

Late Onset Intracranial Dural Fistula Secondary to Frontobasal Mucocele Surgery

Michael Gregorio Ortega-Sierra¹, Gerson Stiven Rojas-Ceballos², Maria Manuela Maldonado-Hoyos³, Diana Alexandra Rodriguez-Manrique², Cindy Vanessa Oliveros-Falla², Mayra Esperanza García-Abril⁴, Jhoan Sebastián Robledo-Arias⁵ and Md Moshur Rahman^{6*}

¹School of Medicine, Corporación Universitaria Rafael Nuñez, Cartagena, Colombia

²School of Medicine, Universidad Surcolombiana, Neiva, Colombia

³School of Medicine, Universidad CES, Medellín, Colombia

⁴School of Medicine, Universidad Juan N Corpas, Bogotá, Colombia

⁵School of Medicine, Universidad del Quindío, Armenia, Colombia

⁶Neurosurgery Department, Holy Family Red Crescent Medical College, Dhaka, Bangladesh

***Corresponding Author:** Moshur Rahman, Neurosurgery Department, Holy Family Red Crescent Medical College, Dhaka, Bangladesh.

Received: November 23, 2021; **Published:** December 30, 2021

Abstract

Dural fistulas are defined as abnormal connections between the meningeal arteries and small venules of the dura. They represent a little more than 10% of the cases of intracranial shunts. The relevance of this condition lies in the high risk of spontaneous hemorrhage to become a malignant fistula. Little is known about the etiopathogenesis of this entity, however, there are few published cases on the development of a dural fistula secondary to frontobasal mucocele surgery. Based on the above, the aim of this manuscript is to describe a case of late onset intracranial dural dural fistula secondary to frontobasal mucocele surgery in a 55-year-old female patient with only history of seizure event.

Keywords: Arteriovenous Fistula; Central Nervous System Vascular Malformations; Mucocele; Neurosurgery

Introduction

Dural fistulas are defined as abnormal connections between the meningeal arteries and small venules of the dura. They represent a little more than 10% of the cases of intracranial shunts [1-3]. The relevance of this condition lies in the high risk of spontaneous hemorrhage to become a malignant fistula [4,5]. Little is known about the etiopathogenesis of this entity, however, there are few published cases on the development of a dural fistula secondary to frontobasal mucocele surgery [6].

Evidence suggests that outcomes during surgical treatment of mucoceles tend to be favorable and uncomplicated. The use of endoscopic techniques substantially reduces hospital stay and the risk of postoperative morbidity [6]. However, due to the lack of knowledge of factors associated with the development of dural fistulas, there are no specific considerations for the development of dural fistulas after mucocele surgery.

Based on the above, the aim of this manuscript is to describe a case of late onset intracranial dural dural fistula secondary to frontobasal mucocele surgery in a 55-year-old female patient with only history of seizure event.

Presentation of case

55-year-old female patient, who came to the neurosurgery department due to symptoms of approximately 5 years of evolution, consisting of tinnitus in the left ear and oppressive headache that subsides with analgesia, which was established after a convulsive event of 4 minutes duration with a postictal state of 7 minutes. Brain magnetic resonance imaging was requested, showing evidence of right dural fistula and contralateral temporal cavernoma. Subsequently, a cerebral panangiography was performed, showing a high-grade dural fistula to the right transverse sinus and sigmoid sinus. Based on the above, it was decided to admit the patient for embolization.

On physical examination the patient was hemodynamically stable, with presence of horizontal nystagmus with rapid phase to the left. Venous drainage was performed through the right transverse sinus and sigmoid sinus, as well as through the right superior petrosal sinus and sigmoid sinus on the same side. The patient passed the postintervention phase without any complications. Follow-up was performed at 3 months, where complete resolution of the symptoms was observed. The patient was satisfied with the intervention and her quality of life returned to normal.

