

## CASE REPORT

### Perioperative airway management of a 16-year-old boy with progressive airway obstruction due to juvenile nasopharyngeal angiofibroma

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## Introduction

Juvenile nasopharyngeal angiofibroma (JNA) is an uncommon benign, hypervascular tumor that occurs almost exclusively in preadolescent boys. JNA originates in the nasopharynx or nasal cavity and often grows laterally and posteriorly, sometimes with intracranial invasion [1]. The standard treatment of JNA is surgical resection after angiographic embolization. However, the anesthetic management is difficult due to the risk of massive bleeding because of the hypervascularity of JNA [2]; only one reported case has involved a difficult airway [3].

This report presents an unusual case of JNA causing airway obstruction and its anesthetic management.

## Case Report

A 16-year-old boy weighing 53.5 kg was admitted to our hospital with a 1-year history of nasal obstruction and snoring. One month earlier, he consulted his family

#### Key Clinical Message

Juvenile nasopharyngeal angiofibroma (JNA) involves difficult anesthetic management because of the risk of massive bleeding, while airway management is rarely a problem in JNA. This report presents an unusual case of JNA causing airway obstruction.

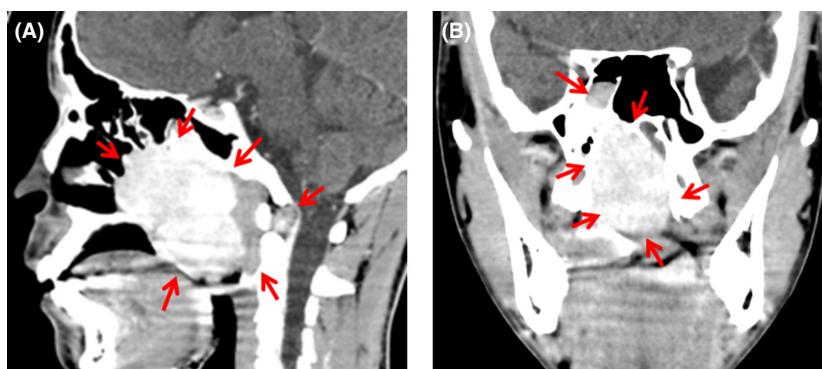
#### Keywords

Adolescent, difficult airway, general anesthesia, otolaryngology.

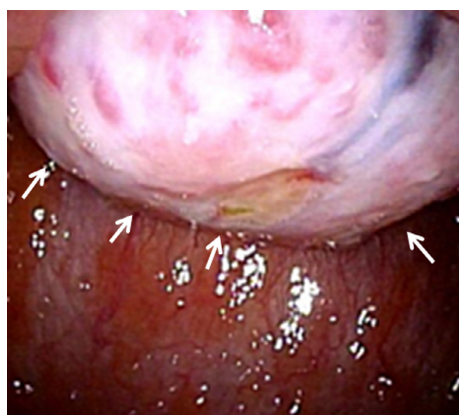
physician with epistaxis. The bleeding stopped spontaneously, and a tumor was discovered in the right nasal cavity, extending to the nasopharynx, right nasal cavity, and right butterfly sinus, and protruding below the free edge of the soft palate (Fig. 1).

A biopsy was scheduled under general anesthesia. At the preoperative evaluation, we observed that the tumor extended to the oral cavity (Fig. 2). Nevertheless, he did not have dyspnea in the supine position, and his SpO<sub>2</sub> on room air was 99%. He had no facial swelling, and he was evaluated as Mallampati Grade 1.

As preanesthetics, 50 µg fentanyl and 2.5 mg droperidol were administered intravenously. The pharynx was anesthetized locally with 4% lidocaine via a nozzle injector. First, we observed the pharynx and glottis with a fibroscope, and found nothing predicting intubation difficulties via direct laryngoscopy. Although we anticipated difficulty with mask ventilation of our patient, we judged that endotracheal intubation would not be difficult. However, in awake, tracheal intubation for young patients, we



**Figure 1.** Sagittal (A) and coronal (B) contrast-enhanced computed tomography (CT) images of the soft tissues of the nasopharynx. The sagittal image shows the mass (red arrow) protruding below the free edge of the soft palate (A). The coronal image shows the mass (red arrow) extending to the nasal cavity and right butterfly sinus.



**Figure 2.** The tumor (white arrow) was noted in the oral cavity at the prebiopsy evaluation.

worry about the possibility of bleeding from the tumor with movement [4] or because of high blood pressure.

