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Carotid Body Tumor: A Case Report

[1]Ranjana Thakur, [2]Muskan Thakur, [3]Komal Rana

[1]Nursing Tutor (Medical Surgical Nursing)
[2]PG Student (Medical Surgical Nursing)
[3]Assistant Professor (Mental Health Nursing)

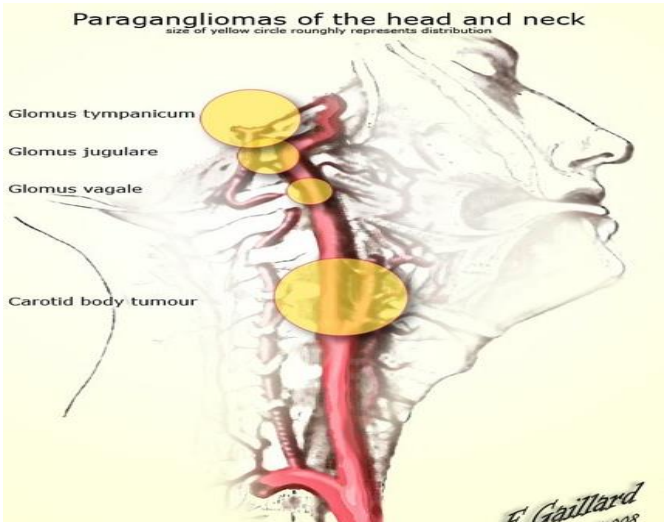
Abstract:

Carotid body tumours (CBTs) are neoplasms that occur at the bifurcation of the carotid artery with characteristic splaying of the ICA and ECA, described as the **lyre sign**. and are pathologically classified as paragangliomas. **In the 4th edition of the WHO classification, paragangliomas are categorized as neoplasms with malignant potential.** Mrs. Urmila 50-year-old woman admitted in IGMC, Shimla with chief medical complaints of lump in neck, difficulty in swallowing, breathing difficulty, high blood pressure, numbness of tongue and pain in shoulder. Patient had undergone resection of carotid body tumour on dated 12-04-2025.

Keywords: Lyre sign, paragangliomas, neoplasms, malignant, numbness.

INTRODUCTION

Carotid body tumours (CBTs) are neoplasms that occur at the bifurcation of the carotid artery and are pathologically classified as paragangliomas. **In the 4th edition of the WHO classification, paragangliomas are categorized as neoplasms with malignant potential.**



Clinically, about 5% of CBTs present with malignant features such as metastasis.

Recent advances in genetic testing have elucidated the genetic characteristics of paragangliomas, including carotid body tumours. Over 20 genes have been identified as being involved in tumour development. Particularly in head and neck paragangliomas, abnormalities in genes related to **succinate dehydrogenase** are frequently observed.

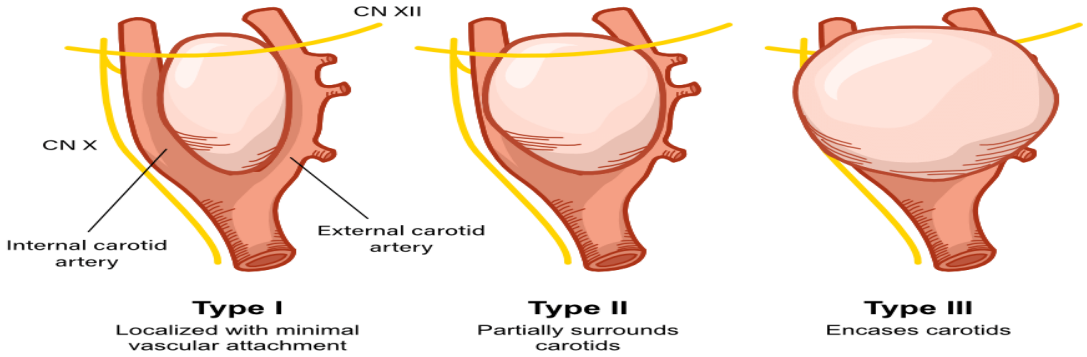
The definitive treatment for CBTs is surgical resection. These tumours are prone to bleeding and often adhere firmly to the carotid artery, making intraoperative bleeding control challenging.

Epidemiology

Typically, carotid body tumours are diagnosed in the 4th to 5th decades and have a female predilection like the other paragangliomas of the head and neck . They are the most common type of paraganglioma of the head and neck (account for 60-70%). In approximately 10% of cases, they are bilaterally.

