

Giant Intraparotid hemangioma presenting with facial nerve palsy in an adult: a rare case report of surgical excision and sural nerve graft reconstruction

Rogers Leonardo Baquero García

Head and Neck Surgeon. Hospital Universitario Mayor – Méderi. Bogotá

Juan Esteban Ortiz Elejalde

Hospital Universitario Mayor – Méderi. Bogotá

Silvana Barrera Rodríguez

Universidad del Rosario. Bogotá

Isabella González Guillén

Universidad del Rosario. Bogotá

Gonzalo Mallarino Restrepo

Plastic Surgeon – Microsurgeon. Hospital Universitario Mayor – Méderi. Bogotá

María Camila León Murcia

Hospital Universitario Mayor – Méderi. Bogotá

Juan Carlos Vallejo-Soto

juanc.vallejo@urosario.edu.co

General Surgeon. Hospital Universitario Mayor – Méderi. Head, Universidad FUCS. Bogotá

Case Report

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Abstract

Background

Vascular anomalies of the parotid gland, particularly those presenting in adult populations, are rare entities that pose significant diagnostic and therapeutic challenges due to their infiltrative nature and proximity to vital neurovascular structures. While infantile hemangiomas are common in the pediatric population, extensive vascular tumors involving the parapharyngeal space and encasing major cervical vessels in young adults are rare and require meticulous surgical planning.

Case Presentation:

We present the case of a 19-year-old male presenting with a progressively enlarging mass on the left side of the face associated with trismus and difficulty chewing. Advanced imaging, including contrast-enhanced CT and MRI, identified a large hemangioma compromising the left parotid gland with extension into the parapharyngeal and the retrostyloid spaces. The lesion encased the internal carotid artery and jugular vein and was associated with preoperative facial nerve palsy. The patient underwent successful surgical excision of the mass. To address the functional deficit, surgical facial reanimation was performed concurrently using a sural nerve graft.

Conclusions

Extensive parotid hemangiomas in young adults are extremely rare tumors that can mimic malignant behavior through vessel encasement and nerve paralysis. A coordinated surgical approach involving complete excision and subsequent facial reanimation with nerve grafting represents an effective strategy for restoring facial symmetry and function in complex head and neck vascular pathologies.

Introduction

Vascular anomalies involving the salivary glands, particularly within the parotid space, represent a specialized subset of head and neck pathology. Historically, the management of these lesions was hampered by a confusing, purely descriptive nomenclature that used terms like "cavernous hemangioma" and "lymphangioma" interchangeably (1). This lack of taxonomic rigor often led to misdiagnosis and inappropriate surgical interventions, which increased patient morbidity and the risk of permanent facial nerve injury (2).

The modern transition toward a scientifically rigorous framework began with the Mulliken and Glowacki binary paradigm, which separated true vasoproliferative neoplasms (vascular tumors) from structural morphogenetic errors (vascular malformations) (2). This system, refined by the International Society for the Study of Vascular Anomalies (ISSVA), classifies lesions based on endothelial cell kinetics and clinical

behavior (3). Vascular tumors, such as infantile hemangiomas, exhibit rapid endothelial turnover and mitosis, whereas malformations consist of quiescent, mature endothelium (3).

Epidemiologically, infantile hemangiomas (IH) are the most common vascular tumors of childhood, affecting up to 10% of infants (4). While 90% of IHs undergo spontaneous involution by the end of the first decade of life, primary vascular tumors of the parotid in the adult or late-adolescent population are extremely rare, accounting for only 0.4% to 0.6% of all parotid gland tumors (4). In contrast to the pediatric population, vascular anomalies in adults are predominantly low-flow venous malformations (VMs), which represent approximately 1.6% of adult parotid tumors and do not exhibit spontaneous regression (3).

The clinical phenotype of parotid vascular anomalies typically includes a soft, painless, and slowly progressive facial mass (5). While many are asymptomatic, extensive lesions can lead to functional compromise. Rapid enlargement may occur due to intralesional hemorrhage or thrombosis, and in severe cases, the mass may infiltrate the parapharyngeal space (5). Such extensive involvement can result in the encasement of major vessels like the internal carotid artery or trigger compressive symptoms, including airway compromise and facial nerve palsy (5).

