Archives of Clinical and Experimental Surgery
2020 VOL 9, NO. 1, PAGE 16-18

CASE REPORT

Open Acess

Staged hybrid therapy of open and endovascular repair for acute type a aortic dissection complicated descending aortic rupture

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ABSTRACT

Acute type an aortic dissection is one of the most life-threatening diseases, especially when malperfusion or aortic rupture is complicated. We present the case of a 67-year-old man with right limb ischemia and descending aortic rupture complicated by acute type an aortic dissection. We performed central operation with entry resection first. On postoperative day 5, we performed thoracic endovascular aortic repair (TEVAR) for descending aorta; thereafter, we evacuated a giant extrapleural hematoma from the left thoracic cavity. The treatment was successful. Concomitant use of open surgery and endovascular repair is one of the most effective options.

ARTICLE HISTORY
Received: September 23, 2020
Accepted: October 07, 2020
Published: October 14, 2020

KEYWORDS
Acute type a dissection; Malperfusion; Aortic rupture; Hybrid therapy

Introduction

Despite substantial advances in the open operative technique and endovascular treatment, acute type an aortic dissection (TAAD) is one of the most life-threatening diseases. The operative mortality rate ranges from 10% to 26% [1,2]. If the entry tear is located in the ascending aorta or arch of the aorta, emergency open aortic replacement is required to prevent cardiac tamponade and malperfusion. However, when aortic rupture is complicated, the strategy for aortic repair becomes challenging. We report the case of a patient with TAAD-complicated descending aortic rupture and discuss the management.

Case Report

A 67-year-old man was admitted to our emergency department with a complaint of chest pain and nausea. His previous medical history included hypertension for 10 years. On examination, he was conscious but pale with a sweaty forehead. The blood pressure was 110/73 mmHg and 90/77 mmHg in his right upper and lower limbs, respectively and 141/71 mmHg in his left lower limb. Electrocardiography showed normal sinus rhythm with no ST elevation. Computed tomography angiography revealed Stanford type an aortic dissection from the ascending aorta to the common iliac arteries, causing ischemia of the right limb (Figure 1). The entry tear was located in the arch of the aorta. There was a giant extra pleural hematoma in the left thoracic cavity indicative of descending aortic rupture. However, the vital signs were stable; therefore, we considered the descending aorta as a sealed rupture. We decided to perform central operation first. The entry was located in the proximal arch of the aorta. We performed the entry resection and hemi-arch aorta replacement with brachiocephalic artery and left common carotid artery reconstruction. On the day of the operation, the patient was awake and was confirmed to have no paralysis. The blood pressure was stable, while the oxygenation was kept low even under the control of the respirator. Computed tomography angiography revealed decrease in the false lumen and amelioration of right limb ischemia. The giant extrapleural hematoma in the left thoracic cavity remained unchanged (Figure 2). On postoperative day (POD) 5, we performed thoracic endovascular aortic repair (TEVAR) for the descending aorta with axillo-axillay bypass and

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left subclavian artery embolization. On POD 6, we performed thoracoscopic evacuation of the giant traumatic extrapleural hematomas. We evacuated 700 g of extrapleural hematoma. Oxygenation improved gradually, and the patient was weaned from ventilation on POD 12. On POD 18, he fell into a deep coma suddenly. His spontaneous respiration disappeared completely. Computed tomography revealed wide-range cerebellar hemorrhage and ischemic changes in the brain stem. We evaluated that his brain damage was irreversible, and he was not indicated to undergo craniotomy for removal of the hematoma. His blood pressure decreased gradually, and he died on POD 23.

