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Title of the presentation:
Chemodectoma – A journey from embolization to excision.

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Introduction/ Review of Literature:

Carotid body tumors are part of the *paraganglioma family*, seen at the carotid bifurcation with peculiar splaying of the ICA and ECA. In about 7-10 % of cases, these show familial inheritance which are frequently multicentric or associated with multiple syndromes including MEN, Tuberous Sclerosis, NF1, VHL and others.

Surgical excision stands as the foremost treatment of choice for carotid body tumours. These tumors have a natural course of unhindered size increase with possible encasement of adjacent neurovascular structures which accordingly increases the surgical challenges and associated morbidity.

With advancements in medical care, *super-selective embolization of vascular feeders* has been used effectively to reduce tumour vascularity and bulk.

Case Description:



Clinical Picture

- This is a case of a 14-year-old girl child presenting with a **painless neck swelling** with insidious onset and gradual increase in size.

Imaging

- CT angiogram reveals a highly vascular lesion sitting at the bifurcation of left common carotid artery, with splaying of ICA and ECA - measuring ~ 3.5x3.2 cm in maximum axial dimensions.
- There was **> 270 degrees encasement of the ICA (Shamblin grade III)** and complete encasement of the ECA.

Plan

- Surgical resection was planned; however, there were concerns about the need for ipsilateral ICA sacrifice. Thereafter, the child was **planned for balloon occlusion test and pre operative embolization** in IR suite.

Results:



BTO Procedure and results

- Bilateral femoral punctures were performed and vascular access secured. Balt – Copernic balloon was inflated at the vertical segment of left ICA for 10 minutes and subsequent runs were taken from the contralateral ICA and vertebral arteries. Patient was also clinically evaluated on table for any focal neurological deficits during balloon occlusion test
- *BTO angiographic runs showed good cross circulation with adequate filling of left ACA from A-com and left MCA through P-com.*

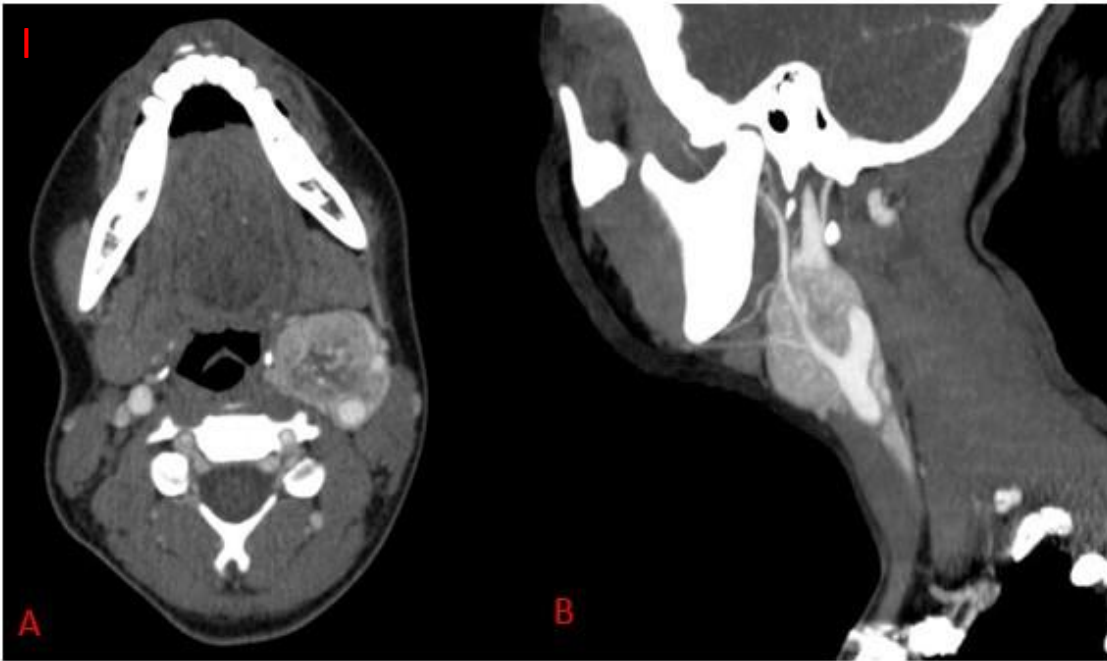
Embolization

- DSA revealed a highly vascular lesion with *multiple tiny feeding branches* arising from both left ICA and ECA. Trans -arterial embolization was not feasible in view of difficulty in super-selective cannulation of tiny feeders.
- Ultrasound guided *percutaneous puncture of tumour* was performed using 22G-Chiba needle and embolization done using *50 % NBCA (glue) – lipiodol combination* under fluoroscopic guidance.

Excision

- Post embolization; surgical resection of the tumour was successful *without the need for ICA sacrifice* in view of relative ease following good tumour devascularization.
- Tumour was dissected from the vessels and excised with *minimal intra-operative blood loss.*

Representative images:



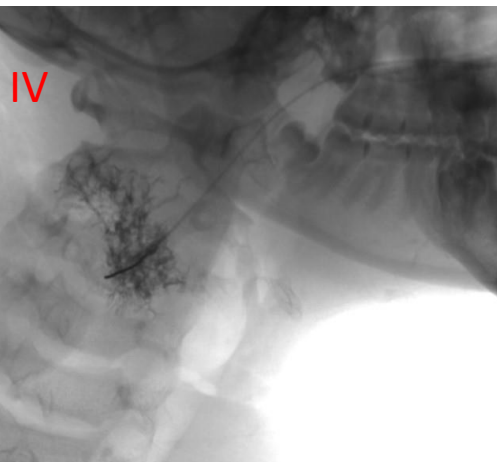
I. CECT images in axial (A) and reformatted sagittal (B) planes showing a markedly enhancing soft tissue lesion in the left carotid space with splaying and encasement of ICA and ECA without infiltration.



II. DSA runs showing tumoral feeders from ipsilateral carotid arteries.



III. BTO runs from right ICA showing good cross circulation of ACA and MCA.



IV. Tumor puncture using 22G-Chiba needle

Percutaneous embolization done using 50% NBCA-lipiodol combination

Pre and post embolization runs show excellent decrease in tumoral blush.

V. Post embolization DSA run (A) and radiograph (B) showing complete cessation of tumour vascularity and good target embolization.



Conclusion:

- Most patients presenting with carotid body tumors seek medical advice when tumors have grown to exceed Shamblin I stage, leading to challenging surgical outcomes and associated morbidity.
- *Pre-operative embolization significantly enhances resection by decreasing size, blood loss, and improving visualization of the tumour mass, thereby alleviating the risk of carotid artery injuries, stroke and damage to major cranial nerves.*
- *Balloon test occlusion (BTO) is an angiographic test to evaluate the neuro-parenchymal arterial circulation as a marker for its ischemic tolerance post permanent occlusion of ICA.*
- Operation within 48 hours after embolization is recommended to minimize revascularization edema or a local inflammatory response.

References:

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4. Adjunct endovascular interventions in carotid body tumors - Konstantinos P. Economopoulos, MD, PhD,a,b Aspasia Tzani, MS,b and Thomas Reifsnnyder, MD,c Boston, Mass; Athens, Greece; and Baltimore, Md
5. Carotid body tumors: the role of preoperative embolization - [F E Kafie¹](#), [J A Freischlag](#)
6. Beneficial effects of preoperative superselective embolization on carotid body tumor surgery: A 13-year single-center experience Nan Li, Yuan Wan, Wei Chen, Jianyong Yang, Guangqi Chang and Yonghui Huang