



Case report

Transhiatal esophagectomy on a patient with aberrant right subclavian artery: A case report

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ARTICLE INFO

Keywords:

Right aberrant subclavian artery
Esophageal cancer
Trans-hiatal esophagectomy
Case report

ABSTRACT

Introduction: Esophageal dissection is generally safe and easy during transhiatal esophagectomy (THE). The right subclavian artery crosses between the esophagus and spine in about 1 % to 2 % of cases. This condition is called aberrant right subclavian artery and is the most common congenital aortic arch anomaly. Pre-operative recognition of this anomaly is important in esophageal surgeries. In unprepared situations injury to this vessel may result in life threatening bleeding.

Case presentation: A 45 year old female patient presented with progressive dysphagia and weight loss. Esophageal mass was found during upper gastrointestinal endoscopy. Additionally, a CT scan of the thorax and abdomen revealed an aberrant right subclavian artery and a distal esophageal mass. Biopsy revealed squamous cell carcinoma. A transhiatal esophagectomy was performed successfully with no complications.

Discussion: The vast majority of patients with an aberrant right subclavian artery do not experience any symptoms. In rare cases, patients may present with dysphagia (dysphagia lusoria) and obstructive respiratory symptoms in their fourth or fifth decade. When patients present with dysphagia from esophageal cancer, careful review of imaging is needed to identify the aberrant artery.

Conclusion: The presence of aberrant right subclavian artery causes difficulty in performing esophagectomy. If it is diagnosed preoperatively, cautious retroesophageal dissection prevents injury to this vessel and complications following it.

1. Introduction

Aberrant right subclavian artery (ARSCAs) is one of the most common congenital vascular anomalies of the aortic arches. This is caused by a disruption of branchial arches from the right dorsal aorta to the sixth cervical intersegmental artery [1]. Previously, this variant was viewed as a normal vessel; however, it is now considered an aberrant vessel with a female predominance. The majority of patients with ARSCA are asymptomatic. There is a rare possibility that patients may exhibit dysphagia (dysphagia lusoria) and obstructive respiratory symptoms, which typically appear in the fourth or fifth decade. Usually it occurs as a single anomaly, but, coarctation of aorta, complete interruption of the aortic arch or a right-sided aortic arch can rarely occur with it [1,2]. Pre-operative recognition for the presence and clinical importance of this anomaly is important in esophageal surgeries among others. In unprepared situations injury to this vessel may result in life threatening bleeding. Our case report presents a patient with ARSCA who had distal esophageal carcinoma and an uneventful postoperative course because

ARSCA was recognized early. This case report has been reported in line with the SCARE 2020 criteria [6].

2. Case report

Our patient was a 45 year old female who came with chief complaint of progressive dysphagia of 3 months duration; she was only able take liquid diet at the time of presentation. She had also significant weight loss. Physical examination was none revealing. On laboratory investigations all organ function tests were in normal ranges, except the serum albumin which was 3.2 mg/dl.

Upper gastrointestinal endoscopy revealed esophageal mass starting about 30 cm from the incisor teeth and extending to the gastroesophageal junction, Fig. 1. Biopsy was taken from the mass and the result concluded squamous cell carcinoma. Thoracic and abdominal computed tomography (CT) scan was also done. It showed distal esophageal thickening and a right subclavian artery arising from the distal aortic arch and coursing obliquely to the right thoracic outlet posterior to the

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<https://doi.org/10.1016/j.ijscr.2023.108438>

Received 25 May 2023; Received in revised form 12 June 2023; Accepted 20 June 2023

Available online 25 June 2023

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esophagus, Figs. 2–4.

Preoperatively discussion was made among the surgical team, anesthesia team and the patient and her family about the conditions patient has surgical approach and possible complications. Patient and her family agreed for the procedure and routine preoperative preparation was done.

Patient was taken to the operation theater and general anesthesia was given with single lumen endotracheal tube intubation. After prepping and draping was done, upper midline abdominal incision from xiphisternal junction to umbilicus was made. Abdomen was explored for any intraperitoneal seeding and liver nodules. After signs of metastasis were ruled out except left gastric enlarged lymph nodes surgery was continued. Gastric mobilization was done after gastrosplenic ligament and short gastric vessels division with protection of gastropiploic arcade. Then, the abdominal esophagus was encircled with Penrose drain and working through the esophageal hiatus the tumor containing and lower part of the esophagus was mobilized.

