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"IV Branchial Cleft Sinus with Intrathyroid Course" – A Rare Presentation

Dr. B. Santh Kumar[1], Dr. B.N. Chander[2], Dr. S. Sri Sravya[3]
1 Associate Professor, Radiology, 2 Professor & HOD, Radiology, 3 Post Graduate, Radiology,

Abstract: *Development of brachial arches is a complex process. Any aberration in the development will give rise to various anomalies. Among all brachial arch anomalies second (II) brachial arch anomalies are most common. Fourth (IV) brachial arch anomalies are rarely seen, usual modes of presentation of fourth (IV) brachial arch are neck mass, bronchial cleft cyst with recurrent infections, recurrent episodes of fever and thyroiditis. Appropriate diagnosis is a must to avoid complications. Hence we are presenting a case of left IV brachial arch anomaly with brachial cleft cyst having an intra-thyroid course, which is a rarity.*
Keywords: *Brachial arch, neck mass, intra-thyroid course.*

I. Introduction

In the intra uterine life at the end of IV week of gestational age, 6 brachial arches develop in the neck of the fetus. Among these 1 – IV arches are well developed when compared to V – VI arches, which remains rudimentary. Each arch contains a central core of mesenchymal tissue with clefts & pouches adjacent to this. Mesenchymal core is derived from neural crest cells, where as clefts are ectodermal derivatives and pouches are endodermal derivatives. Fourth pouch derivatives are laryngeal cartilage, laryngeal & pharyngeal constrictor muscles, superior laryngeal nerve, left thoracic aorta, right proximal subclavian artery, superior parathyroid glands (1, 2). Anomalies of brachial arches presents as cyst, sinus & fistulas. Fistula is a tract which has openings on both sides, sinus is a tract which has an opening only on one side and cyst has no opening. Remnants of IV brachial arch are extremely rare with < 100 cases reported in the literature and accounts for 1-4% of all brachial anomalies (4, 5). Usual course of IV brachial arch fistula is from pyriform sinus (internal opening) to anterior border of sternocleido mastoid muscle (external opening). In our case the brachial cleft sinus is having an intra thyroid course, hence being presented.

II. Case Report

A 19 year old female patient came to DR.PSIMS & RF with complaints of swelling in the neck region towards left side since childhood. Swelling is associated with severe pain, restriction of neck movements, painful swallowing and left ear ache since I month. There is history of 2 episodes of incision and drainage of this swelling .The swelling is seen extending superiorly upto thyroid cartilage and inferiorly upto 2cm above the left sternocleidomastoid muscle. Skin over the swelling appears normal. The swelling moves with deglutition. CECT of neck showed abscess collection between left lobe of thyroid and left sternocleidomastoid muscle which is anterior to carotid space. This collection was seen extending to left lateral aspect of larynx through a short tract traversing through upper portion of left lobe of thyroid. This tract is seen extending to pyriform fossa through larynx. few adjacent enlarged cervical lymphnodes noted. Surgical excision of the cyst with its tract and hemi-thyroidectmy was performed and specimen was sent to histopathological examination. Histopathological examination confirms findings of infected brachial cyst. The thyroid specimen shows nodular goiter.

III. Discussion

Brachial apparatus is a complex of 6 mesodermal arches which develop by the end of fourth week of gestational age, these arches are separated by clefts (externally) and grooves (internally). As the development proceeds, II arch increases in thickness and proliferates caudally to meet V arch, due to this II, III & IV clefts gets enclosed leading to smooth contour of neck.(6)

Embryological derivatives from branchial arches (6).

