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Multi Detector 3D Computed Tomography in the Diagnosis of Paraganglioma: A Case Report

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Multi Detector 3D Computed Tomography in the Diagnosis of Paraganglioma: A Case Report

Elsafi Ahmed Abdalla [α], Caroline Edward Ayad [σ], Mohammed Abdallwahab [ρ] & Monadil Awad [ω]

Abstract- This report describes a case of 45-year-old female with carotid body paraganglioma. This study was conducted in May 2014. CT scanning was performed using high-resolution techniques .The 3D Volume-Rendering reconstructions provided a selective visualization of the anatomic relationships among carotid body tumors, vessels, and surrounding osseous structures with excellent details. Both tumors were suggested to be treated surgically with histological analysis.

I. Introduction

Carotid body tumors are rare vascular neoplasms deriving from the paraganglionic cells of the carotid bifurcation. Incidence was reported to be 3.33 per 100,000 patients [Sajid MS, Hamilton G, Baker DM 2007, Plukker JT et al, 2001]. Females appear to be predominate [Rodriguez-Cuevas S 1998, Luna-Ortiz K et al, 2005]. The neoplasm presents as asymptomatic neck mass [Lazar B Davidovic et al, 2005].Total resection of the carotid body paragangliomas is the best and effective treatment although postoperative bleeding, stroke and injury to cranial nerves may accompany total resection [Young NM et al ,1988].

II. Case Report

A 45 year old female was referred from Eastern Sudan to the CT department with mass in her neck with pain; difficulty in swallowing. Her past medical history reported previous medications of hypertension and no family history of Paraganglioma. Physical examination showed a palpable mass, and no nerve problems were detected. CT with contrast and reconstructed Images were obtained (figure1) and showed hyper vascular mass (45x43x35 mm) which was seen at the bifurcation of left common carotid artery which was displaced laterally in addition to internal and external carotid arteries. Another smaller hyper vascular lesion (28x24x19mm) was seen at bifurcation of right common carotid artery showing similar imaging characteristics. No evident encasement of ICA or ECA.

Bilateral Submandibular enlargement lymph nodes were noted with preserved hilar fat, free nasopharynex, free fossa Rossenmuller, free Valleculae, normal larynx, normal cricoids and thyroid cartilages, and free parapharyngeal fat. Normal parotid glands, normal thyroid gland, free muscle layers and overlying fascia.

The lesion imaging features were consistent with bilateral carotid body tumors (paragangiliomas)

CT scanning was performed using a high-resolution technique, slice thickness 0.5 mm. After acquisition, CT images were transferred to the works-tation, oblique Maximum Intensity Projection (MIP) 12.50, WW/WL332/130 and Volume-Rendering images were generated (Vitrea 2, Vital Images). Multi-slice CT angiography demonstrated large and small masses within left carotid bifurcation. The 3D Volume-Rendering reconstructions provided a selective visualization of the anatomic relationships among carotid body tumors, vessels, and surrounding osseous structures with excellent details. Both tumors were suggested to be treated surgically with histological analysis.

III. Discussion

The carotid body was first described in 1743[Milewski C, 1993] .Carotid body tumors are rare vascular neoplasms originating in the paraganglionic cells of the carotid bifurcation. Their incidence ranges between 0.06-3.33 per 100,000 patients [Sajid MS, Hamilton G, Baker DM,2007, Plukker JT et al, 2007].The carotid body paraganglioma is more common in females[Maves MD,1993] like the patient under study.

The paraganglia was the most appropriate nomenclature from an embryologic point of view [Myers EN, Johnson JT, 1993, Kyriakos M: 1987, Maves MD1993].The development of tumors is related to both environmental and genetic risk factors. People who live at higher altitude are considered to have a higher frequency of paragangliomas-[Pacheco-Ojeda L, Durango E, Rodriquez C, et al, 1988]. Our case lives at high altitude area.

Clinical observation combined with radiological imaging is important for early recognition of contra-lateral tumors [Muhm M, Polterauer P, Gsottner W, Temmel A, Richling B, Undt G,et al,1997] .The carotid angiography is the most useful diagnostic test for paragangliomas. The angiography demonstrates tumor blood supply and widening of the carotid bifurcation by a well-defined tumor blush ("lyre sign"), which is classic patho-gnomonic angiographic finding [Maves MD, 1993, Mayer R, 2000, Defraigne JO, 1997, Laube HR, 1994].

MR and contrast CT are more effective noninvasive imagining modalities comparing with duplex ultrasonography, especially for minute growth

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[Defraigne JO et al, 1997, Devuyever D et al1993]. Radio immune detection of carotid body paraganglioma was also depicted in the previous studies [Devuyever D, 1993].

The surgical removal is the treatment of choice for carotid body paragangliomas[Rush Bf Jr1962].

Multislice CT angiography can demonstrate a large, carotid body tumor, as well as small, unsuspected mass within the carotid bifurcation. The 3D volume-rendering reconstructions provide a selective visualization of the anatomic relationships among carotid body tumors, vessels, and surrounding osseous structures with excellent detail. The diagnosis of this case was derived from the above mentioned facts.

