

## CASE REPORTS

### Anesthetic management of a patient with face hemangioma: case report



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**Abstract** Anesthetic agents and/or surgical positions, the total volume of hemangioma may increase under general anesthesia; thus, airway management of patients with a hemangioma may be very difficult. Our patient in this case report has a periorbital and oropharyngeal hemangioma that reaches down to the esophagus. We observed that the size and volume of the hemangioma increased significantly during elective nephrectomy surgery. After adequate therapy with steroids and beta-blockers, the size of the hemangioma decreased during the post-operative care unit monitoring period. We report this case to show the importance of airway management of hemangiomas with the potential for life-threatening complications.

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## Introduction

Infantile hemangiomas are benign neoplasms that are composed of a normal or abnormal proliferation of vascular structures. Seventy percent of hemangiomas are congenital. Most of them regress spontaneously.<sup>1</sup> Treatment involves steroids, beta-blockers, interferon- $\alpha$ , vincristine, cyclophosphamide, pulse dry laser, and surgery.<sup>1</sup> Recurrence risk is high, which is independent of treatment. Ten percent of infantile hemangiomas may lead to tissue destruction.

Size, volume, location, aggressive nature, and increased growth may lead to life-threatening complications. Possible complications may be predicted depending on the location site.<sup>2</sup> Here, we present our experience with a patient with a periorbital and oropharyngeal hemangioma during elective nephrectomy under general anesthesia.

## Case report

The patient was a 40-year-old male with a weight of 73 kg, a height of 178 cm, and American Society of Anesthesiologists (ASA) II. His complaint was effort dyspnea; however, his ECG was normal sinus rhythm, and echocardiography revealed an ejection fraction (EF) of 60%, which is completely normal. Cardiovascular and respiratory sys-

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**Figure 1** Preoperative, intraoperative and postoperative pictures of a patient with facial hemangioma. After general anesthesia was applied, the size of the hemangioma was increased and color change with the intraoperative lateral decubitus position observed. After medical and conservative treatment, the hemangioma partially regressed and the patient was extubated. He completely recovered by the 24th hour. A, Preoperative 24 hours; B, Intraoperative growing hemangioma; C, Postoperative 24 hours, regressed hemangioma.

tem examination were normal. Ten years ago, he had an elective inguinal hernia operation under spinal anesthesia without any complications. He had a history of frequent urinary tract infections. A simple nephrectomy was planned because of a unilateral atrophic kidney. The Mallampati score was 2. His neck movements and mouth opening were normal. There was a periorbital and oropharyngeal hemangioma on the left of his face. He mentioned that the hemangioma reached the esophagus (Figure 1A). In the preoperative period, it was evaluated by the Ear Nose Throat (ENT) with a flexible nasopharyngolaryngoscope. There was a purple-colored lesion suggesting hemangioma on the hard palate. Vocal cords are mobile and there is no edema. His medical history revealed that all lesions were already present at birth. The size of those lesions depended on the "upright" position of the patient, which means that when the patient is upright standing or sitting, the size and volume of the hemangioma are small. When the patient lies down (horizontally), the size and volume of the hemangioma increase. When he stands up again, it regresses, and the size and volume decrease spontaneously. No specific treatment was recommended. There is no medical or surgical

cure. The patient told us that he had been asymptomatic since birth. Written and oral informed consent were taken and signed. Possible complications were explained in detail: bleeding, aspiration, difficult intubation, and tracheotomy. An oropharyngeal hemangioma may involve difficult airway management tools (airway gum-elastic bougie, tracheotomy set, supraglottic airway device, and video laryngoscopy) and necessary equipment. On the operation table, routine non-invasive monitoring (blood pressure, heart rate, saturation, 3-lead ECG) was performed. With a face mask, 3 minutes of preoxygenation was performed with 100% oxygen. Anesthesia induction involved intravenous (IV) lidocaine ( $1 \text{ mg.kg}^{-1}$ ) and propofol ( $3 \text{ mg.kg}^{-1}$ ). Adequate mask ventilation was performed. Then, rocuronium  $0.6 \text{ mg.kg}^{-1}$  IV was administered for muscle relaxation. We did not want to traumatize the hemangioma during endotracheal intubation, which is why we used the C-MAC Storz video laryngoscope to see and record the visual content between the upper palate and lip. Using a spiral endotracheal tube (ID 8.0 mm), intubation was performed very carefully. If there was a failed intubation, the next step would be tracheotomy. Because supraglottic airway device were not dropped due to intraoral

lesions and risk of bleeding, invasive right radial artery blood pressure monitoring was performed. The right lateral flank position was set on the operation table for the surgeons to operate. Anesthesia maintenance involved sevoflurane 2–3% (MAC 1–1.3) and 50% oxygen + 50% air with IV remifentanyl infusion 0.1–0.3 mcg.kg<sup>-1</sup>. minute<sup>-1</sup>. The hemangioma color changed, and the volume increased gradually (Figure 1B) after induction and lateral flank positioning.

The tube rope (string) position was checked to ensure that it did not interfere with circulation. An intraoperative ENT consultation was made. The heart rate was 72 beats/minute, the blood pressure was 90/64 mmHg, and the peripheral oxygen saturation was 98%. The ENT recommended metoprolol 2 mg IV, methylprednisolone 80 mg IV, and ranitidine 50 mg IV. We also administered these medications. The hemodynamics were stable throughout the intraoperative period. For extubation, all preparations were made, including invasive interventions. At the end of surgery, the patient was again in the supine position. The hemangioma partially regressed in the supine position and the upper airway was evaluated as safe with a flexible nasopharyngolaryngoscope. Vocal cords are no edema and hemangioma in the left upper lip. Sugammadex (2 mg.kg<sup>-1</sup>) was administered. We waited until the patient spontaneously breathed on his own. When protective upper respiratory reflexes returned, we extubated him. No complications occurred. The size and volume of the hemangioma decreased in the postoperative period. The color also returned to normal. During postanesthetic care unit (PACU) monitoring, we waited to be sure that the airway was fully safe and secure. When the patient was completely awake and stable, we transferred him to his bed in a urology ward room (Figure 1C). The postoperative period was stable and without complications, and the hemangioma regressed. He was discharged from the hospital on the fifth postoperative day.

