

## Carotid Body Tumours- Our Institutional Experience

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**ABSTRACT:** Carotid Body Tumour is a rare Vascular tumour, with incidence of less than 5% in the general population. These were first described in 1743.

Here we present a retrospective observational study of a series of 17cases of Carotid Body tumours& their peri-operative outcomes, at our Department of Vascular Surgery, Government Rajaji Hospital, Madurai, between 2012 and 2017.

**KEYWORD:** Carotid Body tumour, Shamblin class I,II,III, Chemodectomas, Potato Tumor, Paragangliomas – Glomus tumor caroticum.

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### I. Introduction

Paragangliomas are tumours arising from the Glomus bodies of carotid, temporal bone, rarely orbit, nasopharynx, larynx, nasal cavity, PNS, tongue and jaw. They have a chemoreceptor activity and modulate cardiovascular and respiratory functions in response to fluctuations in arterial pH, pO<sub>2</sub> & pCO<sub>2</sub>. Glomus bodies in head & neck normally average 0.5- 1.0mm diameter in size. They are located in the Jugular fossa (50%), Tympanic canaliculus (20%), Cochlear promontary (10%) and few along the descending part of the facial canal.

#### CAROTID BODY TUMOUR(CBT):

Also known as Chemodectoma, Potato Tumor and Glomus tumor caroticum, Carotid Body tumours are located within the adventitia of the postero-medial aspect of the Common Carotid Artery. Blood supply to the carotid bodies are derived from the vasa-vasorum initially. Later accessory blood supply is derived from branches of the Vertebral Artery & Ascending Cervical Artery. Sensory Innervation is derived from the Glossopharyngeal Nerve.

Incidence of CBT is <5% in general population. As the tumours enlarge in size, they tend to displace & encircle the Internal & External Carotid vessels, causing thinning of vessel wall by pressure from the mass. They may also present as large masses, extending towards the cervical spine, skull base, angle of mandible or lateral pharyngeal space. They are slow growing tumours, may be asymptomatic or cause pressure symptoms like dysphagia, pain, cranial nerve palsies or Carotid sinus syndrome. Incidence of malignancy in a carotid body tumour is <0.5%. The prognosis depends not on the histo-pathological nature of the lesion, but on the rapid local growth & Neuron/Vascular invasion. Incidence of local spread to lymphatics (5%) or distant metastases (low risk <=5 %) is low. The mass lies deep to SCM, tethered to adjacent structures, with fixity in large tumours seen extending to spine, skull base or sub-mucosal bulge in tonsillar area. They may even present with a bruit. Hence, once diagnosed, it is advisable to proceed with surgery at the earliest.

