



Case Report

Extradural abscess following synthetic fabric duraplasty

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Received : 25 March 2021

Accepted : 21 April 2021

Published : 25 May 2021

DOI

10.25259/SNI_310_2021

Quick Response Code:



ABSTRACT

Background: Duraplasty refers to the neurosurgical process of reconstructing dural defect. Variety of materials is used for such reconstruction, including natural, semisynthetic, and synthetic materials. Although synthetic materials are readily available and easy to apply, these are associated with foreign body reaction which may lead to serious consequences in some cases. We describe one such rare instance of extradural abscess after polypropylene synthetic fabric duraplasty.

Case Description: Our patient is a 33-year-old lady who suffered road traffic accident leading to massive brain laceration, contusion of bilateral frontal lobes, and anterior skull base fractures. Emergency craniotomy was carried out and dural defect repaired with polypropylene (G-Patch; G. Surgiwear® Ltd.) synthetic fabric as the duraplasty material. Three months later, the patient presented with discharging wound at the incision site. Neuroimaging showed ring enhancing lesion in frontobasal extradural space with cutaneous extension. The lesion failed to heal despite intravenous antibiotics and surgery was planned. Intraoperatively, abscess was found between G-Patch and dura. Histopathology showed granulomatous foreign body reaction. The lesion healed after synthetic dura removal and abscess drainage.

Conclusion: Although various materials are used for duraplasty, there is no clear consensus on what material should be used for dural repair. Synthetic materials are bio-inert, offer good handling and malleability. Polypropylene has been used safely for both single- and double-layered duraplasty. However, foreign body reaction may occur and very rarely present as extradural abscess. Randomized trials should be done to establish the safety and efficacy profile of commonly used duraplasty materials.

Keywords: Epidural abscess, Foreign body reaction, Polypropylenes

INTRODUCTION

Duraplasty is a neurosurgical intervention that involves application of biological or synthetic graft over an area where the dural integrity has been compromised.^[4] It, simply stating, is the process of reconstructing a dural defect. Duraplasty is done for a lot of common neurosurgical procedures, such as tumor resection, decompressive hemicraniectomy for traumatic lesions, and Chiari malformation.^[3] A variety of material is used for repair of dural defect. These include autologous, allogenic, and xenograft natural dural substitutes as well as a range of synthetic and semi-synthetic dural substitutes.^[5] Synthetic dural substitutes are being used increasingly for dural repair. However, these synthetic materials may lead to occurrence of inflammatory granulomatous foreign body reaction with serious consequences in some cases.^[2]

We, herein, describe a rare case of an extradural abscess presenting as a discharging forehead sinus after polypropylene (G-Patch®) synthetic fabric duraplasty.

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CASE DESCRIPTION

A 33-year-old female and her spouse were transferred to the emergency department of our teaching hospital after sustaining road traffic accident, when their motorbike was allegedly hit by a truck. The husband, who was in the driving seat, was pronounced dead immediately on arrival. The woman, who was a pillion rider, sustained severe head injuries with massive brain laceration and gross extrusion of brain tissues from the forehead [Figure 1]. Imaging revealed hemorrhagic contusions in bilateral frontal lobes, fracture of frontal bone involving frontal sinus, crista galli and anterior skull base with dural tears, blowout fracture of the left orbit, and all the walls of the right orbit. Emergency craniotomy with cranialization of frontal sinus was performed. Dural repair was carried out with synthetic polypropylene fabric patch (G-Patch; G. Surgiwear® Limited, India) to prevent CSF leak. Cranioplasty was not done due to the presence of open, contaminated wound. Our patient tolerated the procedure well and had an uneventful early postoperative period. Three months after the procedure, she presented to us with complaint of purulent discharge from an opening at the incision site. On inspection, a punched-out discharging wound of about 1 cm diameter was seen on the forehead [Figure 2]. Gram stain and culture from the discharge turned out negative. Contrast-enhanced MRI showed mixed intensity ring-enhancing lesions measuring 1.2×1.4 cm and 1.3×1.1 cm in frontobasal extradural space communicating with the skin of forehead suggestive of abscess formation [Figure 3]. Our patient was started on intravenous flucloxacillin for 6 weeks. Despite giving antibiotics, the discharge continued. Surgery was planned. Intraoperatively, abscess was identified between G-Patch (Surgiwear®) and duramater [Figure 4]. The synthetic dura was removed and abscess drained. Histopathology showed foreign body granuloma with giant cell and chronic inflammatory features.



