Diagn Interv Radiol 2009; 15:179–181

CT of double descending thoracic aorta in an adult female

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ABSTRACT
Persistent double dorsal aorta is a rare congenital anomaly of the descending aorta. It is an anomaly with two variants. The first type is characterized by complete separation of two dorsal aortae. The second type is a double-lumen descending aorta with a central dividing septum from the level just below the ductal ligament to the aortic bifurcation. We present a completely separated double dorsal aorta with a narrower right segment and the main left segment between the 6th and 10th thoracic vertebrae.

Key words: • *computed tomography* • *aorta, thoracic* • *diagnostic x-ray*

Congenital variations in the development of the thoracic aorta are common, and the most common congenital anomalies of the thoracic aorta are anomalies of the aortic arch (1). Few reports describe anomalies of the descending aorta (2, 3). Among these, persistent double dorsal aorta is a rare congenital anomaly of the descending aorta. In this report, we present thoracic computed tomography (CT) findings of a woman with persistent double dorsal aorta.

Case report

A 46-year-old woman was admitted to our hospital because of a nonpurulent intermittent cough. The patient had no history of surgery or trauma. Physical examination and laboratory findings showed no abnormalities. There was minimal left hilar enlargement on frontal chest radiograph (Fig. 1). The patient was evaluated by thoracic CT examination (Philips Mx 800, Best, The Netherlands). After IV contrast medium was given, arterial phase images were obtained, with slice thickness of 6.5 mm. Axial postcontrast CT images showed no parenchymal abnormalities or mediastinal lymphadenopathy. Axial images demonstrated that the thoracic aorta divided into two sections at the level of the 6^{th} thoracic vertebra. The right segment was narrower than the main left segment. These segments joined at the level of 10^{th} thoracic vertebra, and continued as a single aorta (Fig. 2).

Discussion

Developmental abnormalities of the aortic arch have been described in the literature. These anomalies may be isolated, or may be associated with heart defects. Aortic arch anomalies may be related to the complexity of the process of development of the aortic arch (4). The formation of the descending aorta is simple: in accordance with the fundamental bilateral symmetry of the body, the arteries and veins initially constitute a paired symmetric system. Right and left primitive aortae, whose longest descending portions pass along the dorsal aspect of the gut, are, in the early stages, plexiform vessels that distribute blood from the heart to the embryonic tissues, yolk sac, and chorion by segmental plexuses (5). Before a single aorta is formed in the embryo, paired dorsal aortae are present. These vessels join just distal to the branchial arteries which represent anlage for the aortic arch. In this configuration, the right-sided dorsal aorta supplies the right intercostal arteries, the left dorsal aorta supplies the left-sided vessels (6).

In the literature, there are a few reports describing a double dorsal aorta (2, 3, 7–9), an anomaly with two variants. The first type consists of complete separation of the two dorsal aortae, similar to our case (7–9). The second type is a double-lumen descending aorta with a central dividing septum from the level just below the ductal ligament to the aor-

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Received 14 November 2007; revision requested 6 January 2008; revision received 7 January 2008; accepted 20 January 2008.

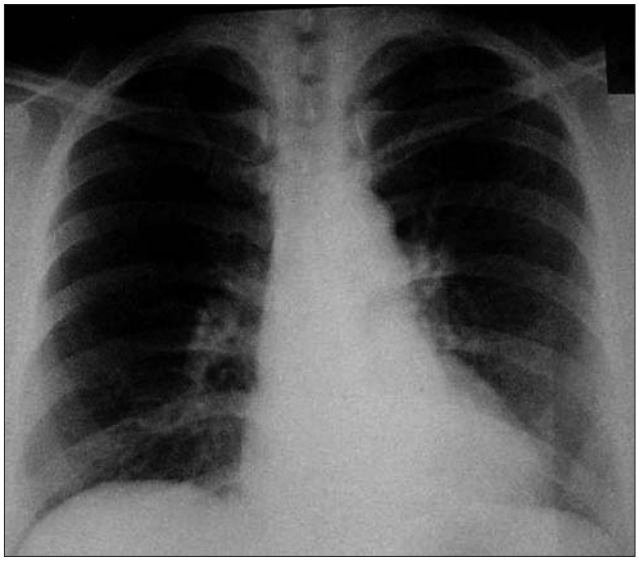

Figure 1. The posteroanterior chest radiograph shows minimal left hilar enlargement, which corresponds to the main left aortic limb of double aorta.

