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Case Report

Right subclavian artery aneurysm presenting as midline neck mass

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Abstract

Introduction: Subclavian artery aneurysm is a very rare aneurysm, comprising of 1% of all peripheral aneurysms. The most prevalent aetiology of a subclavian artery aneurysm is atherosclerosis, which accounts for approximately 60% of reported cases. Other causes include trauma, thoracic outlet syndrome, and infection.

Aim: To present an atypical presentation of an acute, enlarging subclavian artery aneurysm as a midline neck mass, causing respiratory distress and dysphagia and the subsequent diagnostic possibilities.

Case study: We present a case involving a 50-year-old male who presented with a sudden, large, midline neck swelling, causing shortness of breath, hoarseness, and dysphagia, in the background of severe hypertension and chest pain.

Results and discussion: Chest radiograph revealed widening of the mediastinum, suggesting an aortic aneurysm or a mediastinal mass. Computed tomography (CT) of neck and thorax was planned, but the patient's condition deteriorated in the attempt to lie flat prompting an emergent intubation procedure to secure his airway. Contrast-enhanced CT neck and thorax, with angiography was done. The scan demonstrated a proximal right subclavian artery aneurysm measuring 6.0 × 6.0 × 7.2 cm. The final diagnosis of a right subclavian artery aneurysm was made.

Conclusions: (1) Diagnosis of arterial aneurysm should be considered in an acute midline neck mass, especially in middle-aged men with severe hypertension and chest pain. (2) CECT neck and thorax, with angiography is useful to evaluate the origin, size and extent of the lesion, supporting the diagnosis of subclavian artery aneurysm. (3) In acute airway emergency, caution should be taken to perform tracheostomy as it would cause rupture of the aneurysm.

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1. INTRODUCTION

Subclavian artery aneurysms are uncommonly encountered peripheral aneurysms.[1] Its enlargement can cause a myriad of symptoms, such as respiratory depression, dysphagia, hoarseness, or neck and shoulder pain.[2] Subclavian aneurysms have the risk of rupture, embolisation, or thrombosis.[3]

2. AIM

We present a rare case of a right subclavian artery aneurysm with an atypical presentation as a midline neck swelling, leading to tracheal and oesophageal compression. This resulted in respiratory distress, hoarseness, and dysphagia, posing a significant diagnostic challenge.

3. CASE STUDY

A 50-year-old man with a history of gouty arthritis presented to the emergency department with a rapidly enlarging neck swelling. He was uncertain about its exact duration but reported noticing it only in the past two days. The swelling was progressively increasing in size and was accompanied by odynophagia and radiating chest pain. Initially, he sought medical attention at a nearby clinic, where he was discharged with painkillers. However, following his discharge, he developed worsening symptoms, including hoarseness and shortness of breath. Additionally, he had fever, palpitations, and anxiety. There was no history of fluctuating swelling with straining or coughing, nor any history of neck trauma. He had a 20-year history of cigarette smoking.

On examination, the patient was alert, with no stridor, and was able to speak in full sentences. He was positioned at a 45° incline and maintained adequate oxygen saturation with a facemask at 5 L/min. On arrival at the emergency and trauma department (ETD), his blood pressure was 192/142 mm Hg, which decreased to 175/120 mm Hg after administering oral Captopril 25 mg. He was not tachycardic, and his temperature was recorded at 37.0°C following oral paracetamol intake. Radial and femoral pulses were present.

A neck examination revealed a huge anterior midline neck mass measuring 10 × 8 cm (Figure 1). It was a wellcircumscribed mass, that was soft on palpation. Superiorly, the swelling began at the level of the thyroid cartilage and extended inferiorly, beyond the upper border of both clavicles. The inferior border was not well demarcated. There was mild tenderness, but no pulsations or fluid thrill. The laryngeal framework was not palpable. Fine needle aspiration was done but there was no yield. The floor of the mouth was not raised, and his dentition was fair on oral examination.

Bedside flexible nasopharyngolaryngoscopy showed a medialization of the right lateral pharyngeal wall. The epiglottis was displaced to the left side. The vocal cords were symmetrically mobile bilaterally. Full blood count showed leucocytosis while other routine blood investigations were unremarkable.

Figure 1. A right subclavian artery aneurysm presenting as a large anterior midline neck mass, measuring 10 × 8 cm from the anterior (A) and lateral (B) views.

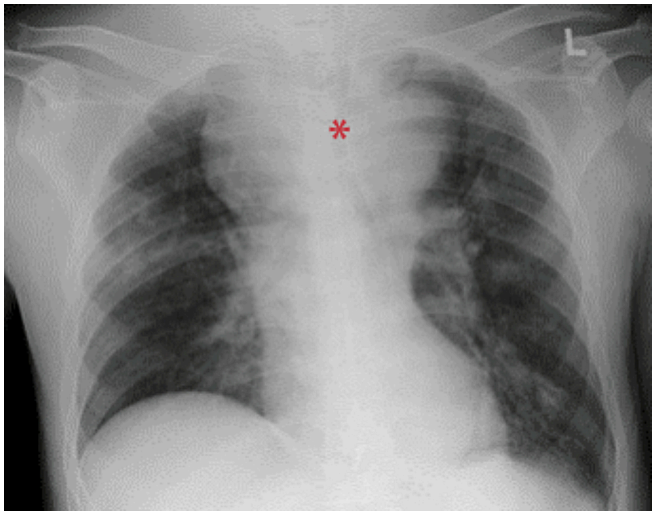

Figure 2. The widening of mediastinum was visualized in a plain chest radiograph.