Neck incision was made along the anterior border of left sternocleidomastoid muscle. After incision through platysma omohyoid muscle was transected and middle thyroid vein was ligated and divided. With lateral retraction of carotid sheath cervical esophagus was encircled with penrose drain. The surgical team was aware of the presence of aberrant right subclavian artery, so we initially dissected the upper thoracic esophagus anteriorly. After lifting up the cervical Penrose drain retroesophageal dissection was done cautiously after adequate visualization. Both blunt and sharp dissection was used while intermittently pulse of the aberrant artery was being checked. Lateral attachments of the esophagus were divided with sharp dissection and the mediastinal dissection was completed.

Gastric mobilization was completed after division of gastrohepatic ligament and left gastric vessel ligation and division with abdominal lymph node dissection. Esophagus was transected in the neck and brought to the abdomen. With adequate free margin measured gastric

cardia transected and margins marked and prepared for histopathology examination. There was breach to the left pleural cavity and chest tube was inserted. The conduit was closed with two layers and pulled up to the neck without any tension and difficulty. In the neck, end to side esophagogastrostomy was done with single layer interrupted suture. Since the patient didn't have any complaint specific to the ARSCA, no treatment was made for it.

The postoperative course of the patient was an uneventful and oral feeding was started on the fifth postoperative days according to our institution's protocol. Patient was discharged from the hospital at the 8th postoperative day.

Pathology examination of the specimen revealed well differentiated squamous cell carcinoma with both proximal and distal free margin. Patient was evaluated at surgical referral clinic twice and she didn't have any complaint. Later she was linked to medical oncology on 6th post-operative week.

3. Discussion

Historically ARSCA was described by Bayford In 1794 as “Dysphagia lusoria”. Later it was named as “arteria lusoria”, because dysphagia was not a constant symptom in this anomaly [2]. It originates on the left distal to the left subclavian artery. It then runs obliquely upward to the right thoracic outlet. It crosses the midline posterior to the esophagus in more than 80 % of the cases, between the trachea and the esophagus in 15 % of the cases, and anterior to the trachea in 5 % of the cases [3].

Most patients with ARSCA are asymptomatic. Symptoms may develop in three scenarios: 1) when the esophagus and trachea are located between the arteria lusoria posteriorly and a common origin of the two common carotid arteries anteriorly, 2) when aneurysmal change develops in the aberrant subclavian and 3) when there is atherosclerotic hardening or fibromuscular dysplasia with aging [4].