In this report, we present a rare and challenging case of a 19-year-old male with an extensive left-sided facial mass. Imaging confirmed a large hemangioma involving the parotid and parapharyngeal spaces, characterized by the encasement of the internal carotid artery and jugular vein. The patient presented with established facial nerve palsy, necessitating a complex multidisciplinary approach involving radical surgical resection and subsequent facial reanimation via a sural nerve graft with plastic surgery.

Case presentation

A 19-year-old male with an unremarkable medical history presented to the emergency department following an 8-month evolution of a progressively enlarging mass involving the left hemifacial and ipsilateral cervical regions. The patient reported intermittent localized pain, accompanied by a significant limitation in oral aperture (trismus) and impaired mastication. He denied the presence of constitutional symptoms, such as weight loss or fever, and no other associated neurological or systemic complaints were noted at the time of admission. Figure 1 shows the patient's characteristics upon admission.

Initial diagnostic evaluation via computed tomography (CT) of the paranasal sinuses identified a large, heterogeneous mass measuring 88 x 117 x 108 mm. The lesion extensively involved the masticator space, the left parapharyngeal space, and the parotid space. It demonstrated significant mass effect, characterized by the medial displacement and encasement of the internal carotid artery (ICA) and the internal jugular vein (Fig. 2).

Based on the initial imaging characteristics and multispatial involvement, a preliminary diagnosis of lymphatic malformation was suggested. To achieve a more precise anatomical and hemodynamic characterization, a contrast-enhanced magnetic resonance imaging (MRI) of the face was performed.

The MRI documented an expansive, infiltrative, and multilobulated lesion measuring 112 x 90 x 97 mm, which resulted in the complete loss of normal parotid gland architecture. The mass infiltrated the adipose tissue of the masticator and parapharyngeal spaces, extended into the inferior periauricular region, and involved the posterior margin of the sternocleidomastoid muscle. The lesion's extension into the parapharyngeal space was confirmed, showing circumferential encasement of the common carotid artery, internal carotid artery, and internal jugular vein (Figs. 3 and 4).

Further extension studies included a nasolaryngoscopy, which revealed significant bulging of the left lateral wall of the oropharynx, though no endoluminal or mucosal lesions were identified. Due to the aggressive clinical behavior, vessel encasement, and the presence of facial nerve palsy, the patient was scheduled for radical surgical intervention. An approach was performed through a modified Blair incision to access adequately the carotid space. The surgical technique prioritized the complete excision of the infiltrative mass while managing complex neurovascular relationships. Given that the extensive tumor obscured traditional landmarks such as the tragal pointer and tympanomastoid suture, a meticulous dissection was required. A radical parotidectomy was performed, during which the encased internal carotid artery and jugular vein were carefully preserved. Intraoperative findings revealed a bilobed lesion approximately 15 x 10 cm originating from the superior lobe of the left parotid gland, extending into the deep lobe. This lesion caused compression and infiltration of the main trunk of the facial nerve up to its bifurcation into the cervicofacial and temporofacial trunks, making nerve preservation impossible. The lesion was in contact with the wall of the inner ear without evidence of mucosal involvement (Fig. 5).

Complete dissection of the tumor was performed, achieving adequate cleavage of the vascular structures (Fig. 6A). Additionally, a 3 x 2 cm lymph node conglomerate was identified in left lymph node stations IIA, IIB, and III, requiring ipsilateral supraomohyoid radical lymph node dissection. The patient recovered well and was discharged on postoperative day 3 without complications. The histopathological evaluation of the surgical specimen documented a left parotid gland weighing 233 grams, which was entirely compromised by a mixed venous and cavernous hemangioma without evidence of malignancy (Fig. 6B). The concurrent neck dissection yielded nine lymph nodes demonstrating reactive sinusoidal hyperplasia, with no signs of malignant infiltration.

Four months after the radical resection, the patient was scheduled for facial reanimation using a sural nerve graft. The surgical approach utilized the previous incision; however, due to the significant retraction of the proximal facial nerve stump, a petrosectomy was performed in collaboration with the otology service to facilitate neural access. A 30-cm segment of the sural nerve was harvested from the left leg. Reconstructive techniques involved the anastomosis of three sural nerve segments to the distal stumps of the facial nerve, specifically the frontal and zygomatic branches, and the cervicofacial trunk (Figure 7A) with a proximal anastomosis performed at the mastoid segment (Figure 7B). The patient's postoperative course was unremarkable, and he was discharged without complications. He is currently participating in a facial nerve rehabilitation program.

