

Case Report

Subdural hematoma as a rare complication of a percutaneous balloon compression: case report

Sergio Neto¹, Gustavo Noletto¹, Kleber Paiva Duarte², Nilton Caetano da Rosa³, Manoel Jacobsen Teixeira^{2,4}

¹Division of Neurosurgery, School of Medicine, University of Sao Paulo, Sao Paulo, Brazil; ²Division Functional Neurosurgery, School of Medicine, University of São Paulo, São Paulo, Brazil; ³Division of Surgical Oncology, International Research Center, A.C. Camargo Cancer Center, São Paulo, Brazil; ⁴Division of Neurosurgery, School of Medicine, University of Sao Paulo, Sao Paulo, Brazil

Received September 13, 2015; Accepted December 3, 2015; Epub February 15, 2016; Published February 29, 2016

Abstract: Background: Trigeminal neuralgia (TN) it's the most common of all 14 types of facial pain and it's a well-described pathology presenting as a paroxysmal (clusters of sharp lancinating) shock-like pain in abrupt crises, limited to the trigeminal domain side. We present a complication of a percutaneous balloon compression never reported before. Presentation: A 86 Years old (Y.O), Male patient on the immediate post operative of a PBC (percutaneous balloon compression) presented suddenly unresponsive and with right pupilarisocoria. Conclusion: The authors believe that the cause of the Hematoma was due to the stretch and rupture of bridging dural veins secondarily to the expansion of the balloon. The quick detection and treatment was the key for a good outcome for the patient.

Keywords: Trigeminal neuralgia, ballon compression, subdural hematoma, rhizotomy

Introduction

Trigeminal neuralgia (TN) is the most common of all 14 types of craniofacial pain worldwide, according to The International Headache Society, with a significant impact on quality of life of those with the disease [1]. It's defined as a neuropathic disorder characterized by recurrent episodes of brief sudden unilateral severe lancinating pain in the distribution of one or more branches of the trigeminal nerve [2]. The first descriptions were made in the XVII century in the work of John Locke [3]. It Affects 3 to 27 persons per 100,000 population and an estimated 15,000 new cases diagnosed per year in the United States [4] and Women are more frequently affected with this type of craniofacial pain, in the ratio of 2:1 [4, 5] and incidence of 17.5 per 100,000 in individuals aged 60 to 69 years and 25.6 per 100,000 for those older than 70 years and he right side is more frequently involved [1, 3, 5].

TN can be classified as classical or idiopathic and on symptomatic or secondary acute or chronic (lasting > 3 months) [1, 9].

The etiology of the pain for the majority of TN patients is vascular compression of the trigemi-

nal nerve, most commonly a loop of the superior cerebellar artery (75%-88%), but the anterior inferior cerebellar artery (10%-25%), basilar artery (1%-4%), and adjacent veins (6%-13%) [10].

There are many treatment options available for TN, ranging from pharmacologic, radiosurgery, and other minimally invasive percutaneous techniques to major intracranial nerve exploration and decompression [2, 5]. The American Academy of Neurology (AAN) and the European Federation of Neurological Societies (EFNS) Guidelines on TN treatment from 2008 recommend medical treatment with carbamazepine (CBZ; 200-1,200 mg/day) and oxcarbazepine (OXC; 600-1,800 mg/day) or lamotrigine and baclofen as first option [4, 5, 9]. Carbamazepine reduces both the frequency and intensity of painful paroxysms and was equally efficacious on spontaneous and trigger-evoked attacks [2, 5, 9].

Percutaneous treatment modalities for TN consist of percutaneous balloon compression (PBC), glycerol rhizotomy (GR), and radiofrequency thermocoagulation (RFT) [1]. All 3 of these treatments are generally safe, efficient, and effective, and rely on the principle of induc-

