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Case Report

Resection of a nasal arteriovenous malformation with favourable aesthetic outcome: a case report

Melissa de A. Hidalgo*, Axel P. Ramírez, Emiliano O. Chang, Antonio U. Vitelly

Department of Plastic and Reconstructive Surgery, Hospital General de México, Mexico-City, México

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***Correspondence:**
Dr. Melissa de A. Hidalgo,
E-mail: melissa.de.anda@hotmail.com

ABSTRACT

This case report details the management of a high-flow arteriovenous malformation (AVM) in a 13-year-old male, a rare condition in pediatric patients. The AVM, located on the left nasal wing, initially presented as a progressively enlarging purple nodule with recurrent bleeding. Initial treatment included embolization on 11 November 2022, which halted growth and led to partial involution. Despite this, renewed bleeding urged further intervention. The patient's significant medical history, including chronic cardiopathy, added complexity to his care. A two-step treatment approach, including transcatheter embolization followed by surgical resection, achieved approximately 95% devascularization. The post-operative course showed satisfactory recovery with no complications. This case highlights the effectiveness of a multidisciplinary approach in managing complex facial AVMs and underscores the need for ongoing monitoring and individualized treatment strategies.

Keywords: Case report, Nasal arteriovenous malformation, Surgical resection, Facial vascular malformation

INTRODUCTION

Arteriovenous malformations (AVMs), classified by the International Society for the Study of Vascular Anomalies (ISSVA), are high-flow congenital vascular anomalies where blood shunts from high-flow arteries to low-resistance veins through a central nidus, bypassing the capillary bed. Arteriovenous fistulas (AVFs), in contrast, directly connect an artery and a vein without a nidus and can be either congenital or iatrogenic.[1] These lesions are categorized by ISSVA into benign, borderline, and malignant tumors.[2]

AVMs in the head and neck are particularly concerning due to their high flow, which leads to significant aesthetic issues and potential life-threatening complications. The prevalence of AVMs varies, with incidence rates between 0.89 and 1.34 cases per 100,000 person-years and community prevalence estimated at less than 0.02%. A German study found a prevalence of 0.2% in healthy young men. Despite many AVMs remaining asymptomatic, they can have a substantial annual mortality rate, reaching up to 3.4% in untreated cases.[3]

Treatment approaches for AVMs can vary significantly depending on the multidisciplinary strategy employed. The vascular anomaly clinic (VAC) has proven effective in managing complex vascular anomalies through a coordinated multidisciplinary approach.[4] For instance, at King George Medical University, a study conducted from February 2013 to June 2014 treated twelve patients with facial venous malformations using a combination of sclerotherapy with sodium tetradecyl sulphate and surgical resection. This tailored approach demonstrated effective management with minimal complications.[5]

Despite advancements in understanding and management, extracranial AVMs remain rare and complex, significantly affecting patients' quality of life. High recurrence rates and the complexity of these lesions present ongoing treatment challenges, with surgery often serving as the primary and curative approach for focal AVMs. Continued genetic and

molecular research offers hope for future improvements in therapeutic options.[6]

CASE REPORT

A 13-year-old male was diagnosed with a high-flow arteriovenous malformation (AVM) in the nose, first identified at age 9. The AVM presented as a purple nodule on the left nasal wing, which progressively enlarged and caused recurrent bleeding. Initial treatment included a protocol for hemangioma at a pediatric hospital, followed by embolization on 11 November 2022, which partially halted the growth. However, the patient was readmitted to the pediatric department on 22 March 2023, due to renewed bleeding and recurrent growth, necessitating further intervention.

The patient has a significant medical history, including chronic cardiopathy diagnosed in November 2022. His cardiopathy is characterized by a double aortic lesion, aortic stenosis, moderate aortic insufficiency, pulmonary stenosis, right ventricular dilation, ascending aorta dilation, and coronary artery dilation, all contributing to heart failure (NYHA class I). Physical examination revealed a mass measuring approximately 5x5x6 cm on the middle third of the face, with indurated, mobile, and friable characteristics, attached to the left nasal wing and tip (Figure 1).

