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Right Aortic Arch with Aberrant Left Subclavian Artery : A Case Report

KEYWORDS: Right sided aortic arch, aberrant left subclavian artery, embryonic aortic arches, right fourth branchial arch, dysphagia lusoria.

Dr.Neeta P. Pradhan
Associate Professor, Department of Medicine, Smt. KashibaiNavaleMedical College & General Hospital, Narhe, Off Pune-Mumbai Bypass, Ambegaon, Pune- 411041.

Dr.Shreepad M
Professor and HOD, Department of Medicine, Smt.KashibaiNavale Medical College & General Hospital, Narhe, Off Pune-Mumbai Bypass, Ambegaon, Pune- 411041.

Dr.YuvrajSawant
Senior Resident, Departmentof Medicine, Smt. KashibaiNavaleMedical College & General Hospital, Narhe,Off Pune-Mumbai Bypass, Ambegaon, Pune- 411041.

Dr.Kishor M. Shinde
Senior Resident, Department of Medicine, Smt.KashibaiNavaleMedical College & General Hospital, Narhe, Off Pune-Mumbai Bypass, Ambegaon, Pune- 411041.

Dr.Suchit R. Patil
Junior Resident, Smt.KashibaiNavaleMedical College & General Hospital, Narhe, Off Pune-Mumbai Bypass, Ambegaon, Pune- 411041.

ABSTRACT *Right sided aortic arch is a developmental anomaly resulting from persistence of rightfourth branchial arch during embryonic development of the aorta. It is usually asymptomatic and is commonly an incidental finding, but may at times be associated with extrinsic esophageal compression and dysphagia or congenital heart disease. We present a female patient with restrictive lung disease and pulmonary hypertension with cardiac failure, who was incidentally found to have a right sided aortic arch with aberrant left subclavian artery.*

INTRODUCTION

Right sided aortic arch is an aortic developmental anomaly occurring in about 0.05% of the population[1]. It results from persistence of the right fourth branchial arch during embryonic development of the aorta[1,2]. Right sided aortic arch is commonly anincidental finding, though it may sometimes be associated congenital heart disease[1,3,4,5]. Right sided aortic arch anomaly may occasionally be associated with dysphagia due to extrinsic eophageal compression caused by an aberrant subclavian artery, known as dysphagia lusoria[6,7,8] . We present afemale patient admitted with lung parenchymal disease, pulmonary hypertensionand cardiac failure, who was incidentally found to have a right sided aortic archand an aberrant left subclavian artery.

CASE REPORT

A 65 year old female patient was admitted with a one month history of exertional breathlessness, intermittent palpitations and bilateral lower limb swelling. On examination, she had an irregular pulse (84/min); was tachypnoeic, pale, with significant pedal edema, raised JVP and a left sided thyroid swelling. On examination of the cardiovascular system, she had an ejection systolic murmur at the base; chest examination revealed bilateral basal crepitations; on abdominal examination she had mild hepatomegaly and presence of free fluid. The patient was administered diuretics, oxygen therapy and hematinics. Investigations of the patient were as follows: Hemoglobin - 9.4gm%, peripheral smear - microcytic, hypochromic RBCs; ECG showed atrial fibrillation with a ventricular rate of 80/min. Chest x-ray was suggestive of cardiomegaly, prominent pulmonary trunk and aright sided aortic arch (Image 1).Neck ultrasoundrevealed enlarged left lobe of thyroidwith multiloculated left sided lesions; thyroid function tests were suggestive of hyper-thyroidism. Pulmonary function tests were suggestive of moderate restriction;echocardiography showed dilated right atrium and right ventricle, moderate pulmonaryhypertension and an ejection fraction of 55%.

Computed tomography of the chest was performed which showed a right sided aortic arch and an aberrant left subclavian artery coursing posterior to the eophagus, but without causing any esophageal compression (Images 2,3,4).

Treatment was continued in the form of diuretics and hematinics; a calcium channel blockerand phosphodiesterase inhibitor were added in view of significant pulmonary hypertension. The patient was also put on anti-thyroid therapy. Patient improved considerably and was discharged after a couple of weeks.