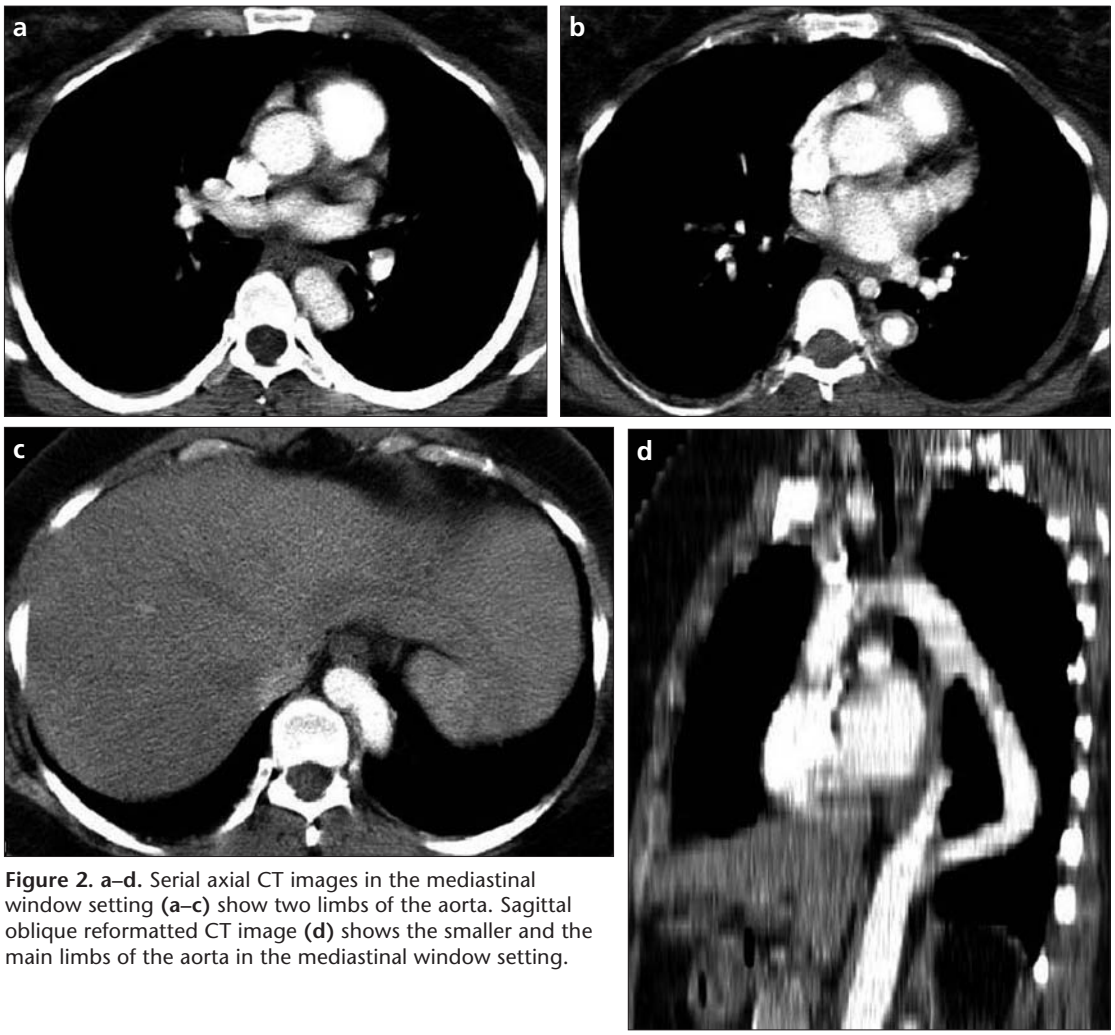

Figure 2. a–d. Serial axial CT images in the mediastinal window setting **(a–c)** show two limbs of the aorta. Sagittal oblique reformatted CT image **(d)** shows the smaller and the main limbs of the aorta in the mediastinal window setting.

tic bifurcation (2, 3). In the first type, the bilateral intercostal arteries and the visceral branches originate from only one descending aorta, and only blindly ending rudimentary openings for the intercostal and visceral arteries may be present in the opposite aorta (7, 8). In the situation of a double aorta with a dividing septum, the paired arterial branches originate from the corresponding ipsilateral trunks, whereas unpaired arteries originate from only one aorta (2, 3).

There is one case of a double dorsal aorta associated with renal agenesis

and bone abnormalities (9). In another case, double aorta was associated with abdominal heterotaxia, with the main aortic limb on the right. In this patient, the intercostal arteries originated from the smaller midline limb of the aorta. (8). In three cases mentioned above, aortic anomalies were incidental findings at autopsy (1, 2, 7); two cases were diagnosed in living patients (8, 9).

In our patient, contrast-enhanced CT was diagnostic for the double dorsal aorta. There was no other congenital heart anomaly or vessel anomaly noted on the chest CT of our patient.

In conclusion, the double descending thoracic aorta is a very rare aortic anomaly that may mimic left hilar enlargement on frontal chest radiograph.

References

1. VanDyke CW, White RD. Congenital abnormalities of the thoracic aorta presenting in the adult. J Thorac Imaging 1994; 9:230–245.
2. Trubnikov GV, Naïmark DA, Nalobina MS, Kolomnec AY. A case of double aorta with renovascular hypertension. Klin Med (Mosk) 1977; 55:138–141.
3. Hristova M, Cenova V, Gegova A. [Rare case with a double descending aorta in an adult]. [Article in Bulgarian] Eksp Med Morlol 1985; 24: 44–49.
4. Barry A. The aortic arch derivatives in the human adult. Anat Rec 1951; 111:221–238.
5. Hamilton WJ, Mossman HW. Human embryology. Prenatal development of form and function. 4th ed. Baltimore: Williams & Wilkins, 1972; 261-264.
6. Moore KL. The developing human: clinically oriented embryology. Philadelphia: Saunders, 1988; 291.
7. Mosquera JE, Micarelli R. [Double aorta] Aorta doble. [Article in Spanish] Rev Fac Cien Med Cordoba 1975; 33:89–94.
8. Formanek AG, Weisner KM, Lantz PE. Anomaly of the descending aorta: a case of persistent double dorsal aorta. AJR Am J Roentgenol 1991; 156:1033–1035.
9. Eibach VE, Walter E. [Unilateral renal agenesia, combined with aorta duplex persistens and skeletal anomalies] Einseitige nierenagenesie, kombiniert mit aorta duplex persistents und skelettanomalien. [Article in German] ROFO 1978; 129:386–387.