

Intraoperative Malperfusion after Central Repair for Acute Aortic Dissection

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Abstract

A 54-year-old man was hospitalized with sudden occurrence of chest and back pains. Computed tomography revealed a thrombus acute type A aortic dissection. Emergency prosthetic graft replacement of the ascending aorta was performed. After completion of the central repair, intraoperative transesophageal echocardiography showed significant narrowing of the true lumen due to the expansion of the false lumen at the level of the descending thoracic aorta. We successfully performed surgical aortic fenestration at the level of the descending thoracic aorta after the reestablishment of cardiopulmonary bypass.

Key words: malperfusion; acute type A aortic dissection; surgical fenestration

Introduction

Although recent advances in the management of acute aortic dissection have improved the outcomes of surgical intervention for the disease, this condition is still challenging, particularly when associated with malperfusion, a pathology that carries a significantly poor prognosis.

Case Report

A 54-year-old man was hospitalized after presenting with chest and back pain, and weakness in his bilateral lower extremities. The symptoms in his legs had resolved by the time he had arrived at our hospital. Arterial pulsations in his bilateral legs were excellent. Medium-Contrast Computed Tomography (CT) revealed a thrombosed acute type A aortic dissection. All aortic branches to the visceral organs emerged from the true

lumen. Emergency prosthetic graft replacement of the Ascending Aorta (AA) was performed. Cardiopulmonary Bypass (CPB) was established with bicaval blood drainage and arterial return through the Right Femoral Artery (FA). After the AA was cross-clamped, proximal anastomosis was performed, with systemic cooling to a rectal temperature 25°C. Antegrade selective cerebral perfusion was started. Because no entry was present in the AA or aortic arch, the patient's AA was replaced. However, 27 minutes after he was easily weaned from CPB, the pressure gradient between the left FA and the right radial artery was 70 mmHg. Transesophageal Echocardiography (TEE) showed a significant narrowing of the true lumen due to the expansion of the false lumen in the Descending Thoracic Aorta (DTA) (Figure 1A). We decided to perform the surgical fenestration at the DTA level, because the patient had previously undergone an abdominal aortic aneurysm repair. CPB was reestablished with Right Atrial (RA) drainage and arterial return through the right FA and side branch of the vascular prosthesis. An excellent surgical view of the DTA was provided by displacement of the heart with a heart positioner followed by opening the pericardium into the left pleural cavity. A longitudinal incision of approximately 2 cm was made in the adventitia of the DTA, and the thrombi in the false lumen were removed. A transverse incision of approximately 1 cm was then made on the intima, and the adventitia was approximated with 4-0 polypropylene and felt strips. We confirmed the expansion of the true lumen in the DTA by intraoperative TEE (Figure 1B). The patient recovered uneventfully. Enhanced CT showed expansion of the true lumen and closure of the false lumen with thrombus (Figure 2A, 2B).



Figure 1: Intraoperative transesophageal echocardiography. (A) Before fenestration. Narrowing of the true lumen due to expansion of the false lumen in the descending thoracic aorta. (B) After fenestration. Expansion of the true lumen in the descending thoracic aorta was observed.