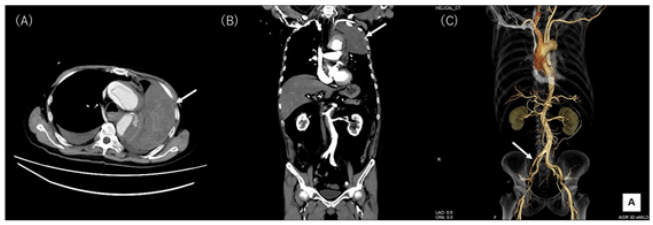

Figure 1. Preoperative computed tomography angiography shows a giant extrapleural hematoma in the left thoracic cavity (A,B) (arrow). Stanford type a aortic dissection from the ascending aorta to the common iliac arteries is seen, causing right limb ischemia(C) (arrow).

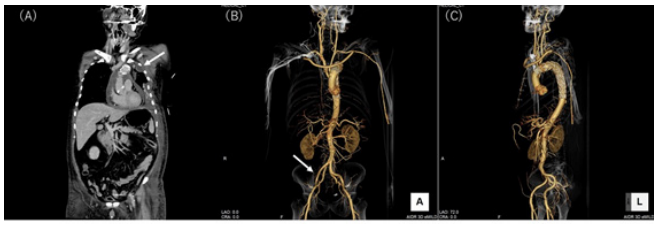

Figure 2. Postoperative computed tomography angiography shows that the giant extrapleural hematoma in the left thoracic cavity is evacuated (A) (arrow). The blood flow of right iliac artery is improved (B) (arrow). The false lumen is reduced remarkably, and the treatment of TAAD complicated descending aortic rupture is successful(C).

Discussion

Treatment of TAAD is challenging. Development of TAAD-combined malperfusion or aortic rupture makes the strategy more complicated. The central operation is the first choice for TAAD to prevent cardiac tamponade and increase the pressure in the true lumen. In contrast, conservative treatment of hypotension is the standard choice for acute type B aortic dissection. Recently, endovascular treatment has been reported for acute type B aortic dissection [3-5]. However, the mortality rate of TEAR for acute type B aortic dissection-complicated aortic rupture or malperfusion is reported to be high at 7% to 61% [3,4]. In the present case, central operation was performed first because of right limb malperfusion. The treatment for descending aortic rupture and a giant extrapleural hematoma in the left thoracic cavity were controversial. The descending aortic rupture was a sealed rupture; therefore, evacuation of extrapleural hematoma might have resulted in a free rupture. At the time of median sternotomy, we noticed no injury in the left pleura. We kept the left thoracic cavity closed during the first operation. Before the operation, we could not detect the precise rupture point of the descending aorta. If we had performed total arch replacement, the distal anastomosis might have involved the rupture point. We foresaw that for endovascular treatment, we would need to consider the landing zone around the distal anastomosis. Therefore, we performed hemi-arch aorta replacement with reconstruction of the brachiocephalic and left common carotid arteries. We preserved more than 2 cm distance from the distal anastomosis to the left common carotid artery reconstruction. The optimal timing for endovascular treatment during aortic dissection is controversial. Miyairi and colleagues reported that TEVAR performed for aortic dissection within 24 hours was associated with worse outcomes than TEVAR performed after 24 hours [6]. They also described that TEVAR performed between 24 hours and 14 days did not appear to increase the risk of perioperative complications compared with TEAR between 14 days and 6 weeks. In the present case, we performed TEVAR 5 days after the first operation. By delaying the procedure, we confirm conclusive hemostasis from the first operation, and we expect improvement in the intensity of the descending aorta. Computed tomography angiography could not reveal the rupture point of the descending aorta before TEVAR. Therefore, we decided to perform TEVAR with intent to cover the same level of extra pleural hematoma. The distal height of TEVAR was at the aortic root level. Considering that there was a potential risk of paraplegia, we added axillo-axillary bypass for left subclavian artery embolization to prevent paraplegia. Unfortunately, the patient died of cerebellar hemorrhage. However, the treatment of TAAD-complicated descending aortic rupture was

successful.

Conclusion

The treatment of TAAD-combined mal perfusion or aortic rupture might develop complications. The concomitant use of open surgery and endovascular repair is one of the most effective options.

Disclosure Statement

The authors have no conflicts of interest to declare.

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