

Kommerell's diverticulum as an unusual cause of back pain and differential diagnosis for mediastinal enlargement: images in cardiology

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A 54-year-old male with history of hypertension, hypercholesterolaemia, and active smoking presented with chronic back pain for six months, unresponsive to non-steroidal anti-inflammatory drugs. The physical examination was unremarkable. The electrocardiogram was notable for left anterior fascicular block. A chest X-ray (*Figure 1A*) revealed mediastinal enlargement and a right aortic arch; echocardiography indicated mild aortic regurgitation (*Figure 1B*). A CT angiogram disclosed a 46.8 × 38.9 mm Kommerell's diverticulum (KD) (*Figure 1C–F*) and aberrant left subclavian artery (ALSA), which were compressing and displacing the trachea. Due to symptoms and KD's size, the patient was referred for surgical resection of the diverticulum stump and revascularization of ALSA. After cardiac rehabilitation, he is now asymptomatic. Kommerell's diverticulum is an embryological malformation of the fourth branch of the aortic arch system, accounting for 1% of congenital heart defects.¹ It was first diagnosed by Burckhard

Kommerell in 1936 as a pulsatile mass compressing the oesophagus. This anomaly is a result of regression in the fourth left aortic arch between the left carotid and left subclavian arteries. Most cases are asymptomatic, but adults may present dysphagia lusoria, dyspnoea, or chest pain, typically manifesting as retrosternal discomfort (often associated with atherosclerosis) or due to compression of surrounding structures by the diverticulum. In this case, back pain was an unusual presentation.² The risk of aneurysm rupture and aortic dissection has been reported at 53% and 19%, respectively.³ CT angiography is a non-invasive tool that allows for 3D reconstruction and analysis of complex anatomy, but magnetic resonance imaging is considered the gold standard for diagnosis. Treatment is recommended for symptomatic patients or those with dilated KD; the aim is resection of the diverticulum and reconstruction of the subclavian artery through open surgery or hybrid treatment. Post-operatively, 20-year overall survival estimates are 98%.

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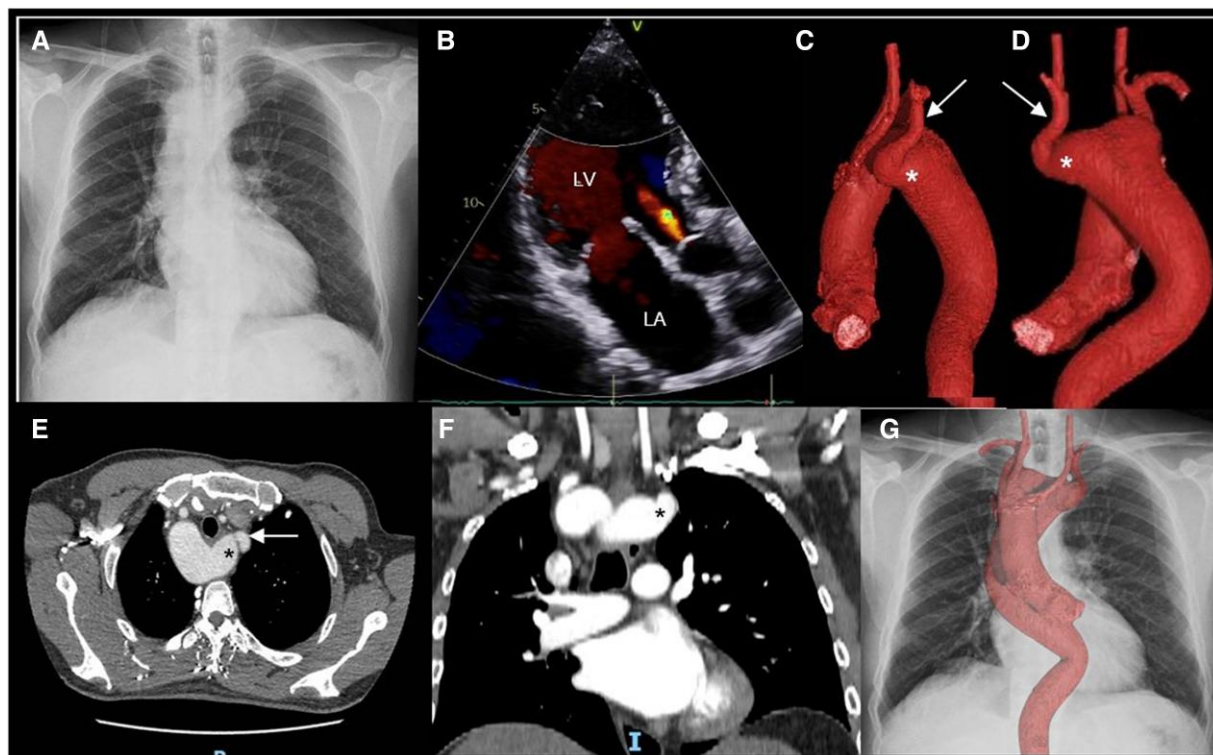


Figure 1 Kommerell's diverticulum (KD) with an aberrant left subclavian artery (ALSA) and a right aortic arch (RAA). Postero-anterior chest X-ray (A) disclosing mediastinal enlargement. Apical long axis view echo (B) revealing mild aortic regurgitation. Lateral (C) and posterior view (D) of a 3D reconstruction of the aorta showing the KD (asterisk) of 46.8×38.9 mm, ALSA (arrow), and right aortic arch. Axial (E) and coronal section (F) of a CT angiogram disclosing the KD (asterisk) and ALSA (arrow). Overlapping of the 3D reconstruction of the aorta on the chest X-ray (G). LA, left atrium; LV, left ventricle.

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Data availability

All data are incorporated into the article.

References

1. Moffatt C, Bath J, Rogers RT, Colglazier JJ, Braet DJ, Coleman DM, et al. International multi-institutional experience with presentation and management of aortic arch laterality in aberrant subclavian artery and Kommerell's diverticulum. *Ann Vasc Surg* 2023;**95**: 23–31.
2. Hale BW, Lu JC, Romano JC, Lowery R, Yu S, Norris MD. Kommerell diverticulum: distinctions between arch side and evaluation of morphology, size, and risk. *Ann Thorac Surg* 2022;**114**:848–856.
3. Cinà CS, Althani H, Pasenau J, Abouzahr L. Kommerell's diverticulum and right-sided aortic arch: a cohort study and review of the literature. *J Vasc Surg* 2004;**39**: 131–139.