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CASE REPORT

# Perioperative Anesthetic Challenges in Juvenile Nasopharyngeal Angiofibroma Excision: A Case Report

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## ABSTRACT

Juvenile nasopharyngeal angiofibroma (JNA) is a rare, histologically benign but highly vascular and locally aggressive tumor occurring predominantly in adolescent males. Surgical excision, often preceded by preoperative embolization, remains the treatment of choice; however, anesthetic management is particularly challenging because of the risks of difficult airway, massive intraoperative hemorrhage, aspiration, and significant hemodynamic fluctuations. We report the successful perioperative anesthetic management of a 16-year-old male with JNA who underwent preoperative embolization followed by coblation-assisted surgical excision. Comprehensive preoperative assessment, meticulous airway planning, invasive arterial pressure monitoring, adequate blood product preparation, and goal-directed fluid therapy were integral to successful management. The patient remained hemodynamically stable throughout the procedure and had an uneventful postoperative recovery. This case highlights the importance of meticulous perioperative planning, effective communication within the multidisciplinary team, and individualized anesthetic strategies in minimizing perioperative morbidity and optimizing outcomes in patients undergoing JNA excision.

## KEYWORDS

• Benign • Coblation • Juvenile Nasopharyngeal Angiofibroma • Massive Hemorrhage

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## INTRODUCTION

Juvenile nasopharyngeal angiofibroma (JNA) is an uncommon, histologically benign yet highly vascular and locally aggressive tumor that predominantly affects adolescent males. Its estimated incidence is approximately 1 in 150,000 individuals and it represents nearly 0.5% of all tumors arising in the head and neck region. The characteristic clinical presentation includes recurrent spontaneous epistaxis, progressive unilateral nasal obstruction, and a nasopharyngeal mass, although additional symptoms may develop depending on the extent of local invasion into adjacent structures.[1]

Complete surgical excision remains the definitive treatment for JNA. Alternative treatment modalities, including radiotherapy, chemotherapy, and hormonal therapy with anti-androgen agents such as flutamide, have been employed in selected clinical situations but are generally reserved for unresectable, recurrent, or residual disease. Owing to the tumor's rich vascular supply, surgical resection carries a substantial risk of significant intraoperative hemorrhage and associated perioperative morbidity.[2]

The management of JNA has improved considerably with advances in cross-sectional imaging, detailed angiographic evaluation, identification of feeding vessels, and preoperative embolization, all of which help reduce intraoperative blood loss. In addition, modern anesthetic techniques, including controlled hypotension and blood conservation strategies, have enhanced surgical safety. Endoscopic excision has increasingly become the preferred approach for appropriately selected small- and intermediate-sized tumors because it offers excellent visualization, avoids external incisions, reduces postoperative morbidity, and is associated with favorable recurrence rates.[3]

Despite these developments, anesthetic management of JNA remains challenging. The tumor's hypervascularity, proximity to critical neurovascular structures, and anatomically confined location demand meticulous perioperative planning. Furthermore, even limited intraoperative bleeding can significantly impair endoscopic visualization, making controlled hypotensive anesthesia an important adjunct for optimizing the surgical field while maintaining adequate end-organ perfusion. Although the surgical management of JNA has been widely described, reports focusing specifically on anesthetic management remain relatively limited. This case report highlights the perioperative anesthetic considerations and challenges encountered during the endoscopic excision of juvenile nasopharyngeal angiofibroma.[4,5]

## CASE REPORT

A 16 year old male patient, body weight 72kgs, ASA PS-I, presented with chief complaints of left unilateral nasal obstruction for a period of 3 months, followed by nasal bleeding which was intermittent in nature and lasted for 5-10 minutes. In the last episode of nasal bleed he had to undergo nasal packing to control epistaxis. He also gave a history of occasional upper respiratory tract infection for which he had to take metered dose inhalers and bilateral nasal blockage. Clinical examination indicated no pallor. There wasn't any family or medical history noted. There was no history of blurring of vision, headache or vomiting. Endoscopic examination of the mass was compressible, congested, filling the left inferior and middle meatus with no external facial deformity. On posterior rhinoscopy, the mass can be seen extending into nasopharynx. The orodental examination was normal and Modified Mallampatti grade was 2. General examination revealed no significant abnormality. Routine hematological investigations were within normal limits. CECT of paranasal sinus and nose revealed the presence of a large poorly defined heterogeneously enhancing soft tissue density mass lesion with a minimal extension of the tumor through the sphenopalatine foramen into the pterygopalatine fossa making it a Radkwoski's stage IIA (figure 2). No intracranial extensions were noted. Patient history revealed no adjuvant radiotherapy or hormonal therapy in the preoperative period. High risk written informed consent was obtained with the possibility of intensive care unit and/or post operative ventilatory support. Adequate blood and blood products were reserved.