In symptomatic cases and aneurysmal ARSCA, surgical treatment is

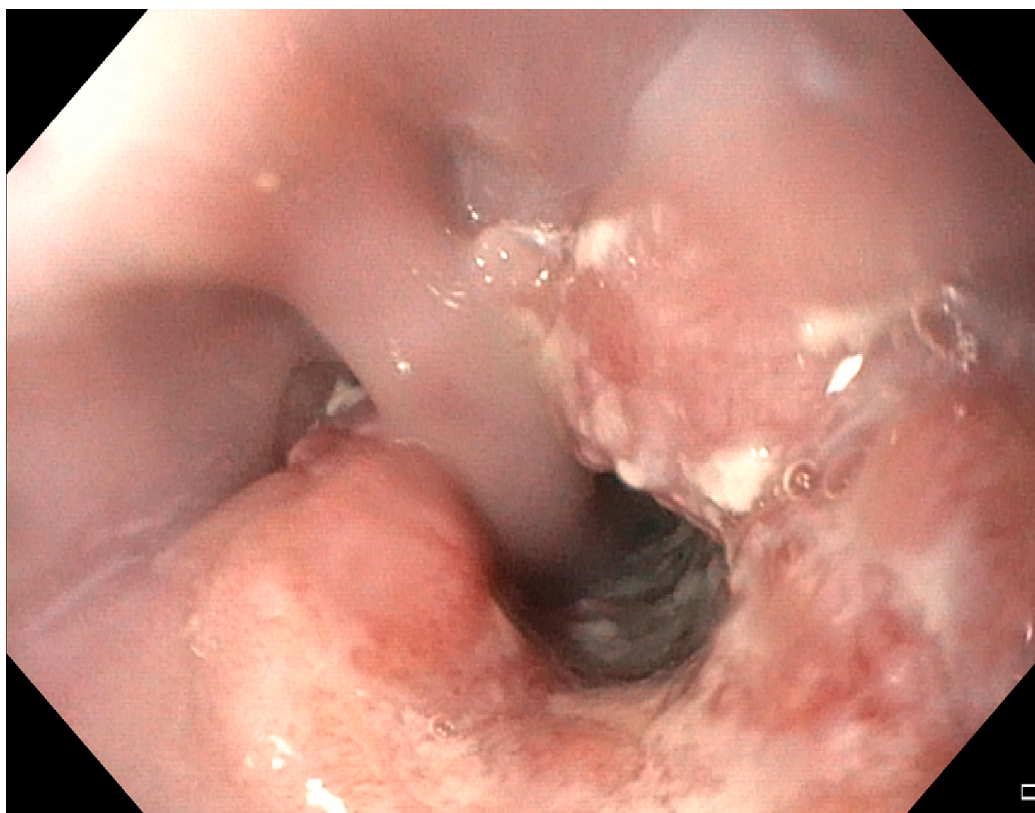


Fig. 1. Endoscopic view of the tumor showing intraluminal exophytic growth pattern.

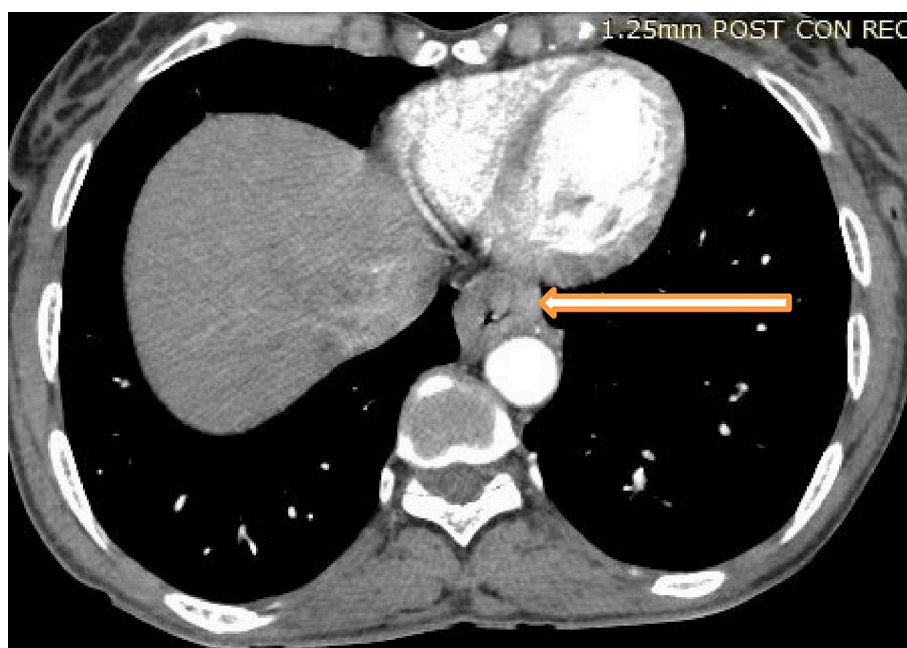


Fig. 2. Axial view of CT scan, shows circumferential distal esophageal wall thickening (arrow).