Discussion

The presentation of an extensive vascular tumor in a 19-year-old male underscores a rare and complex intersection of vascular biology and adult head and neck surgery. While pediatric parotid hemangiomas often follow a predictable course of proliferation and involution, their manifestation in late adolescence typically demonstrates more aggressive, non-regressing clinical features (6). This case is uniquely challenging due to the lesion's infiltrative extension into the parapharyngeal space and its circumferential encasement of major cervical vessels, a pattern that necessitates radical surgical intervention rather than the conservative medical protocols often sufficient for infantile cohorts.

A hallmark of adult parotid vascular anomalies is the frequent absence of classic diagnostic indicators. For instance, the "turkey-wattle sign"—the enlargement of a facial mass during a Valsalva maneuver or when the head is tilted downward—is a pathognomonic finding in many vascular malformations (7). However, in adult patients, this sign is often absent because the thick, unyielding nature of the overlying parotid fascia limits the lesion's ability to expand clinically (5). In the absence of such signs, these tumors can easily be misdiagnosed as parotid cysts or pleomorphic adenomas, particularly when they present as firm, non-compressible masses due to intralesional thrombosis (7).

The diagnostic workup must prioritize high-quality, non-invasive imaging to map the lesion's trans-spatial extension (8). While Doppler ultrasonography is an effective first-line tool for assessing hemodynamics and identifying phleboliths, magnetic resonance imaging (MRI) remains the gold standard for definitive characterization. In this case, MRI was indispensable for visualizing the loss of normal parotid architecture and the precise relationship of the mass to the internal carotid artery and the facial nerve (8). The ability of MRI to provide high soft-tissue contrast is critical when the mass involves the parapharyngeal and masticator spaces (8).

A vital principle in the management of these patients is the strict avoidance of standard biopsy techniques, often referred to as the "biopsy paradox" (9). Needle puncture in highly vascularized parotid lesions typically yields only fresh, non-diagnostic blood and carries a high risk of life-threatening hemorrhage, hematoma, or pseudoaneurysm formation (9). Furthermore, an induced hematoma can further obscure surgical planes and compress the facial nerve (5). Consequently, surgical decisions must be predicated on radiographic findings and clinical progression rather than preoperative histology.

Surgical resection is the definitive management for adult parotid vascular anomalies when conservative measures are inappropriate or functional deficits like trismus and nerve palsy are present (1). Unlike encapsulated epithelial tumors, these vascular lesions often lack distinct surgical planes and may infiltrate adjacent musculature or wrap around the facial nerve branches (1).

In cases involving massive vessel involvement, preoperative transcatheter embolization is frequently utilized 24 to 48 hours prior to surgery to occlude major feeding vessels and reduce intraoperative blood loss (10). The presence of preoperative facial nerve palsy in this 19-year-old patient indicated either direct neural infiltration or severe chronic compression, necessitating an immediate reconstructive strategy. Identifying the facial nerve trunk is the most critical step in parotidectomy, typically utilizing consistent landmarks such as the tragal pointer, the posterior belly of the digastric muscle, and the

tympanomastoid suture (9). In cases where the main trunk is obscured, retrograde dissection from a peripheral branch may be required, though it increases the risk of bleeding in vascular cases (5).

Facial reanimation via a sural nerve graft, as performed here, represents the standard for restoring neural continuity when a segment of the nerve must be sacrificed due to tumor encasement (11). The sural nerve is a preferred donor site due to its appropriate length and minimal donor-site morbidity (11). By bridging the neural gap, the graft provides a scaffold for axonal regeneration, aiming to restore voluntary movement and resting symmetry over several months. The use of a petrosectomy to access a retracted proximal facial nerve stump, as required in this case, highlights the technical complexity of achieving a tension-free anastomosis in radical head and neck reconstructions.