Figure 1: Initial presentation at the emergency department.

Follow-up after 6 months showed healed scar at the abscess site [Figure 5].

DISCUSSION

In 1895, Robert Abbe described the use of sterilized rubber for closure of dural defect created after removing adhesions following pachymeningitis. Ever since, a variety of natural and synthetic materials has been used for duraplasty. Regardless of the material used, major aims of using dural substitute are to achieve watertight closure, provide surface for neodura formation, and preventing infection.^[7] Natural dural substitutes are associated with problems such as limited availability, requirement of another surgical incision, and disease transmission.^[6] Synthetic materials overcome these drawbacks offering bio-inert environment, good handling, malleability, and prevention of peridural scarring.

G-Patch (G. Surgiwear® Limited, India) is a synthetic polypropylene fabric patch used popularly as a dural



Figure 2: Discharging abscess at incision site on the forehead.

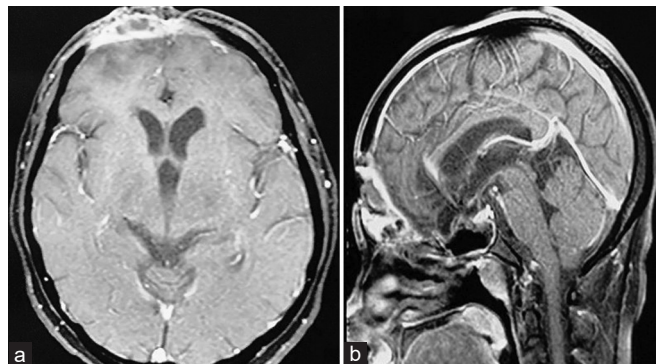


Figure 3: Imaging findings. Axial MRI (left) showing heterogeneous ring-enhancing lesion in the right frontobasal extradural space; sagittal MRI (right) showing localization of abscess beneath dura in the frontal region with cutaneous extension.

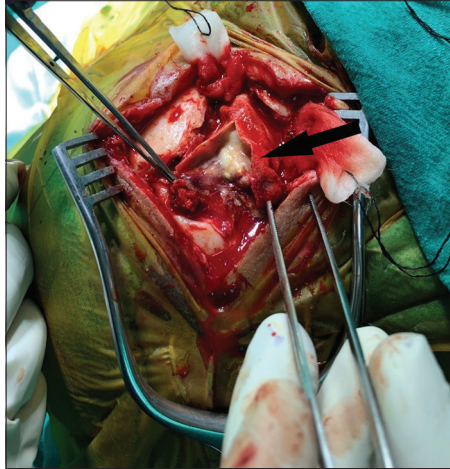


Figure 4: Intraoperative image showing synthetic dura (black arrow) and abscess collected underneath it.



Figure 5: Follow-up image after 6 months showing healed scar at the abscess site.

substitute in Nepal and India. Polypropylene has been shown to induce very less inflammatory reaction and is relatively resistant to infections and biological degradation when used for inguinal and hiatal hernia repair.^[9] The material is bio-inert, easily pliable, and cost effective. It has been used successfully for both single- and double-layered duraplasty with great outcomes.^[5] To the best of our knowledge, no case of foreign body reaction to polypropylene presenting as an extradural abscess has been reported.^[2] This is the first case of a granulomatous inflammatory foreign body reaction presenting as an extradural abscess after using polypropylene as duraplasty material.

The use of both autologous and nonautologous materials for duraplasty in cranial surgery is associated with similar complication rates.^[1,3] There is no clear recommendation on which material is more efficacious and should be used for dural repair.^[8] Complications such as epidural abscess presenting as a discharging sinus is rarely, if ever, encountered but should be kept in mind when using synthetic materials for duraplasty.

CONCLUSION

Complication rates with various types of material used for duraplasty are similar. The choice of material used depends on the local protocol and individual surgeon preference. Although polypropylene has been used safely as both single- and double-layered duraplasty, it may trigger foreign body reaction and present rarely as an extradural abscess. This highlights the importance of continued postprocedural patient follow-up as late complications can occur. Since very less prospective studies have been carried out comparing different dural substitutes; large, randomized, multicentric studies should be carried out to establish the superiority among available materials. This evidence may help immensely in deciding which material should be used for duraplasty.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

Financial support and sponsorship

Publication of this article was made possible by the James I. and Carolyn R. Ausman Educational Foundation.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Sapkota S, Karn M. Extradural abscess following synthetic fabric duraplasty. *Surg Neurol Int* 2021;12:234.