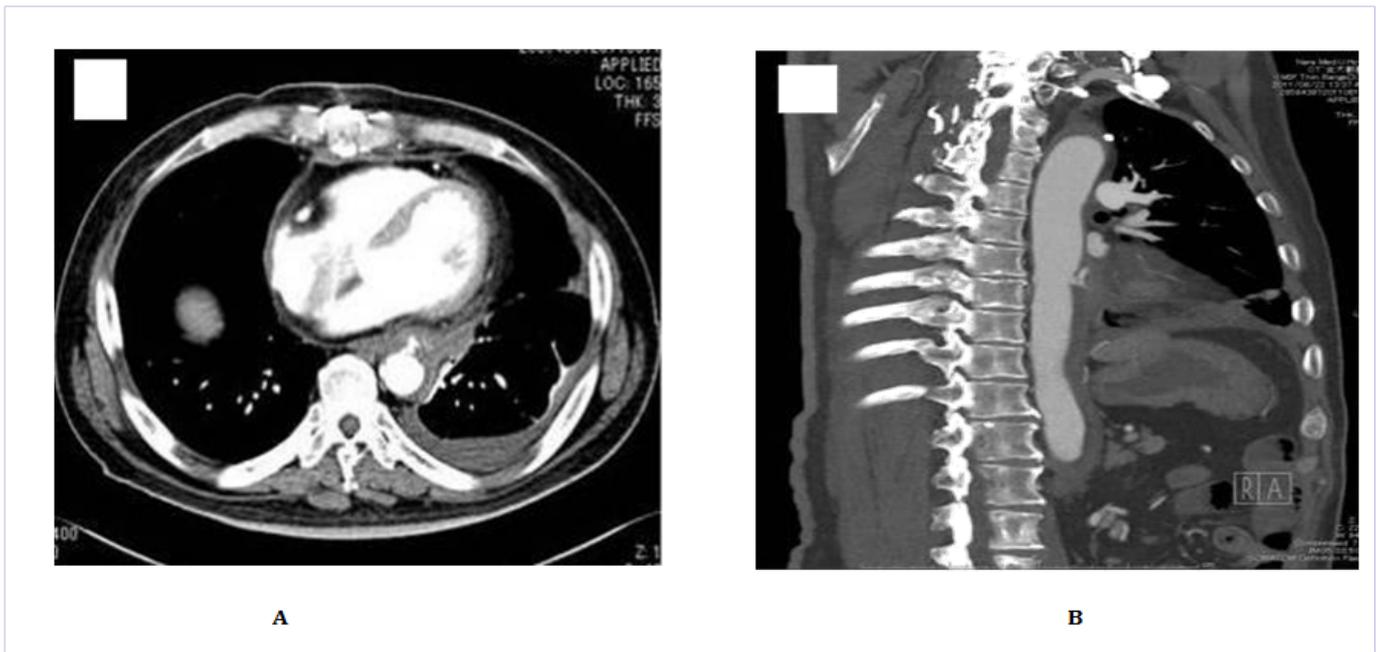


Figure 2: (A) and (B) Postoperative medium-contrast computed tomography. The almost normal diameter of the true lumen was maintained, and the false lumen was occluded with a thrombus.

Discussion

Malperfusion associated with acute type A and B aortic dissection contributes to a poor prognosis.

Malperfusion usually occurs due to the presence of multiple intimal flaps or the compression of the true lumen by the false lumen [1]. Some cases in which the malperfusion occurred before surgery or at the time of the initiation of CPB or aortic cross-clamping have recently been reported in the English literature. Ninety-two percent of the malperfusions occur before surgery

and, are expected to resolve spontaneously after proximal aortic replacement [2].

In our case, after completion of the CPB, we noted the reduction in blood pressure of the FA. TEE revealed the narrowing of the true lumen due to the expansion of the false lumen in the DTA, which was thought to be due to the blood flow to the false lumen through residual intimal tears. Surgical fenestration, direct revascularization, endovascular therapy (fenestration or true lumen stenting), and entry closure with stent-grafting have been

reported as methods of malperfusion repair. Surgical fenestration was first reported in 1935 by Gurin, et al. and some investigators have performed surgical fenestration at the suprarenal and infrarenal level [3, 4]. However, to our knowledge, no reports have described surgical fenestration at the DTA level immediately after central repair. The operative mortality of aortic fenestration in patients with aortic dissection remains high, ranging from 21% to 71% but, the mortality rate of stent grafting in patients with malperfusion has been reported as 14.3 % [5-8]. Stent grafting may be an effective alternative to surgical fenestration. However, no reports have examined stent grafting for malperfusion immediately after central repair, as in our situation. We chose surgical fenestration because a hybrid operation room was not available, and the stent grafting device was not ready. We performed surgical fenestration at the DTA level because the patient had previously undergone an abdominal aortic aneurysm repair. The excellent surgical view of the DTA for the fenestration was yielded by rightward displacement of the heart with a heart positioner.

No uniformed therapies exist for malperfusion. It is important to promptly select the appropriate therapy to suit the challenging conditions of each individual case.

Declaration of Conflicting Interests

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