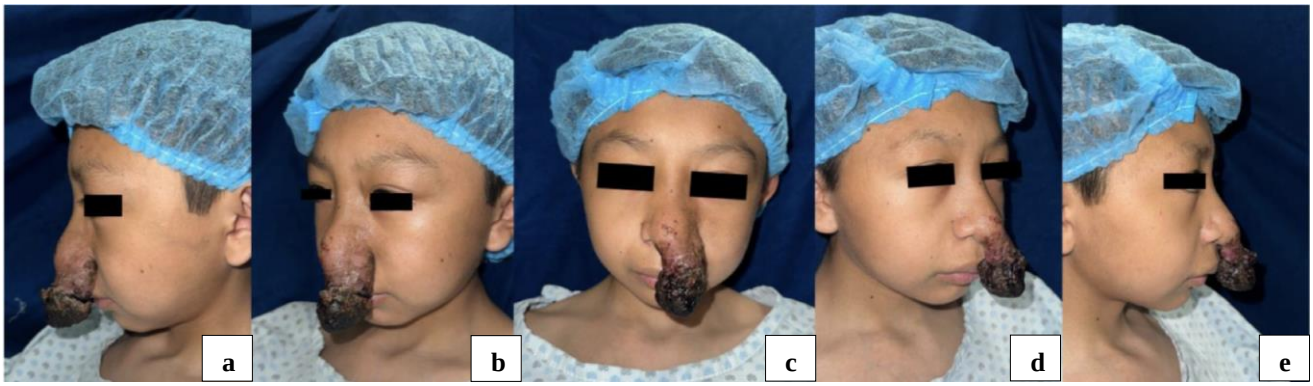

Figure 1 (a-e): Preoperative photographs.

For the treatment of the AVM, selective angiography and supraselective embolization were performed on both the right and left internal maxillary and facial arteries. The right external carotid artery was catheterized, revealing vascular supply to the AVM, and embolization was carried out using histoacryl + lipiodol. This resulted in approximately 95% devascularization, with minimal residual supply from the superficial temporal artery. Similarly, the left external carotid artery was catheterized, and embolization was performed with histoacryl and gelfoam paste, leading to significant devascularization (Figure 2).

Subsequently, 24 hours later, a surgical procedure was performed under balanced general anesthesia. Hemostatic sutures were placed at the left angular branch, bilateral superior labial arteries, and the left dorsal lateral artery. The AVM was resected using electrocautery, resulting in 20 ml of bleeding, which was controlled and hemostasis was confirmed. A full-thickness graft measuring 3×2 cm was harvested from the right retroauricular area and used to cover the defect on the nasal tip. The graft was fixed with absorbable transfixing sutures and tie-over (Figure 3A). The graft was checked after 10 days, showing partial integration (Figure 3B). Follow-up at 3 months revealed satisfactory aesthetic and functional results (Figure 4).

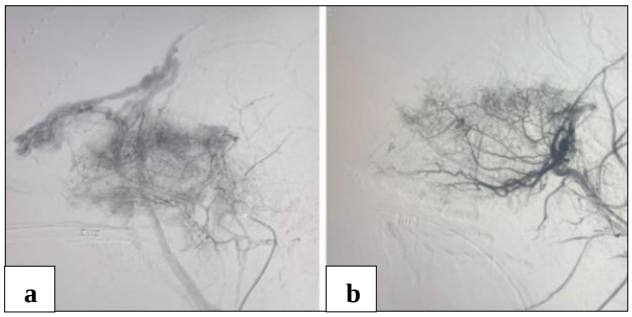

Figure 2: Arteriography (a) before embolization, and (b) after supraselective embolization of the right internal maxillary artery, left facial artery, and left internal maxillary artery.

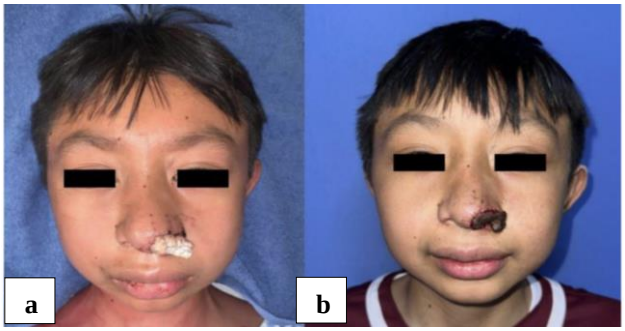

Figure 3: Postoperative photographs (a) tie-over graft, and (b) partial graft integration.