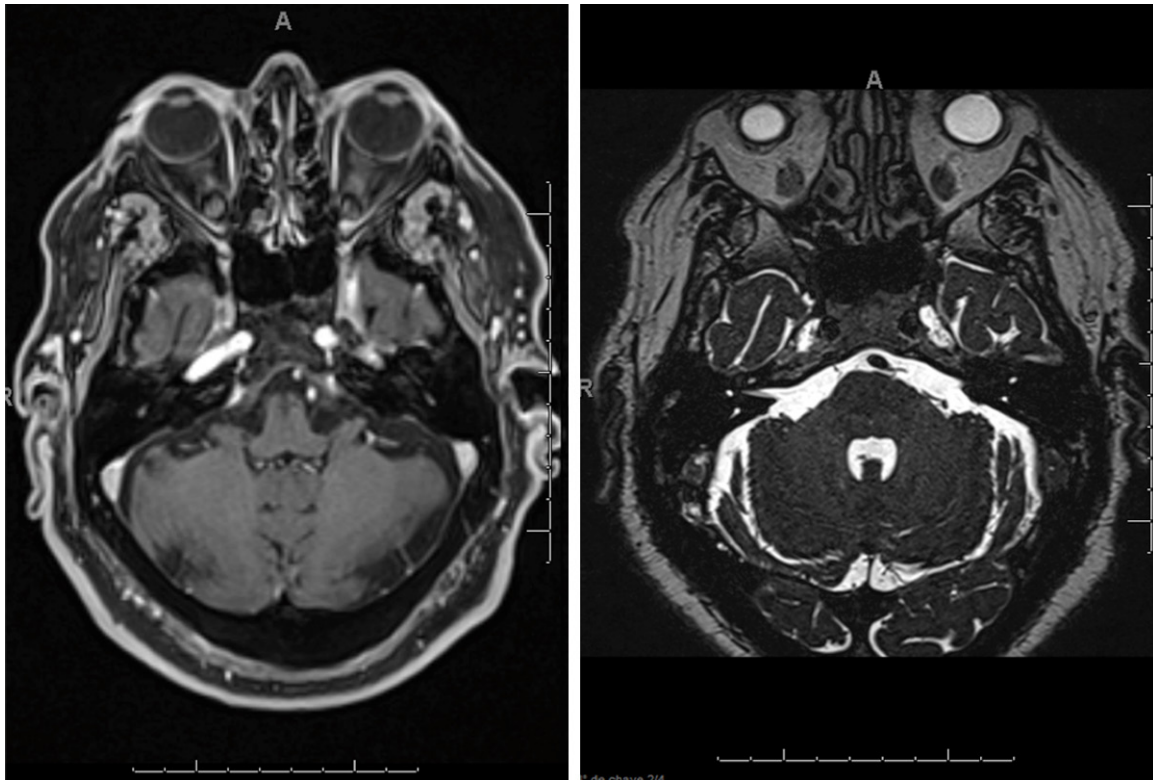


Figure 1. A: Brain MRI T1 and T2 FIESTA with no visible lesion or vascular compression.

ing pain relief by directed injury to the trigeminal nerve and offer a good rate of immediate postoperative pain relief ranging from 80% to 90% [2, 4, 5].

The complications due to PBC include: dysesthesias in a trigeminal distribution and rates vary from 0% to 15%, corneal analgesia (due to disruption of the corneal reflex), motor weakness (typically involves the masseter in rates of 0% to 33%) and more rare are the post-operative morbidity complications including infection and meningitis in rates of 0% to 5% depending on the study [4].

The authors present a rare complication of a PBC, successfully treated with a good outcome.

Case report

J.R, 84Y.O, with a past medical history of hypertension, diabetes, Trigeminal neuralgia (diagnosed in 2012 TN due to the following symptoms: Shock like pain radiated to right V1-V3 territory in a frequency of 3-4 ictus per week). The patient was initially treated with high doses

of carbamazepine for 6 months and associated phenytoin for 2 months with no great improvement of symptoms. The first surgery was in 2013 and a PBC was performed, the technique chosen was based on the patient's age, clinical conditions and no radiological finding on MRI (**Figure 1**). The initial results were good and patient evolved with no symptoms for 1 year until when symptoms recurred and even with medical treatment the patient complained. A new PBC was indicated in effort to improve symptoms.