DISCUSSION

Right sided aortic arch is a developmental anomaly of the thoracic aorta resulting from persistence of the right fourth branchial arch during embryonic development of the aorta[1,2]. Aortic development occurs during 3rd week ofgestation. Each primitive aorta consists of a ventral and a dorsal segment that arecontinuous through the 1st aortic arch. The two ventral aortae fuse to form theaortic sac. The dorsal aortae fuse to form the midline descending aorta. Six pairedaortc arches, the so-called branchial arch arteries develop between the ventral anddorsal aortae. Each of the pairs of arch arteries give rise to arteries as follows[2]:

1. Proximal segment of the 3rd pair: Common carotid arteries.
2. Left arch of the 4th pair: Segment of normal left aortic arch between the left common carotid and the left subclavian arteries.
3. Right 4th arch: Right subclavian artery.
4. Billateral 6th arches: Pulmonary arteries.(Image 5).

The 1st, 2nd and 5th arch pairs eventually disappear.

Anomaly in the embryonic development of aorta with persistence of the right 4thbranchial arch gives rise to a right sided aortic arch. The various arch anomalies that can be encountered as described below include[2,9,10]:

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1. Left aortic arch with aberrant right subclavian artery.
2. Right aortic arch with aberrant left subclavian artery.
3. Double aortic arch.
4. Cervical aortic arch.
5. Interrupted aortic arch.

Right sided aortic arch anomaly is usually aymptomatic and an incidental finding, but may occasionally be associated with abnormal course of an aberrant left subclavian artery[6,7,8]. The aberrant left subclavian artery courses posterior to the esophagus and can cause extrinsic esophageal compression and dysphagia[6,7,8]. This is known as dysphagia lusoria[6].

Right aortic arch anomaly may also be associated with congenital cardiac anomalies. There are case reports of concurrent occurrence of right sided aortic arch with an atrial septal defect[4] or anomalous origin of right pulmonary artery[5]. Our patient did not have dysphagia or any congenital cardiac anomaly.

CONCLUSION

Right sided aortic arch is a developmental anomaly resulting from persistence of the right fourth branchial arch during embryonic development of the aorta and itsbranches. It is most often symptomatic and an incidental finding, but may occasionally be associated with congenital cardiac anomalies or dysphagia due to esophageal compression by an aberrant left subclavian artery.

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Image 1: X-Ray Chest showing right aortic arch

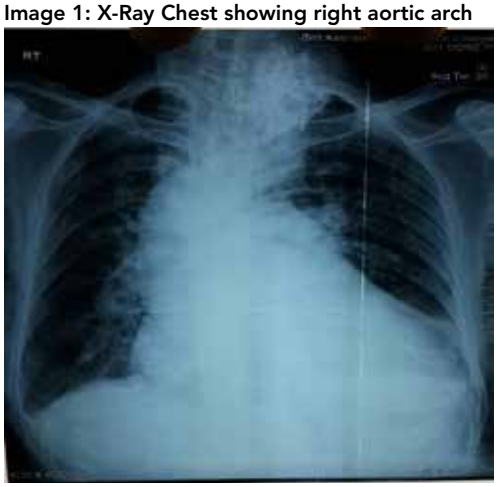


Image 2: CT image showing right aortic arch

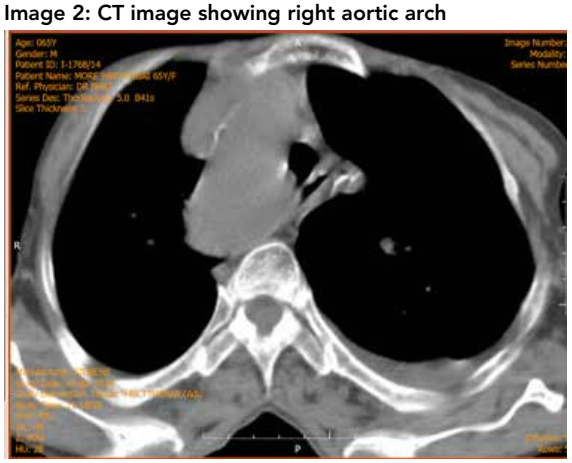


Image 3: CT image showing descending aorta seen in the right hemithorax.