THE SHMBLINS CLASSIFICATION:

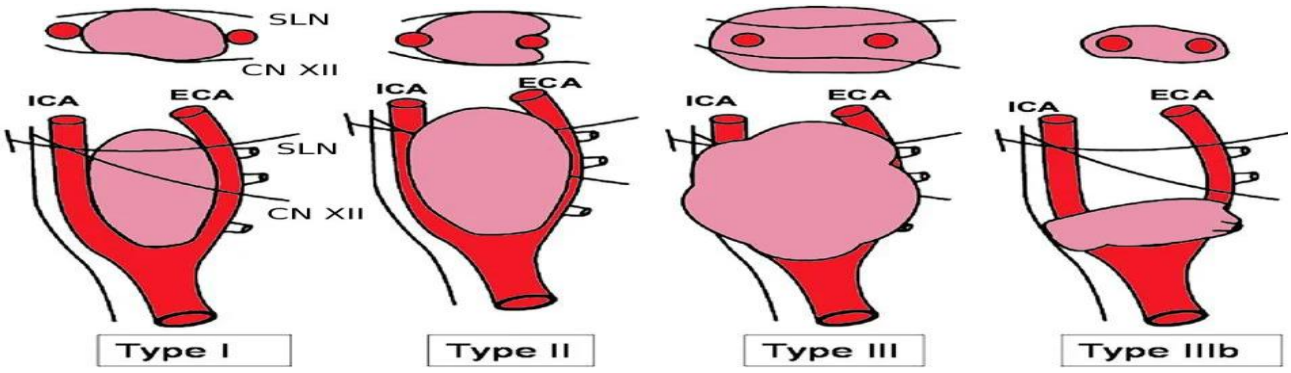
Shamblin classification helps in predicting the prognosis and difficulties for surgical resection.



- Group I – includes localized tumours not involving the carotid vessels.
- Group II – tumours partially surround carotid vessels or is adherent to them.
- Group III – defined as larger tumours encasing the carotid vessels.

MODIFIED SHAMBLIN CLASSIFICATION

They introduced a class IIIa, representing the old class III, and a class IIIb which includes tumours of any class (I, II, or III) where there is infiltration of the vessel wall and not just circumferential encasement.



1. CASE PRESENTATION

Mrs. Urmila 50-year-old woman admitted in IGMC, Shimla with chief medical complaints of lump in neck, difficulty in swallowing, breathing difficulty, high blood pressure, numbness of tongue and pain in shoulder.

Present Medical History:

The patient complaint of lump in neck, difficulty in swallowing, breathing difficulty, high blood pressure, numbness of tongue and pain in shoulder.

Present Surgical History:

The Patient had undergone resection of carotid body tumour on 12-04-2025.

PAST HEALTH HISTORY:

- **Past Medical History**: The patient has history of hypertension for 5.6 year and was on medication. (Tab.Metoprol 25mg OD and Tab Telma 40 mg OD).
- **Childhood illness:** There no significance of any childhood illness.
- **Other illness:** There is no history of any communicable or hereditary illness in the family.
- **Past Surgical History**: No history of any past surgery.

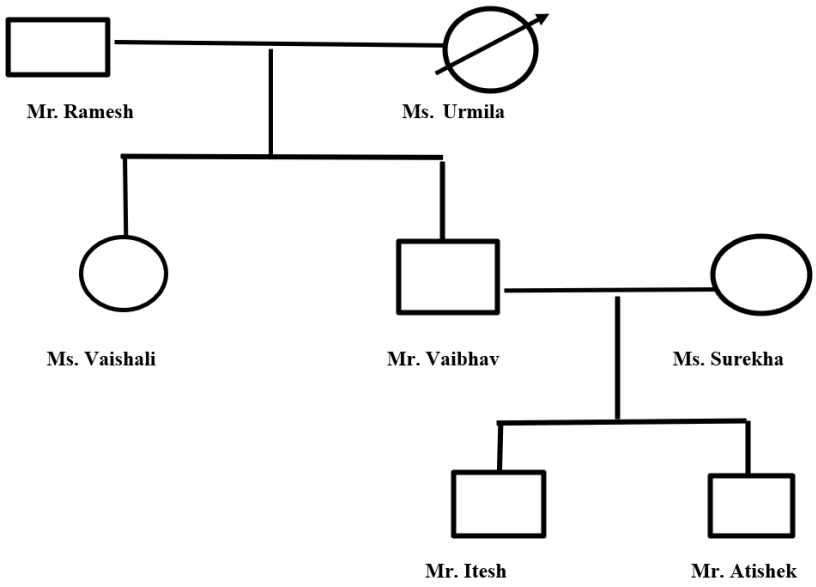
FAMILY HEALTH HISOTRY:

