

Dysphagia Due to Aortic Diverticulum: An Adult Surgical Case

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A right aortic arch is an anatomic variant only occurring in approximately 0.1% of the population. A mirror-image right aortic arch without congenital cardiac anomaly is fairly uncommon. We report on a rare case of dysphagia due to isolated aortic diverticulum in a mirror-image right aortic arch. A 72-year-old man presented with dysphagia which was due to posterior compression of the esophagus by a dilated aortic diverticulum. There was no vascular ring and we thought that the pathology was atherosclerotic dilatation of the diverticulum. Graft replacement of the diverticulum was sufficient to relieve his symptom. (*Ann Thorac Cardiovasc Surg* 2007; 13: 132–4)

Key words: mirror-image right aortic arch, aortic diverticulum, dysphagia

Case

The patient was a 72-year-old man who suffered from dysphagia and weight loss of 20 kg during the past six months. He had never experienced any previous medical problems except for a lumbar disc hernia. He underwent an esophagogram which revealed external compression of the upper esophagus posteriorly. The enhanced computed tomography (CT) scan showed a mirror-image right aortic arch and a descending aortic aneurysm distal to the right subclavian artery. The descending aorta shifted to the left just above the diaphragm. The retro-esophageal aneurysm was sacciform and protruded to the left side, approaching the left subclavian artery. Therefore we made the diagnosis of an aortic diverticulum (Fig. 1). There were no intracardiac anomalies seen the echocardiogram. Because the symptom appeared later in his life and ductus arteriosus was not evident, we considered that esophageal compression was not due to a vascular ring but due to the aneurysmal dilatation of the congenital aortic diverticulum. We thus planned to simply replace the de-

scending aorta and decompress the diverticulum to relieve his symptom.

The operation was performed through the right fourth intercostal space. We did not dissect the adhesion between the aneurysm and esophagus. Ductal tissue did not exist on the right side. Partial cardiopulmonary bypass was established via the right femoral artery and vein. After cross clamping, the descending aorta was opened and a pair of intercostal artery were ligated. We did not dissect any further behind it. The descending aorta was transected and replaced with a straight woven Dacron graft (Hemashield, Boston Scientific, Oakland, NJ, USA, 22 mm).

The patient was extubated six hours after the operation and left the intensive care unit the next day. On the same day he started to eat with no symptoms of dysphagia. The postoperative CT scan and esophagogram showed no posterior compression of the esophagus. The pathological examination of the specimen revealed secondary atherosclerotic change with cholesterol clefts. He was discharged two weeks after the operation.

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Discussion

We report a rare case of isolated aortic diverticulum in the right aortic arch with mirror-image branching, from which no arch vessel arose. The patient presented with



Fig. 1. The 3-dimensional CT scan from the posterior view shows the retro-esophageal sacciform aneurysm protruding to the left side.

We made the diagnosis of isolated aortic diverticulum.

dysphagia later in his life which was due to posterior compression of the esophagus by a dilated aortic diverticulum. Graft replacement of the diverticulum was sufficient to relieve his symptom. There was no need for dissection around the esophagus, or ligation and division of the ductus arteriosus.

The embryological pattern of mirror-image right arch includes dissolution of the left dorsal aorta distal to the origin of the seventh intersegmental artery so that the left fourth arch becomes the proximal subclavian artery. The sixth arch usually connects to the proximal or subclavian artery side of the disruption. The left ductus arises from the underside of the left innominate artery and passes to the left pulmonary artery.¹⁾ In the case of true mirror-image, the right sixth arch persists as ductus arteriosus. Therefore, this type of right aortic arch does not usually produce a vascular ring except for an exceptional case that usually presents with symptoms in infancy.¹⁻⁶⁾

Another type of right arch that causes compression of

the esophagus or trachea is retroesophageal diverticulum of Kommerell, although the term “Kommerell” first meant the aberrant right subclavian artery arising from a descending aortic diverticulum in the left aortic arch.⁷⁻⁹⁾ The overall incidence is 0.3% of all who underwent cardiac catheterization.¹⁾ Disappearance of the left fourth embryonic arch with persistence of the left sixth arch between the aortic sac and left dorsal aorta accounts for this anomaly. As a rule, the ductus arteriosus is on the left side and runs from the diverticulum to the left pulmonary artery. A vascular ring is thus formed, and the posterior esophageal wall has extrinsic pressure from the posterior right arch, aortic diverticulum, and traction exerted by the left subclavian artery. Obstruction of both the trachea and esophagus is rare except in infancy and childhood.⁵⁾ Most patients are asymptomatic but treatment is surgical division of the ligamentum or ductus in patients who are symptomatic and is usually performed through a left thoracotomy.

The patient in this report had a mirror-image right aortic arch and a descending aortic diverticulum which mimics Kommerell but is not, because it has no arch branch. His symptom appeared later in his life and CT scan showed posterior compression of the esophagus by the retroesophageal segment of the descending aorta. Thus we think that the aneurysmal dilatation of the congenital diverticulum, but not the vascular ring, was a cause of dysphagia. To our knowledge, there has been only one case report of dysphagia caused by isolated aortic diverticulum in the right aortic arch without a vascular ring. In this case they divided the diverticulum at its origin and the defect was closed by direct suture.¹⁰⁾

Conclusion

We report on a very rare case of dysphagia caused by the isolated aortic diverticulum in a mirror-image right aortic arch. Simple graft replacement of the aneurysm through right thoracotomy completely resolved his symptom, and there was no need for ductal ligation or any other additional procedures.

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