sure generated, have been reported. These include an acute aortic dissection [4], rib fractures, and lung herniation [5].

Our patient developed diaphragmatic and intercostal muscle injuries after an episode of sneezing. Diaphragmatic injuries typically occur after blunt or penetrating trauma. Injury occurs in approximately 1% to 7% of patients with significant blunt trauma and 10% to 15% with penetrating wounds [1].

Spontaneous diaphragmatic injuries are rare, representing only 1% of all injuries. Such events have been reported after bouts of coughing, parturition, and heavy exercise. A lack of muscular coordination during sudden and violent Valsalva maneuvers is the likely mechanism leading to spontaneous diaphragmatic injury [2]. Injury is reported to occur 5 times more frequently on the left than on the right, due to protection by the liver on the right and the presence of the thin deficient lumbocostal trigone on the left [1, 2].

Auscultation of bowel sounds in the chest is pathognomonic of diaphragmatic tear with bowel herniation [1]. Timely diagnosis can be problematic and, to overcome this, the possibility of a diaphragmatic injury should always be considered early [1]. Complications of delayed diagnosis include herniation and strangulation of intra-abdominal organs [6]. Computed tomography is a useful diagnostic tool, not only in providing information on diaphragmatic injuries but also in looking for any associated injuries [1].

Diagnosis in a number of cases continues to occur only at surgery. Treatment is through surgical repair preferably with nonabsorbable sutures, performed through either laparotomy or thoracotomy, or a combined procedure [1].

This is a very unusual presentation of a diaphragmatic injury. To our knowledge, there are no other reported cases of this condition after sneezing. Diaphragmatic injuries can be life threatening, therefore the possibility should be considered even in patients without a history of trauma.

References

Mycotic Aneurysm of the Aortic Arch Presenting With Left Vocal Cord Palsy

George Tokmajj, Igor Gosev, MD,
Kanako Kunishima Kumamaru, MD, PhD, and
Ralph Morton Bolman, III, MD

Division of Cardiac Surgery, and Department of Radiology, Brigham and Women’s Hospital, Boston, Massachusetts

We report a case of a 71-year-old man with a mycotic aneurysm of the aortic arch who presented with progres-

Fig 3. Intraoperative photograph showing extended full thickness incision to intercostal muscle tear.

© 2013 by The Society of Thoracic Surgeons
Published by Elsevier Inc

http://dx.doi.org/10.1016/j.athoracsur.2012.11.033
sive hoarseness. Three weeks prior to this event the patient was admitted to an outside hospital in septic condition and was diagnosed with a mycotic abdominal aortic aneurysm. Resection of the infected abdominal aortic aneurysm with right axillofemoral and femoral-femoral bypass grafts was performed and the patient was discharged home on intravenous antibiotics. At our institution, the aortic arch aneurysm was treated with extensive debridement and replaced with a Dacron prosthesis under circulatory arrest with antegrade cerebral perfusion through the axillofemoral bypass.

A mycotic aortic aneurysm is an irreversible dilatation of the vessel wall associated with infection-related destruction of the aortic media and is known for being a serious life-threatening condition due to the significant rupture risk [1, 2]. Paralysis of the left vocal cord due to compression of the left recurrent nerve is a rare complication of this type of aneurysm. More common symptoms are pulsatile, painful, and enlarging mass with systematic features of infection [3]. The commonly accepted treatment for this condition is an open surgical procedure with extensive debridement of all necrotic and infected tissue around the vicinity of the aneurysm and resection of the diseased aortic segments.

We report a case of a 71-year-old male with a mycotic aneurysm of the aortic arch who presented to an outside hospital with progressive hoarseness. After initial workup, the patient was referred to the Brigham and Women’s Hospital for a possible mycotic aortic arch aneurysm repair. Two months prior, the patient was admitted to an outside hospital with *Clostridium septicum* sepsis and was found to have a mycotic aneurysm of the abdominal aorta. Resection of the infected abdominal aortic aneurysm with right axillofemoral and femoral-femoral bypass grafts was performed and the patient was discharged home on intravenous antibiotics (Fig 1).