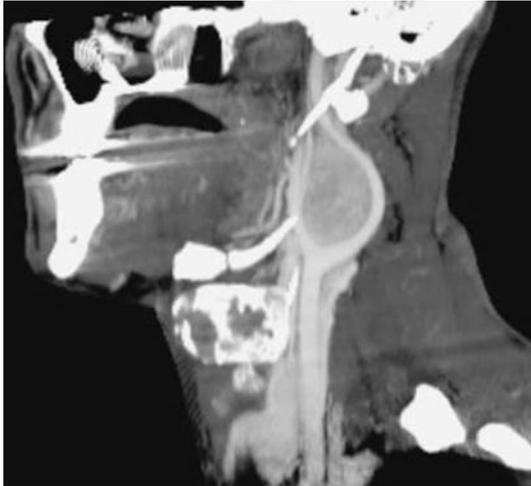


Figure 1: CECT of Carotid body tumour

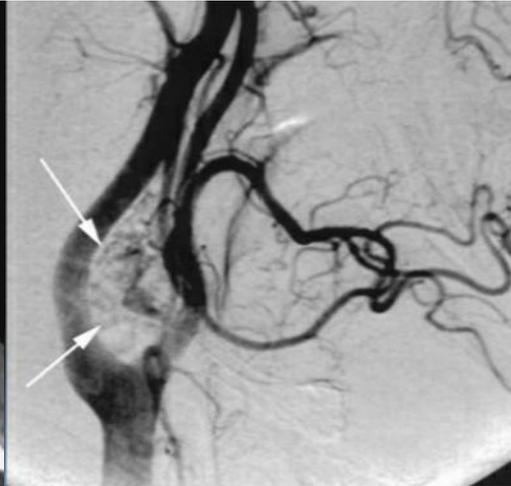
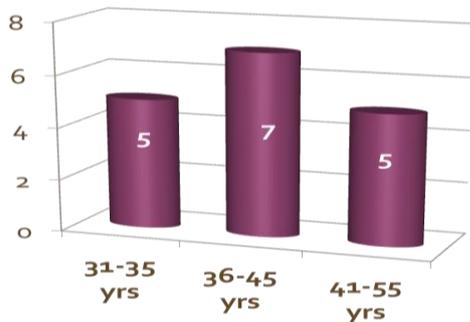


Figure 2 CT Angiogram of Carotid body tumour

OUR INSTITUTIONAL EXPERIENCE:

All patients with Anterior Triangle swellings, with possible diagnosis of Carotid Body Tumour, admitted in the Department of Vascular Surgery-Govt Rajaji Hospital, Madurai&those referred-in from General Surgery Department between January 2012- June 2017 were evaluated. Pre-op evaluation was done with baseline investigations, Ultrasonogram and CT Angiogram. We had 17 patients with Carotid body tumours, 11 females and 6 males, belonging to age group of 35-50years. The mean duration of presentation was 4.5 years, there no Bilateral lesions. CT Angiogram was done and Shamblin’s classification applied: 5 patients belonged to Shamblin III, 8 to Class II, 4 to Class I. (None of these patients were subjected to pre-op embolization).



Median Age Of Presentation - 43 years

Figure 3: Age Distribution

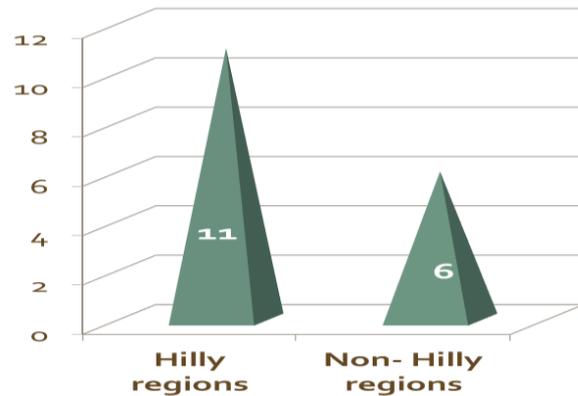


Figure 4: Altitudinal Variation

Shamblin Class	No of cases	%
Class I	4	23.5%
Class II	8	47.05%
Class III	5	29.4%

Figure 5: Clinical presentation according to Shamblin's Classes



Figure 6: Our Management Protocol

Pre-op work up:



