



International Journal of Medical Anesthesiology

E-ISSN: 2664-3774
P-ISSN: 2664-3766
www.anesthesiologypaper.com
IJMA 2024; 7(3): 106-109
Received: 26-05-2024
Accepted: 30-06-2024

Dr. Ananya Garg
Senior Resident, MGM Medical
College & Hospital, Kamothe,
Navi Mumbai, Maharashtra,
India

Dr. Javed Wani
Senior Resident, MGM Medical
College & Hospital, Kamothe,
Navi Mumbai, Maharashtra,
India

Dr. Gayatri Jain
Senior Resident, MGM Medical
College & Hospital, Kamothe,
Navi Mumbai, Maharashtra,
India

Dr. Ankita Joshi
Associate Professor, MGM
Medical College & Hospital,
Kamothe, Navi Mumbai,
Maharashtra, India

Dr. Vishwas Sathe
Professor, MGM Medical
College & Hospital, Kamothe,
Navi Mumbai, Maharashtra,
India

Corresponding Author:
Dr. Ananya Garg
Senior Resident, MGM Medical
College & Hospital, Kamothe,
Navi Mumbai, Maharashtra,
India

Anaesthetic management of carotid body tumour excision: A case report

**Dr. Ananya Garg, Dr. Javed Wani, Dr. Gayatri Jain, Dr. Ankita Joshi
and Dr. Vishwas Sathe**

DOI: <https://doi.org/10.33545/26643766.2024.v7.i3b.493>

Abstract

Carotid body tumours are rare benign tumours with a reported incidence of 1-2 per 1,00,000; arising at the bifurcation of the carotid artery. The carotid body is responsible for sensing the partial pressure of oxygen and carbon dioxide in the blood; hence, it is vital for controlling of ventilation during hypoxia, hypercapnia, and acidosis. Surgical excision is the preferred treatment modality for this condition. The authors present a case report of a 30-year-old patient who underwent excision of a left-sided carotid body tumour and discusses anaesthetic management.

Keywords: Carotid body, carotid body tumour, excision, hypotensive anaesthesia

Introduction

Carotid Body tumour is a rare (1-2 per 1,00,000) [1]. Benign tumour which is a non-chromaffin paraganglioma arising from the chemoreceptor cells at the bifurcation of the carotid artery in the neck. Despite being benign, the tumour can create problems due to mechanical pressure on the neighbouring neuro-vascular structures like the Internal Carotid artery, Vagus nerve, Hypoglossal nerve and Superior laryngeal nerve. Surgical excision of tumours is the preferred choice of treatment with a high risk of peri-operative morbidity and mortality [2]. While posing serious challenges to the anaesthetist.

Case Report

A 30-year-old female presented to the Surgery OPD of the author's institution with a slow-growing, lump over the left side of the neck for over a period of 4 years with a history of difficulty in deglutition and hoarseness of voice. Computerized tomography (CT) angiogram confirmed the diagnosis of a highly vascular carotid body tumour measuring 5*4*5 cm for which an elective excision procedure was planned after subjecting her to trans-catheter embolisation. Pre-operative anaesthetic concerns included difficulty in intubation, massive blood loss and elective post-operative mechanical ventilation.

Pre-operatively a day before the elective surgery, informed high-risk consent was taken. The patient and relatives were well informed and counselled about the complications along with various peri-operative concerns. Anticipated post-operative ICU with ventilator support was reserved for the patient.

The patient was wheeled into the operative room and standard monitors (non-invasive blood pressure, electrocardiograph and arterial oxygen saturation (spO₂) monitors were attached and all vital parameters were recorded. In the preoperative room, the patient was administered nebulisation with inj. duolin, along with inj. glycopyrrolate intravenously. The patient was made to gargle with a viscous solution of lignocaine solution (2% preparation). Otrivin (Xylometazoline) drops were instilled in both nostrils, and an oral spray of lignocaine into the oral cavity was used along with a transtracheal block. Further, Inj. midazolam 1 mg and fentanyl 50 mcg were administered and a slow-controlled intravenous infusion of dexmedetomidine 30 mcg/100 ml was started. The appropriate-sized tube was loaded over fibre-optic scope, and the scope passed through the oral cavity. On visualising the vocal cords, lox 2% spray was used, further progressing the scope. On crossing the vocal cords, the tracheal rings were seen, further rail-roading the endotracheal tube. The endotracheal tube placement was also confirmed by End-Tidal CO₂ measurement and four-point auscultation. The patient was eventually induced with Inj.

propofol and paralysed using muscle relaxant Inj. vecuronium. A subclavian central venous line with a triple-lumen catheter and an arterial line was secured for continuous hemodynamic monitoring.

