Case Report

New Indian Journal of Surgery
Volume 10 Number 6 / November - December 2019
DOI: https://dx.doi.org/10.21088/nijs.0976.4747.10619.11

Innovative Scalp-Protecting Cap

Abhinav Aggarwal[1], Ravi kumar Chittoria[2], Saurabh Gupta[3], Chirra Likhitha Reddy[4], Padma lakshmi[5], Imran Pathan[6], Praveen Upadhyay[7]

[1,3-6]Senior Resident, [2]Professor and Registrar (Academic), Department of Plastic Surgery, Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Pondicherry 605006, India. [7]Senior Resident, Department of General Surgery, Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Pondicherry 605006, India.

How to cite this article:

Abhinav Aggarwal, Ravi Kumar Chittoria, Saurabh Gupta et al. Innovative Scalp-Protecting Cap. New Indian J Surg. 2019;10(6):619–621.

Abstract

Cranioplasty is done commonly following decompressing craniotomy following neurological trauma and other indications. Although a relatively simple procedure, cranioplasty is associated with a very high rate of complications. Among the most common complications is postoperative seizures.

Seizures in immediate preoperative period can lead to trauma to the surgical site and lead to hematoma and risk of reexploration. We have devised a simple protective scalp protecting cap to be worn by the patient in the immediate preoperative period to protect the head from trauma. The cap is easy to fabricate, light and comfortable for the patient. We would like to share the same.

Keywords: Scalp; Protective; Cap; Cranioplasty

Introduction

Calvarial defects are seen following trauma, neurosurgical procedures like Decompressive craniotomies for various indications like tumor, infections, bleed and congenital defects. It usually involves preservation of the resected bone flap in the subcutaneous plane usually in the abdomen. Calvarial defects are associated with problems like headache, irritability and epilepsy due to direct atmospheric pressure on the defect.

Corresponding Author: Ravi Kumar Chittoria, Professor and Registrar (Academic), Department of Plastic Surgery, Jawaharlal Institute of Post Graduate Medical Education and Research (JIPMER), Pondicherry 605006, India.

E-mail: drchittoria@yahoo.com

Received on 21.03.2019, **Accepted on** 28.11.2019

The cranioplasty procedure protects the underlying brain, gives the proper cranial aesthetic which are very essential for the quality of life of the patient.

Cranioplasty is one of the oldest neurosurgical procedures being practiced, several materials have been used as the bioprosthetic including–coconut shells, resins, ceramics.

Postoperative care of cranioplasty procedure is as important as the procedure itself. The rate of complications associated with cranioplasty has been documented to range from 12% to 45% in various studies. Most patients with postsurgical calvarial defects are at a risk of seizures due to organic brain injury and change in dynamics of the CSF following cranioplasty.[1-5]

Grand mal seizure in the postoperative period can lead to dreaded complications such as trauma to the operative site and hematoma under the operated site which may lead to loss of implant, infections and similar complications. We propose the use of a protective skull cap in the postoperative period which is light, easy to fabricate and comfortable for the patient to wear in the perioperative period.

Case Report

Thirty-four years old male presented to the Plastic surgery OPD with a complaint of right side calvarial defect of four month duration following decompressive craniotomy for right Subdural Hematoma. The patient had the bone flap presented in the abdominal wall in the subcutaneous plane.

Pt was a known diabetic since 4 months on oral hypoglycemic drugs.

Patient had history of 2 seizure episodes 4 months back after the decompressivecraniectomy and was on oral anti-epileptic drugs. Patient had no other neurological weaknesses and was freely ambulant. After due investigation, autologous bone plate was harvested from the abdomen and fixed to the calvarial defect using plates and screws. Drain was inserted.

Immediate postoperatively, after the patient was fully awake, a protective skull cap was fabricated using resin coated fibre glass cast material (Dyna Cast Prelude™, BSN Medical) (Fig. 1). The fiber glass was made wet with water and placed over the existing dressing over the scalp. The fiber glass was coated with soft polypropylene padding to minimise the pressure points and additional adding was given on the inner aspect. The outer surface was bandaged with a roller gauze. The patient was supposed to keep the protective splint *in situ* throughout the day including when sleeping.