Finally, it's important to highlight the high risk of recurrence following incomplete resection. Incomplete excision can create a hypoxic microenvironment that upregulates angiogenic proteins such as VEGF and matrix metalloproteinases (MMP-2 and MMP-9), which drive the aggressive regrowth of residual tissue (5). Definitive postoperative diagnosis often relies on GLUT1 immunohistochemical staining; GLUT1 positivity is diagnostic of infantile hemangiomas, while its absence characterizes the vascular malformations more commonly seen in adults (2). This case demonstrates that a coordinated multidisciplinary approach is essential for achieving complete oncologic resection while restoring functional integrity, reducing the risk of intraoperative complications.

Conclusion

Extensive vascular anomalies of the parotid gland in young adults are rare and potentially debilitating conditions. This case illustrates that lesions historically termed "hemangiomas" can exhibit aggressive clinical behavior, including the encasement of major cervical vessels and the induction of facial nerve palsy. Successful management relies on advanced preoperative imaging and a meticulous surgical technique that prioritizes both total lesion excision and functional restoration. The use of a sural nerve graft for facial reanimation provides a viable pathway for functional recovery in patients with established neural compromise, emphasizing the need for comprehensive reconstructive strategies in head and neck surgery.

Declarations

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Author contribution

Rogers Leonardo Baquero García: Study conception and design, drafting of manuscript, critical revision of manuscript.

Juan Esteban Ortiz Elejalde: Analysis and interpretation of data and drafting of manuscript.

Silvana Barrera Rodríguez: Analysis and interpretation of data and drafting of manuscript.

Isabella González Guillén: Data collection, methodology and investigation.

Juan Carlos Vallejo-Soto: Analysis and interpretation of data, drafting of manuscript, critical revision of manuscript.

María Camila León Murcia: Image preparation, drafting of the manuscript.

Gonzalo Mallarino Restrepo: Supervision, theoretical advice and analysis, critical revision of manuscript.

All authors approved the definitive version of the manuscript.

Ethical Standards

Ethical compliance with the Helsinki Declaration, current legislation on research Res. 008430-1993 and Res. 2378-2008 (Colombia) and the International Committee of Medical Journal Editors (ICMJE) were ensured under our Ethics and Research Institutional Committee (IRB) approval, prior signing of informed consent by the patient. The protocol for this article was previously approved by the Ethics Committee of Investigation in Human Beings (CEISH) of our institution (Hospital Universitario Mayor – Méderi).

Consent for Publication

The patient subject of this report and his parents previously signed the written informed consent form in the presence of two witnesses, authorizing the anonymous use of all the information from his medical history (including personal and clinical details) and corresponding images in any publications with scientific or academic interest.