General anaesthesia was maintained with oxygen/air (FiO₂:100%) and Isoflurane (1-1.5%) with vecuronium used as the muscle relaxant.

The total Duration of Surgery was 3 hours with a total blood loss of 400 ml. Vital parameters were stable except for 2 episodes of bradycardia and hypotension during the handling of the tumour.

Post-surgery, the patient was extubated, with neuromuscular reversal drugs using Inj. Neostigmine & Glycopyrrolate and were transferred to the surgical ICU for post-operative management and observation.

Discussion

The carotid body, first described by von Haller in 1743^[3], is a highly specialised chemoreceptor organ situated at the bifurcation of the Common carotid artery, which detects changes in arterial oxygen tension^[4].

According to Shamblyn classification, carotid body tumours are classified into 3 types based on the severity of internal carotid artery involvement^[5]. Type 1 has the least invasion into the internal carotid artery and can be easily removed. In Type 2, which is more common, the internal carotid artery is partially involved and surgical removal is challenging. Type 3, on the other hand, requires the removal of the carotid artery as there is a complete invasion of the carotid artery by the tumour.

When the literature is reviewed, mostly preference for general anaesthesia for Carotid Body Tumor surgery is noted. However, in some cases cited in the literature, local and regional anaesthesia was applied. In a series consisting of 4 cases reported by Toktas *et al.* local anaesthesia had been used, and no surgical complication was noted^[6].

Cervical plexus block is a preferred anaesthetic method for carotid artery surgery^[7, 8] with the complication arising from bleeding from the hyper-vascular tumour mass during attempts at block, as the tumour is located at the bifurcation of the carotid artery.

Needle or open biopsy is contraindicated in these tumours^[9] because of the risk of bleeding from the tumour. The dangerous surges in BP occurring during induction of anaesthesia and surgical manipulation during the excision of functional paragangliomas can be prevented by the administration of alpha-blockers preoperatively and beta-blockers intra-operatively. Moderate cooling of the patient (31 °C) is recommended to prevent cerebral hypoxia^[10]. Inj. Thiopentone (3-5 mg/kg/hr) infusion can be used to decrease the cerebral metabolic oxygen demand if the carotid artery has to be clamped. Involvement of cranial nerves (IX, X, XI) by tumour invasion preoperatively, nerve injury intra-operatively, or tissue oedema causing nerve palsy postoperatively may predispose to airway obstruction or aspiration.

Review of Literature

Shamblin WR and others in 1971, analysed the clinicopathologic findings in 90 cases of carotid body tumours at the Mayo Clinic. Out of 90, 70 patients underwent surgical management, with total excision in 49, including 1 patient with bilateral tumours. The overall surgical mortality rate was 5.7 percent, usually related to

carotid arterial damage or ligation. In addition to this, a classification was suggested for future surgical cases. Group 1 tumours are relatively small and minimally attached to the carotid vessels where surgical excision usually can be carried out without difficulty. Group 2 tumours are usually larger and show moderate arterial attachment. These tumours are amenable to careful surgical removal. Group 3 tumours are usually large and incarcerate the carotids.

In a retrospective study at Antalya Training and Research Hospital, Antalya, Turkey between 2013 and 2016, 10 consecutive patients among 176 patients who underwent surgery for the management of carotid body tumours were analysed. The average intraoperative blood loss was 287±68 mL. Tachycardia and hypertension were observed in 1 patient; bradycardia and hypotension were seen in 4 patients. Infusion for inotropic support was administered to 1 patient. The mean duration of operation was 109±20 minutes. The mean VAS score was 4±1, mean ICU tramadol consumption was 80±25 mg. Duration of stay in ICU and hospital were 2.4±1.1 hours and 3.8±0.7 days, respectively. Mortality and neurological complications were not seen in the postoperative period.

In 2004, Kohler HF with others analysed the Surgical treatment of paragangliomas of the carotid bifurcation. All patients underwent complete tumour resection. In 3 cases, resection of the internal carotid was necessary, and immediate reconstruction was performed. No patients had postoperative strokes. Five patients had postoperative nerve palsies. During the follow-up period of 4 months to 12 years, no patients had local recurrence developed.

In 2013, Sheetal R Jagtap, along with others, analysed the anaesthetic management of a 38-year-old female, with a Shamblin type II Carotid body tumour, thereby emphasising the importance of diagnosis based on clinical history, physical examination and MRI. A biopsy to confirm the diagnosis might turn out to be catastrophic. Intraoperative techniques to reduce blood loss and arrhythmias must be used, and cerebral protection therapy needs to be considered in the event of brain ischaemia. Surgical expertise must be available for neurovascular preservation to ensure the safe, yet complete removal of neoplasm. Postoperative care must be taken to check cranial nerve involvement and institute prophylactic ventilation to ensure a safe outcome.



