Case Report

Carotid Body Paraganglioma Excision: Anesthetic Challenges

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Abstract

Carotid body paraganglioma (CBP) is a rare tumour which arises from chemoreceptor cells of the carotid body situated at the bifurcation of common carotid artery. Most commonly these tumours are benign, however, 5–7% of tumours may turn out as malignant; hence, excision is the rule. Anesthesia for excision poses numerous challenges, as these tumours are highly vascular, sense pH, arterial oxygen tension; may secrete catecholamine or serotonin, generally adhere to the carotid artery and accompanied with a perioperative morbidity of 20–40%. Anesthesia managed successful for excision of a CBP Shamblin Group II tumour avoiding invasive monitoring hence reported.

Key words: Anesthesia, benign, excision, monitoring, paraganglioma

Introduction

Carotid body paragangliomas (CBPs) are rare, nonchromaffin tumours arise from chemoreceptor cells of the carotid body (CB).[1] These tumours are mostly benign, can turn out as malignant, and infiltrate or exert pressure on the adjacent neurovascular structures.[2] Anesthesia for excision poses several challenges because the CBPs are highly vascular and firmly adherent to carotid bifurcation and accompanied with a perioperative morbidity of 20–40%. Anesthesia maintained successfully for excision of a CBP Shamblin Group (SG) II tumour purposefully avoiding invasive monitoring hence reported.

Case Report

A 40-year-old female weighing 59 kg presented with a swelling on the left side of neck near the angle of mandible since 2 years. The lump was painless, slowly growing, firm, nontender, nonpulsatile, 4 cm × 3 cm × 1.5 cm in size; bruit, and mobility with deglutition are absent, indirect laryngoscopy showed normal vocal cord function. A computed tomography (CT) scan of the neck showed an oval, well-defined, and soft-tissue mass displacing the left-sided carotid artery slightly medially. Fine needle aspiration cytomorphological (FNAC) features were strongly suggestive of paraganglioma of CB. In view of, typical location, cytological findings, and radiological results a diagnosis of CBP Shamblin Group-II was made and excision under general anesthesia (GA) was planned [Figures 1 and 2].

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Quick Response Code:

Website: www.karnatakaanaesthj.org

DOI: 10.4103/2394-6954.190775

Her preanesthetic examination, routine investigations, and blood biochemistry were within normal limits; chest X-ray and electrocardiogram (ECG) were also normal. Four units of blood were cross-matched and preserved. Since the patient was asymptomatic urinary vanillyl mandelic acid and serum catecholamines were not done.

The patient was administered tablet alprazolam 0.25 mg and tablet ranitidine 150 mg on the night and in the morning of day of surgery. In the operation room (OR), heart rate (HR), noninvasive blood pressure, oxygen saturation, ECG, and temperature were monitored using a multichannel monitor. Intravenous (IV) infusion was started with Ringer's lactate using an 18 G cannula at the rate of 100 ml/h. Premedicated with IV glycopyrrolate 0.004 mg/kg, midazolam 0.05 mg/kg, and fentanyl 0.002 mg/kg. Anesthesia was induced with IV thiopentone 5 mg/kg after 3 min preoxygenation, and trachea was intubated with a 7.5 mm cuffed endotracheal tube, using 2 mg/kg IV suxamethonium. Patient was maintained on controlled ventilation with vecuronium 0.08 mg/kg followed

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How to cite this article: Jewarlal NI, Rajaseker M, Reddy VS, Devika V, Bhardwaj A. Carotid body paraganglioma excision: Anesthetic challenges. Karnataka Anaesth J 2016;2:34-6.

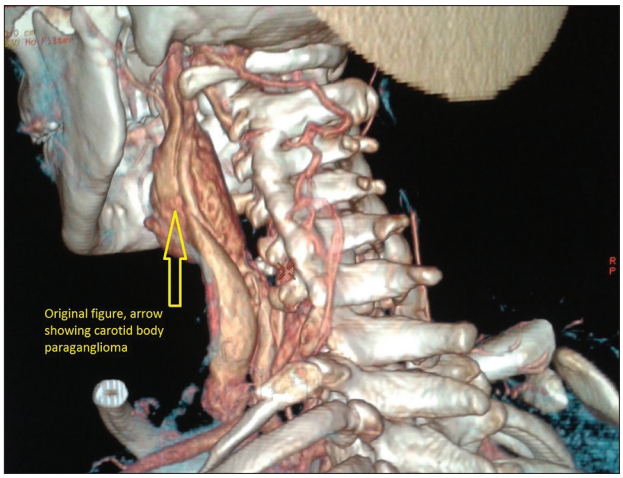

Figure 1: Three-dimensional view of carotid body tumour

Figure 2: Computed tomography scan of neck showing carotid body tumour (Arrow showing Carotibody paraganglioma)

by intermittent doses of 0.02 mg/kg, 66% nitrous oxide in 33% oxygen, and 1% halothane. Induced hypotension was achieved with nitroglycerine 0.5 mcg/kg/min and clonidine 0.03 mcg/kg/min, infusion was adjusted to maintain the mean arterial pressure of 80–90 mmHg and HR 70–80 beats/min. OR temperature was maintained at 22°C with patient's temperature of 34–35°C for mild hypothermia.