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Figures

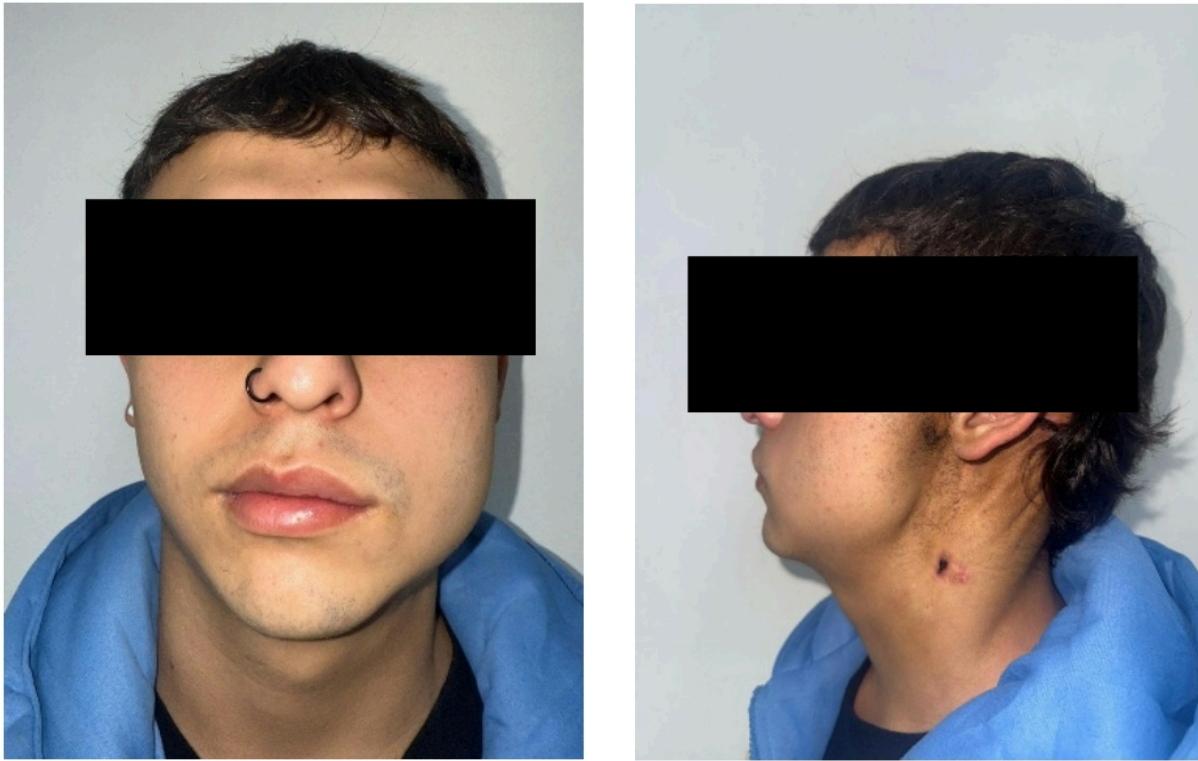


Figure 1

Patient images upon admission showing the mass compromising the left hemiface.

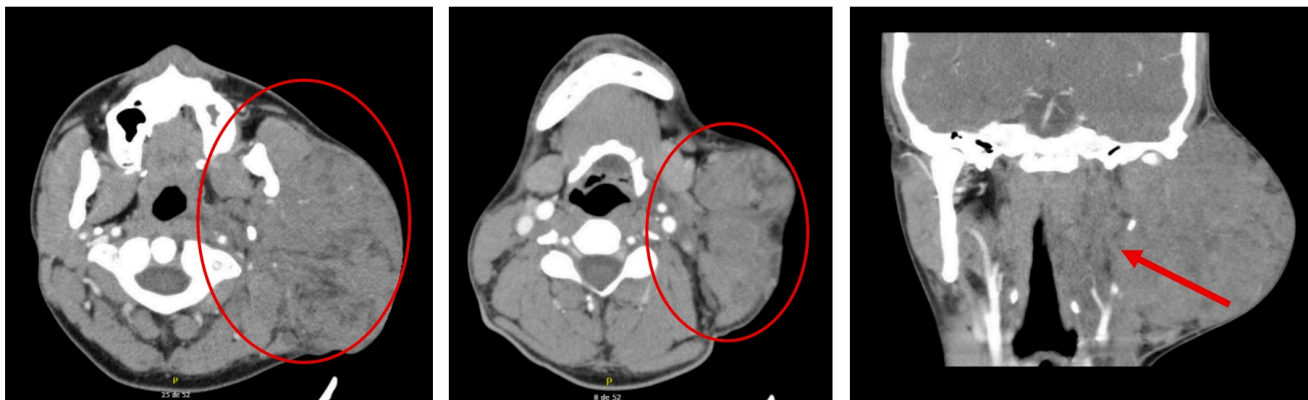


Figure 2

Paranasal sinus contrast-enhanced CT-scan showing (A) the mass occupying the left parotid space in the axial plane (in circle), (B) the extension of the mass at the level of the hyoid bone in the axial plane (in circle), and (C) coronal axis showing the encasement of the common and internal left carotid arteries (arrow).