The procedure was performed according the required techniques (under general anesthesia and guided by radioscopy with no complications during the procedure). Immediately on the post-op. the patient presented unresponsive with right pupil anisocoria and left hemiparesis. An emergent cybrain CT was performed, showing a large subdural hematoma with 6 mm midline shift (**Figure 2**). Patient was taken to the emergency room(ER) where a decompressive craniotomy (due to the non-traumatic origin and no brain swelling we chose to perform a tucchi-flap technique [6] instead of the classic tech-

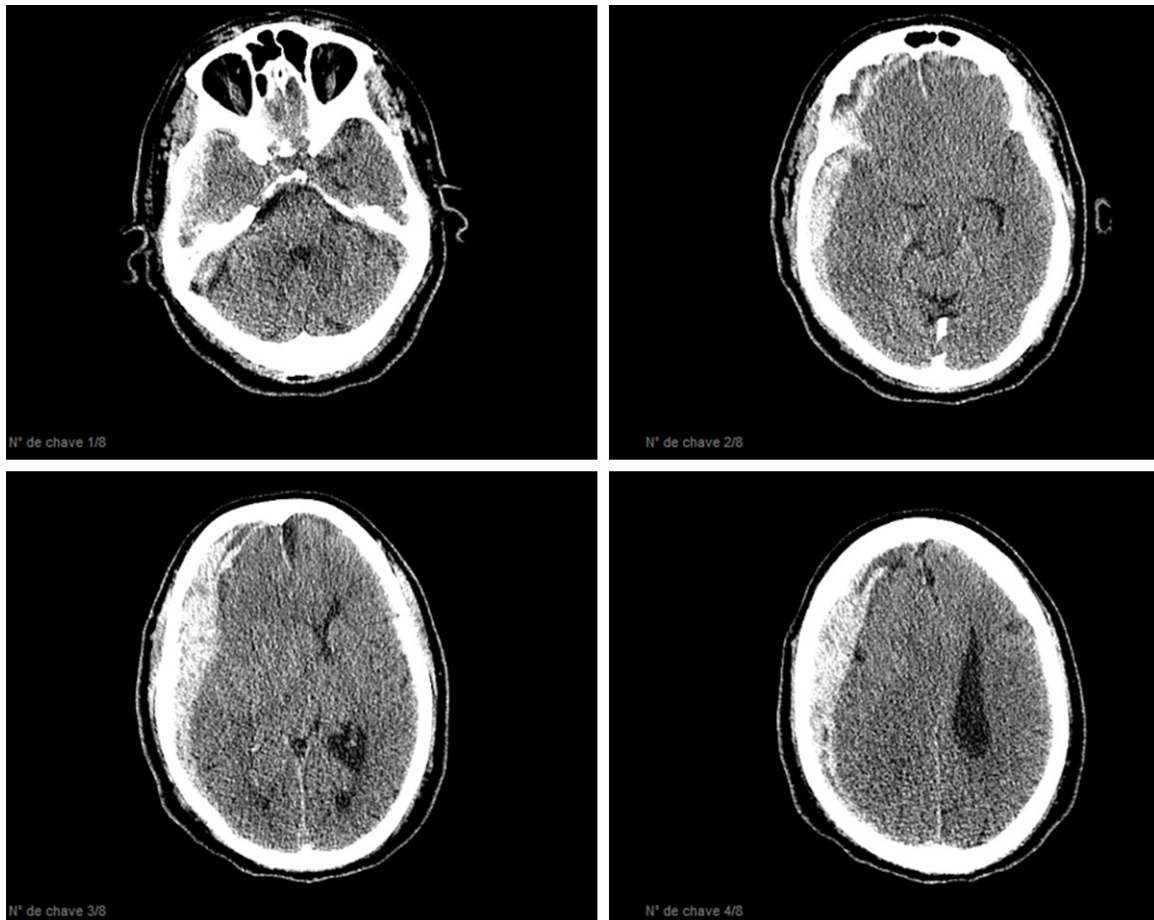


Figure 2. Head CT: large subdural hematoma with 6 mm midline shift.

nique) was performed and the subdural hematoma successfully evacuated (**Figure 3**). The patient remained on ICU for 7 days and was discharged after 45 days with Glasgow outcome scale (GOS) 3.

Discussion

Gasserian ganglion compression for treatment of facial pains has been known since the work of Shelden, CH. published in 1950 [13]. The first study reporting the effectiveness of PBC was made by Mullan and Lichtor in 1983.8,13. Since then it represent effective, low-cost, simple therapeutic modality for treatment of TN and more suitable for older, debilitated patients in comparison with MVD [8, 9, 13].

Based on our literature review, this case is the first report of a Subdural hematoma (SDH) as a major complication of a PBC [7, 8]. No other article has ever reported such complication

and the authors believe that the cause of the Hematoma was due to the stretch and rupture of bridging veins during the balloon expansion.