Discussion

Evidence reports that the final outcome of mucocele surgery is generally very favorable. Dzhabazov, *et al* [7] conducted a case series, where they found that there is an equal distribution between mucocele presentation in the different locations (frontal, fronto-ethmoidal, ethmoidal and sphenoid-ethmoidal). There is no significant difference with respect to sex, and only 1 patient presented intracranial extension [7]. This is a finding that, although it has not been presented with sufficient research support as a possible causality between mucocele surgery and the development of intracranial dural fistula, it may be a risk factor to consider.

Another reason supporting the above statement would be the fact of delay between the natural history of mucocele, antecedents and corrective intervention. Scangas, *et al* [9] performed a retrospective analysis of more than 100 patients, where they showed that mucocele developed after trauma, previous surgery and functional sinus endoscopy; these times were 5, 17 and 18 years, respectively [9]. 45% of the cases presented intraorbital or intracranial extension, or both, and the great majority did not present complications [9]. Probably, the intracranial extension and connection with the dura may cause a silent lesion that in time remains active and transforms into a fistula that, depending on the extension and its nature, may be of early or late onset.

On the treatment and prognosis of intracranial dural fistulas, retrograde leptomeningeal venous drainage was associated with intracranial hemorrhage [5]. However, this type of complication is only seen in 2-3% of patients. The overall risk of death is 1.2% (95% CI, 0.6 - 1.8) [5]. Therefore, although there is a low probability of developing complications and death due to fistula development secondary to mucocele surgery, these interventions carry high health costs and are not necessary. Thus, all necessary measures should be taken to reduce the risk of development of intracranial dural fistula.

It is necessary to stimulate research and investment in robotic neurosurgery, as well as minimally invasive surgeries, in order to reduce the risk of complications and postoperative morbidities, as well as to study with greater precision the pathophysiological dynamics of certain conditions in neurosurgery [10]. This is one of the few cases reported where the early establishment of a fistula following mucocele surgery is evidenced.

Conclusion

There is a risk of developing intracranial dural fistulas following frontobasal mucocele surgery. There are no data or significant causal associations. It is necessary to carry out prospective multicenter studies to investigate the behavior of this type of conditions and make recommendations based on evidence.

Bibliography

1. Reynolds MR., *et al.* "Intracranial Dural Arteriovenous Fistulae". *Stroke* 48.5 (2017): 1424-1431.
2. Elhammady MS., *et al.* "Epidemiology, clinical presentation, diagnostic evaluation, and prognosis of cerebral dural arteriovenous fistulas". *Handbook of Clinical Neurology* 143 (2017): 99-105.
3. Yokoyama S., *et al.* "Dural Arteriovenous Fistula Arising after Intracranial Surgery in Posterior Fossa of Nondominant Sinus: Two Cases and Literature Review". *Asian Journal of Neurosurgery*, 14.2 (2019): 602-606.
4. Mulholland CB., *et al.* "Endovascular management of intracranial dural arteriovenous fistulas". *Handbook of Clinical Neurology* 143 (2017): 117-123.
5. Kobayashi A and Al-Shahi Salman R. "Prognosis and treatment of intracranial dural arteriovenous fistulae: a systematic review and meta-analysis". *International Journal of Stroke* 9.6 (2014): 670-677.
6. Santos PLD., *et al.* "Outcomes in Surgical Treatment of Mucocele in Frontal Sinus". *Journal of Craniofacial Surgery* 28.7 (2017): 1702-1708.
7. Dzhabazov KB., *et al.* "Mucocele of the Paranasal Sinuses - Retrospective Analysis of a Series of Seven Cases". *Folia Medica* 60.1 (2018): 147-153.
8. Kuczkowski J., *et al.* "Śluzowiaki zatok przynosowych [Mucoceles of the paranasal sinuses]". *Otolaryngologia Polska* 61.5 (2007): 680-686.
9. Scangas GA., *et al.* "The natural history and clinical characteristics of paranasal sinus mucoceles: a clinical review". *International Forum of Allergy and Rhinology* 3.9 (2013): 712-717.
10. Lozada-Martínez I., *et al.* "Letter: Need and Impact of the Development of Robotic Neurosurgery in Latin America". *Neurosurgery* 88.6 (2021): E580-E581.

Volume 5 Issue 1 January 2022

©All rights reserved by Moshir Rahman., *et al.*