CASE REPORT

An unusual cause for a relatively common radiographic abnormality

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SUMMARY

A 59-year-old Indian woman presented to the respiratory clinic with chest pains, long-standing swallowing difficulties and a chest radiograph, which was reported as showing a shadow in the right paratracheal region. A CT scan was obtained and was reported as demonstrating a right-sided paratracheal lymph node and varicosities adjacent to the inferior vena cava. Histology from an endobronchial ultrasound-guided biopsy revealed a heavily blood-stained sample but showed no evidence of granulomas or malignancy. Subsequently, the images were reviewed, with the conclusion that they were actually of an engorged azygos vein compressing the oesophagus. MRI confirmed the absence of mediastinal lymphadenopathy and the presence of a prominent hemiazygos vein compressing the oesophagus. This case highlights the importance of including anatomical abnormalities in the differential diagnosis and reassessing patients when the history and investigations do not correlate.

BACKGROUND

A dilated azygos vein with an obliterated inferior vena cava is a rare abnormality. Our patient underwent an invasive procedure and may have been started on unnecessary antituberculous (TB) therapy, which could have led to harmful consequences. By writing up this case we hope to publicise this rare but important abnormality to other clinicians who hopefully will recognise this as a possible differential diagnosis in difficult cases and hence prevent patients from unnecessary investigations and management.

CASE PRESENTATION

A 59-year-old Indian woman with a history of depression, deep vein thrombosis and gastric ulcer diagnosed on oesophagogastroduodenoscopy (OGD) presented to the respiratory clinic with chest pains, pain on swallowing and an abnormal chest radiograph. She last travelled to India a year ago and took no medications. Examination revealed anterior chest wall tenderness. There were no other relevant findings on history or examination.

INVESTIGATIONS

A chest radiograph demonstrated a shadow in the right paratracheal region ([figure 1A](#)). Blood tests were unremarkable apart from a raised ACE 78 (8–52 IU/L) and erythrocyte sedimentation rate (ESR) 26 (0–20 mm/h), which later normalised on repeat testing. A CT scan was arranged, which was reported as showing a right-sided paratracheal

lymph node measuring 3.7×2.4 cm and varicosities seen adjacent to the inferior vena cava, which were absent below the level of the renal arteries ([figure 1B–D](#)). Subsequently, an endobronchial ultrasound-guided biopsy was organised. Ultrasound Doppler was used to avoid blood vessels and to identify a 2 cm lymph node just below the vocal cords, which appeared normal with no pathological features ([figure 2](#)). The histology revealed blood-stained calcified material with no evidence of granulomatous disease or malignancy.

The patient's scans were discussed in the respiratory X-ray meeting with the consensus that the previously reported lymph node was actually an engorged azygos vein. MRI established the absence of mediastinal lymphadenopathy and the presence of a hemiazygos vein greater than 4 cm in diameter extending up the posterior mediastinum ([figure 3A, B](#)) and compressing the oesophagus ([figure 3C](#)).

DIFFERENTIAL DIAGNOSIS

- ▶ Tuberculosis
- ▶ Sarcoidosis
- ▶ Lymphoma
- ▶ Histoplasmosis
- ▶ Squamous cell and large cell lung cancer
- ▶ Metastasis: renal, papillary thyroid cancer, carcinoid
- ▶ Dilated azygos/hemiazygos vein

TREATMENT

The patient was discharged from the respiratory clinic.

OUTCOME AND FOLLOW-UP

The patient was referred to the vascular surgeons and later underwent an OGD, which showed moderate oesophagitis and pyloric inflammation and stenosis. Biopsy revealed ulceration, inflammation and intestinal metaplasia suggestive of reactive gastritis but no dysplasia or malignancy and the patient was instructed to start proton pump therapy prior to the results of the *Campylobacter*-like organism test, which was negative. A repeat OGD 3 months later demonstrated complete resolution of the oesophagitis but persistence of the pyloric stenosis.

DISCUSSION

The patient had an unusual cause of a relatively common abnormality on chest radiograph. Similar abnormalities have been documented in asymptomatic patients, children and individuals presenting with intrathoracic masses seen on radiology.^{1–4} Campo *et al*⁵ and Yilmaz *et al*⁶ described cases where azygos continuation led to swallowing

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Figure 1 (A) Chest radiograph showing a right paratracheal opacity. (B) Axial CT of the thorax at the level of the aortic arch showing a dilated azygos vein. (C) CT of the thorax (arterial phase) D9 level showing a dilated azygos vein. (D) CT of the abdomen just below the origin of the renal arteries showing an absent inferior vena cava.

difficulties and mimicked paraoesophageal lymph node enlargement, respectively. The defect is due to failure of the right subcardinal–hepatic anastomosis resulting in atrophy of the right subcardinal vein during embryology.^{7 8}

The hemiazygos enters the azygos vein at around the level of D8–D9 and the azygos vein subsequently drains into the superior vena cava. The azygos system connects the inferior vena cava

to the superior vena cava, thus forming a crucial collateral pathway when either the superior or inferior vena cava is obstructed.⁹

Although rarely troublesome, the condition may predispose to bilateral venous insufficiency, sick sinus syndrome or deep vein thrombosis,¹⁰ the latter of which our patient experienced during pregnancy. Furthermore, knowledge of the abnormality

Figure 2 Endoscopic ultrasound guided biopsy of the paratracheal lymph node.