A day before surgery, patient underwent angioembolisation of internal maxillary artery under general anesthesia (figure 1) to reduce intraoperative bleeding. On the day of surgery, NPO status was verified. Once the patient was in the operation theatre, all ASA

specific standard non-invasive monitors were attached. Preoxygenation was done with 100% oxygen for 3 minutes. During preoxygenation intravenous glycopyrrolate 0.2mg, fentanyl 100mcg, ondansetron 4mg, midazolam 1mg, dexamethasone 4mg and hydrocortisone 200mg was given. Patient was induced by lignocaine 40mg and propofol 150mg. Once the verbal response to command was lost patient was given 1mg/kg of rocuronium and a direct laryngoscopy aided orotracheal intubation using a 7mm ID cuffed flexometallic tube was done. Anesthesia was maintained with sevoflurane 1.0% along with Nitrous: Oxygen at 2:1. A throat pack was inserted. Two large bore intravenous access (16G and 18G) was done. Left radial artery cannulation was done to check beat to beat blood pressure changes (figure 4). Intraoperative analgesia was maintained by intermittent boluses of fentanyl 1mcg/kg. Intravenous paracetamol 1g with tramadol 100mg was also given.

The approximate duration of the surgery was 4 hours. Hypotensive anesthesia was provided to the patient with dexmedetomidine, loading dose of 1mcg/kg over 10 minutes followed by an infusion of 0.4-0.5mcg/kg/hr along with an intravenous Nitroglycerin infusion of 0.25-0.5 mcg/kg/min, targeting a MAP of 60+/-5mmHg. Urine output was maintained between 0.5-1ml/kg/hr. the patient was stable throughout the surgery. Hexaethyl starch of 500ml was given with 4 balanced salt solution of 500ml each. Total blood loss was around 150-200ml. At the end of the surgery, the throat pack was removed and an anterior nasal pack was placed in situ. After the leak test, extubation was done using intravenous sugammadex 1mg/kg. Post operatively patient was given intravenous paracetamol 1g TDS and tramadol 100mg BD.

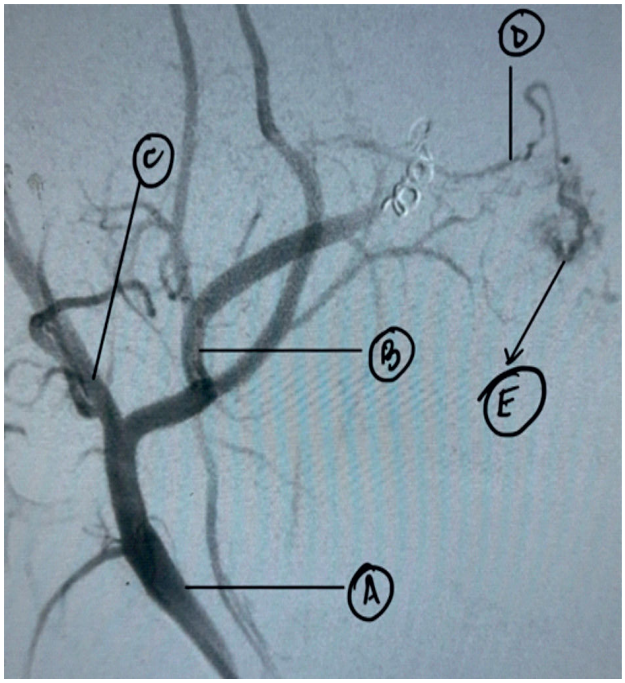



**Figure 1:** Digital Subtraction Angiography (DSA) after embolization of internal maxillary artery.
**A:** External Carotid Artery, **B:** Internal maxillary artery, **C:** Superficial temporal artery, **D:** Ascending pharyngeal artery, **E:** Tumor blush