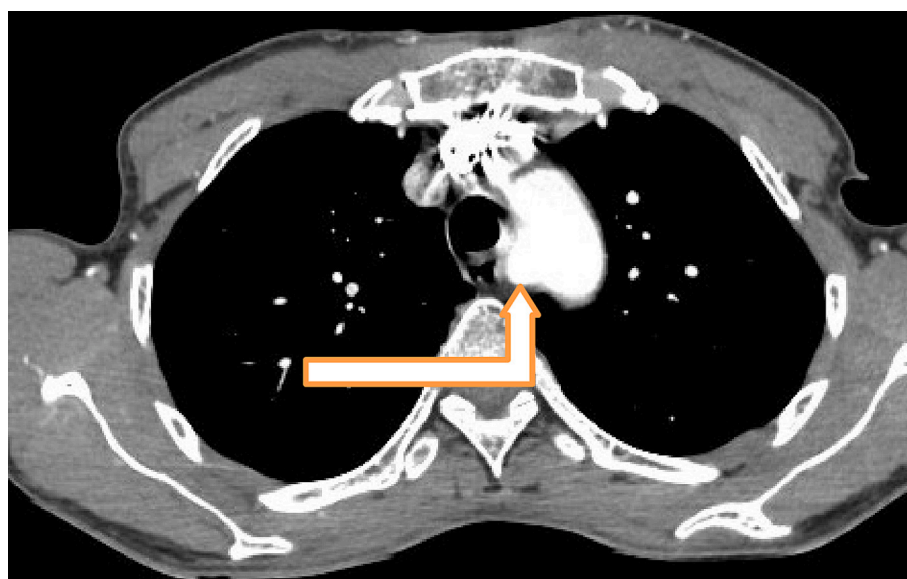


Fig. 3. Axial view of CT scan shows ARSCA originating from distal aortic arch (arrow) with indentation on lateral wall of the esophagus.

recommended. Non-aneurysmal symptomatic aberrant right subclavian artery is approached through a right supraclavicular incision. Surgical repair of aberrant right subclavian aneurysms can be accomplished through an incision in the right supraclavicular neck and left thoracotomy [4].

In asymptomatic cases, it is generally non-significant clinically, so there is no need for any intervention. But in patients having dysphagia from other causes, like esophageal cancer as in our case the symptom may be attributed to the ARSCA, unless detailed clinical evaluation and investigations are interpreted well. If patient misses appropriate management on the initial presentation, esophageal cancer may get advanced. The other challenge is performing esophagectomy might be difficult due to the proximity of the vessel to the esophagus [5].

Without detection of ARSCA prior to surgery, any surgical procedure involving the esophagus can cause life-threatening complications. It is

possible that mobilization of the esophagus may injure this vessel if an aberrant artery has not been detected preoperatively. If injury happens to this artery may result in mediastinal hemorrhage or even arterio-esophageal fistula in a long-term [5]. Preoperative diagnosis for the presence of ARSCA can be made by barium swallow where an oblique defect or indentation along the posterior aspect of the esophagus can be seen extending from left to right just above aortic arch [1,5]. A CT or magnetic resonance (MR) angiography will reveal a more definite visualization of arch anatomy and ARSCA [1].

Compared with the three incisions Ivor Lewis esophagectomy, transhiatal esophagectomy provide a lower risk of pulmonary complications that will reduce morbidity and improve clinical outcomes. During the procedure, the stomach is mobilized as a conduit to the cervical esophagus through an abdominal and cervical incision [7].