The patient tolerated the procedure and was recovering well. However, 3 weeks later he developed increasing hoarseness and a dramatic loss of his voice associated with unilateral vocal cord palsy. Subsequent evaluation revealed an extensive aneurysm of his aortic arch that was compressing on his left recurrent nerve. The patient’s medical history was significant for ulcerative colitis on chronic corticosteroid therapy, prostate cancer, hypertension, smoking, and osteoporosis.

On presentation to our institution, the patient was afebrile (36.3°C), with a blood pressure of 141/81 mm Hg, and in normal sinus rhythm. On physical examination, the patient was alert and oriented. His lungs were clear and he had good symmetrical pulses on all 4 extremities.

A computed tomographic (CT) scan showed a large, irregularly shaped aneurysm of the aortic arch involving origin of the arch vessels with a moderate size mural thrombus measuring 9.0 × 6.6 cm (Figs 2 and 3). A positron emission tomography-CT showed elevated mural fluorodeoxyglucose uptake most prominent in the aortic arch concerning for an infectious aortitis.

The patient was placed under general anesthesia. A 6-mm Dacron graft was placed on the right femoral artery, which was attached to the arterial limb of the bypass circuit. In this setup, the blood was flowing retrograde through the axillofemoral bypass into the right axillary artery. This was used for antegrade
cerebral perfusion during the period of systemic circulatory arrest. We approached the aorta and the aortic arch through a midline sternotomy and the aorta was replaced using 30-mm 4-branched aortic arch prosthesis with a 10-cm elephant trunk extension into the descending thoracic aorta. Individual branch reconstruction of the head vessels using branches of the Dacron prosthesis with proximal attachment of the graft at the sinotubular junction were performed (Fig 4). Cardiopulmonary bypass time was 363 minutes, cross-clamp time was 205 minutes, and deep hypothermic circulatory arrest at 18°C was 122 minutes with antegrade cerebral perfusion through an axillofemoral bypass and a terminal dose of retrograde cerebral perfusion through superior vena cava cannula for removal of air and debris removal.

The resected tissue material showed evidence of a prior infection and no bacterial growth. Blood cultures were also negative.

The patient’s postoperative course was complicated by pneumonia, problems with swallowing and acute tubular necrosis for which he required dialysis. His kidneys eventually recovered. The patient was discharged in a good condition on a life-long course of amoxicillin for suppression of possible persistent infection. He has done well at home with the exception of swallowing problems and hoarseness that were treated 2 months later with cordal injections.

Comment

A mycotic aortic aneurysm is a life threatening condition with high risk of rupture due to infection-related damage to the aortic media [1, 2]. Our patient presented with left vocal cord palsy without other commonly seen symptoms of the mycotic aneurysms such as pulsatile, painful, and enlarging mass with systemic features of infection. His aneurysm involved origin of the arch vessels and prompted complete arch replacement with elephant trunk extension for possible second-stage descending aortic repair.

During the procedure planning it was noticed that the right axillary artery was already used for distal bypass and that its exposure for the arterial cannula site would compromise blood flow to the lower part of the body. A 6-mm Dacron graft was placed on the right femoral artery, which was then attached to an arterial limb of the bypass circuit. In this setup, the blood was flowing retrograde through the axillofemoral bypass into the right axillary artery. This was used for antegrade cerebral perfusion during the period of systemic circulatory arrest. A 4-branched aortic arch prosthesis with a 10-cm elephant trunk extension into the descending thoracic aorta and individual branch reconstruction of the head vessels using branches of the Dacron prosthesis with proximal attachment at the sinotubular junction was performed.

Due to the recurrent aortic aneurysm, our patient was placed on lifelong antibiotic prophylaxis. Known risk factors for developing an aortic aneurysm that the patient had were chronic immune suppression therapy, history of smoking, and hypertension [4–6]. In order to minimize the risk for a recurrent aortic aneurysm and due to the absence of major flares of ulcerative colitis in 10 years time, immune suppression therapy had been stopped postoperatively. The pathophysiology and cardiopulmonary setup that we were confronted with in the manage-
iment of our patient was a unique learning experience that led to this case report.

References