**Figure 2:** Computed Tomography image of JNA

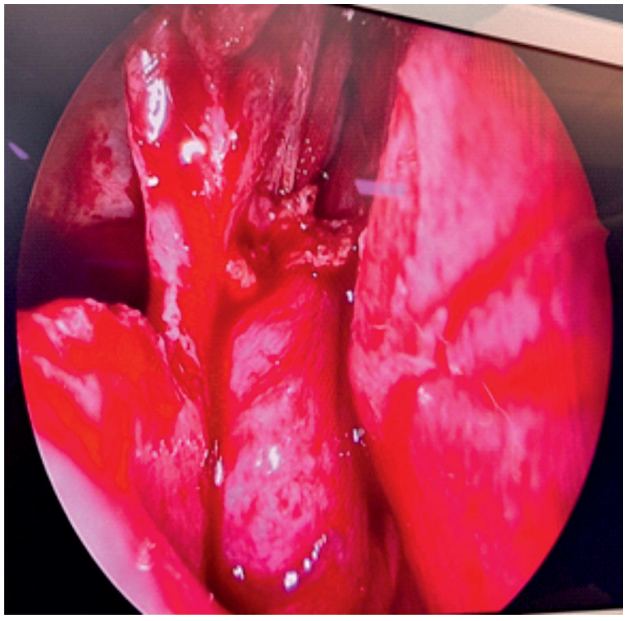


**Figure 3:** Endoscopic image of JNA

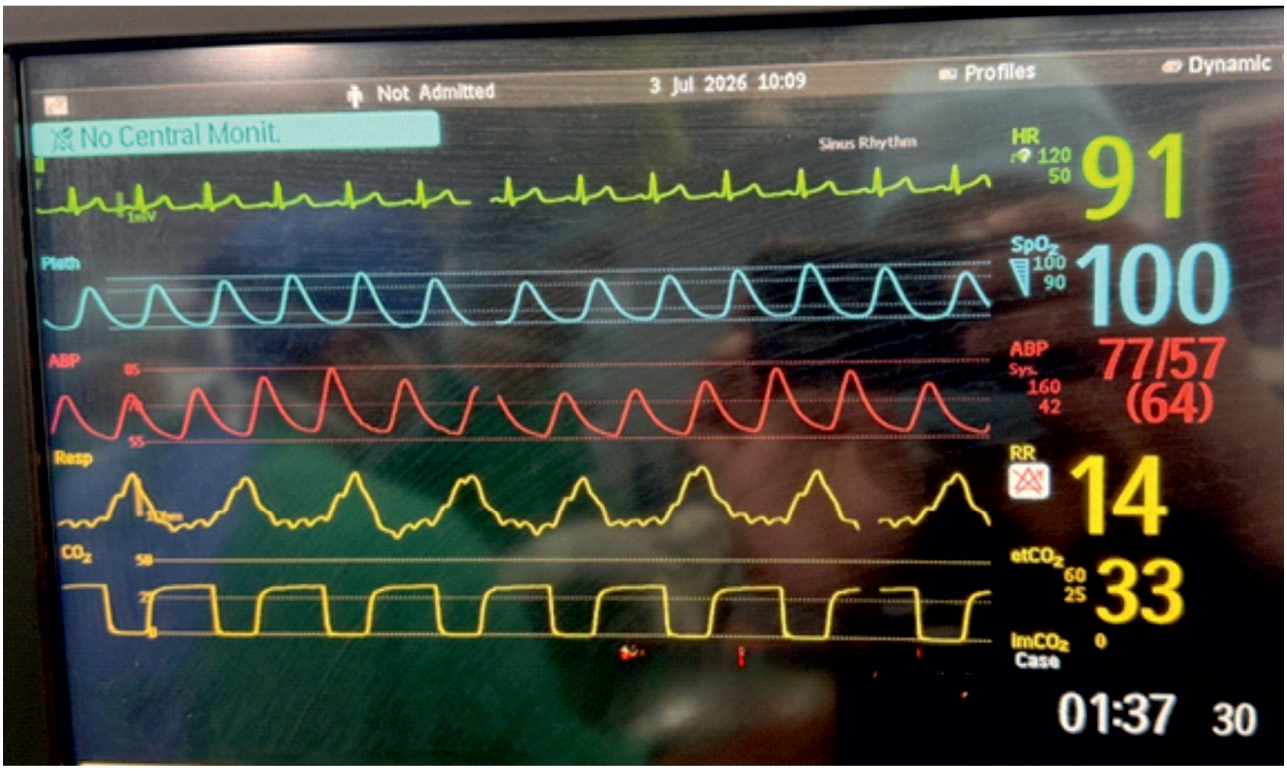



**Figure 4:** Intraoperative monitoring



**Figure 5:** Picture showing excised JNA

## DISCUSSION

Juvenile nasopharyngeal angiofibroma (JNA) is an uncommon but highly vascular benign tumor arising from the nasopharynx. Despite its benign histology, it demonstrates locally aggressive behaviour and may present with life-threatening complications, including progressive airway obstruction, recurrent epistaxis with the potential for aspiration, intracranial extension, orbital involvement, and significant intraoperative hemorrhage.

