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Case report

Circumferential dissection of ascending aorta☆

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ABSTRACT

Acute type A aortic dissection is a surgical emergency. Unfortunately, the early outcome of surgical correction has not improved significantly over the past 20 years (Chiu and Miller, 2016). There is still conflict regarding operative extent and optimal conduct of the operation (Chiu and Miller, 2016). Stanford type A aortic dissection deforms the aortic root and causes aortic regurgitation. On rare occasion, there can be circumferential intimal disruption. Because of the critical, general and hemodynamic state of patients, surgery carries high risk. Two cases with circumferential Stanford type A aortic dissection were detected; Case I had interposition graft while Case II underwent Bentall's procedure.

Introduction

Aortic Dissection is a life threatening condition. It requires immediate surgical intervention to prevent the grave consequences. Despite continuous advances in diagnostic methods, operative technique and perioperative care; acute Stanford type A aortic dissection remains a major unsolved cardiovascular surgical challenge, as illustrated by the most recent International Registry of Acute Aortic Dissection (IRAD) report showing an 18% operative mortality in a contemporary cohort [2010 – 2013].[2] We came across circumferential dissection of ascending aorta on two such occasions.

Case reports

Case I

A 54 years old patient was admitted to our hospital with acute chest pain, dyspnea (NYHA class iii) and vomiting for 2 days. On examination, there was significant difference in blood pressure of upper (90/50 mmHg) and lower limbs (120/70 mmHg); pulsation in both upper limbs had low volume while in both lower limbs it was high volume. Both carotid pulses appeared low volume with similar character. He had no neurological deficit and adequate urine output. Cardiac examination revealed normal heart sounds with grade 2/6 systolic and 3/6 diastolic murmur over left sternal border.

Investigations

Chest radiography revealed enlarged cardiac silhouette and pulmonary congestion. Twelve leads electrocardiography showed normal sinus rhythm with no ischemic changes and LV strain pattern. Biochemistry and hematological profiles were within normal limits. Two-dimensional Trans-thoracic echocardiography revealed moderate dilatation of aortic root and severe aortic regurgitation with normal LV dimension and LVEF of 55%. However, aortic valve leaflets were normal in morphology. There was a large flap seen in ascending aorta extending to arch and great vessels that was visualized on supra-sternal view. Epigastric view showed flap in descending aorta.

Surgery

Two arterial invasive monitoring lines were placed in right radial artery and left femoral artery. CPB was established with femoral and right atrial cannulation and the patient was cooled to 28 °C. Large clots were found all around the heart on opening the pericardium. All clots were evacuated. Ascending aorta was dilated tapering towards great vessels. A small area was cleared proximal to innominate artery for aortic cross clamp. Aorta was vertically opened at the most dilated part after cross clamping. Dissection had complete intimal disruption circumferentially with intact surrounding adventitia (Fig. 1). The dissection was well away from both coronary ostia (Fig. 1). Aortic valve was found to be morphologically normal (Fig. 1). We decided to preserve aortic valve and coronary ostia. We created proximal and distal cuff of aorta with Teflon felt taking care to suture adventitia and intima in a single layer. We replaced ascending aortic segment with number 24 knitted polyester graft. Patient was weaned from cardiopulmonary bypass. Radial and

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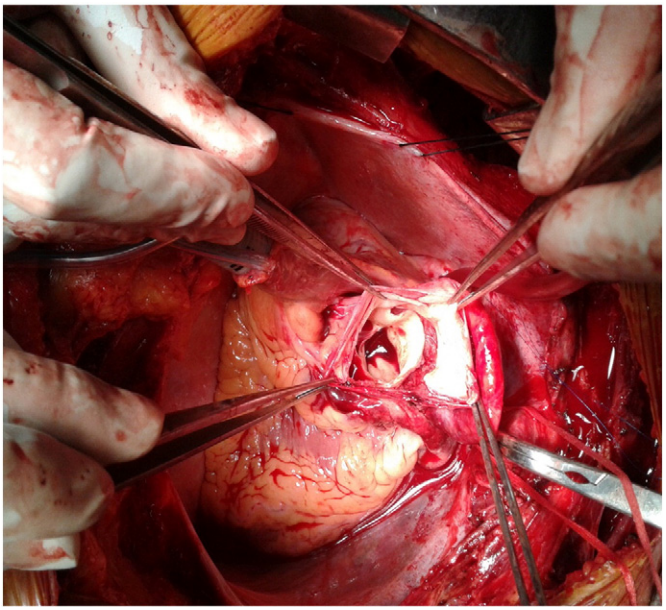

Fig. 1. Dissection is away from coronary ostia.

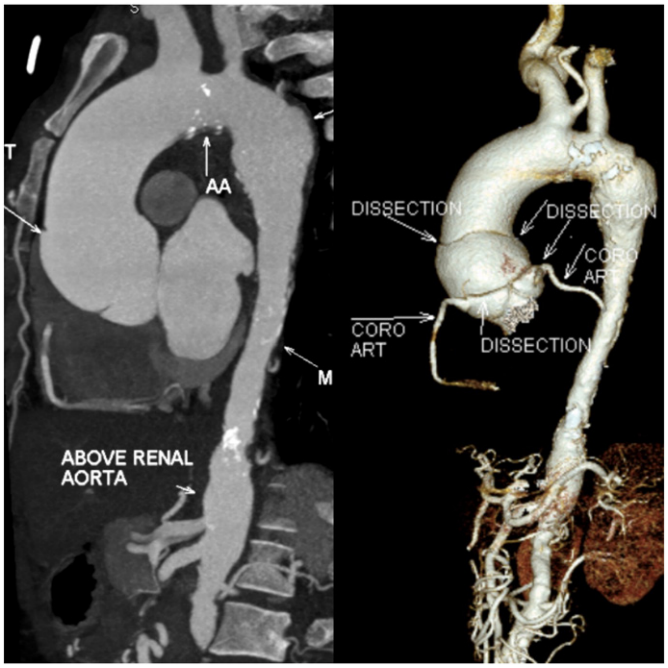

Fig. 2. Pre-Op CT s/o Stanford type A aortic dissection.