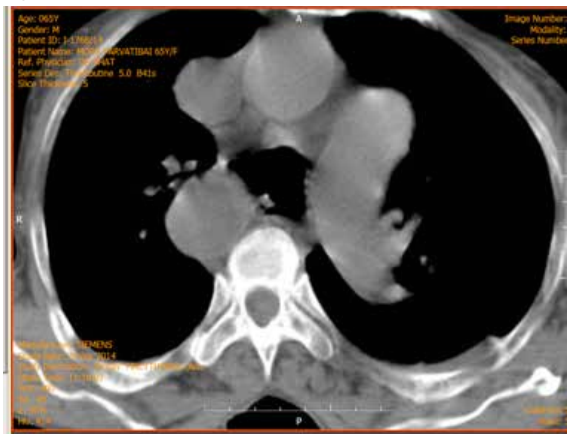


Image 4: CT image showing aberrant left subclavian artery

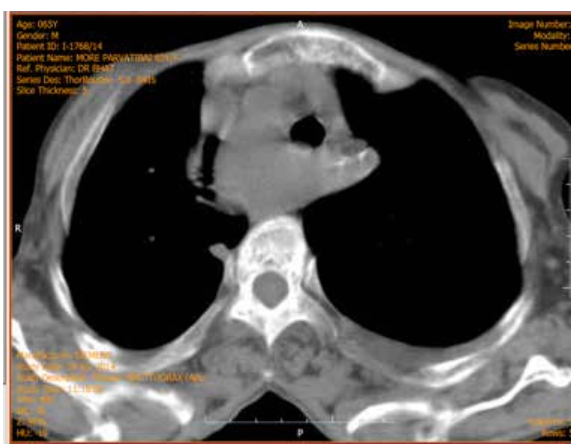
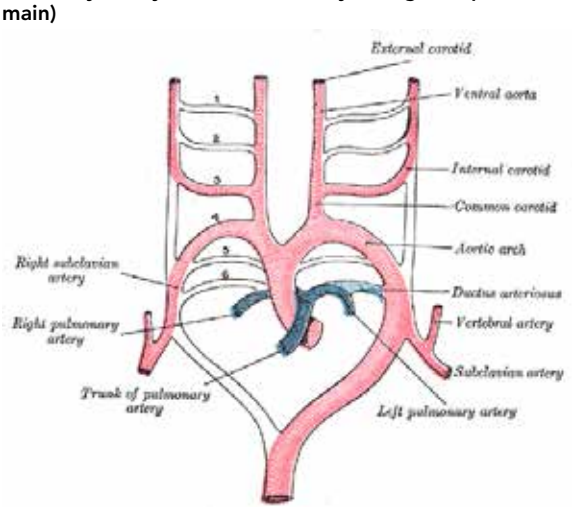


Image 5: Embryonic development of the aorta and its branches
(Courtesy: Gray'sHuman Anatomy: Image in public domain)



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REFERENCE

1.Bialowas J, Hreczecha J, Grzybiak M. Right sided aortic arch. Folia Morphol | Walsz 2000; 59(3): 211-6. | 2. Inderbir Singh, GP Pal. Textbook of Human Embryology, 7th Edition, 2005, | (Pages 236-43). | 3. Knight L, Edwards J. Right aortic arch types and associated cardiac anomalies. | Circulation 1974; 50: 1047-51. | 4. Choi JY, Sung MJ, Lee YS, Lee JB, Ryu JK, Lee S, Choi JY, Kwon OC, Chang SG, | Kim KS. A case of right sided aortic arch combined with atrial septal defect. | J Cardiovasc ultrasound 2011 March 19(1): 32-4. | 5. Hamzeh G, Crespo A, Rey E, Blanco R, Luis M, Rodriguez MA, Aramendi J. | Right aortic arch with aberrant left subclavian artery and anomalous origin of | Right Pulmonary artery from ascending aorta. World JPediatrCongenit Heart | Surg 2011; Apr 2(2): 324-6. | 6. Khalid S, Narayansamy S, Siddiqui S, Mohd Khalid. Middle-aged woman with | Dysphagia to solid. Diagnosis: Right-sided aortic arch with an aberrant left | subclavian artery. Saudi JGastroenterol 2014 Jan-Feb; 20(1): 76-7. | 4 | 7. Drucker MH, Symbas PN. Right aortic arch with aberrant left subclavian artery: | symptomatic in adulthood. Am JSurg 1980 Mar; 139(3): 432-5. | 8. McKenna E, Kelly BE, Khan M. Dysphagia due to an aberrant left subclavian artery | In right sided aortic arch. Ulster Med J May 2001; 70(1): 64-66. | 9. Turkvatan A, Buyukbayraktar FG, Olcer T, Cumhur T. Congenital anomalies of the | Aortic Arch: Evaluation with the use of Multidetector CT. Korean JRadiol 2009 | Mar-Apr 10(2): 176-84. | 10. Kav T, Sinzig M, Gasser J, Lesnik G, Rabitsch E, Celedin S, Eicher W, Illiasch H, | Hausegger KA. Aortic development and anomalies. SeminInterventRadiol June | 2007; 24(2): 141-52. |