MEDICAL CHANNEL

Original Article

CAROTID BODY TUMOR EXPERIENCE AT JINNAH POSTGRADUATE MEDICAL CENTRE

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ABSTRACT

Introduction Paragangliomas arising from the carotid bodies are generally rare tumors but comprise the majority of Head and Neck Paragangliomas (60-70%). They arise from the medial side of the carotid body and needs very meticulous dissection.
Objective **:** The aim of this study is to share the experience of meticulous dissection of carotid body tumor and show the discrepancy of sex, age and living area of patients between international data and our experience.
Study Design **:** Retrospective study
Materia; and Method **:** This study was conducted in ENT and Head and Neck Surgery department, Jinnah Postgraduate Medical Centre, Karachi from 2000 to 2008. During this duration total 08 patients were admitted having carotid body tumor. 05 were female and three were male. Mean age was 42 years (youngest patient was 23 years old). 05 patients were from Karachi and 02 patients were referred from Punjab and 01 patient from Balochistan. One patient with huge tumor refused any kind of treatment and he was 25 years old young male.
Results **:** Internal Carotid artery was damaged in two cases which were repaired with proline by a vascular surgeon. There is no cerebral damage post operatively. Average blood loss was 300 ml.
Conclusion**:** Carotid body tumors are slow growing and benign. The keys to successful surgery are careful preoperative planning, proximal and distal control of the vasculature with vessel loops, careful identification and preservation of neural structures if possible, dissection in the sub adventitial, white line and preparation for vascular reconstruction if necessary with suture repair, patch grafting or interposition saphenous vein graft.

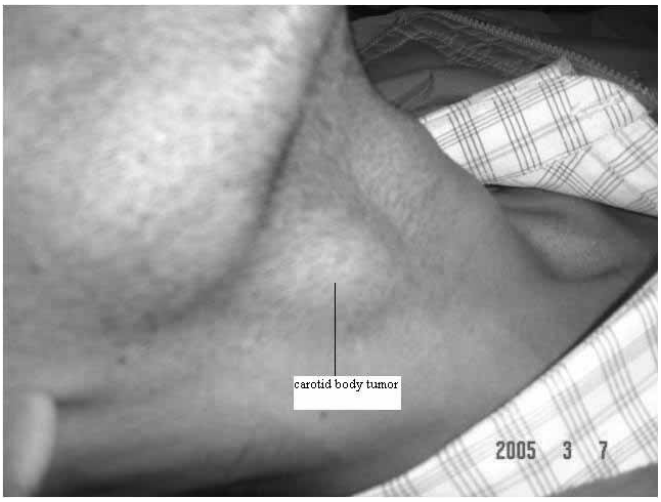
Key Words **:** Carotid body tumor, Paraganglioma, Carotid body

INTRODUCTION:

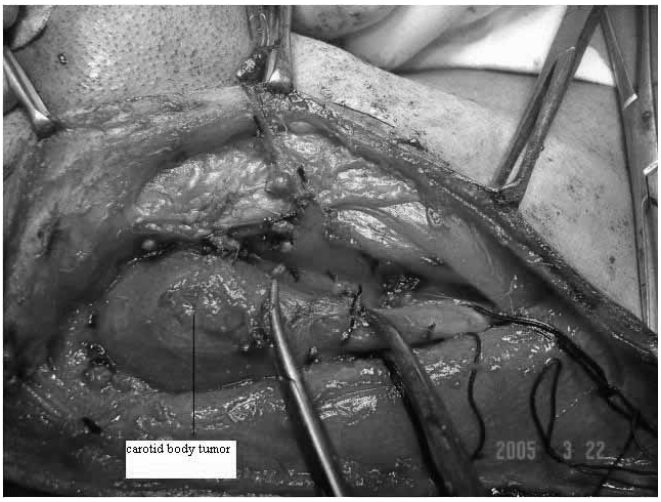
Carotid body tumor is a rare tumor of the head and neck, which is arises from the medial side of the carotid bulb. Historically carotid body was first described by Von Haller in 1743. It is a reddish brown to tan structure, 3-5 mm in diameter in the adventitia of the common carotid artery located on the postero-medial wall of the vessel at its bifurcation. Its feeding vessel is external carotid artery mainly. It is sensitive to change in pH and arterial oxygen tension.

Carotid body tumor was formerly called Chemodectoma and Glomus tumor but now called Carotid body Paraganglioma. Von Luschaka in 1862 from Europe first described carotid body tumor. Tumor is dark, tan to purple in color, slow growing (~5 mm/year), rarely malignant (6-12.5%). Tumor is located at the level of the Hyoid bone. It is non tender, firm, rubbery (potato tumor), pulsatile, bruit may be present. It can move side to side but not up and down because of its attachment to the carotid bifurcation. It refills in step synchronous fashion with the pulse after compression.

MATERIALS AND METHODS:







This study was conducted in ENT and Head and Neck Surgery department, Jinnah Postgraduate Medical Centre, Karachi from 2000 to 2008. During this duration total 08 patients having carotid body tumor were admitted. 05 were female and three were male. Mean age was 42 years (youngest patient was 23 years old). 05 patients were from Karachi and 02 patients were referred from Punjab and 01 patient from Balochistan. One patient with huge tumor refused any kind of treatment and he was 25 years old young male. Surgery was done is 07 patients. All patients were present with an asymptomatic mass in antero-lateral region of neck.

