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ASYMPTOMATIC CONGENITAL THORACIC ARTERIO-VENOUS FISTULA BETWEEN DESCENDING THORACIC AORTA AND LEFT BRACHIOCEPHALIC VEIN

Radio-Diagnosis

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ABSTRACT

Thoracic aortovenous fistulae are rare entities where a direct shunt between thoracic arteries and systemic veins is seen. They can be traumatic or congenital in origin. Congenital thoracic aortovenous fistulae usually involve descending aorta and azygos, hemiazygos systems. Rarely, they can occur with brachiocephalic vein or vena cava. Presenting symptoms range from continuous murmur to signs of congestive heart failure. Here we have reported a case of 69-year-old female who underwent computed tomography of neck and thorax for complaint of change of voice, which incidentally revealed an aberrant vessel originating from descending aorta and draining into the left brachiocephalic vein.

KEYWORDS

arteriovenous, fistulae, descending aorta, brachiocephalic vein, innominate vein, congenital

INTRODUCTION

Arteriovenous fistulae (AVFs) are abnormal direct communications between an artery and a vein that bypass the capillary bed, leading to altered hemodynamics. These vascular anomalies can be classified as congenital or acquired, with the latter most commonly resulting from trauma, surgical interventions, invasive procedures, or vascular pathologies such as aneurysmal rupture or infection. Congenital AVFs are rare and often associated with syndromic conditions or isolated vascular malformations.

The pathophysiological consequences of AVFs depend on their size, location, and flow dynamics. High-flow fistulae may lead to significant shunting of blood, resulting in volume overload, cardiac dilatation, and, in some cases, high-output cardiac failure. Clinically, patients may present with a continuous murmur, localized thrill, or signs of systemic complications, depending on the site and magnitude of the shunt.

While AVFs can occur in various anatomical locations, thoracic AVFs are particularly uncommon and pose diagnostic challenges due to their rarity and nonspecific presentations. Early identification and appropriate management are essential to prevent progression to heart failure or other complications.

Here, a case of congenital arteriovenous fistula originating from descending aorta with direct drainage into the left brachiocephalic vein is presented. This case illustrates a rather rare congenital entity with computed tomography images.

Case

A 69-year-old female patient presented to New Civil Hospital, Surat with the complaints of cough, fever and change of voice since 4 months. On examination, the patient was having normal vitals with no signs of pallor, cyanosis or clubbing. On routine blood investigations, the patients had normal complete blood counts. The liver and renal function tests were unremarkable. On indirect laryngoscopy, left vocal cord was found fixed.

Then the patient was referred for contrast enhanced CT scan of neck and thorax. The contrast was given via intravenous cannula in right arm. CT scan showed laxity of left vocal cord with medialization and thickening of left aryepiglottic fold; findings suggestive of left vocal cord palsy. Incidentally noted was an aberrant vessel with average diameter of 3.8mm originating from posterior aspect of descending thoracic aorta at level of left 4th intercostal space and draining into left brachiocephalic vein. There was vivid opacification of the left brachiocephalic and subclavian veins as well as the tributaries seen in the arterial phase itself. However, the patient did not have any related complaints or signs of cardiac failure. Also, she did not have history of any trauma or intervention. Cardiac size was within normal limits. Aortopulmonary ratio was maintained. Azygous vein was found to be normal.

DISCUSSION

A congenital aortocaval fistula is a very rare cause of a left to-right shunt. Most of the arteriovenous fistulous communications occur extracranially, commonly arising from the carotid or the vertebral arteries. Very rarely, fistulas involving the descending aorta and brachiocephalic vein have been described. Our case here represents a subgroup from these rare anomalies arising as an asymptomatic arteriovenous fistula from descending aorta to left brachiocephalic vein.

Thoracic aortovenous fistulae can be classified on an etiological basis as acquired or congenital. Its congenital origin is a rare entity which has been reported in a limited number of cases. [2–4, 7, 13, 14]. Most of the cases are acquired secondary to trauma, rupture of a dissecting aneurysm in patients with connective tissue disorders like Marfan syndrome or iatrogenic complications [15, 16]. Soler et al. [12] has described multiple fistulae originating from descending aorta and draining into superior vena cava, azygos vein and innominate vein in their reports [1–4, 7, 11, 13, 14]. If the shunt is small, most patients remain asymptomatic. However, if the fistula is large and there is a moderate-to-large left-to-right shunt, early and more pronounced hemodynamic effects occur.

Cases with a large fistula presented early in the infancy with signs of congestive heart failure [8]. Other potential presentations include atypical endocarditis and embolic phenomenon [3].

Our case has reported a case of 69-year-old asymptomatic female in whom incidentally thoracic aortovenous fistula was detected, implying that small fistula can go undetected without any apparent clinical signs and symptoms. Our patient was vitally stable and did not show any signs of heart failure.

Embryologically, the arteries and veins arise from a common embryonic primordium, with a capillary meshwork developing in between. In congenital arteriovenous fistulae, the process of differentiation of arteries and veins fail and therefore, an early connection persists [12]. The venous drainage at the level of 3rd and 4th intercostal space involves the left posterior cardinal vein and common cardinal vein with drainage into the left innominate vein [12], whereas venous drainage of midthorax involves subcardinal vein with drainage into azygos and hemiazygos system [12].

Therefore, upper descending aorta origin fistulae are drained into the innominate vein, whereas lower descending aorta origin drained into the azygos/hemiazygos system [2–4, 13]. Our case upkeeps with this embryological basis as the origin of the fistula is seen from the descending thoracic aorta at the level of the left 4th intercostal space with direct drainage into the left brachiocephalic vein without involvement of the azygos/hemiazygos system.

Generally, if the patient is symptomatic, transcatheter occlusion of congenital vascular malformations can be performed by different occluding devices [8]. Also, coils and Amplatzer plug can be used in endovascular treatment of thoracic arteriovenous fistulae [9].

As our patient was asymptomatic and vitally stable, she didn't undergo any intervention.

Figures:

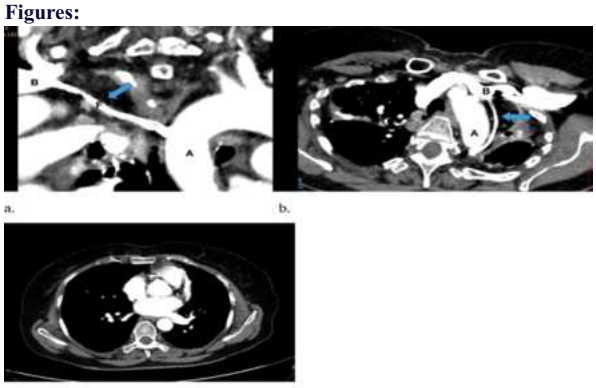

Figure 1: Contrast enhanced scan of thorax: Curved multiplanar reconstruction (a) and axial oblique reformatted (b) images showing an aberrant vessel 'F', marked with blue arrow, originating from descending thoracic aorta 'A' and draining into left brachiocephalic vein 'B'. Axial image (c) shows that cardiac size is within normal limits.

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