## Discussion

A hemangioma is a malformation of normal and/or abnormal vascular structures that regresses spontaneously. The pathogenesis is not yet fully understood. Gene mutations, deletions, hormonal factors, and microtraumas may be causative or predisposing factors that lead to hemangioma during the infancy/newborn period of human life.<sup>1</sup> Generally, hemangiomas are located in the head and neck.<sup>3</sup> In adulthood, hemangiomas do not respond to medical treatment and tend to bleed upon surgical interventions. Treatment indications are as follows: functional symptoms, airway obstruction, swallowing difficulty, and bleeding attack.<sup>1</sup> Here, we aimed to emphasize the importance of successful airway management with appropriate treatment of the rapidly growing hemangioma in a patient who underwent simple nephrectomy.

First, in 2008, Leaute-Lebeze et al started steroids for the treatment of hemangioma; however, their patient developed obstructive cardiomyopathy. Then, steroid treatment was gradually decreased and stopped; it was noticed by chance that the hemangioma coincidentally became smaller. Instead of steroids, the use of the nonselective beta-blocker propranolol is advised. However, propranolol also has some

adverse effects, such as bronchoconstriction, hypotension, hypoglycemia, and early depletion of cardiac performance, which are some of the main complications, especially under 6 months of age. Therefore, close monitoring protocols are recommended. Nonselective beta-blockers have therapeutic effects on hemangiomas; for example, palpation causes hemangiomas to soften, vasoconstriction leads to some color changes, the expression of VEGF and bFGF genes may decrease, the RAF mitogen gene may activate the protein kinase pathway, and capillary endothelial cells may trigger apoptosis.<sup>4</sup> We observed that the rapidly growing hemangioma during the operation was rapidly resolved by using steroids and beta-blockers in our case.

Studies have been conducted with other beta-blockers similar to propranolol, such as nadolol and timolol. However, it should be noted that other beta-blockers also have some adverse side effects; appropriate doses should be titrated to obtain optimal benefit. Beta-blockers have been shown to be alternatives to steroids in terms of hemangioma shrinkage and color change.<sup>1</sup> Nonselective beta-blockers have been shown to be effective in the treatment of infantile hemangiomas located in the orbital region. Both propranolol and metoprolol were combined with steroids to treat infantile hemangiomas located in the orbital region. This study suggested beta-blockers as the first-line treatment for hemangiomas in children.<sup>5</sup>

Chen et al. revealed that hemangioma tissue has significantly more HIF-1a (hypoxia-inducible factor-1a) than normal tissues. The level of HIF-1a (hypoxia-inducible factor-1a) decreased significantly after propranolol treatment depending on the time and dose. Propranolol inhibits apoptosis (which is activated by HIF-1a, hypoxia-inducible factor-1a). Propranolol also inhibits the cellular proliferation, migration, and tubal formation of hemangiomas, which is why propranolol may be considered in the future to be the first-line treatment choice.<sup>2</sup> Although steroids were shown to be the first choice of medical treatment for infantile hemangiomas, it was recently shown that steroids may also lead to unwanted complications such as mental retardation, infections, and pain by way of actions on the proliferative phase of the hemangioma.<sup>1</sup> In the case of hemangiomas that are located in the airway region (on the inside wall of the respiratory tract), the treatment protocol depends on the patient age, lesion localization, and hemodynamic parameters.<sup>3</sup> In our case, we preferred metoprolol combined with steroids for our treatment protocol; nevertheless, we believe that surgical position and vasodilatation (due to anesthetics) are two main factors that worsen hemangioma volume and the risk of airway compromise.

## Conclusion

In surgery, oropharyngeal hemangiomas may compromise airway security and even cause life-threatening complications because of the vasodilatation effects of anesthetics and surgical positions on the hemangioma. Adult patients may also require steroids and beta-blockers for treatment to decrease hemangioma volume and relieve symptoms. In this patient, we had concerns about airway security because the hemangioma was very large and was

even larger with anesthetics and in the surgical position. We emphasize here all the elective preparations, anesthetic needs, effective doses of treatment drugs, side effects, surgical positions, and possible life-threatening outcomes.

### Conflicts of interest

The authors declare no conflicts of interest.

### References

1. Xu S-Q, Jia R-B, Zhang W, et al. Beta-blockers versus corticosteroids in the treatment of infantile hemangioma: an evidence-based systematic review. *World J Pediatr.* 2013;9:221–9.
2. Chen Y, Bai N, Bi J, et al. Propranolol inhibits the proliferation, migration and tube formation of hemangioma cells through HIF-1 $\alpha$  dependent mechanisms. *Braz J Med Biol Res.* 2017;50:e6138.
3. Kumar P, Kaushal D, Garg PK, et al. Subglottic hemangioma masquerading as croup and treated successfully with oral propranolol. *Lung India.* 2019;36:233.
4. Léauté-Labrèze C, de la Roque Dumas E, Hubiche T, et al. Propranolol for severe hemangiomas of infancy.(Letter to the editor). *N Engl J Med.* 2008;358:2649–51.
5. Porubanova M, Sharashidze A, Hornova J, et al.  $\beta$ -blockers in the treatment of periocular infantile capillary haemangioma. *Neoplasma.* 2015;62:974–9.