Idiopathic internal mammary artery aneurysm in the setting of aberrant right subclavian artery

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ABSTRACT
Aneurysms of the internal mammary artery are extremely rare. Immediate treatment is necessary because of the high risk of rupture that can be life-threatening. Here we describe a case of idiopathic internal mammary artery aneurysm in a 54-year-old woman in the setting of aberrant right subclavian artery. The aneurysm was successfully treated with coil embolization without complications. (J Vasc Surg Cases and Innovative Techniques 2017;3:251-3.)

CASE REPORT
The patient is a 54-year-old woman with a past medical history of hypertension, diabetes mellitus, and end-stage renal and liver disease and a past surgical history significant for right upper extremity arteriovenous fistula. The patient presented to the Division of Vascular Surgery with an incidental computed tomography (CT) finding of a 2.4-cm right IMA aneurysm during evaluation for combination kidney-liver transplantation. A chest CT scan taken 20 months earlier showed the aneurysm size at 1.5 cm. CT angiography of the chest was performed at the time of presentation and showed the IMA aneurysm at 2.4 cm and an aberrant right subclavian artery (Fig 1). The patient denied any significant trauma or procedures to the chest. She did have a right-sided transjugular catheter placement for dialysis before her fistula but denied any trouble or difficulty during insertion. The patient was referred to the cardiothoracic surgery service for possible open repair of the aberrant right subclavian artery and IMA aneurysm, but because of the mild degree of dysphagia caused by the aberrant right subclavian artery, no further treatment was recommended. Therefore, endovascular repair of the right IMA aneurysm with coil embolization was performed.

Diagnostic angiography using a right common femoral artery approach demonstrated an aberrant right subclavian artery. This was cannulated using a VS catheter and Glidewire (Terumo Medical Corporation, Somerset, NJ). Injection arteriography through the tip of the VS catheter demonstrated a common trunk of the IMA and thoracodorsal arteries (Fig 2). Over Glidewire, a 90-cm 6F Raabe guiding sheath was advanced and successfully cannulated the proximal portion of the aberrant right subclavian artery. The anatomic course of the IMA makes it vulnerable to severe deceleration or penetrating injuries. These injuries can result in pseudoaneurysms of the IMA. Connective tissue disorders or infections are also frequent causes of IMA aneurysm. Idiopathic IMA aneurysm without a history of trauma or connective tissue disorders as described in our case is extremely rare. Although the IMA aneurysm in this case could be due to...
trauma during right transjugular venous catheter insertion, it is highly unlikely because of the uneventful placement. In the past 15 years, two idiopathic IMA aneurysms were described in the literature and were treated successfully using an open approach with uneventful recovery. The variable presentations of these aneurysms create a diagnostic dilemma. CT angiography and conventional angiography are required to delineate the IMA aneurysm and to plan the appropriate intervention. In this case, symptoms of IMA aneurysm were absent, and the aneurysm was found incidentally on chest CT during evaluation for transplantation. Whenever the diagnosis of IMA aneurysm is made, prompt therapy is highly recommended to prevent life-threatening complications, given that the majority of these pathologic processes are pseudoaneurysms in nature.

Multiple treatment options are described in the literature (open surgical repair, stent deployment, and coil embolization). The Table summarizes previously reported IMA aneurysms regarding location, etiology, treatment, and outcome. Despite the lack of long-term results, an endovascular approach by coil embolization or stent deployment has become the treatment option of choice because of its minor invasiveness. However, open surgical repair is recommended in selected cases (large aneurysms causing compressive symptoms and the need for histologic examination).

An aberrant right subclavian artery is the most common congenital abnormality of the aortic arch. Although it is mostly asymptomatic, the retroesophageal and retrotracheal course can result in progressive dysphagia, dyspnea, and aneurysmal formation. In our case, the aberrant right subclavian artery was causing mild dysphagia that did not require any intervention. The presence of an aberrant right subclavian artery in this case helped in reducing the risk of stroke associated with endovascular treatment of the arch vessels.
CONCLUSIONS
This case demonstrates that an endovascular approach with coil embolization is safe and feasible in treating right IMA aneurysm in the setting of an aberrant right subclavian artery.

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Table. Previously reported internal mammary artery (IMA) aneurysms

| Study        | Location          | Etiology                  | Treatment                                             | Outcome               |
|--------------|-------------------|----------------------------|-------------------------------------------------------|-----------------------|
| Okura et al  | Right IMA aneurysm| Idiopathic                 | Open ligation and resection                          | Uneventful recovery   |
| Phan et al   | Left IMA aneurysm | Ehlers-Danlos syndrome     | Thoracotomy (ligation of left IMA and hemothorax evacuation) | Uneventful recovery   |
| Ohman et al  | Right IMA aneurysm| Loeys-Dietz syndrome       | Coil embolization                                     | Uneventful recovery   |
| Common et al | Left IMA aneurysm | Marfan syndrome            | Coil embolization                                     | Uneventful recovery   |
| Burke et al  | Left IMA aneurysm | SMAD3 mutation             | Coil embolization                                     | Uneventful recovery   |
| Heyn et al   | Left IMA aneurysm | Idiopathic                 | Open surgical resection                               | Uneventful recovery   |
| Present case | Right IMA aneurysm| Idiopathic                 | Coil embolization                                     | Uneventful recovery   |