Burr hole cover

It is well known that burr hole trephination is a simple and effective surgical option to treat patients with CSDH and the rate of its surgical complication is very low.

However, this small trephination leaves a focal bony defect which eventually causes an undesirable scalp depression. While many neurosurgeons are less concerned about the outcomes of such small scalp depressions, majority of patients experience cosmetic complexes and functional handicaps.

Numerous materials have been described to repair bony defects. These implants include organic substitutes such as autologous bone, muscle, or fat tissue, synthetic substitutes such as polymethyl methacrylate (PMMA), hydroxyapatite (HA), or polyethylene, and metallic substitutes.

Organic substitutes are highly biocompatible, but related with donor site complications, time consuming, and difficult to apply. PMMA can be easily applied, but it is time consuming and has thermal reaction which is toxic to surrounding tissues. Mineral graft such as HA is not toxic to the tissues and has osteoconductive properties, but it is too brittle and its resorption easily takes place when cerebrospinal fluid or water is present.

Polyethylene is biocompatible, available in various sizes, and easy and quick to apply. However, its poor cost-effectiveness can be a disadvantage.

Finally, titanium, one of metallic substitutes, has been used in orthopedic, plastic, and maxillofacial surgery in several decades as an alternative to autologous bone because of its good biocompatibility and lack of magnetic properties. It offers greater strength and protection than any other materials. Compared to other metals, it is nontoxic and compatible with surrounding tissues, has extremely low rate of corrosion, and elicits no inflammatory reactions.

In addition to its excellent biocompatibility, BHC made of titanium is magnetic resonance imaging (MRI) compatible and does not produce significant artifacts on CT or MRI.

Titanium BHC is commercially available in various sizes and shapes, easy to handle, and considerably less expensive than most other substitutes.

The ideal implant should be biocompatible, strong enough to retain its physical shape, easy to handle, quick to apply, and cost-effective. The titanium BHC meets these criteria well. Further detailed studies on newer biodegradable materials with larger series of patients are required for advancement in techniques of cranial reconstruction after burr hole trephination of CSDH.

Titanium BHC is highly effective for reconstruction of skull defect after burr hole trephination of CSDH. It provides excellent cosmetic and functional outcomes by preventing scalp depression from burr hole defect without significant complications such as postoperative infections or instrument failures. Neurosurgeons must be aware of the undesirable cosmetic and functional outcomes caused by such minor cranial defects, and these deformities should be adequately repaired ¹⁾.

The aesthetic outcome after burr hole trepanation for the evacuation of chronic subdural hematomas (cSDH) is often unsatisfactory, as the bony skull defects may cause visible skin depressions. The purpose of a study of Vasella et al. from the Department of Neurosurgery, University Hospital Zurich, Switzerland, was to evaluate the efficacy ofburr hole cover placement to improve the aesthetic

outcome.

They reviewed consecutive patients treated by burr hole trepanation for cSDH with or without placement of burr hole covers by a single surgeon between October 2016 and May 2018. The clinical data, including complications, were derived from the institution's prospective patient registry. The primary endpoint was the aesthetic outcome, as perceived by patients on the aesthetic numeric analogue scale, assessed by means of a standardized telephone interview. Secondary endpoints were skin depression rates and wound pain, as well as complications.

From n = 33, outcome evaluation was possible in n = 28 patients (n = 24 male; mean age of 70.4 \pm 16.1 years) with uni- (n = 20) or bilateral cSDH (n = 8). A total of 14 burr hole covers were placed in 11 patients and compared to 50 burr holes that were not covered. Patient satisfaction with the aesthetic outcome was significantly better for covered burr holes (mean ANA 9.3 \pm 0.74 vs. 7.9 \pm 1.0; p < 0.001). Skin depressions occurred over 7% (n = 1/14) of covered and over 92% (n = 46/50) of uncovered burr holes (p < 0.001). There was no difference in wound pain (p = 0.903) between covered and uncovered sites. No surgical site infection, cSDH recurrence, or material failure was encountered in patients who had received a burr hole plate.

In this retrospective series, placement of burr hole covers was associated with improved aesthetic outcome, likely due to reduction of skin depressions. A randomized controlled trial is developed to investigate whether adding burr hole covers results in superior aesthetic outcomes, without increasing the risk for complications ²⁾.

KLS Martin has developed a range of burr hole cover shapes and sizes for each neurosurgery application.

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Im TS, Lee YS, Suh SJ, Lee JH, Ryu KY, Kang DG. The Efficacy of Titanium Burr Hole Cover for Reconstruction of Skull Defect after Burr Hole Trephination of Chronic Subdural Hematoma. Korean J Neurotrauma. 2014 Oct;10(2):76-81. doi: 10.13004/kjnt.2014.10.2.76. Epub 2014 Oct 31. PubMed PMID: 27169038; PubMed Central PMCID: PMC4852620.

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