed drainage system. As BHC is more invasive, it is usually performed in the operating theatre and frequently under general anesthesia [2].

TDC is a very attractive option as it is less invasive than BHC. Nevertheless, a systematic review of the published literature found some weak evidence (class III) that TDC may be associated with a higher recurrence rate compared to

BHC [3]. Hence, burr-hole evacuation is the surgical technique most frequently employed for CSDH treatment [2]. It is also considered the gold standard against which alternative techniques should be evaluated.

In 2003, a modified TDC technique was developed in the USA: the subdural evacuating port system (SEPS) [4]. In comparison with existing TDC methods, the SEPS (Medtronic, Inc., Minneapolis, MN, USA) offers the advantage of a hermetically closed system that can evacuate a CSDH without the need to insert a subdural catheter, thereby avoiding the risks of brain laceration and bleeding from cortical vessels. A recent case-control study showed no statistically significant differences in the recurrence rate among patients treated with BHC and SEPS [5]. However, as there were only 42 case-matched patients included in this study, one cannot conclude that SEPS has the same efficacy as BHC.

The technique used by Krieg et al. is very similar to the SEPS technique. However, a number of differences exist. The technique described by Krieg et al. uses intra-operative and post-operative (once daily) irrigation routinely to promote brain re-expansion. The SEPS technique mainly relies on a low negative pressure (applied through the suction reservoir bulb) in order to promote the drainage of the collection and gradual brain re-expansion. Interestingly, the observed re-operation rate was 36.7 % in the series of Krieg et al. and 25.9 % in the SEPS group of Rughani et al. Intuitively, one may associate this with the fact that one-third of the cases treated by Krieg et al. were of the septated/loculated subtype, whereas such cases were excluded by Rughani et al. No surgical infections were noted by Rughani et al., whereas Krieg et al. report five cases of post-operative meningitis. This may be related to the routine intra- and post-operative irrigation undertaken in the series by Krieg et al.

Krieg et al. correctly state that there is conflicting evidence regarding the usefulness of irrigation. However, they follow on saying that “even two recent randomized

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controlled trials were not able to answer this question sufficiently". One of the cited papers was a preliminary report of a trial of burr-hole evacuation with or without the insertion of a subdural drain (20 patients in each arm), a study not designed or equipped to provide definitive evidence to the question whether irrigation (either intra- or post-operative) is beneficial. The other cited trial was one conducted in our institution [1]. It demonstrated that the use of a subdural drain after burr-hole evacuation of CSDH is safe and associated with reduced recurrence and mortality at 6 months. An assessment of the effectiveness of irrigation was not one of the trial objectives.

We believe that the studies by Krieg et al. and Rughani et al. provide evidence that the use of TDC without a subdural drain is a safe and effective technique for the management of CSDH.

Nevertheless, a definitive study (prospective randomized trial), directly comparing the clinical and cost-effectiveness of BHC (the current gold standard) with TDC, will have to be performed prior to suggesting that TDC should become the first-line treatment. We propose that such a trial needs to be well powered, have carefully selected inclusion/exclusion criteria, clinical endpoints (functional outcome at 6 months, re-operation rate, complications), patient-centered outcomes (e.g., post-operative pain/discomfort, quality of life) and should also be accompanied by a detailed health–economic analysis. The question of which surgical technique is optimal for the primary treatment of CSDH is an important one and on the basis of current evidence, a

randomized trial comparing BHC with the SEPS technique seems timely and justified.

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**Conflicts of interest** None.

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