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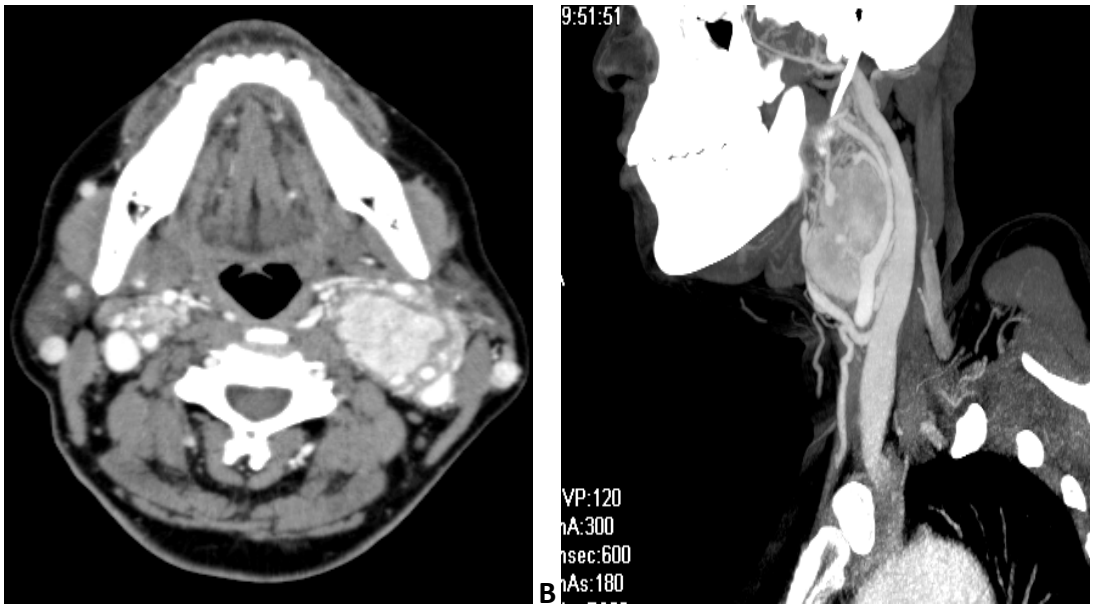

Figure 1 : [A] CT with axial cut with contrast and [B] reconstructed Images. [A] Showed hyper vascular mass (45x43x35 mm) seen at the bifurcation of left common carotid artery (red arrow) which displaced laterally in addition to internal and external carotid arteries. Another smaller hyper vascular lesion (28x24x19mm)(yellow arrow)seen at bifurcation of right common carotid artery showing similar imaging characteristics

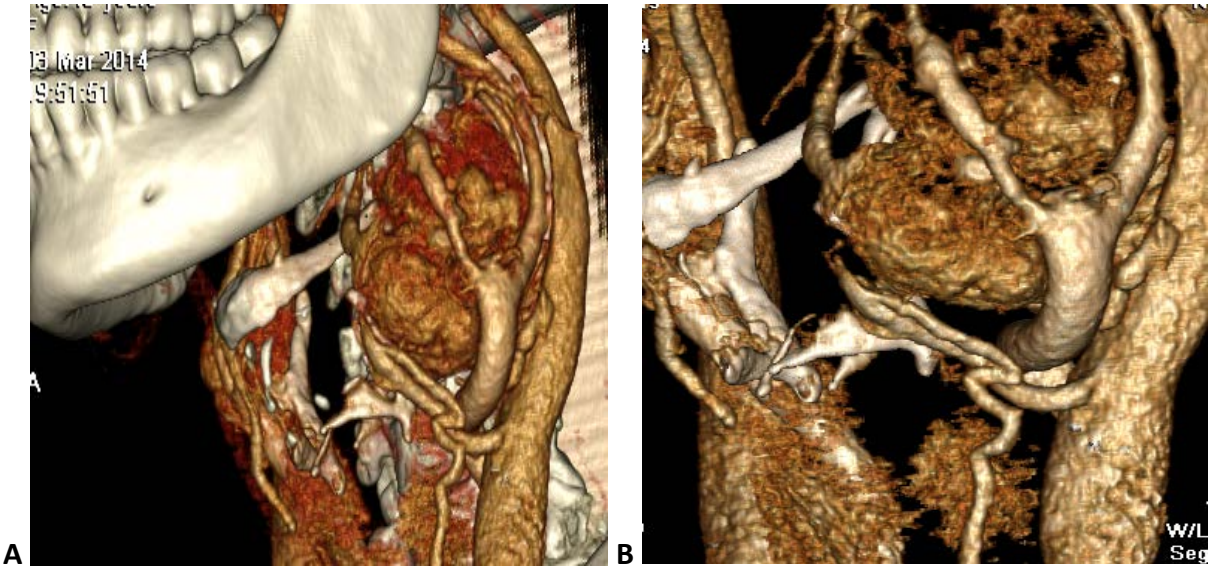

Figure 2 : A,B The 3D Volume-Rendering reconstructions provided a discriminating visualization of the anatomic relationships among carotid body tumors, vessels, and surrounding osseous structures with excellent details. WW/WL63/183(segmented Vessels only)(White arrows)

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