The diagnosis and treatment (medical or surgical) management of trigeminal neuralgia (TN) has proven during time one of the most frustrating and rewarding challenges in neurosurgical practice [9].

Compression by the balloon selectively injures the myelin present in large myelinated fibers that mediate light touch because the compression is selective for large fibers but not selective for pain originating from a particular trigeminal division, it reduces the sensory neuronal input, thus turning off the trigger to the neuropathic trigeminal pain.

There is a lack of data regarding PBC but a general consensus exists on the utility of percutaneous balloon compression (PBC) to treat

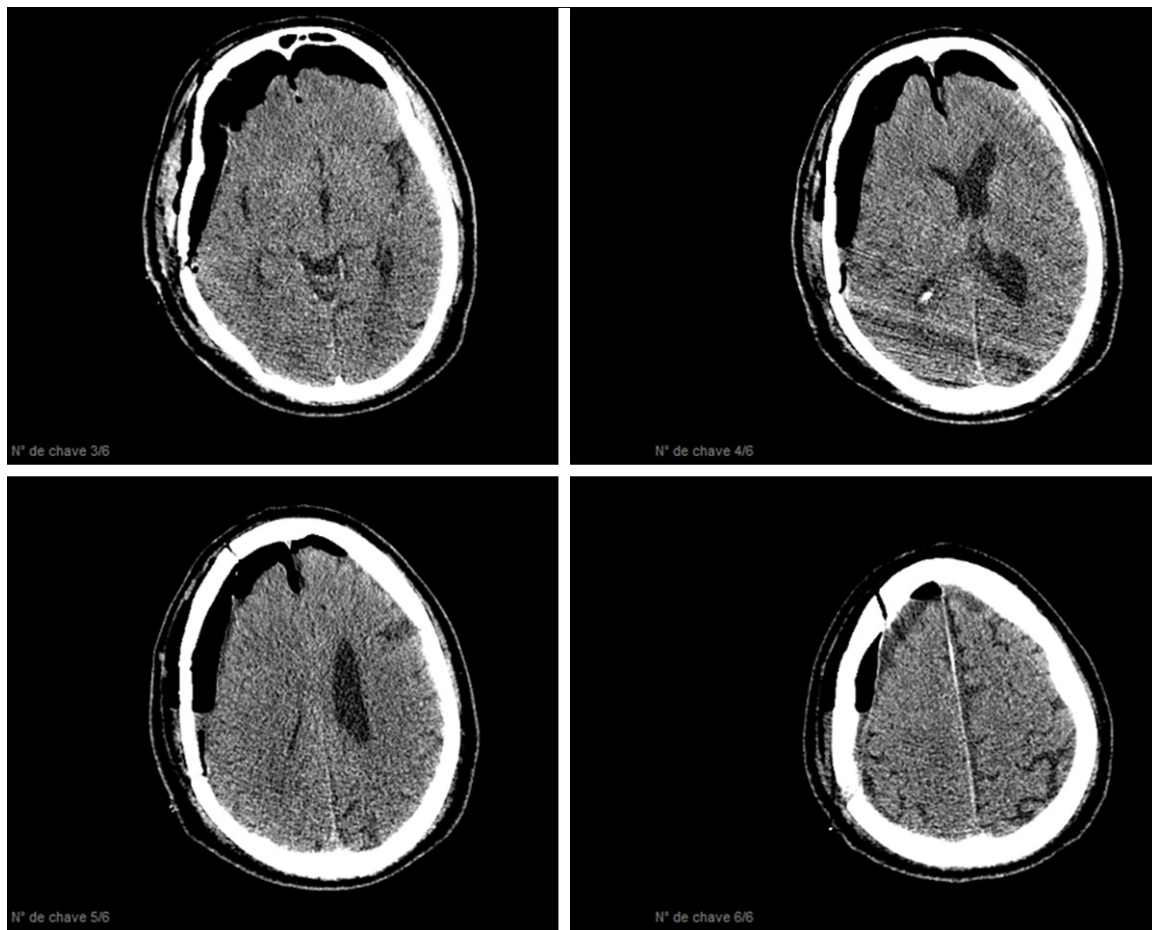


Figure 3. Head CT: midline shift improvement in immediate post op.

patients with drug-resistant trigeminal neuralgia (TN) in general population [5]. PBC offers a good rate of immediate postoperative pain relief ranging from 80% to 90% and a pain-free time without medication that ranges from 2 years to 3 years [11].