Fig 1: Pre-operative assessment of tumour



Fig 2: Airway assessment preoperatively

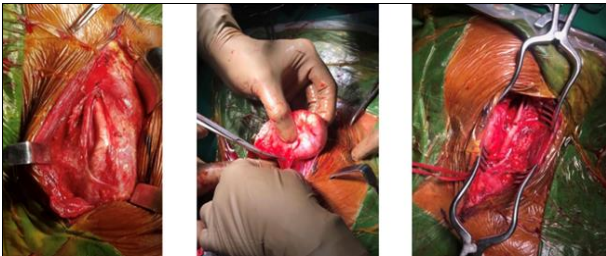


Fig 3: Anaesthetist attempting Fibre-optic Intubation



Fig 4: Intra-operative dissection of tumour



Fig 5: Post operative Scar

Conclusion

Utmost vigilance is essential for anaesthetists during the surgical removal of a carotid body tumour to the prevention of complications and prompt management for a successful surgical outcome. Preoperative assessment of tumour details and the airway is of utmost importance. Intensive monitoring and hypotensive anaesthesia with a high index of suspicion for possible complications are necessary to prevent them.

Acknowledgement

We would like to express an acknowledgement to the Department of Cardio-Vascular-Thoracic Surgery (CVTS) for their contribution to this case. We are immensely grateful to the operating surgeon Dr. Sameer Kadam, Head of the department CVTS and his surgical team. We have to express our appreciation to the patient for her cooperation and to the hospital with staff members for their contribution to the case.

Conflict of Interest declaration

The authors declare that they have NO affiliations with or involvement in any organization or entity with any financial interest in the subject matter or materials discussed in this manuscript.

Financial support and sponsorship: Nil.

References

1. Sevilla Garcia MA, Llorente Pendas JL, Rodrigo Tapia JP, Garcia Rostan G, Suarez Fente V, Coca Pelaz A, *et al.* Head and neck paragangliomas: Revision of 89 cases in 73 patients. *Acta Otorrinolaringol Esp.* 2007;58:94-100.
2. Hallett JW, Nora JD, Hollier LH, Cherry KJ, Pairolero PC. Trends in neurovascular complication of surgical management for carotid body and cervical paragangliomas: A fifty year experience with 153 tumours. *J Vasc Surg.* 1988;7:284-291.
3. Milewski C. Morphology and clinical aspects of paragangliomas in the area of head-neck. *HNO.* 1993;41:526-531.

4. Guyton AC. Textbook of medical physiology. 11th ed. Philadelphia: Saunders. Nervous regulation of circulation and rapid control of arterial pressure; c2006. p. 211-2.
5. Shamblin WR, ReMine WH, Sheps SG, Harrison EG Jr. Carotid body tumor (chemodectoma). Clinicopathologic analysis of ninety cases. *Am J Surg.* 1971;122:732-739.
6. Toktaş F, Yümün G, Gücü A, Göncü T, Eriş C, Çayır Ç, *et al.* Protective surgical procedures for carotid body tumors: A case series. *Erciyes Med J.* 2014;36:133-135.
7. Sait Kavaklı A, Kavrut Öztürk N, Umut Ayoğlu R, Sağıdıç K, Çakmak G, İnanoğlu K, *et al.* Comparison of combined (deep and superficial) and intermediate cervical plexus block by use of ultrasound guidance for carotid endarterectomy. *J Cardiothorac Vasc Anesth.* 2016;30:317-322.
8. Çoruh T, Yapıcı N, Yılmaz C, Çınar B, Maçika H, Abay G, *et al.* Karotis endarterektomisinde genel anestezi, servikal pleksus blokajı ve servikal epidural anestezi yöntemlerinin karşılaştırılması. *GKD Anest Yoğ Bak Dern Derg.* 2000;6:30-34.
9. Köhler HF, Carvalho AL, Mattos Granja NV, Nishinari K, Kowalski LP. Surgical treatment of paragangliomas of the carotid bifurcation: results of 36 patients. *Head Neck.* 2004;26:105.
10. Jagtap SR, Bakhshi RG, Khatavkar SS, Phadtare SJ, Mohite SN. Carotid body tumour excision: Anaesthetic challenges and review of literature. *Indian J Anaesth.* 2013;57:76-78.
11. Tamai H, Kuribayashi T, Sawamura S, Sumida T, Chinzei M, Hanaoka K, *et al.* Perioperative treatment for carotid endarterectomy with induced mild hypothermia: A case report. *Masui.* 2002;31:1132-1136.

How to Cite This Article

Garg A, Wani J, Jain G, Joshi A, Sathe V. Anaesthetic management of carotid body tumour excision: A case report. *International Journal of Medical Anesthesiology.* 2024;7(3):106-109.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.