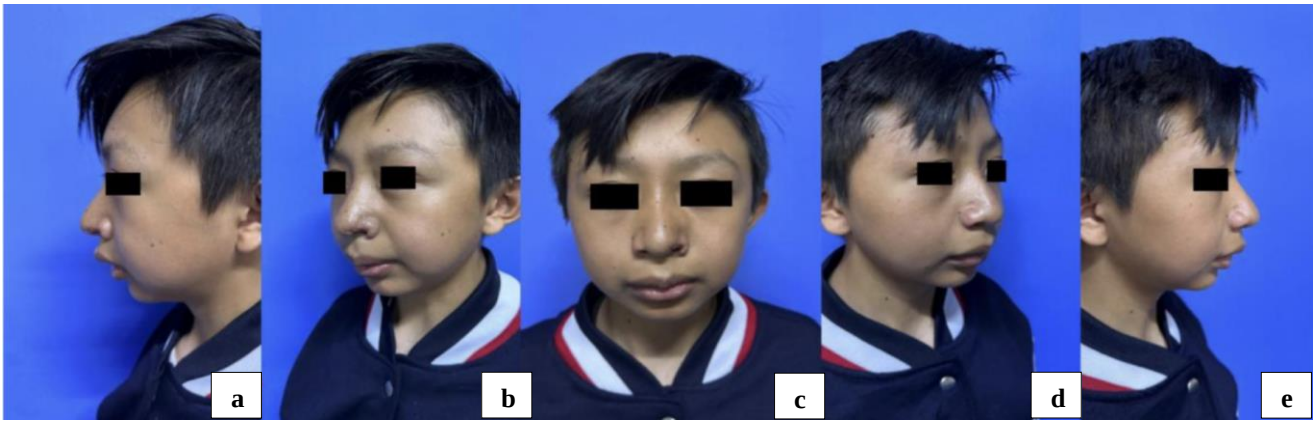

Figure 4 (a-e): Three months postoperative photographs.

DISCUSSION

The management of this high-flow AVM involved effective initial embolization, which halted growth and led to partial involution. Subsequent selective and supraselective embolization achieved significant devascularization. Surgical resection, including precise hemostatic measures and a full-thickness graft, resulted in satisfactory outcomes. Despite these successes, challenges included partial graft integration, emphasizing the complexity of managing high flow AVMs. The patient's chronic cardiopathy further complicated the procedure and postoperative care. The literature emphasizes that vascular malformations can cause significant complications and that a multidisciplinary approach, combining interventional radiology and surgery, is crucial for effective management. Early diagnosis and tailored treatment strategies are essential for minimizing complications and improving outcomes. The optimal management of pediatric AVMs remains debated, with a multidisciplinary approach and multimodal therapy proving beneficial results across all age groups; microsurgical resection is considered the gold standard, especially in urgent cases, while embolization and radiosurgery serve as adjunctive treatments, though their long-term efficacy requires further study.[7]

CONCLUSION

This case demonstrates the effectiveness of a multidisciplinary approach in managing arteriovenous malformations of the face. The successful combination of embolization and surgical resection highlights the importance of a collaborative management strategy involving both interventional radiology and plastic surgery services. Regular follow-up is crucial for managing residual or recurrent lesions and ensuring favorable long-term outcomes.

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REFERENCES

1. AlShamekh S. Arteriovenous malformations. Dermatol Clin. 2022;40(3):445-8.
2. International Society for the Study of Vascular Anomalies. ISSVA classification of vascular anomalies. 2018. Available at: https://www.issva.org/UserFiles/file/ISSVA-Classification-2018. Accessed on 12 September 2024.
3. Laakso A, Hernesniemi J. Arteriovenous malformations: Epidemiology and clinical presentation. Neurosurg Clin N Am. 2012;23(1):1-6.
4. Sires JD, Williams N, Huilgol SC, Harvey I, Antoniou G, Dawson J. An integrated multidisciplinary team approach to the management of vascular anomalies: Challenges and benefits. Pediatr Surg Int. 2020;36(10):1149-56.
5. Kumar S, Kumar V, Kumar S, Kumar S. Management strategy for facial venous malformations. Natl J Maxillofac Surg. 2014;5(1):93-6.
6. Chung HY, O TM, Waner M. Reconstruction after ablative treatment of arteriovenous malformations of the head and neck. J Oral Pathol Med. 2022;51(8):872-7.
7. El-Ghanem M, Kass-Hout T, Kass-Hout O, Alderazi YJ, Amuluru K, Al-Mufti F, et al. Arteriovenous malformations in the pediatric population: Review of the existing literature. Interv Neurol. 2016;5(4):218-25.

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