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CLINICAL IMAGE

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Extensive or partial first rib resection for thoracic outlet syndrome? The contribution of three-dimensional imaging to the preoperative planning and the postoperative evaluation

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Key Clinical Message

Transaxillary partial excision of the first rib is associated with minimal morbidity and excellent relief of symptoms of thoracic outlet syndrome due to instant and permanent obviation of the external arterial compression. Three-dimensional imaging offers incremental value of the surgical outcome, highlighting the role of minimally invasive partial resection.

KEYWORDS

partial first rib resection, thoracic outlet

1 | CASE PRESENTATION

A 29-year-old female presented to our institution complaining of a tingling sensation on her left hand while her shoulder was in an abducted position. Dynamic arteriographic study revealed an external compression of the left subclavian artery on shoulder hyperabduction and a reduction in blood flow, consistent with thoracic outlet syndrome.

Preoperative three-dimensional (3D) reconstruction imaging identified the exact point of interest (Figure 1A), allowing a tailor-made, minimally invasive surgical strategy. A modified partial resection of the first rib and myotomy of the scalenus anticus muscle was contemplated to decompress the left thoracic outlet with a transaxillary approach. The anterior origin of the serratus anterior muscle was detached from the second rib, and the 2 intercostobrachial nerves were identified and preserved. The scalenus anticus muscle was cut by sharp dissection. The periosteum over the rib was incised and dissected. The anterior portion of the first rib was osteotomized at the level of the scalene tubercle (Figure 1B,C) cautiously not to injure the subclavian vessels and brachial plexus, and the posterior was left intact.

At 3-year follow-up, the patient was free of symptoms. Postoperative 3D imaging offered excellent visualization of

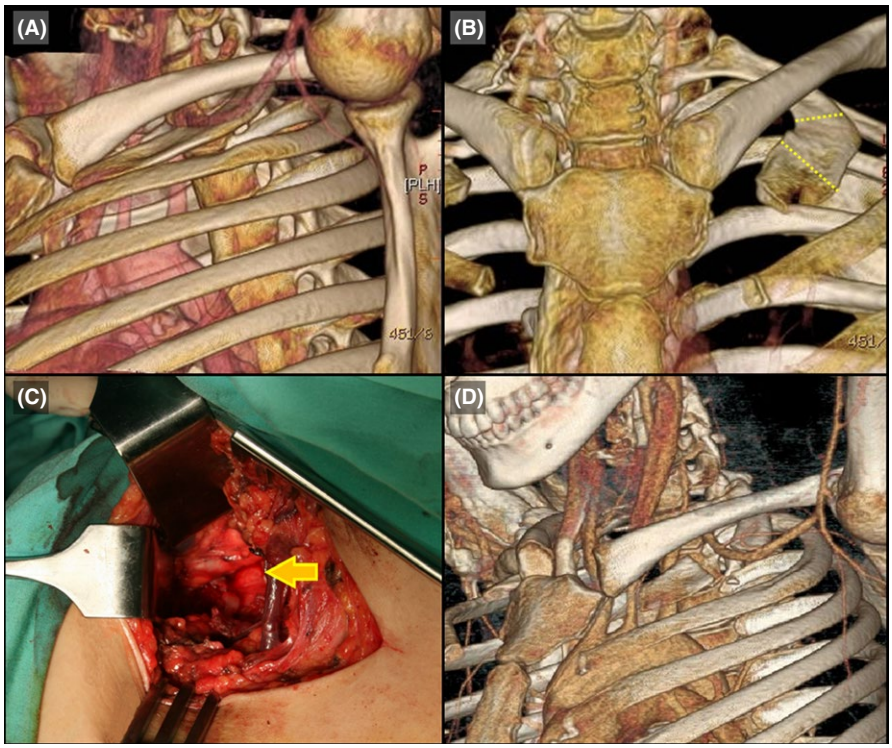

FIGURE 1 A, Preoperative three-dimensional computed tomography (CT) scan shows the first rib and the point that compresses the subclavian artery. B, Preoperative planning of the excision (dotted lines). C, Transaxillary first rib resection and myotomy of the scalenus anticus muscle. The first rib was osteotomized at the level of the scalene tubercle (arrow). The posterior remainder was left intact. D, Postoperative three-dimensional CT scan shows partial resection of the first rib and the decompressed subclavian artery

the partial excision and the decompressed subclavian artery (Figure 1D).

CONFLICTS OF INTEREST

The authors report no financial relationships or conflicts of interest regarding the content herein.

AUTHOR CONTRIBUTION

ES: performed conception and design of the research and writing of the manuscript. ES, MS, NG, and CD: involved in acquisition of data. ES, MS, DIT, and DM: carried out analysis and interpretation of the data. DD, TT, and PT: involved in critical revision of the manuscript for intellectual content.

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