Figure 7



Figure 8



Figure 9

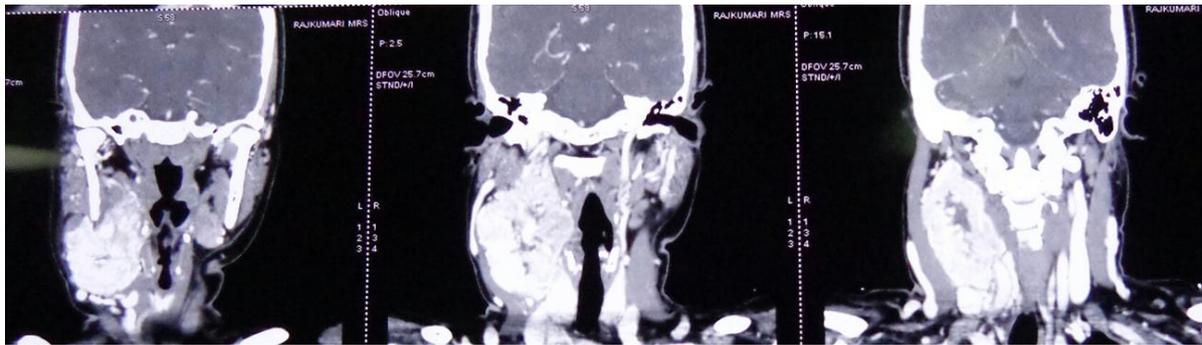


Figure 10



Figure 11: CBT

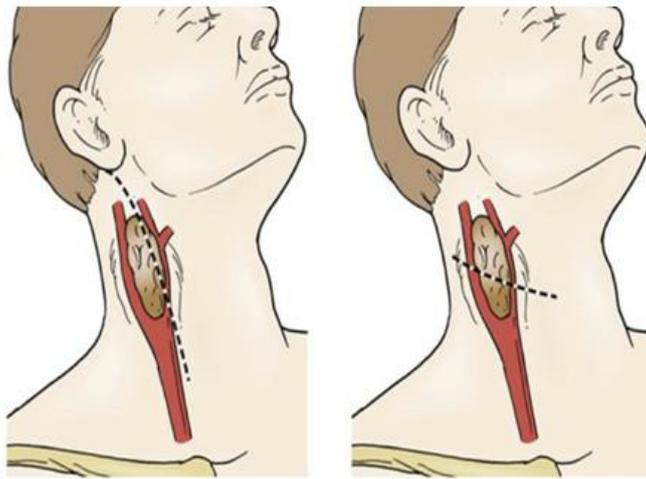


Figure 22: Incisions for CBT excision

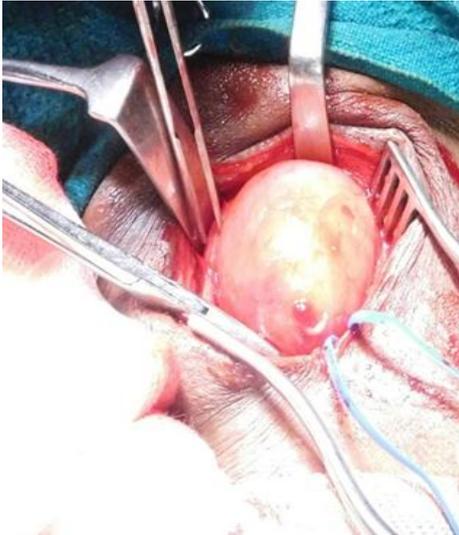


Figure 33: CBT Excision



Figure 44: Specimen of Carotid body tumour

Our Protocol: Excluding other Paragangliomas, bilateral tumours and recurrent tumours, the above patients were taken up for surgery after detailed informed and written consent. Elderly individuals, and patients with other comorbidities were not included.

Out of these, 12 patients of Class I & II Shamblin underwent complete excision of tumour. Of the 5 Patients with Class III, 4 underwent Vein grafting. In 1 patient, there was intra-op injury to the External Carotid A, during dissection of tumour, hence the same was sacrificed and used as bypass.

Shamblin Class	No of cases	Management	
Class I	4	Complete Excision	
Class II	8	Complete Excision	
Class III	4	Excision with Vein Graft	2 Synthetic graft 2 GSV
	1	Excision with Ext Carotid A graft	