Figure 3 (A) Coronal T1-weighted (T1W) MR showing a vestigial intrahepatic segment of the inferior vena cava. (B) Coronal T1W MR showing a dilated azygos vein. (C) Axial T1W MR showing an enlarged azygos vein compressing the oesophagus against the left atrium anteriorly and descending thoracic aorta on the left side.

is particularly important when considering cardiac catheterisation using a transfemoral approach,¹¹ or to the surgical team, by whom the removal of the azygos vein could prove fatal.¹²

Patient's perspective

I was pleased to be given a diagnosis and was grateful to the doctors looking after me for not starting me on any unnecessary medications.

Learning points

- ▶ A dilated hemiazygos vein is a rare cause of oesophageal compression, and may present with chest pain and swallowing difficulties.
- ▶ MRI of the chest is a useful investigation if a differential of a dilated azygos vein is being considered.¹³
- ▶ The importance of reassessing patients when symptoms cannot be easily reconciled with diagnostic findings.
- ▶ The importance of recognising that radiological reports are an interpretation of images and that rarities are often not thought of as differentials in radiological reports as other, more common, pathologies are more likely to explain the abnormalities seen.

Moreover, our patient underwent a potentially fatal invasive procedure and could have gone on to have further unnecessary investigation or could have been started on medications such as anti-TB therapy. Subsequent investigations revealed oesophagitis and reactive gastritis. Such findings can explain our patient's chest pain but not her swallowing difficulties, which are likely due to external compression of the oesophagus from a dilated hemiazygos vein. On a wider level, this case highlights the value of reassessing patients when the symptoms cannot be easily reconciled with the diagnostic findings.

Contributors AO was responsible for original drafting of the manuscript, attaining patient notes and submission of the final manuscript. MF was involved in initial conception of the manuscript, provided images and interpretation of images as a radiology consultant and was also involved in drafting of the final manuscript. ZB was involved in initial conception of the manuscript; obtained written consent from the patient and was also involved in drafting of the final manuscript.

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REFERENCES

- 1 Okouchi M, Takagiwa J, Ichioka M, *et al.* A case of interruption of the inferior vena cava with azygos continuation accompanied by anomalies of tracheobronchial branching. *Nihon Kyobu Shikkan Gakkai Zasshi* 1994;32:908–12.
- 2 Yildirim A, Oğuz D, Öner Y, *et al.* An unusual case of heterotaxy and polysplenia syndrome associated with hemiazygos continuation of the left-sided vena cava inferior, dilated azygos vein and large venous ectasia. *Congenit Heart Dis* 2011;6:262–5.

- 3 Castellino RA, Blank N, Adams D. Dilated azygos and hemiazygos veins presenting as paravertebral intrathoracic masses. *N Engl J Med* 1968;20:1087–91.
- 4 Sparger C, Atkinson W, Streicher R, *et al.* A dilated tortuous tributary vein to the hemiazygos vein seen first as an unusual inferior posterior mediastinal mass. *N Y State J Med* 1962;62:3978–81.
- 5 Campo S, Zullo A, Scandavini C, *et al.* Pseudoachalasia: a peculiar case report and review of the literature. *World J Gastrointest Endosc* 2013;5:450–4.
- 6 Yilmaz U, Halilcolar H, Unsal I, *et al.* Isolated interrupted inferior vena cava with azygos continuation mimicking paraesophageal lymph node enlargement. *Monaldi Arch Chest Dis* 2006;65:228–30.
- 7 Van der Horst R, Hastreiter A. Congenital interruption of the inferior vena cava. *Chest* 1981;80:638–64.
- 8 Ortiz D, Saracho Y, Bobo J, *et al.* Dilatation of the azygos vein: an unusual cause of pulmonary mass. *An Med Interna* 1998;15:656–7.
- 9 Blackmon J, Franco A. Normal variants of the accessory hemiazygos vein. *Br J Radiol* 2011;84:659–60.
- 10 Vijayvergiya R, Bhat M, Kumar R, *et al.* Azygos continuation of interrupted inferior vena cava in association with sick sinus syndrome. *Heart* 2005;91:26.
- 11 Berden W. Plain film findings in azygous continuation of the inferior vena cava. *Am J Roentgenol* 1984;104:452–7.
- 12 Effler D, Greer A, Sitters E. Anomaly of the vena cava inferior. Report of fatality after ligation. *JAMA* 1951;146:1321–2.
- 13 Schultz C, Morrison S, Bryan P. Azygos continuation of the inferior vena cava: demonstration by NMR imaging. *J Comput Assist Tomogr* 1984;8:774–6.

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