**Case Report:**

**Anesthetic management of Carotid Body Tumour excision- A case report**

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**Abstract:**

The carotid body plays an important role in the control of ventilation, hypercapnia and acidosis. The chemoreceptor cells sense the partial pressure of oxygen and carbon dioxide from the blood. And thus helps in managing ventilation and acidosis. Carotid body tumour arises from the chemoreceptor cells with low incidence rate. The tumour is benign in nature but has the tendency to turn into malignant. Removal of tumour poses several anaesthetic challenges and perioperative morbidity or mortality. We report successful anaesthetic management of carotid body tumour excision.

**Key words:** Anesthesia, challenges, carotid body tumour, excision

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**Introduction:**

For the first time the carotid body was described by von Haller in 1743. The main function of the carotid body is related to autonomic control of cardiovascular and respiratory systems along with blood temperature. Carotid body tumour (CBT) is a rare non-chromaffin paragangliomas arising from chemoreceptor cells. These cells are found at the bifurcation of carotid artery.

The paragangliomas arising from these cells constitute majority of head and neck paragangliomas and accounts for 60 – 70 %. The CBT is a benign tumour and may turn into malignant at a incidence rate of 1 to 2 per 1,00,000 cases. This tumour is seen in all the age group with equal incidence in both the sexes. Excision of CBT is considered as it may have local pressure effect, may turn into malignant or may develop metastasis. We describe the anesthetic management of CBT excision and possible perioperative complications associated with it.

**Case report:**

A 50 year old female presented with swelling in the left side of neck since 5 years, (Fig 1) which was insidious in onset, gradually progressive and painless. Initially it was of 1 X 1 cm in size and grew upto 3.5 X 3.5 cm i.e present size. There was no history difficulty in breathing, swallowing, change in voice, palpitation, tremors or excessive sweating. On examination a non-pulsatile mass was seen on left side of the neck, which was non-tender, non-collapsible, and no bruit was heard. On general physical examination patient was 62Kg, 159 cm in height, pulse rate of 78/min, blood pressure of 128/68 mmHg. The airway assessment showed Mallampatti grade I, thyromental distance of 6cm. Other systemic examinations were within normal limits. An indirect laryngoscopic examination was carried out to rule out any other cause and functionality of vocal cords.

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Preoperative blood investigations like haemogram, renal and liver function tests, chest radiograph and ECG were within normal limits. Special investigations like Doppler study showed hypervascular lesion in the left side of carotid bifurcation suggestive of CBT. Radiological imaging of the neck suggested possibility of CBT. There was no feature suggestive of compression of airway. Patient was diagnosed as left CBT and posted for excision under general anaesthesia.

Premedication with Tab. Diazepam 5mg and Tab. Pantoprazole 40 mg in the night before surgery and on the day of surgery in the morning was administered. Patient was kept nil per oral for 6 hours before surgery. 7 Fr, 16 cm, triple lumen central line was secured under local anesthesia in right side subclavian vein for perioperative monitoring and emergency access. With 18 G intra venous cannula a maintenance fluid ringer lactate was started at the rate of 100 ml/hr, and titrated according to central venous pressure (CVP) throughout the surgery. A right radial artery was cannulated with 20 G under local anaesthesia for invasive B.P monitoring. On arrival to operating room, invasive blood pressure (B.P) was 130/80 mm Hg, heart rate of 77/min, regular, respiratory rate of 13/min and oxygen saturation of 96% was recorded. ECG, nasopharyngeal temperature monitoring was established, together with monitoring of invasive B.P and central venous pressure (CVP).

Premedication Inj. Midazolam 0.05mg/kg and Inj. Fentanyl 1mcg/Kg intravenously were administered. Preoxygenation was done for 5 min and patient was induced with Inj. Propofol 2mg/Kg. Tracheal intubation was facilitated by Inj. Vecuronium 0.1mg/kg and a 7 mm cuffed Portex endotracheal tube was inserted orally. Anaesthesia was maintained with oxygen and nitrous oxide (1:1) keeping end tidal concentration of Isoflurane of 0.8 and a minimum alveolar concentration value of 1.1. Patient was put on mechanical ventilation with volume controlled mode and settings were made according to body weight. End tidal CO2 was maintained 30-35 throughout the surgery. Inj fentanyl was supplemented whenever needed. Inj Nitroglycerine was started to keep mean blood pressure in the range of 80-90mm Hg. The nasal temperature showed 33-35°C, which was acceptable during the excision of tumour.