Figure 15: Management outcomes



Figure 16: Tumour surface marking

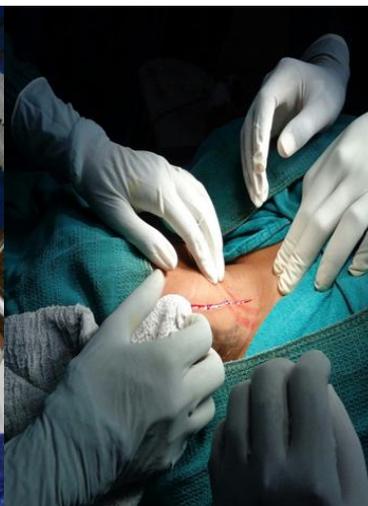


Figure 17: Incision



Figure 18: Tumour dissection

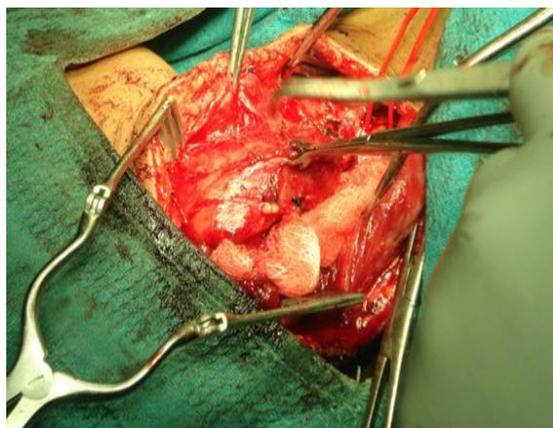


Figure 19: Dissection Of tumour

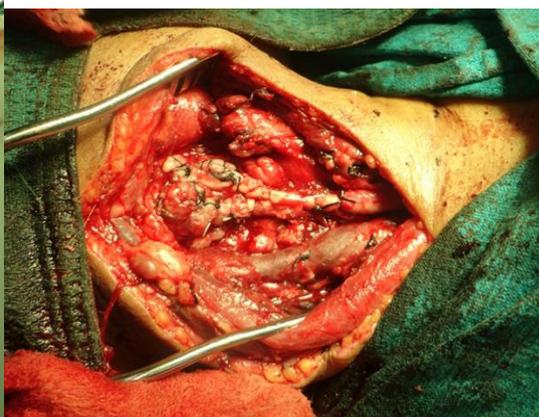


Figure 20: Tumour Bed after Excision

Histopathology of the excised specimen was reported. 15 cases confirmed the diagnosis of Carotid body tumour. 1 turned out to be Schwannoma, 1 a case of Castleman's syndrome.

Peri-Operative outcome in 15 patients was uneventful (88.2%), 2 incurred Nerve injuries. One patient suffered Recurrent Laryngeal nerve injury with Marginal Mandibular Nerve weakness (5.8%). The other developed Horner's syndrome (5.8%), but recovered well with conservative management. There was nil peri-operative mortality. There was no recurrence or delayed complications during the follow up period of 2 years.



Figure 21: Post Surgery



Figure 22: Hypoglossal Nerve involvement

## II. Discussion

Differential Diagnosis Of Carotid body tumours include enlarged Lymph nodes, Carotid Artery aneurysm, Branchial Cleft Cyst, benign tumours (eg: Lipoma) and direct extension of a lateral pharyngeal wall Cancer/ Pyriform Fossa Cancer into soft tissues of the neck.

Diagnosis in CBT is by CT or MRI with contrast; pre-op biopsy is contra-Indicated in view of high vascularity of the tumour and its proximity to great vessels. Angiography is indicated if resection is anticipated. Small lesions 1-5 cm can be resected. Larger lesions/ Fixed/ Unresectable tumours warrant RT.

## III. Conclusion

- Proper diagnosis of suspicious lumps is mandatory; with advances in radio-diagnosis, high index of clinical suspicion and following systematic management protocols would suffice.
- Possible need for vascular reconstruction to be anticipated prior to taking patients up for surgery.
- Cranial Nerve injury is the most common complication (8-12%).
- In view of close proximity to the tumour and encasement of the neurovascular bundle in advanced Shamblin's classes (III) there is an inherent high risk of postop neurovascular complications.

- Early detection and prompt surgical resection minimizes surgical morbidity. Surgical excision is mandatory irrespective of size of tumour / Shamblin type due to malignant potential & in order to lessen neurovascular damage.
- Modern surgical techniques have reduced postoperative mortality rate (0 -3%), Stroke rate (0 - 8%) and recurrence after resection (2 – 6%).

**INFORMED CONSENT:** Obtained for Photographs.

**CONFLICT OF INTEREST:** No conflict of Interest was declared by the authors.

**FINANCIAL DISCLOSURE:** The authors declared that these cases received no financial support.

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