The complication rate for PBC was 16.1% with the exclusion of transient masseter weakness, which affected virtually 100% of the patients and was included in the complications for the other techniques [11, 12].

Conclusions

Complications are set backs associated with procedures. The surgical team has the duty to avoid it at any cost, but when inevitable it must be prepared to face it and correct the issue.

In general practice, PBC is a safe procedure but not very often we can face a major complication like the one reported. The quick detection

and treatment was the key for a good outcome for the patient.

Disclosure of conflict of interest

None.

Abbreviations

TN, trigeminal neuralgia; PBC, Percutaneous balloon compression; GR, glycerolrhizotomy; MVD, microvascular decompression; RFT, radio-frequency thermocoagulation; SDH, subdural hematoma; GOS, Glasgow outcomescale; CT, Computerized tomography; MRI, Magnetic Resonance Image; Y.O, yearsold.

Addresscorrespondence to: Dr. Sérgio Neto, Division of Neurosurgery, School of Medicine, University of Sao Paulo, Dr. Enéas de Carvalho Aguiar Street, 255-5th Floor, Sao Paulo 05403-000, Brazil. E-mail: sgsnnc@gmail.com

References

- [1] Sharma M, Shaw A, Deogaonkar M. Surgical options for complex craniofacial pain. *Neurosurg Clin N Am* 2014; 25: 763-75.
- [2] Rose KR, Stone JJ, Ren Z, Wang H, Jahromi BS. Percutaneous trigeminal rhizotomy in a biplane angiosuite: technical assessment. *J Neurointerv Surg* 2014; 6: 699-703.
- [3] Reddy GD, Viswanathan A. Trigeminal and Glossopharyngeal Neuralgia, *Neurol Clin* 2014; 32: 539-52.
- [4] Missios S, Mohammadi AM, Barnett GH. Percutaneous treatments for trigeminal neuralgia. *Neurosurg Clin N Am* 2014; 25: 751-62.
- [5] Montano N, Conforti G, DiBonaventura R, Meglio M, Fernandez E, Papacci F. Advances in diagnosis and treatment of trigeminal neuralgia, *Ther Clin Risk Manag* 2015; 11: 289-99.
- [6] Goettler CE, Tucci KA. Decreasing the morbidity of decompressive craniectomy: the Tucci flap. *J Trauma* 2007; 62: 777-8.
- [7] Agazzi S, Chang S, Drucker MD, Youssef AS, VanLoveren HR. Sudden blindness as a complication of percutaneous trigeminal procedures: mechanism analysis and prevention. *J Neurosurg* 2009; 110: 638-41.
- [8] Tatli M, Satıcı O, Kanpolat Y, Sindou M. Various surgical modalities for trigeminal neuralgia: literature study of respective long-term outcomes. *Acta Neurochir (Wien)* 2008; 150: 243-55.
- [9] Trojnik T, Šmigoc T. Percutaneous trigeminal ganglion balloon compression rhizotomy: experience in 27 patients. *ScientificWorldJournal* 2012; 2012: 328936.
- [10] Pollock BE, Stein KJ. Surgical management of trigeminal neuralgia patients with recurrent or persistent pain despite three or more prior operations. *World Neurosurg* 2010; 73: 523-528.
- [11] Barker FG 2nd, Jannetta PJ, Bissonette DJ, Jho HD. Trigeminal numbness and tic relief after microvascular decompression for typical trigeminal neuralgia. *Neurosurgery* 1997; 40: 39-45.
- [12] Lopez BC, Hamlyn PJ, Zakrzewska JM. Systematic review of ablative neurosurgical techniques for the treatment of trigeminal neuralgia. *Neurosurgery* 2004; 54: 973-82; discussion 982-3.
- [13] Shelden CH, Pudens RH, Freshwater DB, Crue BL. Compression rather than decompression for trigeminal neuralgia. *J Neurosurg* 1955; 12: 123-126.
- [14] Corrêa CF, Teixeira MJ. Balloon compression of the Gasserian ganglion for the treatment of trigeminal neuralgia. *Stereotact Funct Neurosurg* 1998; 71: 83-89.