Tumour was excised in in 2.5 hours (fig 2) with a total blood loss of 200 ml and was permissible limit. Throughout the surgery the haemodynamics were very well maintained but with a single episode of bradycardia reaching upto 48/min. (fig 3) It got reverted back to normal once the tumour handling stopped. We asked surgeon to infiltrate 3 ml of 2% Inj Lignocaine locally after negative aspiration for blood. The intravenous fluid was titrated to maintain central venous pressure of 10-12 mmHg.

Since the surgery was uneventful patient was extubated after residual neuromuscular blockade was reversed with IV Neostigmine 2.5 mg and Glycopyrolate 0.4 mg and once extubation criteria were met. Patient was conscious, oriented, obeying oral commands and pain free. There was no change in the voice of the patient. Post operatively patient received Inj. Diclofinac 75 mg I.V infusion twice a day. Patient was further monitored for another two days in cardiac post-operative unit and discharge to home after 2 days.

**Discussion:**

The function of carotid body is mainly to maintain the autonomic system of respiratory and cardiovascular system. The tumours of carotid body
which arises from the bifurcation of carotid artery and are rare. These tumours usually commonly found in the age group of 5th or 6th decade. The CBTs are benign in nature with potency of changing into malignant with the incidence rate of 5-7%.\(^{(3)}\)

The main presenting feature is swelling in the neck which is soft in nature and gradually progressive, not tender. The associated features may include dysphagia, choking or hoarseness depending upon the cranial nerve involvement as it has a close anatomical relationship to cranial nerves X–XII.\(^{(6)}\) Diagnosis of the tumour is usually made by ultrasound, with specific investigations include CT or MRI, digital subtraction angiography being the gold standard for diagnosis.\(^{(7)}\)

Both regional and general anaesthesia is practiced for CBT excision. In regional technique continuous cervical plexus block is preferred. The advantages of regional technique over general anaesthesia are continuous neurological assessment, better haemodynamic stability, a decrease in incidence of stroke and cardiovascular adverse events, faster recovery and reduced hospital stay.\(^{(8)}\) Since our patient did refuse regional technique we administered general anaesthesia. The cerebral protection during surgery is very important aspect. Various modalities, i.e. both invasive and non invasive techniques are available to detect abnormal cerebral blood flow. Thus preventing the possible complications associated with it. These are very useful to detect early before the complications develops. Transcranial Doppler, jugular venous oxymetry and near infrared are used for cerebral blood flow. Transcranial Doppler is useful for detecting cerebral vasospasm, jugular venous oximetry for assessing the adequacy of cerebral blood flow, near infrared spectrometry helps to quantify of cerebral blood flow, cerebral blood volume, regional cerebral oxygen saturation and cerebral metabolism. Since we did not have such monitoring equipment we did not monitor.

Intraoperative hemodynamic changes like bradycardia and hypotension are commonly seen. In this case, there was an episode of reflex bradycardia which got reverted back to normal after stopping tumour handling. Sometimes Inj. Atropine is required to treat severe bradycardia. Inj Lignocaine can be infiltrated locally to such incidence. The induced hypotension can be achieved by using Inj. Nitroglycerine, Inj Propofol infusion but care should be taken that cerebral blood flow is not decreased. The blood loss is usually less until and unless the major vessel is not handled properly. Sometimes hypotension due to blood loss is treated with colloids and blood replacement depending upon the amount of loss. CVP was monitored in our patient and maintained at 10 mm Hg. The blood loss throughout the procedure was 200 ml. Acceptable hypothermia; maintain normal blood sugars and infusing non glucose containing intravenous fluid are the key for cerebral protection. Sometimes pharmacological method of cerebro protective drugs is also considered in situations where carotid artery is clamped. In this technique barbiturates are used. A single dose of Inj. Thiopentone causes cerebral metabolic rate of oxygen suppression for 10 min and infusion of 3-5 mg/kg/h have shown neuroprotection.\(^{(9)}\) The cerebral metabolic rate is reduced by 7% for each 1°C fall in body temperature. The hyperventilation should be avoided in this case as it causes vasoconstriction of cerebral blood vessels and there by decreased delivery of oxygen.\(^{(5)}\)

Possible postoperative complications are cerebral stroke, cranial nerve palsy or paresis. Horner’s
syndrome and respiratory depression. Hence postoperative close monitoring of such patient is very important.

Conclusion:
Anesthetic management during carotid body excision is very challenging. A high vigilance is necessary for an anaesthesiologist during tumour handling and excision of the tumour. Cranial nerve involvement with this is not uncommon which may add up perioperative complications. A through history, specific investigation, invasive monitoring, optimization and managing postoperative complications are the key to success.

References: