

Complications of Cranioplasty: Trying Not to Harm

Pelayo Hevia-Rodríguez*, Irati de Goñi-García, Patricia Moreno-Moya, Alejandro Elúa-Pinín and Nicolás Samprón

Department of Neurosurgery, Hospital Universitario Donostia, San Sebastián, Spain

Corresponding author: Pelayo Hevia-Rodríguez, Department of Neurosurgery, Hospital Universitario Donostia, San Sebastián, Spain,

E-mail: pelahevia@gmail.com

Received: 28-Nov-2022, Manuscript No. IPJNN-22-13214; **Editor assigned:** 30-Nov-2022, PreQC No. IPJNN-22-13214 (PQ); **Reviewed:** 14-Dec-2022, QC No IPJNN-22-13214; **Revised:** 21-Dec-2022, Manuscript No. IPJNN-22-13214 (R); **Published:** 28-Dec-2022, DOI: 10.4172/2171-6625.22.S5.447

Citation: Hevia-Rodríguez P, Goñi-García de I, Moreno-Moya P, Elúa-Pinín A, Samprón N (2022) Complications of Cranioplasty: Trying Not to Harm. J Neurol Neurosci Vol.13 No.S5:447

Abstract

Cranioplasty is a procedure routinely performed in neurosurgery. It is associated with significant morbidity and several types of post-surgical complications. Atypical facial pain has not been documented yet as a potential postoperative complication. We discuss a case of atypical facial pain reported during the immediate postoperative period after a patient-specific implant patient-specific cranioplasty. The pain was refractory to medical treatment and sphenopalatine ganglion block. Eventually, the pain disappeared after the surgical revision of the cranial implant.

Keywords: Atypical facial pain; Persistent idiopathic facial pain; Cranioplasty; Complications

Description

Cranioplasty is a surgical procedure to restore the calvarial form and function with hard tissue replacement. It also has a therapeutic role in improving the patient's functional and neurological outcome after decompressive craniectomy in the syndrome of the trephined [1]. It is associated with a relatively high complication rate of postsurgical complications [2,3]. The most common are infections, bone flap resorption and hematomas. Atypical facial pain has not been documented yet as a potential postoperative complication [4]. The extraction of the free bone flap implies the disinfection and mobilization of the temporal muscle with the risk of injury to the muscle fibers, ischemia due to arterial interruption or prolonged retraction and denervation. All this carries the chance that it is frequently associated with postoperative atrophy with significant aesthetic and functional defects. The total or partial malposition of the muscle at the end of surgery can change the position of the temporomandibular joint with pain and limitation of the bite. Other possible complications are tendinitis or temporal tendinosis; both present with stabbing facial pain due to compromise of the temporal tendon with the coronoid process,

below the zygomatic arch and can radiate to the rest of the temporal region. A 61-year-old woman intervened by right hemispheric decompressive craniectomy for the evacuation of an intraparenchymal frontotemporal hematoma after a subarachnoid hemorrhage due to a ruptured right middle cerebral artery aneurysm. After five months and a complete neurological recovery, a personalized cranial Polyetheretherketoneimplant was placed. Immediately after the surgery, the patient began with persistent idiopathic facial pain, accompanied by burning paroxysms, positive signs and irradiation to two trigeminal branches: ophthalmic nerve (V1) and deep temporal nerves, branch of the mandibular nerve (V3) [4]. The type of facial pain met the characteristics of persistent idiopathic facial pain. The traumatic mechanism was double: the incision and surgical mobilization of the temporal muscle and the possible compression by the implant. The affected nerves are the deep medial temporal nerve, masseteric nerve and deep temporal nerves, branches of the mandibular nerve. Once the neuropathic pain circuit has started, it is transmitted to the ophthalmic and mandibular nerves through the Gasserian ganglion. There was no trigeminal neurovascular conflict on magnetic resonance imaging. Other possible diagnoses are neuralgia secondary to neuromas due to exaggerated axonal regeneration with connective scar tissue after nerve damage and characteristic trigger zone; and post-cranioplasty headache, ruled out due to the characteristics and distribution of pain [5]. Tramadol and gabapentin in progressive doses were administrated. A sphenopalatine ganglion block with 0.5% bupivacaine had no effect either. Given the persistence of the pain, 12 months later, a revision cranioplasty was performed. A muscle was observed with atrophied temporal bone, with no other findings, opting to remove the lower part of the implant to leave the temporal area free. Within hours of surgery, the patient reported the disappearance of facial pain, with the ability to open the mouth and palpate the area of the temporal fossa without pain. After two years, the patient remains asymptomatic without needing analgesia treatment (**Figures 1A-1D**).