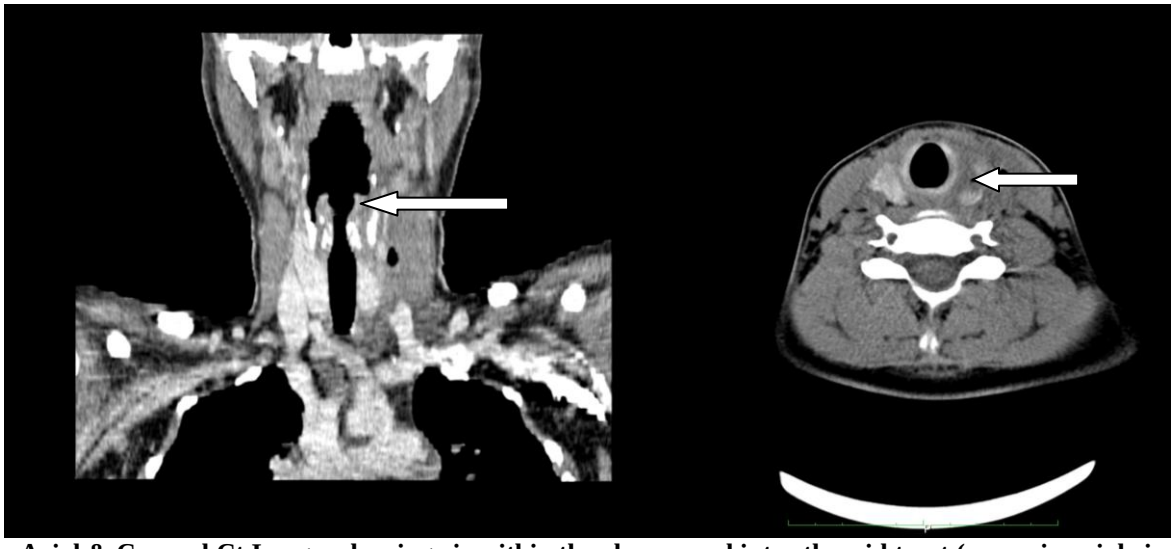
Differentiation of the Branchial Apparatus

Location	Cleft (Ectoderm)	Arch (Mesoderm)	Pouch (Endoderm)
First	External ear canal	Mandible, muscles of mastication, fifth cranial nerve, malleus and incus	Eustachian tube, tympanic cavity, mastoid air cells
Second	Cervical sinus of His	Muscles of facial expression, body and lesser horns of hyoid, seventh and eighth cranial nerves	Palatine tonsil
Third	Cervical sinus of His	Superior constrictor muscles, internal carotid artery, ninth cranial nerve, greater horn and body of hyoid	Inferior parathyroid, thymus, pyriform fossa
Fourth	Cervical sinus of His	Thyroid and cuneiform cartilages, 10th cranial nerve, aortic arch and right subclavian artery, part of laryngeal muscles	Superior parathyroid, apex of pyriform sinus
Fifth and sixth	None	Portions of the laryngeal muscles and skeleton, inferior pharyngeal constrictor muscles, 11th cranial nerve	Parafollicular "C" cells of the thyroid gland

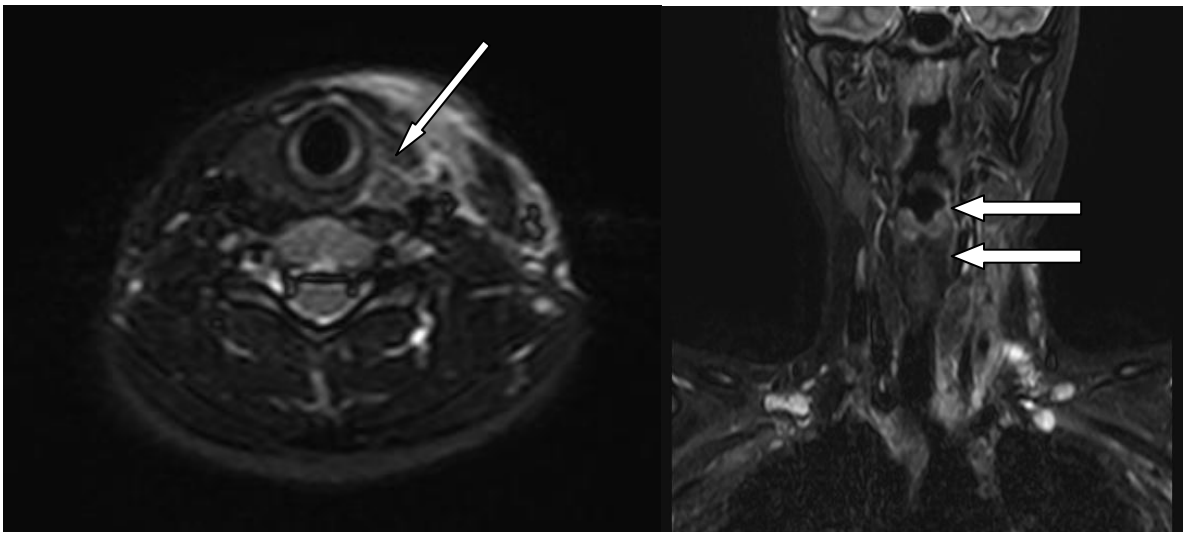
Among all brachial arches anomalies II brachial arch anomalies are most common. Fourth arch anomalies are rare when compared to others. Range of anomalies of IV brachial arch includes cyst, fistula and sinus. Among these cysts are considered to be more common than other two anomalies by ratio 2:1(7). III and IV arches are very close; hence distinction between these two anomalies is difficult (8). On the left side tract courses beneath the arch of the aorta. On the right side it courses beneath the right subclavian artery(3,4,10).II brachial arch cyst can occur anywhere along the course of II brachial arch from skin to pharyngeal wall and passes laterally and inferiorly between ICA & ECA.(9). I brachial arch anomaly is due to abnormal / incomplete fusion of clefts. Embryonic pouch remnants of IV arch often presents as recurrent neck infections mainly on left side. This is mainly due to asymmetric vascular development. (10) CECT is main principle investigation of choice to locate the site of lesion and to tract the course. (11).