Although it is a very short series as compared to international data but as yet no study is done in Pakistan on carotid body Paraganglioma and its dissection.

Surgery was performed by the surgeons having more than 15 years experience in the specialty.

A detail history and thorough examination was done. All patients have unilateral tumor. 06 patients had on right side and 02 patients had on left side. The tumors were firm, rubbery, pulsatile, bruit was positive in 05 patients and reduces in size on compressing the carotid artery.

Apart from routine investigations CT scan, Angiography and Doppler Ultrasound was done. Angiography showed typical lyre sign.

07 patients were treated by surgery. A long incision along the anterior border of sternomastoid muscle from mastoid process to clavicle was given. Bulldog clamps were applied on common carotid during dissection for 45 minute and tumor dissected out. Repair was done with 6/0 proline by vascular surgeon.

Patients were discharged on 3rd-5th postoperative day and advised to come weekly for one month then monthly.

RESULTS:

All patients were from low altitude areas. 05 patients from the Karachi (below sea level), 02 patients were from Punjab (Bhawalpur and Cholistan desert) and 01 patients was from Balochistan (Turbat). Preoperatively there is no neurological deficit associated with carotid body tumor. Embolization was not preferred because of sub adventitial dissection.

Internal carotid artery was damaged in two cases which was repaired with 6/0 proline by vascular surgeon. There was no cerebral damage postoperatively after applying bulldog clamp on common carotid artery for 45 min.

Average blood loss was 300 ml.

DISCUSSION:

The first surgical resection of a carotid body tumor was done by Reigner in 1880, but the patient did not survive. In 1886, Maydl reported a tumor resection but the patient became aphasic and hemiplegic. In 1903, Scudder did the first successful tumor resection. In 1940, Gurdon-Taylor described a sub adventitial dissection approach, also known as “White line”. In 1968, first surgical series with acceptable rates of morbidity and mortality was published by Chambers and Mahoney. The most comprehensive series is that of Mayo clinic, published in 1988 by Hallet et al. with 153 cases in 50 years.

Usually individual’s complaint of a consistent painless cervical mass below the jaw angle. Some classic signs can be observed on physical examination such as non tender tumor on palpation, located between the internal and external carotid arteries (Kocher’s sign I), mobile tumor horizontally and fix vertically (Fontaine’s sign), and on bidigital palpation (external an intraoral), tumor in the tonsillar region (Kocher’s sign II). The differential diagnosis includes carotid artery aneurysm (so why FNAC and Biopsy is contraindicated), neck tumors, Branchial cyst etc.

Carotid body tumors are found in high altitude areas, present in 5th decade and male: female is 1:1[5] which is contrary to our study. In our study all patients was belonged from low altitude areas. Mean age was 42 years and male: female ratio is 5:3.

A classification system based on size and difficulty of resection has been developed (Shamblin, 1971). Group I consist of small and easily respectable tumors. Group II includes medium sized tumors adherent to or partially surrounding the vessels. Group III completely enclosed the carotids. In our study all tumors belonged to group II tumors.

Color Doppler ultrasound is the initial investigation showing a hypoechoic mass at the carotid bifurcation. CT scan, MRI and Angiography show the typical vascular nature and feeding vessels and widening of carotid bifurcation (lyre sign). Embolization is controversial because it cause inflammation due to which subadventitial dissection become difficult.

Surgical resection is the treatment of choice with careful subadventitial dissection. Perioperative complications are hemorrhage, stroke and cranial nerves injury. Little reported 4.1% cranial nerve deficit. Netterville et al reported vascular repair in 10% patients with a tumor less than 5 cm and in 55.5% of patients with a tumor larger than 5 cm. Also cranial nerve injury had occurred in 13.3%. In our study vascular repair was done in 02 (28.57%) cases. Defraigne et al reported vagus nerve sacrificed in 22.2% of patients.

Regarding the post operative complications Mitchell et al have reported that 12% of the patients had peripheral nerve paralysis. Muhm et al had seen cranial nerve paresis in 20.8% of patients. The incidence of post operative complication is related to tumor size. With tumor size less than 5 cm in dm having a neurologic injury rate of 14%, but in tumors larger than 5 cm nerve paralysis or other complications are common (67%). Overall the incidence of cerebrovascular complication is less than 5% and permanent cranial nerve impairment as a complication of surgery overall occurs in approximately 20% of cases. Recurrence after complete resection occurs in 6% of patients.

In our study all tumors were less than 5 cm in dm and there was no neurological deficit and no recurrence.

CONCLUSION:

Carotid body tumors are slow growing and benign. A thoughtful workup of the patient is necessary regarding multicentricity and familial patterns as well as the possibility of neuropeptide activity. The keys to successful surgery are careful preoperative planning, proximal and distal control of the vasculature with vessel loops, careful identification and preservation of neural structures if possible, dissection in the sub adventitial, white line and preparation for vascular reconstruction if necessary with suture repair, patch grafting or interposition saphenous vein graft.

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