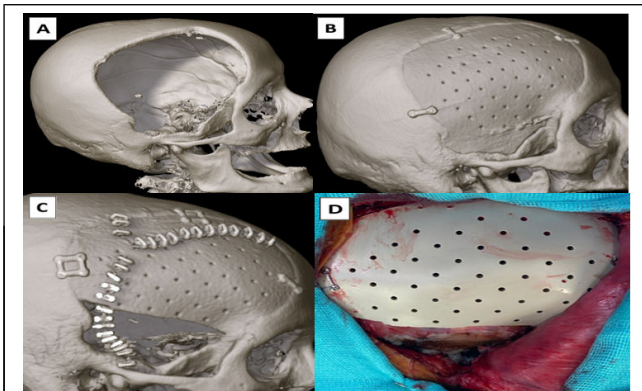


Figure 1: Ruptured right middle cerebral artery aneurysm. (A): Aneurysm Computed Tomography (CT) scan showing the bone defect after decompressive craniectomy; (B): 3D reconstruction CT after custom PEEK cranioplasty placement, showing proper fit; (C and D): 3D reconstruction CT and intraoperative photograph show the end result with the inferior part of the implant removed.

Cranial reconstruction with autologous bone is the first option in many centers due to its biocompatibility, low cost, and easy coupling. A heterologous implant should be used when there is a very extensive or irreparable cranial defect or a history of osteomyelitis. Various materials and designs have emerged recently to perform a personalized cranioplasty or PSI (Patient-Specific Implant). The main ones are hydroxyapatite, PEEK, Polymethylmethacrylate (PMMA) and titanium. Each has advantages and disadvantages; today, no material has proven superior to the rest, so the choice depends on the surgeon's preferences and availability [6]. We must warn that applying this personalized, perfectly adjusted implant can cause nerve compression that goes unnoticed and leads to facial pain. Using a cranioplasty with autologous bone will make the fit less tight and the risk of suffering this complication will decrease.

As preventive measures, it is recommended to expose all the cranial edges and leave them utterly free before placing the graft, watching for entrapment of extracranial tissues. If a custom cranioplasty is used, it is advisable to leave some millimeter clearance in areas at risk of compromise due to

entrapment, such as the temporal fossa. The case presented is the first documented case of neuropathic facial pain as a complication after cranioplasty [4].

Conclusion

The neuralgia appeared immediately after the procedure and did not resolve until the partial removal of the prosthesis one year later. Atypical facial pain is a possible post-surgical complication of a cranioplasty. To prevent it, you must have special care with the mobilization and conservation of the muscle temporary, as well as with the placement of the implant. A personalized design of the implant too tight can favor its appearance. In case of failure of conservative treatment, a surgical revision must be performed.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Ashayeri K, Jackson EM, Huang J, Brem H, Gordon CR (2016) Syndrome of the Trephined: A Systematic Review. *Neurosurgery* 79:525-534.
2. Acciarri N, Palandri G, Cuoci A, Valluzzi A, Lanzino G (2022) Cranioplasty in neurosurgery: is there a way to reduce complications? *J Neurosurg Sci* 64:1-15.
3. Sahoo NK, Tomar K, Thakral A, Rangan NM (2018) Complications of Cranioplasty. *J Craniofac Surg* 29:1344-1348.
4. Hevia Rodríguez P, Samprón N, Plou García MP, Elúa Pinín A, Úrculo Bareño E (2022) Atypical facial pain after cranioplasty: A too perfect design?: Dolor facial at pico asociado a craneoplastia: ¿un encaje demasiado perfecto?. *Neurocirugía* 33:361-365.
5. The International Classification of Headache Disorders. (2018) Headache Classification Committee of the International Headache Society (IHS). *Cephalalgia* 38:1-211.
6. Zanotti B, Zingaretti N, Verlicchi A, Robiony M, Alfieri A, et al. (2016) Cranioplasty: Review of Materials. *J Craniofac Surg* 27:2061-2072.