femoral pressures were the same as opposed to the preoperative condition. The chest was kept open in view of diffuse oozing. Next day, chest closure was done and the patient was extubated 72 h after surgery. The patient did not require any ionotropic support. The Patient was discharged on 10th post-operative day. Post-operative trans-thoracic echo showed no flap in aorta with trivial AR and normal LV Function.

Case II

A 35 years old female patient with no known medical disease presented with complains of acute onset of chest pain, palpitation and dyspnea for five days. She was admitted in intensive care unit where she was found to be hypertensive (150/90 mmHg) and tachycardia (110/min) and tachypnoic. She was awake, alert and exhibited no neurologic deficits. She had adequate urine output.

Investigations

Her electrocardiogram showed normal sinus rhythm without ST-T wave changes, and her troponin T was normal with normal renal function test. Chest radiography revealed dilated ascending aorta. Transthoracic echocardiography revealed moderate dilatation of aortic root, dissection flap in ascending aorta and severe aortic regurgitation with normal LV dimension and LVEF of 55%. A computed tomography (CT) scan with contrast was obtained. The CT scan revealed acute Stanford type A dissection arising from the aortic root and extending 2 cm proximal to the origin of brachiocephalic artery (Fig. 2). She was scheduled for emergency aortic reconstruction with aortic valve replacement.

Surgery

The patient underwent induction of general anesthesia with tracheal intubation. Two arterial invasive monitoring were placed; one each in right radial artery and left femoral artery. Transesophageal echocardiography (TOE) was subsequently performed, which confirmed the presence of a dissection flap in the ascending aorta with severe AR, the LV wall motion was normal and there was no hemopericardium. CPB was established with axillary and right atrial cannulation and the patient was cooled to 28 °C. The aortic root with ascending aorta was excised and Bentall's procedure was done. The patient had an uneventful recovery. Post-operative trans-thoracic echo show no flap in aorta (Confirmed on Post-Op CT scan Fig. 3) with normal LV Function.

Discussion

The evolution in the management of patients with acute Stanford type A aortic dissection has been one driven by inertia and oscillating whims, rather than progressive change. Throughout this process, the debate over the extent of the operation both proximally and distally has recurred.[1] The primary event was a tear in the aortic intima. Its incidence is estimated at 2.6–3.5/100,000 patient years.[3] Systemic hypertension is the most important predisposing factor for acute aortic dissection.[4,5] If untreated, acute dissection of the ascending aorta

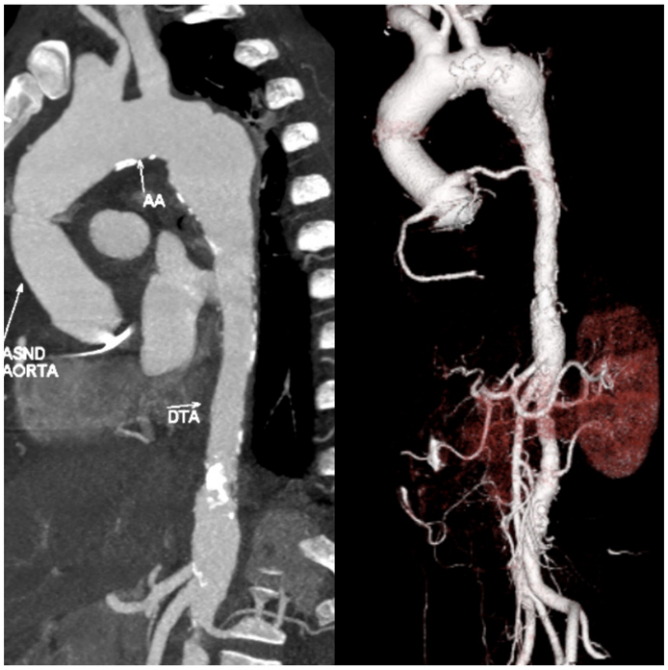

Fig. 3. Post-operative CT scan.

(Stanford type A) is associated with a mortality rate of 60% in first 24 h., 80% within 15 days and 90% within 3 months. Early diagnosis and surgical treatment improves survival preventing a number of sequelae (hemorrhagic shock, cardiac tamponade, aortic rupture or acute occlusion of major aortic branches and cardiogenic shock due to aortic regurgitation).[6,7] Successful surgery of circumferential dissection of ascending aorta is rarely reported.[8] However, we replaced ascending aorta only in first case and the root was spared due to the normal morphology of aortic valve while ascending aorta with aortic valved conduit been replaced in second. Continuity of the true lumen was maintained in both cases so that false remains will subsequently get thrombosed preventing extension of dissection in either direction. First patient is in follow up in NYHA class I with echocardiography suggestive of trivial AR, second patient had first follow up and was in NYHA class I. The rarity of the condition demands a long term follow up of surgical correction and a technical challenge to surgeons.

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