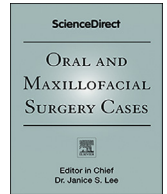


Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Oral and Maxillofacial Surgery Cases

journal homepage: www.oralandmaxillofacialsurgerycases.com

Craniofacial reconstruction with cryopreserved autograft. Case report and technique description



J.A. Franco-Jiménez^{*}, A. Ceja-Espinosa, R. Huato-Reyes, C.A. Tevera-Ovando, M.I. Ruiz-Flores

Neurosurgery Department, Centro Médico "Lic. Adolfo López Mateos", Instituto de Salud del Estado de México, Av. Nicolás San Juan s/n Ex Hacienda La Magdalena, Estado de México, Mexico

ARTICLE INFO

Article history:

Received 29 December 2017
Received in revised form 5 February 2018
Accepted 23 February 2018
Available online 26 February 2018

Keywords:

Cranioplasty
Autologous bone
Fronto-orbital reconstruction
Cryopreservation

ABSTRACT

The craniofacial reconstruction after a craniotomy can sometimes be challenging due to the complexity of the fronto-orbital region, an adequate reconstruction can be achieved with combination of autologous bone and alloplastic materials, with low morbidity and mortality rates, even though it is still needed to perform more studies about this technique to assess its functional and aesthetic outcomes.

At this paper we present one single case of a 19 year old male patient in who we performed a cranioplasty of fronto-orbital region, with a multifragmented autologous bone after 7 months of cryopreservation.

The cranioplasty was performed with bone fragments and titanium mini plates to achieve a good functional and aesthetic outcome, without resorption, infection or complications. We described our method of cryopreservation and sterilization.

© 2018 The Authors. Published by Elsevier Inc. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Traumatic brain injury [TBI] can cause several craniofacial injuries such as, scalp wounds, skull fractures (exposed and depressed), epidural and subdural haematomas, and malignant cerebral swelling with intracranial hypertension. A significant percentage of patients with TBI also suffer facial injuries due to the anatomical proximity of this structures and to the trauma mechanism, up to 12% [1] of patients with TBI will also present maxillofacial lesions.

In many cases the surgical procedure to treat the TBI will lead to large and complex craniofacial defects because the bone fragment has to be withdrawn to allow the brain to swell, or because there are multiple and small bone fragments that cannot be adequately repaired [2]. In most cases (64%) a unilateral decompressive craniectomy is sufficient to treat intracranial hypertension, even though, bifrontal or bilateral craniectomies had also been described [3].

Cryopreservation of the fragments is a standardized method, in which the bone segment is maintained at temperatures which can range from -16 to -80 °C, however the methods used to sterilize the segments are not yet well defined, some authors using autoclaving [4] some without reesterilization process [5]. In our hospital the bone fragments were conserved at the tissues bank with cryopreservation at -80 °C. For cranioplasty, we thawed the bone segment and then washed it with 3% hydrogen peroxide 2 times in 24 hours in a class II biosafety cabinet. Then it is sent to radiosterilization with cobalt gamma rays and cultures to evaluate the absence of any bacteria. Everything is handled in a cold chain.

^{*} Corresponding author.

E-mail address: drjalfonsofranco@gmail.com (J.A. Franco-Jiménez).

The sinking flap syndrome or poscraniectomy syndrome, is secondary to the transmission of the atmospheric pressure to the brain tissue in absence of a large bone fragment and can cause changes in the cerebrospinal fluid [CSF] dynamics and paradoxial herniation. Patients will present neurological deterioration characterized by headache, disorientation, drowsiness, contralateral hemiparesia, sensitive and gait disturbances, among others.

Cranioplasty can reduce this atmospheric pressure effect and this is the main goal of this surgical procedure, secondary aim of this is the aesthetical craniofacial reconstruction. Reconstruction of the fronto-orbital rim can be challenging due to multiple, complex, small, and loss of bone fragments during the craniectomy surgery. These cases require reconstruction with titanium mini plates, that will allow the adequate reconstruction of complex anatomical areas, such as the fronto-orbital region [6,7].

The materials used to perform the craniofacial reconstruction are several which include bone grafts autologous or heterologous, titanium mesh, and biocompatible polymeres. Autologous bone grafts are the best materials, because they have several advantages such as biocompatibility, bone conduction, resistance, elasticity [8] and it is easier to achieve a good aesthetical result with this type of graft. Even though, autologous bone grafts are not always available so the use of alloplastic materials have gained popularity in the last few years. The use of alloplastic grafts does not increase the infection rates, neither the subcutaneous of extracorporeal conservation of bone fragments [9] In some studies in animals the alloplastic grafts have even better resistance and neuroprotection to a new trauma than autologous grafts [10].

The use of 3D printers, aided with a preoperative computed tomography [CT] 3D reconstruction scan, allows the preoperative modelling of the bone defect, exactly to match the patient individual characteristics, and this can achieve better aesthetical results [8].

Cranioplasty and craniofacial reconstruction have low mortality and morbidity rates (10.9%). Infection rates have been reported from 5.8% to 21%. Kingler et al., reported that in 3.5% of their series, required reintervention to drain an epidural haematoma, and founded no difference between the use or not of an epidural postoperative drain to prevent this complication, and this did not affected infection rate.

Long term complications include graft resorption, which diminishes the expected resistance in some cases up to 25% [11] The principal factor associated with this is age of the patient, being patients under 18 years old the ones with the most risk [12]. Craniofacial reconstruction can be performed early (within the first 12 weeks after trauma) or late (after 12 weeks), this has no statistical difference in complications such as infections, postsurgical haematomas or bone resorption [9,12].

2. Case presentation

Here we present the case of a 19 year old male, without previous illnesses, who suffered in February 2016 a TBI secondary to a car crash. At admission he presented a Glasgow Coma Scale [GCS] of 7 points (O1, V1(t), M5), pupils 3 mm, reactive. In the CT scan he presented with diffuse brain swelling, and a bilateral frontal fracture that involved both fronto-orbital and frontozygomatic regions. He underwent a surgical bifrontotemporoparietal craniectomy, and admitted postoperatively to the intensive care unit [ICU] to aggressive neuroprotective treatment. The postsurgical CT scan showed adequate surgical and medical treatment with good clinical recovery, after 5 days in the ICU he was discharged to our hospitalization unit, he did not

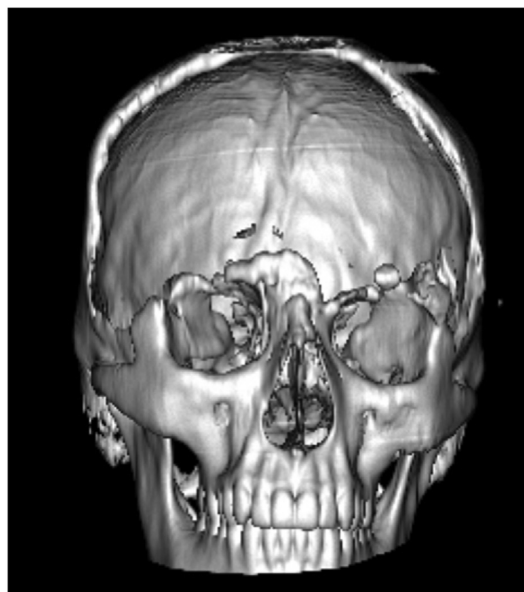


Fig. 1. Anteroposterior view of the bifrontal defect.

Download English Version:

<https://daneshyari.com/en/article/8707000>

Download Persian Version:

<https://daneshyari.com/article/8707000>

[Daneshyari.com](https://daneshyari.com)