Burr hole trephination for chronic subdural hematoma

- Tranexamic acid vs. embolization of the meningeal artery as an adjunctive therapeutic regime to reduce the recurrence rate after surgical relief of chronic subdural hematomas (TABASCO)-a randomized controlled trial
- YL-1 puncture needle-based minimally invasive drainage versus burr-hole drainage in chronic subdural hematoma: A meta-analysis of efficacy and safety
- Best practice in the use of middle meningeal artery embolisation for chronic subdural haematoma
- Burr hole evacuation of chronic subdural hematoma in general versus local anesthesia: a systematic review and meta-analysis
- Factors affecting outcomes following burr hole drainage of chronic subdural hematoma: a single-center retrospective study
- Improving care in elderly neurosurgery initiative guideline on management of chronic subdural haematoma in older people-relevance for the geriatrician
- Modified prediction model for poor short-term prognosis in patients with chronic subdural hematoma after burr hole drainage: a retrospective cohort study
- Bilateral Subdural Hematomas Without Midline Shift: A Case Report

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Burr hole trephination for drainage of chronic subdural hematomas are routine operative procedures done by neurosurgery residents.

Burr hole trephination for chronic subdural hematoma with a closed drainage system

Double burr hole trepanation combined with a subperiostal passive closed-drainage system is a technically easy, highly effective, safe, and cost-efficient treatment strategy for symptomatic chronic subdural hematomas. The absence of a drain in direct contact with the hematoma capsule may moderate the risk of postoperative seizure and limit the secondary spread of infection to intracranial compartments [1].

The main aim of surgery should be a complete removal of the aggressive liquid. In case of many membranes that separate the hematoma into chambers like honeycomb an open procedure cannot be avoided. Nevertheless, the preferred operative therapy for most of CSDH is a burr hole craniostomy with a closed drainage system [2) 3)].

Surgical Technique

Surgical safety checklist

see Surgical safety checklist.

Preoperative antibiotic prophylaxis

see Preoperative antibiotic prophylaxis.

Skin Preparation

see Skin Preparation.

Positioning

Preferably under general anesthesia the surgical approach should be over the thickest part of the hematoma and the patients positioned in a way that the burr hole comes to the highest point to avoid pneumocephalus.

Therefore, the head is rotated and the ipsilateral shoulder is usually padded.

The supine position is used with the patient's head rotated for temporal access. Extremes of head rotation can obstruct the jugular venous drainage, and a shoulder roll can combat this problem or lateral positioning (park bench position).

Skin incision

Sites of predilection are frontal about 1 cm anterior to the coronal suture or parietal posterior to the parietal eminence. The area around Kocher's point offers a safe entry without injury of branches of

the middle meningeal artery or the motor strip. Additionally, the skin incision should be brought, if possible, into alignment with an eventual future skin flap for craniotomy. A curved flap avoids a burr hole position directly under the skin cut and a possible impaired wound-healing as a consequence. Further, the base of the C-shaped incision should be opposite of the planned direction of the drain tip. Obviously, a kinking of the drain is obviated [4].

Burr Holes

A performed burr hole with a diameter of 14 mm enables a sufficient angulation of the drain tip and allows an insertion of the drainage close to the calvaria.

Diren and Ozdemir found that an increase in the width of burr hole craniotomy (BHC), especially the posterior BHC, contributed to the improvement in midline shift [5].

Dura mater opening

The dura mater is coagulated and cut in a stellate fashion.

Technical issues

Under direct vision, the external membrane is perforated by the tips of the bipolar forceps. In general, there are the open or the closed ways of evacuation of the hematoma after the drain is inserted [6]

The open variant should be chosen only if irrigation is desired: the dura and external membrane are opened widely so that the fluid of the hematoma and irrigation can drip out beside the drain during rinsing. Removal of the fluid enriched with inflammatory mediators is considered obviously as an advantage, although a remaining pneumocephalus is seen as an approved factor of recurrence [7] [8].

In the closed way the aim is that no air enters the subdural space. Before the dural opening the drain is tunneled beneath the galea in the direction towards the middle of the base of the skin flap. A distance from the burr hole to the drain’s exit point of at least 5 cm prevents infection [9].