After 3 min of preanesthetic preoxygenation by mask, rapid sequence induction was performed with 150  $\mu$ g fentanyl, 50 mg rocuronium, and a 3- $\mu$ g/mL target-controlled infusion of propofol. As expected, mask ventilation was impossible. He was Cormack–Lehane Grade 1 on direct laryngoscopy, and was intubated. The biopsy progressed smoothly with 320 mL of bleeding, and he was extubated in the operating room.

Three months later, angiographic embolization and surgical resection were scheduled. The tumor had grown since the first operation, and he now experienced severe dyspnea (Fig. 3). He could not sleep in the supine position, and had lost 7.7 kg because he had difficulty eating due to the tumor.

Considering the risk of complete airway obstruction, a tracheotomy was first performed under local anesthesia, and then embolization was performed under general anesthesia.



**Figure 3.** Sagittal contrast-enhanced CT image before angiographic embolization. Within 3 months, the tumor (red arrow) had grown, extending to the base of the tongue.

Two days after embolization, the surgical resection was performed. There was more bleeding than expected, a total of 1320 mL. An intraoperative transfusion was necessary. Tracheotomy was closed on the postoperative day 5. The patient was discharged 10 days postoperatively.

## Discussion

Almost all patients with JNA experience chronic epistaxis and nasal obstruction. Intracranial involvement has been reported in 10–37% of cases [5, 6].

JNA is known for difficult anesthetic management because of massive bleeding. Even a simple biopsy under local anesthesia is not recommended. Previously, we experienced a case of massive bleeding, totaling 3018 mL, during a biopsy of a 13-year-old boy. General anesthesia and preparation for bleeding are recommended for a biopsy of JNA.

Airway management is rarely a problem in JNA, even if the disease progresses. Wheat *et al.* [3] reported a case of JNA causing acute airway obstruction in an adult male, but we could find no other reports.

In our hospital, 19 JNA patients underwent surgery and general anesthesia between 2007 and 2016. Although 79% of these patients were diagnosed with Radkowski's stage 3A or higher, which means that the tumor has spread to the intracranial space beyond the nose and sinus, only this patient experienced progressive airway obstruction requiring a tracheotomy.

When the tumor grows beyond the free edge of the soft palate, it can cause airway obstruction. The appearance of the tumor in the oral cavity may help to predict a difficult airway.

## Conclusion

We experienced an unusual case of progressive airway obstruction in a 16-year-old boy with JNA. Although rare, the possibility of airway obstruction must be considered.

## Learning Points

- 1 The possibility of a difficult airway must be considered in the anesthetic management of juvenile nasopharyngeal angiofibroma (JNA). Sometimes JNA causes progressive airway obstruction. The appearance of the tumor in the oral cavity may help to predict a difficult airway.
- 2 There is no obvious relationship between airway obstruction and disease progression.
- 3 JNA is a hypervascular tumor. Even a simple biopsy is not recommended under local anesthesia.

## Ethical Approval

Ethical approval for this study (M2016-086) was provided by the Ethical Committee of Tokyo Medical and Dental

University, Tokyo, Japan. Informed consent for the publication was obtained from the patient.

## Authorship

SM and KK: drafted the article. KMi, YB, and KMa: participated in critical review and revision of the article, and gave the final approval of the article.

## Conflict of Interest

The authors have no conflict of interest.

## References

1. Martin, H., H. E. Ehrlich, and J. C. Abels. 1948. Juvenile nasopharyngeal angiofibroma. *Ann. Surg.* 127:513–536.
2. Mann, W. J., P. Jecker, and R. G. Amedee. 2004. Juvenile angiofibromas: changing surgical concept over the last 20 years. *Laryngoscope* 114:291–293.
3. Wheat, C., R. J. Bickley, E. Cohen, D. Wenzler, N. Hunter, D. Astiz, 2016. Juvenile nasopharyngeal angiofibroma presenting with acute airway obstruction. *Case Rep. Otolaryngol.* 2016:1537276.
4. Apfelbaum, J. L., C. A. Hagberg, R. A. Caplan, C. D. Blitt, RT Connis, DG Nickinovich, et al. 2013. Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on Management of the Difficult Airway. *Anesthesiology* 118:251–270.
5. Harwood, A. R., B. J. Cummings, and P. J. Fitzpatrick. 1984. Radiotherapy for unusual tumors in the head and neck. *J. Otolaryngol.* 13:391–394.
6. Jafek, B. W., E. A. Krekorian, W. M. Kirsch, and R. P. Wood 1979. Juvenile nasopharyngeal angiofibroma: management of intracranial extension. *Head Neck Surg.* 2:119–128.