Acute type A aortic dissection surgery impeded by substernal colon interposition

Maximilian Vondran*, Farhad Bakhtiary, Michael Andrew Borger and Friedrich Wilhelm Mohr

Department of Cardiac Surgery, Heart Center, University of Leipzig, Leipzig, Germany

* Corresponding author. Department of Cardiac Surgery, Heart Center Leipzig, University of Leipzig, Struempellstr. 39, 04289 Leipzig, Germany. Tel: +49-341-8651421; fax: +49-341-8696646; e-mail: maxmilian.vondran@gmx.de (M. Vondran).

Received 5 May 2014; received in revised form 4 August 2014; accepted 18 August 2014

Abstract

A 54-year old female patient presented with acute aortic dissection, Stanford type A, and a past history of oesophageal resection with substernal colon interposition. Preoperative computer tomography confirmed the aortic dissection and revealed a colonic graft that was adherent to the sternum. We report the first successful surgical treatment of aortic dissection in this challenging patient.

Keywords: Aorta/aortic · Aortic arch · Aortic dissection · Aortic operation · Oesophageal biology/pathology · Oesophageal injury/perforation

INTRODUCTION

We describe an extremely rare condition of an acute aortic dissection, Stanford type A (AADA), occurring in a patient who underwent previous oesophageal resection with substernal colon interposition due to alkali injury. To the best of our knowledge, no case has been reported in the English language literature.

AADA is a life-threatening condition associated with significant morbidity and mortality [1]. Failure in prompt diagnosis of AADA results in deferred surgical treatment, exposing the patient to an excessive risk of early mortality.

CASE REPORT

A 54-year old female with a medical history of alkali injury of the oesophagus with a colon interposition at the age of 2 years, an ileus at 12 years, bouginage of the proximal colon interposition anastomosis at 18, a Billroth I operation due to persistent gastric haemorrhage at 22, a hysterectomy at the age of 40 years because of multiple myomata and persistent hypertension (insufficiently treated).

The primary admission occurred at a tertiary care centre because of acute chest pain and dyspnoea. The patient initially received a loading dose of heparin 5000 IU. Screening for acute myocardial infarction and pulmonary embolism was negative.

The patient was transferred to our emergency department. The blood pressure was 110/70 mmHg with antihypertensive medication. Computed tomography (CT) revealed an AADA with an entry site just above the aortic root with extension to the abdominal aorta. A re-entry site was located 1 cm distal to the left renal artery. The false thoracic lumen was not perfused. The supra-aortic vessels were all being perfused by the true lumen, with the exception of a proximal small dissection in the left common carotid artery. A colonic interposition was located in the anterior mediastinum and was directly adherent to the sternum (Fig. 1).

Emergency surgery was performed at our centre via a median sternotomy. For cerebral oxygenation monitoring, near infrared spectroscopy was utilized with two separate optodes placed over both frontal lobes [2]. Cannulation for cardiopulmonary bypass (CPB) was implemented via the right axillary artery to secure upper extremity perfusion during moderate hypothermia [3] and the right femoral vein by the Seldinger technique using a two-stage cannula. Median sternotomy was performed with an oscillating saw to prevent injury to the colon interposition graft. Following this, very difficult exposure of the colon interposition graft was achieved with a complete dissection from the surrounding structures, especially the sternum and the pericardium without any resultant injuries. Accordingly, the colon interposition graft was pushed to the right and the pericardium could be dissected freely.

After institution of CPB, the distal ascending aorta was cross-clamped and resected just above the coronary ostia. Two entry sites were located in the middle of the ascending aorta, and one extended to the ostium of the right coronary artery. Retrograde blood cardioplegia was given through a coronary sinus catheter.

CPB was reduced to 20% and the aortic arch was opened at a target bladder temperature of 28°C. No re-entry site was detectable in the aortic arch. The dissected layers of the aortic arch were glued together with BioGlue (CryoLife, Atlanta, GA, USA). The convexity of the aortic arch was resected and a 26-mm Dacron graft with an additional 8-mm side arm (Hemashield Platinum, Maquet, Rastatt, Germany) was anastomosed to the re-approximated layers. After 8 min of reduced flow, full CPB flow was restored and the patient was warmed up to normal temperature.

A saphenous vein bypass graft was anastomosed to the RCA because of the dissected ostium, and additional antegradecardioplegia was given via the left coronary ostium and the bypass graft. The complete aortic root with its valve was resected and replaced by a biological aortic valve prosthesis (CEP; Carpentier-Edwards PERIMOUNT Magna, Irvine, CA, USA) sewn within a 26-mm Hemashield graft (i.e. ‘bio-root’). The left coronary ostium was re-implanted and the right
ostium was ligated. Aortic cross-clamping was released after 74 min of cardiac ischaemia. Because of concerns of a possible stenosis of the left common carotid artery, an extra-anatomical bypass at the level of the carotid bifurcation was performed end-to-side with the 8-mm side arm of the Dacron prosthesis.

The myocardial reperfusion time was 50 min and the total CPB time was 127 min. Brain monitoring showed adequate saturation and perfusion at all times.

The patient was extubated within 48 h after surgery and resumed oral intake on postoperative day 72 h. She was discharged 17 days later in good condition and without neurological deficits. Postoperative CT examination of the aorta was unremarkable with the exception of a persistent dissection in the descending and abdominal aorta (Fig. 2).

DISCUSSION

AADA is an uncommon but life-threatening acute pathology of the aorta. A very rare presentation of this is AADA with earlier colon interposition of the oesophagus, which was first described in 2011 by Kao et al. [4]. To the best of our knowledge, no such case has been reported in the English language literature.

In AADA with existing colon interposition present, it is important to determine the tears in the affected area using preoperative CT imaging. Additional transeosophageal echocardiography is inapplicable due to the risk of rupturing the interposition graft. Intraoperative epicardial ultrasound can be used to monitor aortic valve function post-replacement or repair. Another important aspect of preoperative CT imaging is the determination of colonic graft positioning (i.e. retrosternal versus retromediastinal) and the extent of adhesions with the sternum and surrounding structures. The colon interposition graft should be pushed to the right side to facilitate access to the aortic arch. If it is injured during its preparation, immediate suture closure is recommended in order to prevent postoperative mediastinitis.

Conflict of interest: none declared.

REFERENCES