

CASE REPORT

Double aortic arch and nasogastric tubes: A fatal combination

Julia Massaad, Kelly Crawford

Julia Massaad, Kelly Crawford, Emory University School of Medicine, Division of Digestive Diseases, Atlanta, GA 30329, United States

Correspondence to: Julia Massaad MD, Emory University School of Medicine, Division of Digestive Diseases, 1822 Briarvista way NE, Atlanta, GA 30329, United States. jmassaa@emory.edu

Telephone: +1-404-8493230 Fax: +1-404-3157415

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Abstract

Double aortic arch is a common form of complete vascular ring that encircles both the trachea and the esophagus, and presents with various respiratory and esophageal symptoms, usually in the pediatric population. We present a case of double aortic arch in an adult patient that manifested as massive upper gastrointestinal bleeding after prolonged nasogastric intubation.

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Key words: Nasogastric tubes; Aorto-esophageal fistula; Gastrointestinal bleeding; Double aortic arch; Vascular rings

Peer reviewer: Volker F Eckardt, Chief, MD, Professor, Department of Gastroenterology, Deutsche Klinik für Diagnostik, Aukammallee 33, 65191 Wiesbaden, Germany

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INTRODUCTION

Aorto-esophageal fistula is a life threatening complication and its diagnosis can often be delayed in the adult patient without any history of thoracic aortic aneurysm or esophageal malignancy. It is important to note that all imaging modalities to diagnose this entity can be unsuccessful and the best chance for patient survival is a clinical diagnosis made with confidence.

We present a case of an aorto-esophageal fistula complicating nasogastric tube placement in a patient with a double aortic arch, to emphasize the importance of

clinical suspicion in diagnosing aorto-esophageal fistulas, as well as the catastrophic events that might result from nasogastric tube insertion in patients with congenital aortic arch abnormalities.

CASE REPORT

A 38-year-old woman was transferred to our hospital for management of tricuspid valve endocarditis. She had a history of intravenous drug use and had been treated for 2 wk with intravenous antibiotics, but eventually required valvular replacement. On postoperative day 11, she developed massive upper gastrointestinal bleeding. Urgent endoscopy showed a large esophageal ulcer with a probable visible vessel at 22 cm from the gums. Endoscopic therapy with epinephrine injections was performed. Two hours later, she bled again, now more severely, with secondary shock. Given the location of the esophageal ulcer and the degree of bleeding, a clinical diagnosis of aorto-esophageal fistula was made, and the patient was taken to the operating room, in which an aortic endograft was performed, with control of the bleeding. Complete aorto-esophageal fistula repair was planned once the patient's condition stabilized. She was discharged to a subacute rehabilitation facility a few weeks later. On review of her records, it was noted that the patient had a double aortic arch that completely encased her trachea and esophagus, seen on previous chest computed tomography. The patient had a nasogastric tube for more than 5 d postoperatively for feeding and medication administration.

DISCUSSION

Double aortic arch is a complete vascular ring that encircles both the trachea and the esophagus. The most common presenting symptoms, usually in the pediatric population, are respiratory (stridor) and gastrointestinal (dysphagia)^[1-3]. The incidence of aorto-esophageal fistula development in adult patients with congenital aortic arch abnormalities and prolonged nasogastric intubation has been previously reported. An extensive literature review showed an abundance of cases of congenital aortic arch abnormalities, including double aortic arch, and aorto-esophageal fistula in the setting of prolonged nasogastric intubation in the pediatric population^[4-11], but only a few in the adult patient population^[12-18] (Tables 1 and 2).

The pathogenesis of this life-threatening complication is probably related to the continuous and pulsatile pressure between the aorta and the esophagus. In this anomaly, the

Table 1 Literature review of pediatric cases with congenital aortic arch abnormalities and aorto-esophageal fistula after prolonged nasogastric tube placement^[10]

Author	Patient number	Age at admission	Day of upper gastrointestinal bleeding	Days of nasogastric intubation	Result	Reference
Chaikipinyo		2 mo	14th d of hospitalization	56	Lived	5
Miller		11 yr	17th d postoperatively	17	Lived	11
Woerkum		9 wk	22nd d postoperatively	43	Lived	10
Yahagi		9 d	8th d postoperatively	> 8	Lived	8
Heck	1	6 wk	14th d postoperatively	25	Died	4
	2	3 wk	7th wk of hospitalization	28	Lived	
McKeating		3 mo	17th d of hospitalization	17	Died	9
Sigalet	1	3.5 mo	59th d postoperatively	59	Died	7
	2	3 mo			Lived	
Othersen	1	5 wk	10th d postoperatively	?	Lived	6
	2	2 mo	48th d of hospitalization	48	Died	

Table 2 Literature review of adult cases with congenital aortic arch abnormalities and aorto-esophageal fistula after prolonged nasogastric tube placement

Author	Age of patient (yr)	Congenital anomaly	Days of nasogastric intubation	Result	Reference
Minyard	39	Right-sided aortic arch/ RESCA	6	Died	12
Feugier	24	RESCA	?	Lived	13
Edwards	36	RESCA	?	Died	14
Merchant	17	RESCA	9	Died	15
Livesay	25	RESCA	13	Died	16
Belkin	27	RESCA	60	Died	17
Gossot	72	RESCA	30	Died	18
Massaad	38	Double aortic arch	5	Lived	

RESCA: Retroesophageal subclavian artery.

trachea and the esophagus are tightly constricted within a double aortic arch and any inserted tubes (esophageal or endotracheal) can produce pressure necrosis and a resultant fistula^[5]. Aorto-esophageal fistula is a life-threatening complication and its diagnosis can often be delayed in adults without any history of thoracic aortic aneurysm or esophageal malignancy. It is important to note that all imaging modalities to diagnose this entity can be unsuccessful, and the best chance for patient survival is a clinical diagnosis made with confidence. We present this case to alert clinicians to another potential and life-threatening complication of prolonged nasogastric intubation in this specific patient population.

In conclusion, aorto-esophageal fistula is a highly fatal but potentially avoidable complication in patients with vascular rings. The risks of prolonged nasogastric intubation in this patient population definitely outweigh the benefits. The diagnosis of vascular rings can often be missed in the pediatric population, and it is only when a fatal complication such as aorto-esophageal fistula develops in adults that clinicians are alerted to the significance of this anomaly. The need to screen patients who are expected to have prolonged nasogastric intubation for any congenital aortic arch abnormalities should at least be suggested, if not emphasized, because the development of

an aorto-esophageal fistula is a fatal complication that can be avoided with a more meticulous screening technique.

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