Technical note

Received: 23 March 2009
Accepted: 12 July 2010
Available online
24 August 2010

Chronic frontal sinus disease: Combined use of platelet-rich plasma and calvarial bone grafts for sinus obliteration in aggressive and secondary cases

Sinusites frontales chroniques : obturation par l'association de plasma riche en plaquettes et de greffe d'os calvarial dans les formes agressives et secondaires

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Résumé

Introduction. Le traitement chirurgical de la sinusite chronique frontale peut être difficile. Le moyen le plus efficace est l'oblitération des sinus. Plusieurs techniques ont été rapportées. Nous avons évalué l'utilisation d'un mélange de plasma riche en plaquettes et de greffe d'os calvarial dans les sinusites frontales chroniques (SFC).

Patients et méthodes. Sept patients, (quatre femmes et trois hommes) avec des SFC, ont été pris en charge de janvier 2001 à juin 2006. L'âge variait de 35 à 67 ans. Deux patients avaient des signes d'ostéomyélite frontale avec fistule cutanée et le drainage endoscopique avait échoué pour les cinq autres. Tous les patients ont eu une oblitération du sinus frontal par un mélange de plasma riche en plaquettes et de greffe d'os calvarial. La voie d'abord était bicoronale.

Résultats. Une guérison a été observée chez les sept patients avec disparition progressive des signes cliniques sans complications. Le scanner à 12 mois a montré une oblitération complète des sinus frontaux.

Discussion. Le mélange de plasma riche en plaquettes et de greffe d'os calvarial est une technique sûre et fiable pour l'oblitération du sinus frontal. Le faible taux de complications et l'absence de

Summary

Introduction. The surgical management of chronic frontal sinusitis can be challenging. The most effective way to treat this condition is sinus obliteration. Several methods have been published. We evaluated the feasibility of a combined treatment, consisting of platelet-rich plasma (PRP) and autologous calvarial bone chips, in chronic frontal sinus diseases (CFSD).

Patients and methods. From January 2001 to June 2006, seven patients (four women and three men) were admitted presenting with signs and symptoms of CFSD. Their ages ranged from 35 to 67 years. Two patients presented with signs of frontal osteomyelitis and a cutaneous fistula, while endoscopic drainage had failed for five patients. All patients were treated by sinus obliteration though bicoronal access. Free autologous calvarial bone graft combined with PRP was used to repair the frontal sinus.

Results. The frontal sinus repair was successful in all seven patients with progressive resolution of symptoms without perioperative complication. The CT scans at 12 postoperative months showed complete obliteration of sinuses.

Discussion. Combined PRP and autologous bone graft is a safe and reliable procedure for frontal sinus obliteration. The low rate of

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10.1016/j.stomax.2010.07.004 Rev Stomatol Chir Maxillofac 2010;111:216-220

morbidité du site donneur autorisent son utilisation dans les formes agressives et secondaires.

Mots clés : Sinusite frontale chronique, Oblitération, Plasma riche en plaquettes, Greffe osseuse, Calvaria

complications and the absence of donor site morbidity support using this technique in secondary and particularly complex cases.

Keywords : Frontal sinusitis, Chronic disease, Sinus obliteration, Platelet rich plasma, Bone grafting, Calvaria

Introduction

Chronic frontal sinusitis can cause significant morbidity. Intracranial complications include venous sinus thrombosis, meningitis, cerebral or epidural abscess, and subdural empyema. Osteomyelitis, orbital cellulitis, and abscess are the most frequent extracranial complications [1]. Osteomyelitis can subsequently develop with specific signs, such as fistulization with suppuration. Several predisposing factors, including immunodeficiency, cocaine abuse, allergies, and previous sinus surgery, have been implicated in the development of the disease [1].
Surgical management remains the first-line treatment. Preoperative and postoperative medical treatment is aimed at controlling predisposing factors, reducing inflammation of sinus tissues, and facilitating the drainage of sinus secretions [2]. Obliteration of the frontal sinus is a crucial procedure, especially when endoscopic procedures fail. Autologous fat is the most frequently used graft material. Other options include bone or muscle grafts and flaps, such as the galeal frontalis myofascial flap [3]. The use of calvarial bone chips has been described for the reconstruction of craniofacial defects. Calvarial bone harvesting avoids complications frequently encountered with the use of rib or iliac bone, such as pneumothorax and donor site morbidity [4]. Nasal endoscopic procedures are the first-line treatment for chronic frontal sinus disease (CFSD). Surgical revision and complications such as cerebrospinal fluid leakage are frequent, especially in complex, aggressive and refractory cases [5–7].
We assessed the feasibility of a combined treatment, consisting of platelet-rich plasma (PRP) and autologous calvarial bone chips, in seven CFSD patients.

Patients and methods

Patients

From January 2001 to June 2006, seven patients (four women and three men) were admitted to our unit presenting with signs and symptoms of CFSD. Their ages ranged from 35 to 67 years. Two patients presented with signs of frontal osteomyelitis and a cutaneous fistula *(fig. 1)*. Endoscopic drainage had failed for five patients. All patients were treated by sinus obliteration via bicoronal access with autologous calvarial bone chips combined with PRP.
A diagnostic workup, including CT scans, was performed to confirm the diagnosis. All patients were given oral antibiotics for 2 weeks postoperatively.
To prepare PRP, 70 mL of whole blood subdivided into eight test tubes containing citrate sodium were collected during the preoperative period. The whole blood underwent two cycles of centrifugation (standard cell separator): the first one at 120 G for 20 minutes that produced the "first centrifugation PRP"; the second one at 800 G for 15 minutes, which provided a pellet of platelets and platelet poor plasma (PPP). The pellet was then resuspended in 5 to 6 mL of PPP to get the final PRP. The whole procedure is about 45 to 55 minutes long.

Surgical procedure

The surgical route was a bicoronal incision, under general anesthesia, after injection of lidocaine and adrenaline

Figure 1. A patient presenting with a cutaneous frontal fistula.