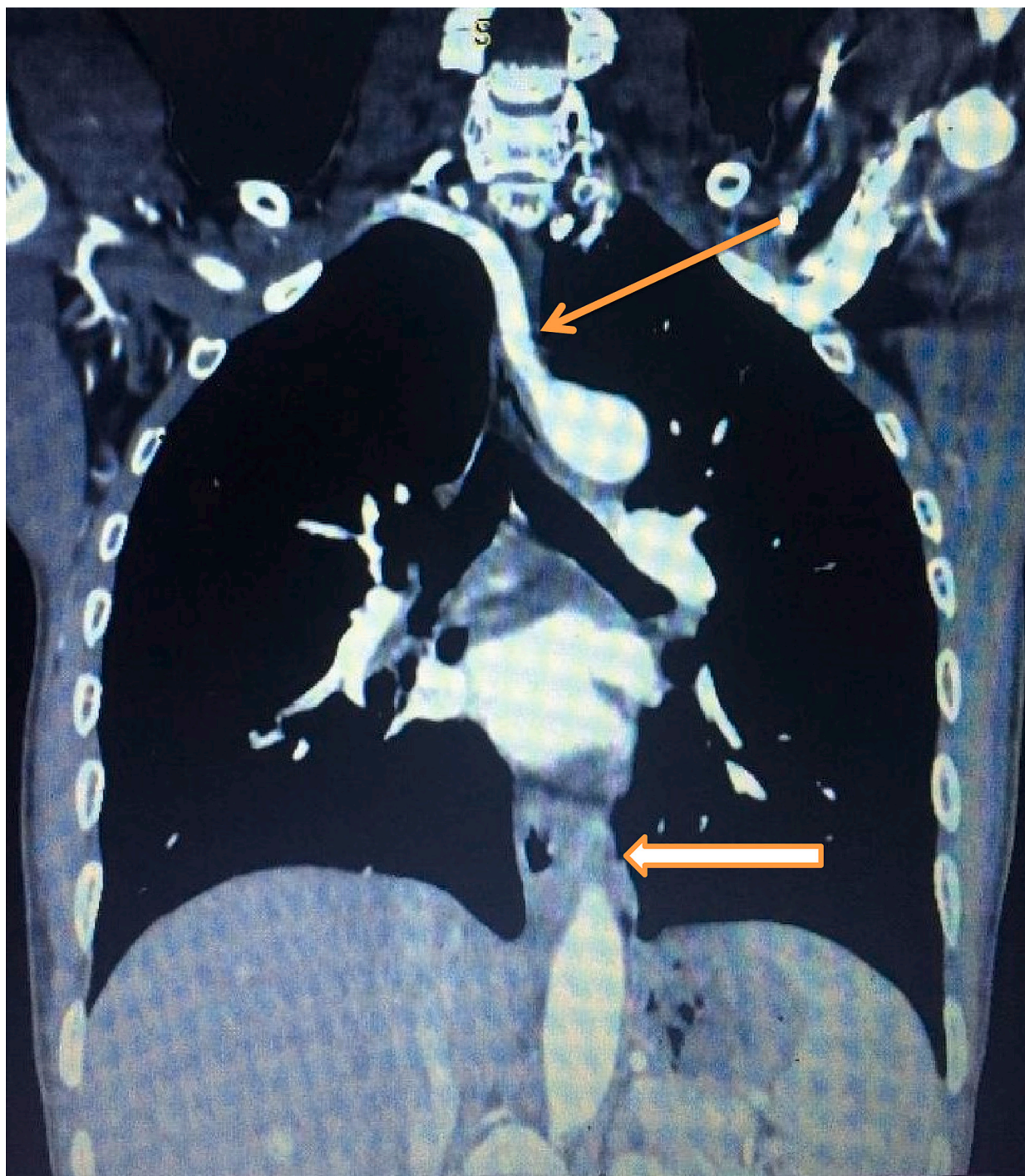


Fig. 4. Coronal view of CT scan; ARSCA coursing obliquely posterior to the esophagus to the right thoracic outlet (slender arrow) and distal esophageal thickening (wider arrow).

4. Conclusion

Performing esophagectomy in patient having aberrant subclavian artery with concurrent esophageal cancer has a risk of injuring this vessel. So, the possibility for the presence of this vessel has to be evaluated in the preoperative work up of patients with esophageal cancer who are candidate for esophagectomy.

Consent

Written informed consent was obtained from the patient for

publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

Ethical approval letter RC/DOS/89/23 was obtained from ethical committee of surgery department, Addis Ababa University, Addis Ababa, Ethiopia on 02 May 2023, to use figures and case report details in publication.

Funding

No funding.

Author contribution

WT operated on the case, did the write up of the manuscript and submitted for publication. SK supervised the surgery and reviewed the manuscript. MF followed the patient at surgical referral clinic, documented post-operative course of the patient and reviewed the manuscript. AM assisted the surgery and reviewed the manuscript.

Guarantor

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Research registration number

Not applicable.

Declaration of competing interest

The authors declare that they have no competing interests.

Acknowledgments

We thank our patient and the team involved in the management of this patient.

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