Fig. 1: Fiberglass material used

The step by step depiction of the fabrication process is delineated (Fig. 2 to 5).

The cap was maintained till the callus formed in the calvarialbone which was checked by regular *X*-rays. It was kept for 3 weeks in the above patient.

Fig. 2: First layer of fiber glass cast placed over patients dressing

Fig. 3: Second layer of Fiber glass casr placed perpendicular to the first layer

Fig. 4: Over bandaging done over the fiber cast to make a compact helmet

Fig. 5: Chin band added to the helmet for adequate padding and placement

Discussion

Incidence of new onset seizures following cranioplasty has been documented to be 2.7 to 15.0% in various studies. The incidence is even higher in patients who have had seizures previously. Surgery might produces free radicals, disturb the ionic balance, and manipulate the cerebral parenchyma, all of which have been postulated as mechanisms for postoperative seizure formation. Moreover, there have been reports of trauma to the surgical site following seizure requiring reoperation which is independently associated with increased morbidity following cranioplasty.

The use of a light, simple and easy to fabricate scalp protecting cap is a simple manoeuvre to prevent additional trauma to the surgical site. Moreover, it is comfortable for the patient and appears like a dressing. It is very strong and radiolucent, therefore, does not interfere with X-ray's as well. The patient discussed above wore the protective cap full time for 3 weeks without any complaints.

It is a traditional practice to protect the surgical site with bulky dressings and even helmets. These practices, though cost-effective and easy to replicate, don't provide optimal strength and interfere with position. Using fiber glass customized scalp cap can helps make it least bulky and durable too.Similar custom made caps using fiber glass tape are already being used orthotic moulding for plagiocephaly and congenital muscular torticollis.

Further refinement of the cap may be done by using a fiber glass cast tape roll but we preferred the above material as it has an additional polypropylene padding which gives a better cushioning effect.

Conclusion

Seizures after cranioplasty are not uncommon and protection of surgical site with a simple, lightweight and customized skull cap made of fiber glass is an effective and innovative idea.

References

1. Dumbrigue HB, Arcuri MR, LaVelle WE, et al. Fabrication procedure for cranial prostheses. The Journal of Prosthetic Dentistry 1998 Feb 1;79(2):229–31.
2. Zanaty M, Chalouhi N, Starke RM, et al. Complications following cranioplasty: Incidence and predictors in 348 cases. Journal of neurosurgery 2015 Jul 1;123(1):182–8.
3. Malcolm JG, Rindler RS, Chu JK, et al. Complications following cranioplasty and relationship to timing: A systematic review and meta-analysis. Journal of Clinical Neuroscience 2016 Nov 1;33:39–51.
4. Rish BL, Dillon JD, Meirowsky AM, et al. Cranioplasty: A review of 1030 cases of penetrating head injury. Neurosurgery 1979 May 1;4(5):381–85.
5. Clarren SK, Smith DW, Hanson JW. Helmet treatment for plagiocephaly and congenital muscular torticollis. The Journal of Pediatrics 1979 Jan 1;94(1):43–46.

Instructions to Authors

Submission to the journal must comply with the Guidelines for Authors. Non-compliant submission will be returned to the author for correction.

To access the online submission system and for the most up-to-date version of the Guide for Authors please visit:

http://www.rfppl.co.in

Technical problems or general questions on publishing with NIJS are supported by Red Flower Publication Pvt. Ltd.'s Author Support team (http://rfppl.co.in/article_submission_system.php?mid=5#)

Alternatively, please contact the Journal's Editorial Office for further assistance.

Editorial Manager
Red Flower Publication Pvt. Ltd.
48/41-42, DSIDC, Pocket-II
Mayur Vihar Phase-I
Delhi - 110 091(India)
Mobile: 9821671871, Phone: 91-11-22754205, 45796900, 22756995
E-mail: author@rfppl.co.in