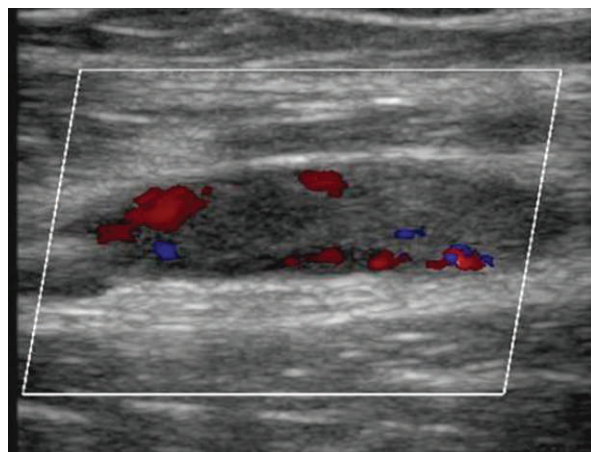


# Left Arterial Thoracic Outlet Syndrome

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**A** 21-year-old previously healthy woman presented with left-hand pain after a fall onto outstretched hands 10 weeks earlier. On examination, her left hand was cool and pale, with absent brachial and wrist pulses. Duplex ultrasonography showed a thrombus in the left brachial artery (Fig. 1). Computed tomography with 3-dimensional reconstruction revealed a superiorly displaced left subclavian artery in association with an anomalous left cervical rib and a prominent left first rib (Fig. 2). Angiography revealed luminal irregularity of the distal left subclavian artery consistent with residual thrombus (Fig. 3).

The patient was treated initially with catheter-directed intra-arterial thrombolysis for her left-hand ischemia. Arterial thoracic outlet syndrome (TOS) was managed by resection of the left cervical and left first ribs via the supraclavicular approach. The distal subclavian artery had a fibrous plaque with intimal irregularity and was primarily excised. She did well and was discharged from the hospital with no complication. She underwent elective resection of her right first rib 6 months later.



**Fig. 1** Duplex ultrasonogram shows a thrombus in the left brachial artery.

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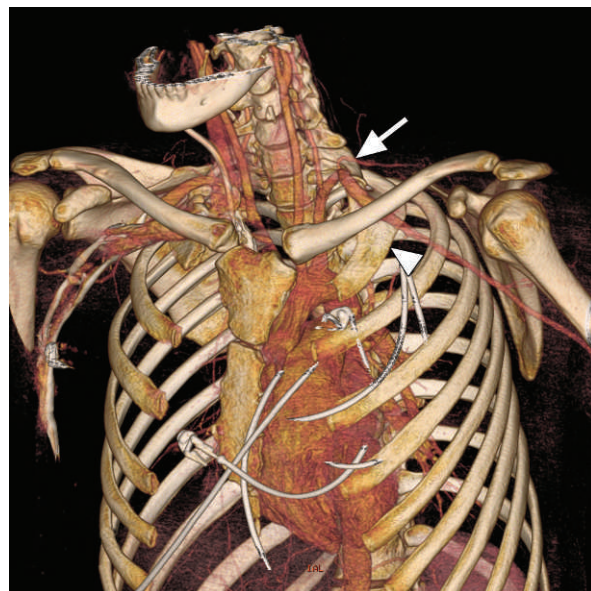
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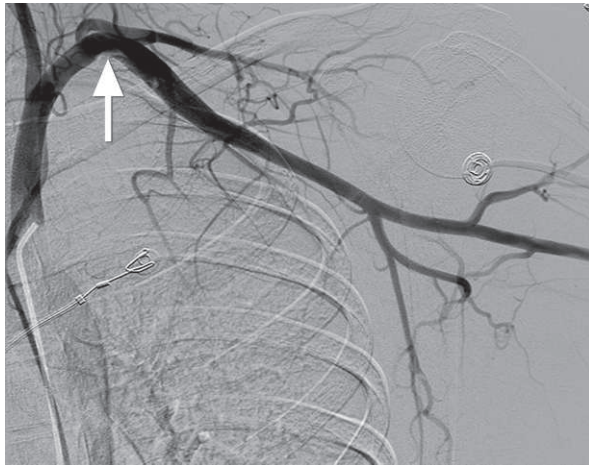
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**Fig. 2** Computed tomogram of the chest (3-dimensional reconstruction) reveals a superiorly displaced left subclavian artery in association with both an anomalous left cervical rib (arrow) and a prominent left first rib (arrowhead).



**Fig. 3** Left upper-extremity angiogram shows luminal irregularity of the distal left subclavian artery (arrow), consistent with residual thrombus.

### Comment

Thoracic outlet syndrome is a rare disorder secondary to compression of the neurovascular bundle at the thoracic outlet. There are 3 types of TOS, depending on which structure is compressed: neurogenic (brachial plexus), venous (subclavian vein), and arterial (subclavian artery). The most common type is neurogenic TOS, which accounts for more than 90% of cases; arterial TOS, which accounts for less than 1% of TOS cases, is the least common.<sup>1</sup>

The scalene triangle is the usual site of thoracic outlet compression. It is bounded anteriorly by the clavicle, inferiorly by the first rib, and posteriorly by the anterior scalene muscle. Vascular variants, especially arterial TOS, are usually associated with congenital bony anomalies, including cervical rib or abnormal first rib.<sup>2</sup> Other components that can contribute to compression in TOS are subclavian muscle and costocoracoid and costoclavicular ligaments.

The typical presentation of arterial TOS is acute onset of upper-extremity ischemia secondary to thromboembolism.<sup>2,3</sup> The chronic compression causes intimal damage and aneurysmal degeneration of the subclavian artery that predispose the vessel to thrombosis or embolism. (In our patient, the fall was probably not causally related to her presenting symptoms, because it occurred 10 weeks before her presentation.) Physical examination is usually nonspecific for TOS. Chest radiography is performed initially to determine the presence of a cervical rib. Cross-sectional imaging, including computed tomography and magnetic resonance, can be helpful in the planning of surgery and to rule out alternative differential diagnoses. Upper-extremity angiography and venography are performed to establish the diagnosis and to plan the further management of vascular TOS.

The management principle of TOS is to decompress the thoracic outlet by removing the cervical rib, the first rib, the fibrous band, and the scalene muscle. The 2 main approaches are the transaxillary and the supraclavicular.<sup>1-3</sup> The transaxillary approach facilitates clear visualization of the first rib but is not suitable for vascular reconstruction. Vascular resection or reconstruction is indicated when there are vascular abnormalities. The supraclavicular approach enables the removal of the first rib and vascular reconstruction if indicated.

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