

# Case Report

## Anaesthetic Management of Excision of Carotid Body Tumor

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### Introduction

Von Haller was the first to describe carotid body tumor in 1743. Carotid body tumors (CBT) are extremely rare, arising from chemoreceptor cells at the bifurcation of carotid artery. Reported incidence is 1-2 per 100000<sup>1</sup>. Frequently these tumors have tendency to turn malignant. Hence operative intervention is the treatment of choice. Removal of tumor poses several anesthetic challenges and is associated with perioperative morbidity of 20 -40 %<sup>2</sup>. This case report highlights the anesthetic management and the problems encountered during CBT excision.

### Case Report

A 42-year-old female weighing 74 kg, presented with history of swelling on the left side of neck near the angle of jaw for 2 months. The lump was slow growing, painful, soft and non-pulsatile. Indirect laryngoscopy revealed normal vocal cord movements and there was no extension of tumor into hypopharynx.

Computed tomography (CT) arch aortogram scan (Fig1) of neck revealed a lesion measuring 52.1 CC (caudal-cranial) x 30 TS (transverse-section) x 20 AP (antero-posterior) mm in the left carotid space at the bifurcation of common carotid artery and there were numerous central and peripheral enlarged feeding arterial branches within (Fig 1). Diagnosis of Shamblin type II CBT was made and planned to excise the tumor under general anesthesia. Her preoperative urinary vanillyl mandelic acid (VMA), and ECG, X-ray chest were normal. In the operation theatre, monitoring of heart rate, invasive blood pressure, Oxygen Saturation (SpO<sub>2</sub>), End tidal carbon dioxide (EtCO<sub>2</sub>) and temperature monitoring were instituted.

Patient was premedicated with Inj. midazolam 1mg iv, induced with Inj. fentanyl 140mcg iv, Inj. propofol 140mg iv, Inj. atracurium 35mg iv and trachea was intubated using 7.5mm ID flexometallic ETT. General anesthesia was maintained with volume controlled ventilation with a tidal volume of 450 ml, respiratory rate 12/min, air: oxygen with 0.5 of FIO<sub>2</sub> and isoflurane with a MAC 0.9-1. Intraoperatively induced hypotension was achieved with Inj. dexmedetomidine infusion of 0.3µg/kg/hr and adjusted to maintain mean arterial pressure 60- 70mmHg.



**Fig1 - CT Arch aortogram shows carotid body tumor**

Patient's temperature and EtCO<sub>2</sub> were maintained between 34°C to 35°C and 35-40mmHg respectively. At the time of dissection of the tumor, there was one episode of bradycardia with heart rate drop upto 42/min and hypotension with mean arterial pressure drop upto 50 mmHg which was treated with Inj. ephedrine 6mg iv and Inj. atropine 0.6 mg iv and local infiltration of Inj 2% lignocaine. Intraoperatively there was blood loss of 1000 ml and one unit PRBC transfusion was transfused. Inj dexmedetomidine infusion was stopped after resection and mean arterial blood pressure was maintained between 80 -90 mmHg for adequate cerebral perfusion. After 5 hours of surgery, neuromuscular blockade was reversed and trachea extubated, when patient was conscious with stable hemodynamic parameters. Hemodynamic monitoring was continued in post operative anesthesia care unit. There were no cranial nerve palsies and her vocal cord movements were normal with good deglutition reflex and the patient was discharged on fifth postoperative day.

## Discussion

Carotid body plays an important role in the control of ventilation during hypoxia, hypercapnia and acidosis as it senses partial pressure of oxygen and carbon dioxide from the blood. Carotid body tumors are rare tumors arising from the chemoreceptor cells present at the bifurcation of carotid artery. The two risk factors for the development of CBT are chronic hypoxic stimulation and genetic predisposition. Incidence of female to male ratio is 1.5:1 in normal altitude and 1:8 in high altitude<sup>3,4</sup>. There are three distinct types of CBT- 85% is sporadic, 10-15% familial type and around 5% hyperplastic type in which 5-7% of these tumors turn malignant, commonly in 5th or 6th decade as painless swelling in the neck. Approximately 10% of patients may present with dysphagia, choking or hoarseness. Horner's syndrome or shoulder drop may be present due to associated cranial nerve involvement (X, XI, XII) because of close relationship with these nerve<sup>5</sup>.

Occasionally these tumors may be associated with pheochromocytoma and secrete catecholamines and serotonin necessitating preoperative catecholamine studies. The surgeons usually request hypotensive anesthesia during the intraoperative period to reduce the blood loss and to have a dry operating field. During manipulation of the tumor, periods of bradycardia and hypotension are a common occurrences. There was one episode of bradycardia and hypotension during the dissection of the tumor which was reverted to normal after giving Inj atropine 0.6 mg iv and Inj ephedrine 6 mg iv and the surgeon was requested to stop manipulation of the tumor and infiltrate 2% lignocaine locally over the tumor. There were no further episodes of bradycardia after the infiltration.

Temperature management is also important, as the cerebral metabolic rate is reduced by 7% for each 1°C decrease in body temperature. Hyperventilation should be avoided in these cases as it causes vasoconstriction of cerebral blood vessels and thereby decreases delivery of oxygen<sup>6</sup>. Intraoperatively cerebral protection is employed during carotid artery clamping by using thiopentone sodium is used in the dose of 3-5mg/kg/hr for neuroprotection. Our patient did not require carotid artery clamping, so we did not use thiopentone sodium infusion.

Post operatively patient was monitored in post anesthesia care unit (PACU) to observe for any complications such as stroke, cranial nerve palsy, respiratory depression, profound hypotension and hemodynamic fluctuation<sup>7,8</sup>. The patient was extubated as all her vital parameters were stable and monitored in the PACU. She made an uneventful recovery and was discharged on the fifth post operative day.

## Conclusion

The successful management of a patient posted for carotid body tumor excision involves taking a detailed history, ordering for specific investigations preoperatively, invasive monitoring, optimization and managing intraoperative and post operative complications. Intraoperative anesthetic management along with cerebral protection, induced hypotension and management of arrhythmias are challenging. A high vigilance is

necessary for an anesthesiologist during the excision of CBT to detect possible intraoperative complications such as arrhythmias, stroke, and cerebral vasospasm and post operative complications such as cranial nerve palsy, stroke, respiratory depression, profound hypotension and hemodynamic fluctuations.

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