Type of family: Joint family

No. of family members: 7 members including patient

Any Illness: Absent

FAMILY TREE



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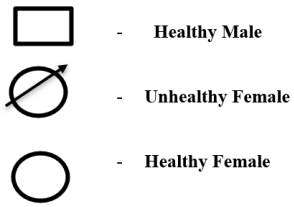

FAMILY COMPOSITION: -

Family Members	Age	Sex	Relationship with the patient	Occupation	Education	Health status
Mr. Ramesh	62yrs	M	Husband	---	12^{h} Pass	Healthy
Mrs. Urmila	59 yrs	F	Patient	---	Uneducated	Unhealthy
Mr. Vaibhav	40 yrs	M	Son	Driver	Graduated	Healthy
Ms. Surekha	39 yrs	F	Daughter in law	Housewife	Graduated	Healthy
Mr. Itesh	19 yrs	M	Grandson	----	BA 1st Year pursuing	Healthy
Mr. Atishek	15 yrs	M	Grandson	-----	10th class pursuing	Healthy

PERSONAL HISTORY

- **Sleeping Pattern:** Patient's sleeping pattern is disturbed due to pain in shoulder and numbness on tongue She takes 4-5 hours' sleep/day.
- **Economic Status:** Patient belongs to a middle-class family. Her sources of family income is her husband. Annual income is approximately Rs.1, 50,000.
- **Dietary Pattern:** Dietary pattern of the patient is inadequate due to difficulty in breathing and swallowing.
- **Addiction:** Patient is addicted to addiction of drugs, alcohol and smoking/tobacco chewing.
- **Elimination Pattern:** Patient's elimination pattern is slightly impaired due to inadequate intake and hospitalization.

VITAL SIGNS

S.no	Vital signs	Patient's Value	Normal Value	Remarks
1.	Temperature	98.2°F	98.6-99°F	Normal
2.	Pulse	100/ min.	60-80 beats/min.	Tachycardia
3.	Respiration	18/min.	16-24 breaths/ min	Normal
4.	Blood Pressure	110/70 mm Hg	Systolic 110- 130 Diastolic 70-90 mm Hg	Stable

MEDICATIONS Day 1

S.no	Drug Name & Salt Name	Dose	Route	Frequency	Action
1.	Inj. Levofloxacin	500 gm	Intravenous	BD	Antibiotic
2.	Inj. Amikacin (Amikin)	250gm	Intravenous	BD	Aminoglycoside- Antibiotic
3.	Inj. Supacef	1.5 mg	Intravenous	TDS	Antibiotic
4.	Tab. Pantop (Pantaprazole)	40 mg	Orally	OD	Antacid
5.	Tab. Dytor Plus	10/80 mg	Orally	OD	Diuretics
6.	Tab. Acitron	2 mg	Orally	OD	
7.	Tab. PCM (Dolo)	650mg	Orally	TDS	
8.	Inj. Human Actrapid (Human Insulin)	8 IU	Intravenous at chamber	As per value of RBS 6 hourly	Anti-diabetic (human insulin supplement)
9.	Tab. Mucnac	600 mg	Orally	BD	

MEDICATIONS Day 2

S.no	Drug Name & Salt Name	Dose	Route	Frequency	Action
1.	Inj. Levofloxacin	500 gm	Intravenous	BD	Antibiotic
2.	Inj. Tazomac	4.5 mg	Intravenous	TDS	Antibiotic
3.	Inj. Teicocin	400 mg	Intravenous	OD	Antibiotic
4.	Inj. Supacef	1.5 mg	Intravenous	TDS	Antibiotic
5.	Tab. Pantop (Pantaprazole)	40 mg	Orally	OD	Antacid
6.	Tab. Dytor Plus	10/80 mg	Orally	OD	Diuretics
7.	Tab. Acitron	2 mg	Orally	OD	
8.	Tab. PCM (Dolo)	650mg	Orally	TDS	
9.	Inj. Human Actrapid (Human Insulin)	8 IU	Intravenous at chamber	As per value of RBS 6 hourly	Anti-diabetic (human insulin supplement)
10.	Tab. Mucnac	600 mg	Orally	BD	

11.	Tab. Ivabred	2.5 mg	Per oral	BD	
12.	Neb. with Duolin with NS (salbutamol& Ipratropium Bromide)	100mcg/ 20 mcg	Nasal inhalation	TDS	Bronchodilator (short-acting beta agonist)
13.	Neb. with Budecort (budesonide)	100 mcg	Nasal inhalation	BD	Corticosteroid type Bronchodilator

PHYSICAL EXAMINATION

A. GENERAL APPEARANCE-

- Nourishment - Nourished
- Body build - Thin in appearance
- Health - Unhealthy
- Weight - 52 kg
- Height - 5 ft. 2 inches
- Patient is very cooperative to the treatment plan.