Several staging systems have been proposed for JNA, most of which are based on the extent of local spread and intracranial involvement. Among these, the Radkowski classification is widely accepted because of its usefulness in predicting surgical complexity, morbidity, and prognosis. Our patient was categorized as Radkowski stage IIA.[6]

Complete surgical excision remains the treatment of choice for JNA, whereas radiotherapy, chemotherapy, and hormonal therapy are generally reserved for selected clinical situations. Preoperative selective arterial embolization of the tumor-feeding vessels has been shown to reduce intraoperative blood loss, particularly in large or advanced tumors. However, favorable outcomes with minimal blood loss have also been reported following endoscopic resection without embolization. In our institution, embolisation of the internal maxillary artery was performed. The tumor was excised using a coblation-assisted trans nasal endoscopic approach (figure 3), which facilitated precise dissection and debulking while minimizing thermal injury despite the lesion's marked vascularity. Following en bloc

excision (figure 5), the operative cavity was carefully inspected endoscopically for residual tumor tissue and bleeding points, which were coagulated as required before nasal packing was placed.[7]

The anesthetic management of juvenile nasopharyngeal angiofibroma is challenging throughout the perioperative period because of the tumor's location, marked vascularity, and potential to compromise the airway. Airway management at induction requires meticulous planning, as the mass may distort or obstruct the upper airway despite many patients exhibiting favorable bedside airway assessments such as Mallampati class I or II. Various techniques have been described for securing the airway, including rapid sequence induction in patients at risk of aspiration and awake or asleep fiberoptic intubation in selected cases. In our patient, successful endotracheal intubation during the preoperative embolization procedure, together with the patient's anxiety, supported the decision to perform a conventional intravenous induction while maintaining readiness for difficult airway management.[8,9]

Massive intraoperative hemorrhage remains one of the most significant concerns during JNA resection. Therefore, invasive hemodynamic monitoring, adequate intravenous access, and the availability of vasoactive medications and blood products are essential components of perioperative preparation. Deliberate hypotension has been advocated as an effective strategy for limiting blood loss during JNA excision. Various pharmacological agents, including volatile anesthetics, vasodilators, opioids, and β-blockers, have been employed to achieve controlled hypotension. we used dexmedetomidine and nitroglycerin to provide controlled hypotensive anesthesia while simultaneously contributing to perioperative analgesia with the help of intermittent fentanyl boluses, with the goal of maintaining a mean arterial pressure of approximately 60 ± 5 mmHg. Urine output remained between 0.5 and 1.0 mL/kg/hour throughout the procedure, reflecting adequate end-organ perfusion.[10]

Airway management at the conclusion of surgery deserves the same degree of attention as induction. Extensive surgical dissection may result in postoperative airway edema or bleeding, both of which can compromise airway patency following extubation. Consequently, the decision to extubate should be individualized based on the extent of surgery, airway swelling, and hemodynamic status. Administration of dexamethasone (0.1 mg/kg) may help reduce postoperative tissue edema. In selected high-risk patients, elective postoperative ventilation or tracheostomy may provide a safer alternative to immediate extubation. Regardless of the chosen strategy, extubation should only be undertaken after confirming adequate hemostasis and the absence of active bleeding.[11]

## CONCLUSION

Anesthetic management of juvenile nasopharyngeal angiofibroma (JNA) remains challenging because of the risks of difficult airway management, bronchoaspiration, massive intraoperative hemorrhage, and postoperative airway compromise. Successful perioperative management requires meticulous preoperative planning and close coordination between the anesthesiologist, surgeon, interventional radiologist and cardiologist. Preoperative embolization, controlled hypotensive anesthesia, vigilant hemodynamic monitoring, and multimodal blood conservation strategies play a pivotal role in minimizing blood loss and improving surgical conditions. Careful airway planning, appropriate anesthetic techniques, and prompt communication throughout the procedure are essential for ensuring patient safety. With advances in endoscopic surgery and perioperative anesthesia, favorable outcomes can be achieved when these principles are meticulously implemented. This case highlights the importance of a multidisciplinary, evidence-based approach in reducing perioperative morbidity and facilitating smooth recovery in patients undergoing JNA excision.

**Conflict of Interest:** Nil

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