IV. Conclusion

Brachial arch anomalies are commonly encountered in our day to day practice, so knowledge regarding the brachial arch anatomy, development and anomalies will help in early detection & better management of the patient. Imaging modalities like CECT & MRI will have a definitive role in detecting brachial Arch anomalies with rare course (e.g.: intra thyroid course) and its complications.



Axial & Coronal Ct Images showing air within the abscess and intra thyroid tract (arrow in axial view)



Axial & Coronal MR T2W Images Showing IV branchial sinus Tract

References

[1]. M. Shrime, A. Kacker, J. Bent, and R. F. Ward, "Fourth branchial complex anomalies: a case series,"International Journal of Pediatric Otorhinolaryngology, vol. 67, no. 11, pp. 1227–1233, 2003.

[2]. M. M. Cohen Jr., "Malformations of the craniofacial region: evolutionary, embryonic, genetic, and clinical perspectives," American Journal of Medical Genetics—Seminars in Medical Genetics, vol. 115, no. 4, pp. 245–268, 2002.

[3]. K. Nicoucar, R. Giger, T. Jaecklin, H. G. Pope, and P. Dulguerov, "Management of congenital third branchial arch anomalies: a systematic review," Otolaryngology—Head and Neck Surgery, vol. 142, no. 1, pp. 21–28, 2010

[4]. A. Jeyakumar and A. S. Hengerer, "Various presentations of fourth branchial pouch anomalies," Ear, Nose and Throat Journal, vol. 83, no. 9, pp. 640–644, 2004.

[5]. H. M. Tucker and M. L. Skolnick, "Fourth branchial cleft (pharyngeal pouch) remnant," Transactions of the American Academy of Ophthalmology and Otolaryngology, vol. 77, no. 5, pp. 368–371, 1973.

[6]. T.Benson, k dalen, A.Anthony, "congenital anomalies of the branchial apparatus:embryology and pathologic anatomy", Radiographics , 1992;12:943-960.

[7]. Gold BM. Second branchial cleft cyst and fistula. AJR Am J Roentgenol. 1980;134 (5): 1067-9.

[8]. Joshi MJ, Provenzano MJ, Smith RJ et-al. The rare third branchial cleft cyst. AJNR Am J Neuroradiol. 2009;30 (9): 1804-6.

[9]. Mittal MK , Surekha B et al , " cystic masses of neck: A pictorial review". ISRI .2012; 22 (4) : 334 -43.

[10]. Rosenfield RM , Biller HF , " fourth brachial pouch sinus: diagnosis and treatment ". otolaryngolo Head Neck Surg 1991; 105 : 44 - 50.

[11]. Wang HK , Tiu CM , Chou Y et al. Imaging studies of pyriform sinus fistula. Pediatr Radiol 2003; 33: 328 -33.