Then the dura and external membrane are incised. This opening should have the same diameter as the drain to allow for a watertight and airtight drain introduction. The hematoma can therefore be evacuated only through the drain: the more fluid that is going to be collected, the more negative pressure that will be built up, which helps the brain to unfold again.

The dura is covered with a small piece of a gelatin sponge and the burr hole is filled and with bone chips collected at the beginning.

The last steps are to connect the drain to a closed collecting system and secure the connection and the exit point from the skin with sutures.

Drain insertion after CSDH drainage is important, but position (subgaleal or subdural) and duration did not appear to influence recurrence rate or clinical outcomes. Similarly, drain location did not influence recurrence rate nor outcomes where both parietal and frontal burr holes were made. Further prospective cohort studies or randomized controlled trials could provide further clarification [10)].

Videos

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/lBgQqvYK8xA" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe></html>

<html><iframe width="560" height="315" src="https://www.youtube.com/embed/6SndhEACTFo" frameborder="0" allow="accelerometer; autoplay; encrypted-media; gyroscope; picture-in-picture" allowfullscreen></iframe></html>

Retrospective single-center cohort studies

In a retrospective single-center cohort study, Zolnourian et al., from the University Hospital Southampton and Queen's Hospital, Barking, Havering, & Redbridge University Hospitals NHS Trust, London, United Kingdom, published in the Journal of Neurosurgery, aimed to identify preoperative and perioperative factors that influence clinical outcomes, complications, and hospital length of stay in adult patients undergoing burr hole drainage for chronic subdural hematoma (CSDH), in order to improve patient selection and surgical decision-making.

They concluded that favorable short-term outcomes were primarily associated with nonmodifiable preoperative factors such as age under 80, preadmission independence, higher Glasgow Coma Scale motor score, lower ASA grade, and fewer regular medications. Surgical variables like laterality or the number of burr holes did not significantly impact outcomes. The use of subdural drains was linked to better discharge outcomes but not to recurrence or complications. These findings provide evidence-based criteria to guide surgical decision-making and patient counseling.

[11)]

1. Redundancy Rebranded as Discovery

The headline findings — that younger, fitter patients with fewer medications and lower ASA scores fare better — are hardly groundbreaking. These are well-known prognostic factors repeated in countless prior studies. Yet the authors present them as if freshly uncovered, bypassing the fact that any intern with access to the NICE guidelines could have written this paper in a call room.

2. Retrospective Data Hoarding

A decade-long data sweep doesn't automatically translate into depth. The absence of temporal stratification — especially in a period of evolving surgical and perioperative standards — renders the findings anachronistic. This is a textbook case of statistical inflation: more rows in a spreadsheet, but no added clinical clarity.

3. Surgical Variables: All Bark, No Bite

The analysis confidently concludes that burr hole laterality and number don't affect outcomes — something already well-established in the literature. Meanwhile, the discussion on subdural drain use is shallow at best, failing to differentiate between drain types, placement protocols, or duration. It's a missed opportunity wrapped in procedural minimalism.

4. ASA Score Worship and Karnofsky Fetishism

The fixation on ASA grading and Karnofsky scores adds little to surgical decision-making. These scores are proxies, not causes. The authors seem content with tautological modeling: patients who are healthier do better. Who would've guessed?

5. Outcomes at Discharge: The Mirage of Meaning

Evaluating outcomes **only at discharge** is misleading in a condition with delayed complications and high recurrence potential. Long-term cognitive, functional, and neurological data are conspicuously absent — yet the study draws bold conclusions as if the post-op day five GOS score is the final word in neurosurgical success.

6. Editorial Bloat and Citation Padding

This paper is a classic of the genre: bloated in size, padded with references, yet starving in conceptual innovation. There's no hypothesis refinement, no exploration of frailty, anticoagulation thresholds, or drainage protocols — just a dressed-up audit with statistical window dressing.

Takeaway for the Neurosurgeon

The study confirms what seasoned neurosurgeons already know — that preoperative fitness matters, drains help, and surgical technique is less critical than patient selection. While it may aid in patient counseling, it contributes little to surgical strategy or innovation. Another brick in the wall of retrospective repetition.

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