The chest radiography demonstrated a huge widening of the mediastinum with a leftward deviation of the trachea. Bilateral lung fields displayed prominent perihilar haziness (Figure 2).

An urgent computed tomography (CT) scan of the neck and thorax was planned. However, upon attempting to lie in a supine position, the patient suddenly developed stridor and worsening shortness of breath. His condition rapidly deteriorated, leading to an inability to maintain adequate oxygen saturation. Given the anticipated difficulty of intubation, he was promptly transferred to the operating room for elective endotracheal intubation. The anaesthetic team successfully performed the intubation using a C-MAC video laryngoscope.

4. RESULTS

A contrast-enhanced neck and thorax (portovenous and delayed phases) with angiographic study was done. Findings showed multilobulated outpouchings arising from the brachiocephalic

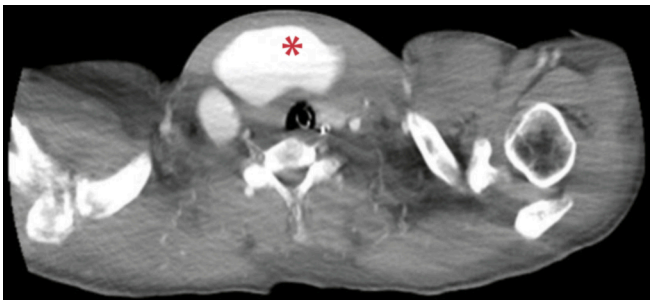

Figure 3. CT Angiography of the neck revealed a hyperdense lesion of the right subclavian artery, with a diameter of 6,0 × 6,0 × 7,2 cm. The trachea was deviated to the left.

junction, extending superiorly to the right and anterior cervical regions. A proximal subclavian artery fusiform aneurysm measuring 6.0 × 6.0 × 7.2 cm was present, with internal partial thrombosis (Figure 3). At the level of the right lower cervical region, the outpouching of mass extends superiorly to the C5 level and measured 3.8 × 3.6 × 7.4 cm. Further extension of the mass to the anterior cervical neck region appeared multilobulated and measured approximately 3.6 × 9.3 × 5.5 cm. Other than that, there was compression onto the adjacent superior vena cava and internal jugular vein with thrombosis. There was tracheal deviation to the left side.

Subsequently, he was referred to the cardiothoracic team. Unfortunately, the patient succumbed due to complications of a catheter-related bloodstream infection (CRBSI) while waiting to be transferred to a cardiothoracic institution.

5. DISCUSSION

Vascular anomalies are congenital lesions of vascular development disorder. The International Society for the Study of Vascular Anomalies (ISSVA) developed a widely accepted classification system based on histopathological findings, flow characteristics, and disease course.[4,5] However, this discussion will focus mainly on the possible differential diagnoses that could be considered in such a patient.

The presence of a progressively enlarging anterior neck mass, along with hoarseness in a middle-aged man, aligns with common clinical characteristics of laryngocele. As laryngoceles enlarge, they can exert local compressive effects on the trachea, potentially leading to respiratory distress. However, in this case, the patient did not exhibit a history of fluctuating neck swelling during the Valsalva maneuver or coughing, features commonly associated with laryngocele. Additionally, he had no history of activities that could increase intraluminal laryngeal pressure for prolonged periods, such as playing wind instruments or glassblowing. Furthermore, there was no medical history of autoimmune diseases, including amyloidosis or chondroma, which are recognised risk factors for acquired laryngocele.

Other differentials considered in this scenario was of lymph node metastasis from a possible primary lung carcinoma, especially in a patient with a history of prolonged smoking. Additionally, enlargement of this mass can cause compressive effects on the upper oesophagus or trachea, resulting in dysphagia and shortness of breath. Metastatic invasion of the recurrent laryngeal nerve can lead to breathlessness and hoarseness.[6]

Alternatively, another diagnosis considered for our patient, was a deep neck abscess. The presence of a sudden, rapidly enlarging anterior neck mass resulting in dysphagia, hoarseness, and breathlessness, are common clinical features associated with this disease.[7] A history of fever during a period of illness also supports this diagnosis.

On the other hand, our patient appeared with a solitary neck mass at the thyroid level, with no involvement from the upper neck region. This differs from neck abscesses, which typically occur in the submandibular or submental region, as the septic focus is in the oropharynx or oral cavity.