Total surgical duration was 2½ h and tumour was excised safely. Except an episode of bradycardia, her vitals remained stable perioperatively and bradycardia reverted to normal once the tumour handling was stopped. At the end of the surgery, her residual neuromuscular blockade was reversed with IV neostigmine 0.05 mg/kg; glycopyrrolate 0.008 mg/kg and extubated once the extubation criteria were met. Postoperative analgesia was maintained with diclofenac 100 mg rectal suppository twice a day and IV paracetamol 1 g 6th hourly. The patient was discharged from the hospital on the 7th postoperative day as her postoperative course was uneventful.

Discussion

CB is a flattened to ovoid structure situated bilaterally within the adventitia at the bifurcation of common carotid artery, first described in 1743 by von Haller.[3] CBP arises from the glomus Type-1 cells of CB.[4] History of recently diagnosed or uncontrolled hypertension, tachycardia, excessive sweating, and facial flushing suggests the possibility of catecholamine-secreting tumour.[5] This warrants necessary tests of serum and urine for catecholamine and breakdown products. Our patient did not have symptoms suggestive of catecholamine secretion; these tests were not done. CBP extension into parapharyngeal space, causes bulging of oropharyngeal wall results in difficult orotracheal intubation.[5] In this case, no parapharyngeal space extension and difficult intubation were noted.

CBP can be diagnosed by CT scan and more accurately by magnetic resonance imaging angiography, but FNAC should not be requested as it can turn out to be tragic.[5] In our case, CBP was diagnosed by CT scan and FNAC completed successfully as suggested by Masilamani *et al*.,[6] without any untoward effect.

Surgical excision and radiation therapy for inoperable cases are the treatment of choice for CBP.[7] Anesthesia techniques that were practiced for CBP excision are GA and cervical plexus block. We preferred GA in this patient to avoid the disadvantages associated with regional anesthesia. Paragangliomas secreting catecholamine may provoke dangerous shoot-up in blood pressure during tracheal intubation and tumour resection. These stress responses can be attenuated by administration of α-blockers preoperatively and β-blockers intraoperatively.[8] Patients may have reflex bradycardia intraoperatively from carotid sinus stimulation, which generally responds to IV atropine.[7] This patient however did not require atropine, the bradycardia that she had, reverted to normal on cessation of tumour manipulation. Shamblin Group-II tumours, which adherent to the adventitia of arteries,[9] may require extensive surgery and results in considerable blood loss while dissecting the tumour necessitates the use of invasive monitoring and ready availability of at least 4 units of blood.[7] In this patient, the tumour was firmly adherent at places to both the carotid vessels was dissected off the vessels without injuring the vessel, hence no invasive monitoring and brain protective strategies were performed, but we used hypotensive anesthesia to minimize blood loss, 4 units of blood, equipment for invasive monitoring, and drugs for cerebral protection were kept ready. Raised intracranial pressure (ICP) should be ruled out in these patients.[5] Either the history or preoperative CT scan was suggestive of raised ICP in our patient.

Postoperatively, intensive surveillance with intermittent nasogastric suctioning was done to prevent aspiration or obstruction of airway due to IX, X, and XII cranial nerve dysfunction. Other neurological complications which can be expected postoperatively include hemiplegia,

hypoglossal, recurrent laryngeal, marginal mandibular nerve palsy, and Horner's syndrome,[10] and no such complications were noted in our case. Sudden decrease of catecholamines following complete excision of functional tumours may cause profound hypotension necessitating use of noradrenaline infusion postoperatively. Removal of CBP which functions as peripheral chemoreceptors may cause severe postoperative respiratory depression. The dose of opioid must be titrated in the postoperative period in these patients.[7] The tumour in our case is nonfunctioning, however, this patient did not receive opioid for postoperative analgesia.

Conclusion

Anesthesia for excision of CBP is a challenge and has operative mortality of 20–40%. Yet, with meticulous preoperative assessment and planning, using techniques to minimize blood loss, to prevent arrhythmias and cerebral protection regimes in the event of brain ischemia intraoperatively and with intensive surveillance postoperatively anesthesia can be managed successfully for excision of CBP.

Acknowledgment

We are extremely thankful to the Department of ENT, particularly to Dr. Narayan H. Kulakerni HOD and Dr. Prawahar. Ch, Postgraduate, Navodaya Medical College and Research Centre, Raichur, Karnataka for their cooperation in bringing this article for publication.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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