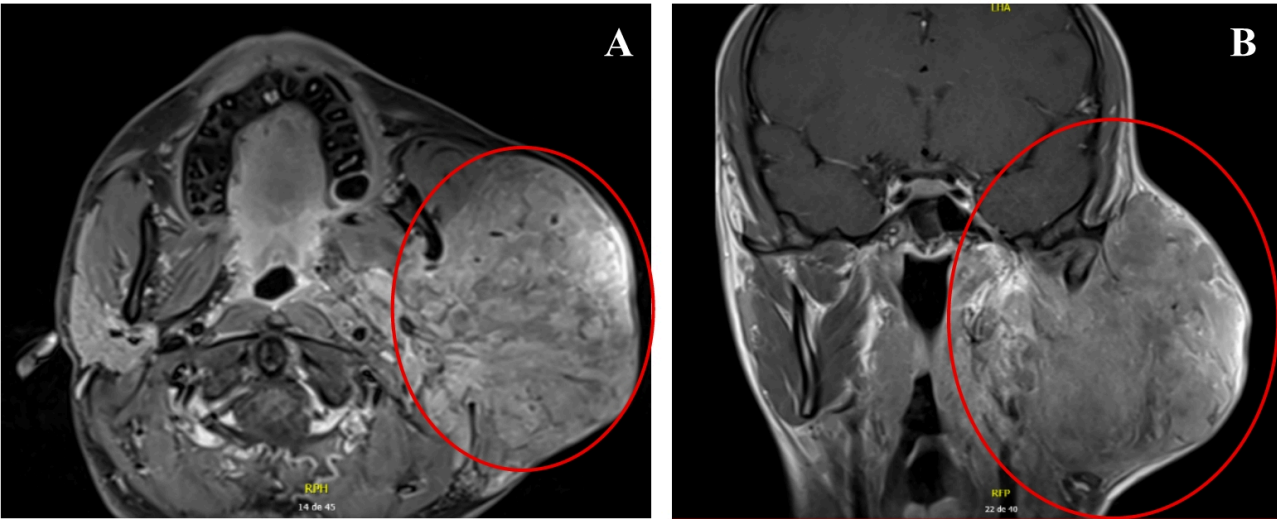


Figure 3

Face contrast-enhanced MRI in T1 sequence showing the multilobulated mass (red circle) emerging from the left parotid gland with extension to the adipose tissue in (A) axial and (B) coronal axis.

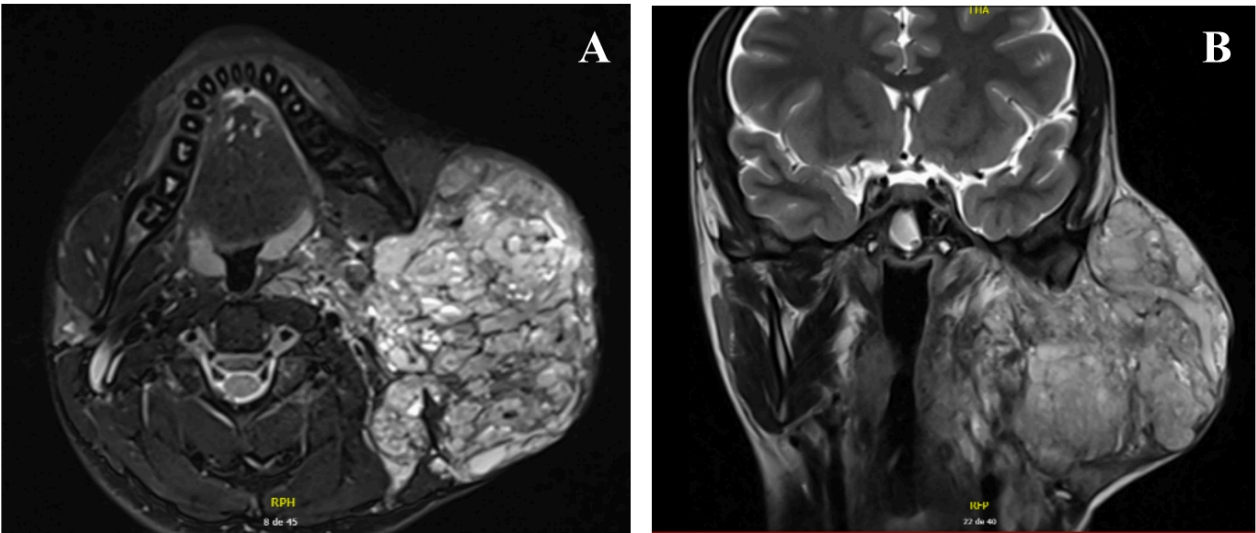


Figure 4

Same MRI image in T2 sequence shows the compromise of the masticator and parapharyngeal spaces in (A) axial and (B) coronal axis.

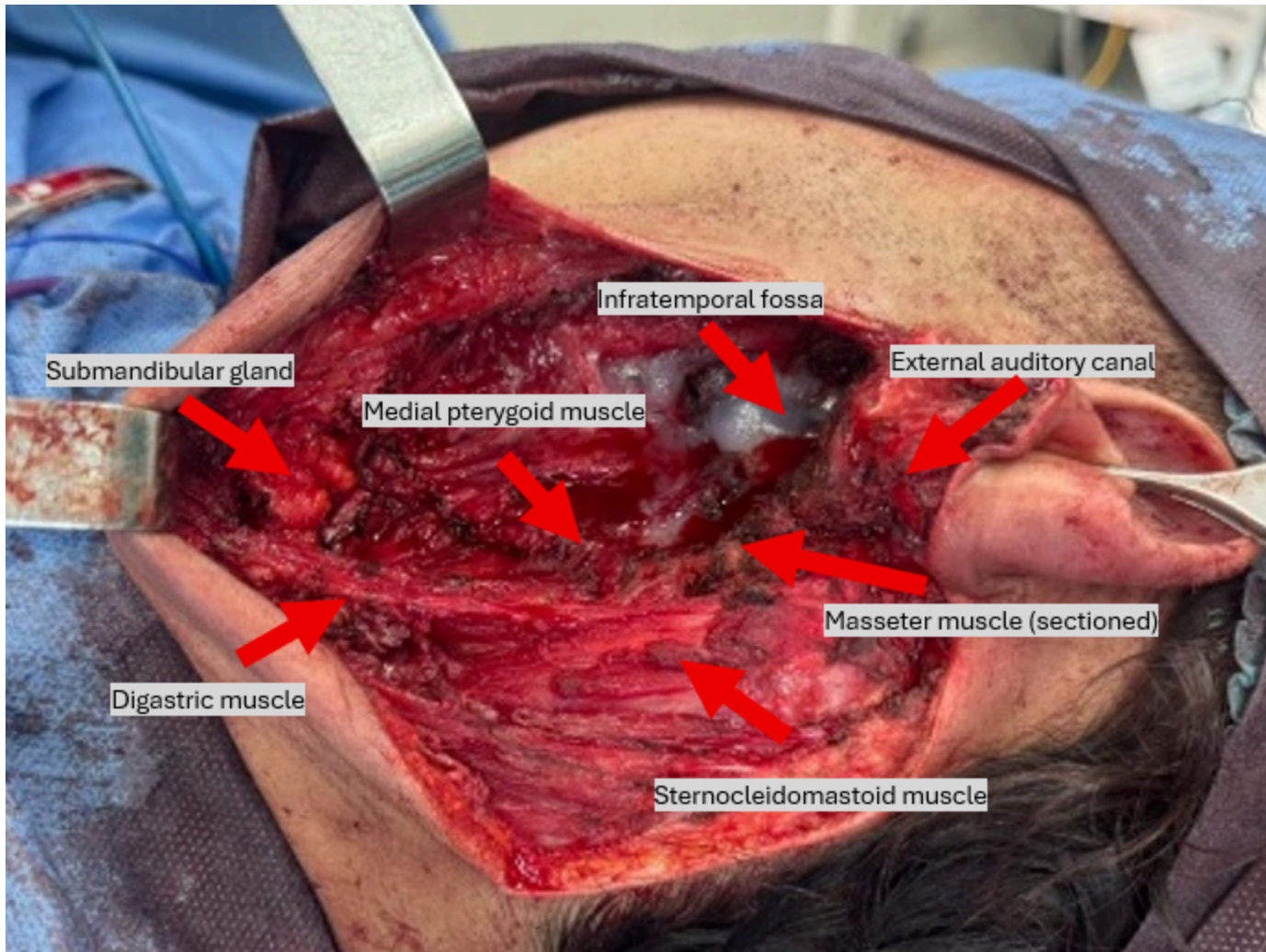


Figure 5

Surgical bed after resection with labeled important anatomic landmarks.

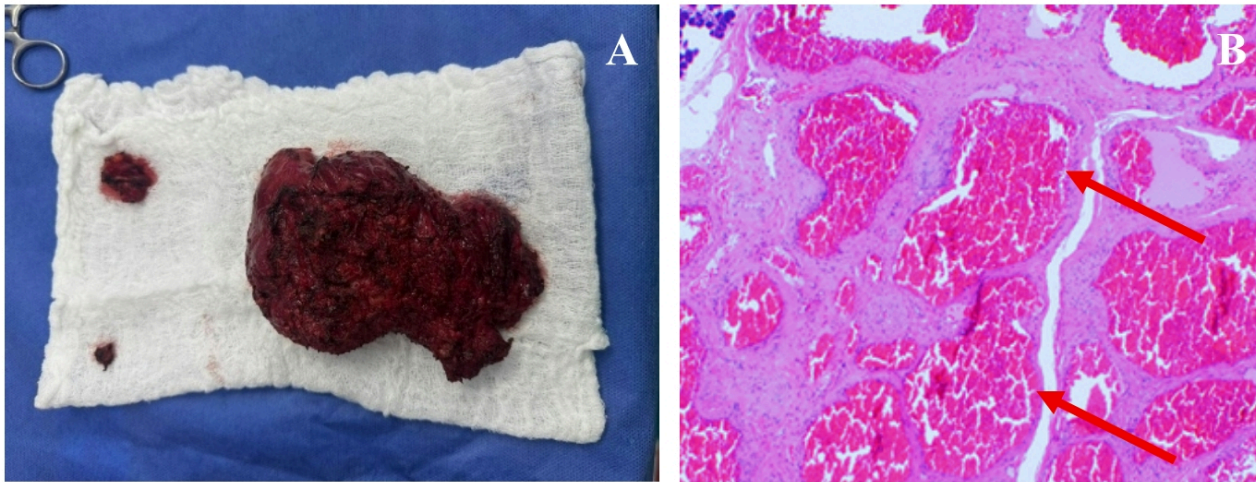


Figure 6

(A) Image of the surgical specimen after complete excision. (B) Histologic section (hematoxylin and eosin) showing variably sized, irregular vascular channels surrounded by normal parotid tissue (arrow).

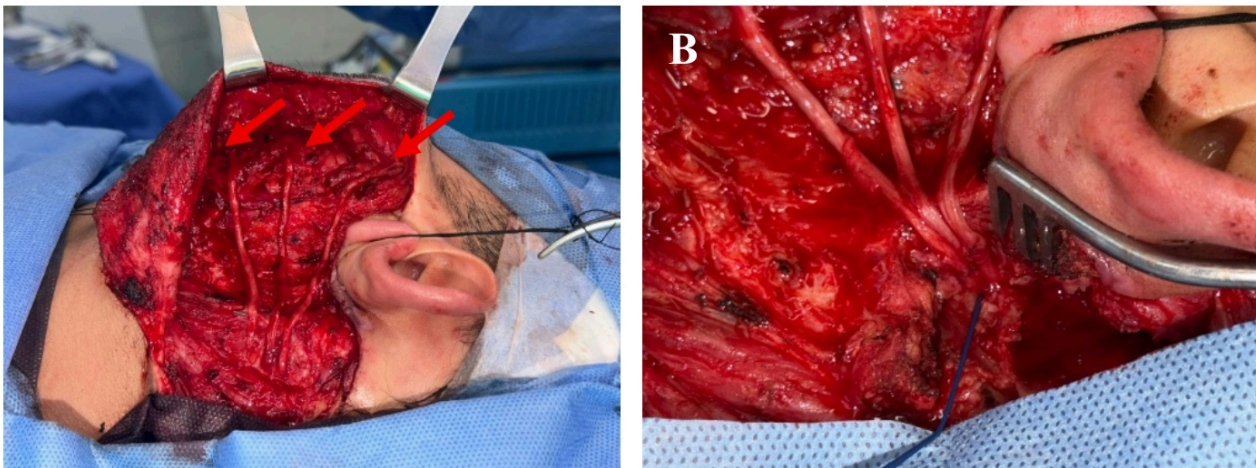


Figure 7

(A) Intraoperative image showing three distal nerve anastomoses in the frontal, zygomatic and cervicofacial trunk (arrows). (B) Proximal anastomosis in the mastoid segment of the facial nerve located after petrosectomy (blue pointer).