B. MENTAL STATUS

- Consciousness - Conscious
- Orientation - Oriented to time, place and person
- Look - Calm

C. POSTURE

- Body Curve - Normal
- Lordosis - Not present (Absent)
- Kyphosis - Not present (Absent)

HEAD TO TOE EXAMINATION

1. SKIN

- Colour - Whitish complexion of skin
- Texture - Patient having neither too dry nor too oily skin texture
- Temperature - 98.2°F
- Scars/Lesions - No scars were present on the patient's skin

2. HEAD to FACE

- Shape of Skull - Normal cephalic and symmetrical in shape.
- Dandruff - No dandruff is present in patient's scalp.
- Hair colour - No scars or lesions over the skin inspected.

3. EYES

- Symmetry - Symmetrical
- Cornea - Normal i.e. Transparent
- Abnormal discharge - No discharge
- Double Vision - Absent
- Pupils - Normal and responds to light
- Papillary Reflex - Change in size of pupil (constriction and dilation) seen in response to light
- Irritation - Absent
- Vision - Normal

4. EARS

- Symmetry - Symmetrical

- External ears - Normal
- Pinna - Normally placed
- Discharge formation - No any discharge or signs of infection or impacted wax
- Hearing Power - Normal

5. NOSE

- Symmetry - Symmetrical
- External nares - Normal
- Discharge - Absent

6. NECK

- Carotid Pulse - Not palpable , visible lump was present
- Range of Motion - Possible (normal extension, flexion and rotation of Neck)

DISCUSSION

A **carotid body tumour (CBT)**, also known as a **paraganglioma**, is a rare, typically benign, highly vascular neoplasm that arises from the paraganglionic tissue of the **carotid body** — a small chemoreceptor located at the **bifurcation of the common carotid artery**. Here's a detailed overview for discussion:

Etiology and Pathophysiology

- **Origin**: Paraganglionic cells, which are part of the autonomic nervous system.
- **Function of the carotid body**: Detects changes in blood oxygen, CO_2, and pH, and modulates respiratory activity accordingly.
- **Genetics**: Can be sporadic or familial (linked to mutations in **SDH genes** — SDHB, SDHC, SDHD).
- **Familial cases** are often bilateral and present at a younger age.

Clinical Presentation

- **Mass**: Slow-growing, painless, pulsatile neck mass at the carotid bifurcation.
- **Symptoms**: Often asymptomatic; may cause:
  - Dysphagia
  - Hoarseness (cranial nerve involvement)
  - Horner's syndrome
  - Tinnitus or bruit (due to vascularity)

Diagnosis

1. **Imaging**:
   - **Ultrasound with Doppler**: Shows hypervascular mass.
   - **CT/MRI with contrast**: Defines extent and anatomy; "salt-and-pepper" appearance on MRI.
   - **Digital Subtraction Angiography (DSA)**: Shows splaying of internal and external carotid arteries (**Lyre sign**).
2. **Functional imaging**: (especially in suspected familial cases)
   - **MIBG scan**, **PET scan**, or **Octreotide scan**.
3. **Genetic testing**: Indicated for familial suspicion or multiple paragangliomas.

Shamblin Classification (Surgical Planning)

Classifies CBTs based on their relationship to carotid vessels:

1. **Type I** – Small, localized
2. **Type II** – Larger, partially surrounds vessels
3. **Type III** – Encasement of carotid arteries; high surgical risk

Management

- **Surgical resection**: Treatment of choice, but challenging due to proximity to cranial nerves and vessels.
  - Preoperative **embolization** often used to reduce bleeding.
  - Risks: cranial nerve palsies, stroke, hemorrhage.
- **Radiotherapy**: For unresectable, high-risk patients, or residual/recurrent disease.
- **Observation**: May be considered in elderly or asymptomatic patients due to slow growth.

Prognosis

- Generally good for benign tumors.
- Malignancy is rare but defined only by **metastasis** (to lymph nodes, bone, liver, lungs).
- Lifelong follow-up recommended due to risk of recurrence or multiple tumors.

CONCLUSION

Mrs. Urmila 50-year-old woman admitted in IGMC, Shimla with chief medical complaints of lump in neck, difficulty in swallowing, breathing difficulty, high blood pressure, numbness of tongue and pain in shoulder. Patient had undergone resection of carotid body tumour on dated 12-04-2025.

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