Short Communication
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Surgical Management of Carotid Body Tumors: Role of Preoperative Catheter Angiography and Embolisation in Our Surgical Technique

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Learning Points

1. Carotid Body Tumours (CBT) are highly vascular tumours of neural crest origin arising within the adventitia of the medial aspect of the carotid bifurcation.

2. Surgery is the preferred treatment option aiming at complete excision of the carotid body tumour with preservation of vital neurovascular structures.

3. Our described technique is based on the principle of devascularisation of the tumour by bipolar coagulation of the surface of the tumor (before resection) and microscopic dissection with microsurgical instruments.

Introduction

Carotid Body Tumours (CBTs) are highly vascular tumours of neural crest origin arising within the adventitia of the medial aspect of the carotid bifurcation. These are classified into sporadic, familial, and hyperplastic forms. Most commonly CBTs present as an asymptomatic palpable neck mass in the anterior triangle of the neck. On examination, the mass cannot be moved vertically because of its attachment to the bifurcation of the common carotid (Fontaine sign). Carotid body tumors may be associated with pain, hoarseness, dysphagia, Horner syndrome, or shoulder drop because in 10% of the cases CBTs can cause paralysis of the hypoglossal, glossopharyngeal, recurrent laryngeal, or spinal accessory nerve, or involve the sympathetic chain. In cases of functional carotid body tumors, symptoms similar to those of pheochromocytoma, such as paroxysmal hypertension, palpitations, and diaphoresis, are seen [1]. Surgery is the preferred treatment and the aim is to achieve complete excision of the carotid body tumour with preservation of vital neurovascular structures. There is increasing evidence to suggest more peripheral location of the CBTs in the periadventitial tissue rather than in the adventitia of the carotid bifurcation [2]. The main blood supply to CBTs comes from the ascending pharyngeal artery through feeding vessels. MRI and MRA are the preferred investigations as the CBT has a characteristic salt and pepper appearance on T1-weighted image and MRA reveals the vascularity of the tumor and its feeding vessels. Based on a recent systematic review surgical excision with preoperative embolization appears to decrease estimated blood loss and operative time when compared with that without preoperative embolization for carotid body tumours [3]. We describe our technique of CBT excision without any preoperative catheter angiography or embolisation.

Technical Description

The patient is positioned supine with head elevation and neck extension under endotracheal intubation. Standard skin prep and drapes are applied. Skin crease incision is made overlying the CBT. Limited flaps are raised and dissection is helped by loupe or microscopic magnification. Extensive bipolar coagulation of the tumor is employed to devascularise the tumor before separation from the carotid arteries. Most important surgical steps were microscopic magnification and micro scissor dissection. No surgical drain was used. Twelve patients had Carotid Body Tumor (CBT) resected by a single surgeon (AH) over a 15 year period (Figure 1-4). None of the patients had preoperative catheter angiography and embolisation. There were no intraoperative and postoperative complications. The intraoperative blood loss was minimal and none of the patients required blood transfusions. There was no recurrence of tumor in subsequent follow-ups.

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Figure 1: A small incision to expose the left carotid body tumour.

Figure 2: Coagulation of the tumour using the bipolar diathermy.

Figure 3: Continued separation of the tumour from the carotid bifurcation using the bipolar diathermy.

Figure 4: Excision of the carotid body tumourrevealing clear carotid artery bifurcation.

Discussion

CBT resection can be performed without preoperative catheter angiography and embolisation. The surgical principle is to devascularise the tumor by bipolar coagulation of the surface of the tumor before resection and microscopic dissection with microsurgical instruments. Utility of our surgical technique is well established and is a standard technique of resection of vestibular schwannoma. In our opinion there is no need for preoperative catheter angiography and embolization that carries inherent risks.

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