The diagnosis of vascular malformations was considered as well. Extra-thoracic aneurysms commonly present with a mass over the supraclavicular fossa.[8] In 51% of patients, the most common complaints are pulsatile mass, shoulder pain, and non-specific chest pain.[9] Apart from chest pain, these commonly associated clinical features were absent in our patient. In addition, the absence of bruit and delayed radial pulses made the diagnosis more unlikely. Nevertheless, there are reported cases of subclavian artery aneurysm despite the absence of pulsatile mass.[8,10]

Furthermore, an arteriovenous malformation may manifest as a thrill, bruit, or pulsatile mass. As the mass enlarges, it can lead to dysphagia and shortness of breath by compressing the airway. This condition may arise from a congenital malformation or result from trauma. However, it rarely presents acutely unless complications arise such as rupture or thrombosis.

Venous phlebectasia may also present with a soft anterior neck mass. It is an abnormal, focal dilation of a vein due to valvular incompetence. However, this condition is unlikely, as this commonly presents in children or young adults with a history of increasing neck swelling on coughing, straining, or on Valsalva manoeuvre.[11] It can occur as a result of neck trauma or any previous surgical interventions affecting venous return.

Midline congenital neck swellings, such as thyroglossal duct cysts, were considered in the differential diagnosis. Thyroglossal duct cysts are common midline neck masses resulting from the incomplete obliteration of the thyroglossal duct and characteristically exhibit movement with tongue protrusion. Acute infection can lead to sudden enlargement. Dermoid cysts, which may occur in the anterior cervical region, are commonly firm, painless, and slow growing. However, they are an unlikely diagnosis in this patient, as they most commonly present in childhood and rarely manifest as acute neck swelling.[12]

The main cause of aneurysm in our patient is most likely due to atherosclerosis. The presence of a severe, undiagnosed

hypertensive episode because of atherosclerotic disease may further contribute to the formation of a subclavian artery aneurysm.

Other known causes of subclavian artery aneurysms include thoracic outlet syndrome, trauma with clavicular or first rib fracture, or infective causes such as syphilis.[1]

Plain chest radiographs are important diagnostic tools because they can visualise a widened mediastinum. Mediastinal widening in a chest radiograph is defined as a width greater than 8 cm on the posteroanterior view.[13] In trauma patients, this is highly indicative of major vascular injury such as thoracic aortic aneurysm injury or aortic dissection.[14] Moreover, the presence of widening mediastinum may also indicate metastatic lymph node disease to mediastinal structures or lymphoma.[15]

Features of a subclavian artery aneurysm on ultrasonography include a dilated, pulsatile, hypoechoic mass in the neck, the presence of a thrombus identified around the aneurysm's periphery, and turbulent flow in colour Doppler studies.[16]

CT scans and angiographic studies provide diagnostic relevance for intrathoracic aneurysms.[2] Imaging findings include stenosis, occlusion, aneurysm, pseudoaneurysm, transaction, dissection, and mural inflammation.[17]

Treatment modalities include conservative management, open surgical repair, endovascular exclusion, and hybrid techniques.[18] The gold standard treatment remains elective surgical repair for most subclavian aneurysms.[19] Albeit rare, subclavian artery aneurysm has the potential for morbid complications such as thrombosis, embolization, and rupture.[1] The most common complications are rupture of an aneurysm followed by limb-threatening condition such as tissue gangrene of the upper limb.[20] While small aneurysms usually cause thrombosis and distal embolism, large aneurysms are more likely to produce compressive symptoms or rupture.[1]

6. CONCLUSIONS

(1) Subclavian artery aneurysms can present with significant compressive symptoms and pose a serious risk of rupture if not promptly diagnosed and managed.
(2) Contrast-enhanced CT with angiography remains the gold standard for diagnosis, aiding in the assessment of aneurysm size, location, and its effects on surrounding structures. Early imaging is essential for preventing delayed intervention.
(3) Airway management in these cases requires meticulous planning. Video laryngoscopy or fiberoptic intubation should be prioritized in emergency scenarios to minimize the risk of aneurysm rupture, while open tracheostomy should be avoided unless absolutely necessary.
(4) A multidisciplinary approach involving vascular surgeons, anesthesiologists, and critical care specialists is crucial for optimizing patient outcomes and preventing complications.
(5) Definitive treatment, whether surgical or endovascular repair, should be considered promptly to mitigate the risks of rupture, embolization, and ischemic complications. Advances in endovascular techniques have provided less invasive alternatives, improving patient prognosis and reducing perioperative morbidity.
(6) Due to the potential for rapid progression and life-threatening complications, early recognition and a high index of suspicion are key. Clinicians must be vigilant in evaluating patients with unexplained neck masses, especially those presenting with respiratory distress or dysphagia.

Conflict of interest

All authors certify that they have no affiliations with or involvement in any organization in the subject matter or materials discussed in this manuscript. There is no conflict of interest to declare by all authors.

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Ethics

This case report have been performed in accordance with the Declaration of Helsinki. This case report was reviewed and granted exemption from requiring ethics approval from the ethics committee of Hospital Universiti Sains Malaysia Hospital Jawatankuasa Etika Penyelidikan Manusia (JEPeM). Further information and documentation to support this will be made available to the editor upon request. Written informed consent for publication of their clinical details and/or clinical images was obtained from the patient. The consent form will be made available to the editor if requested and will be treated confidentially.

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