A Successful Surgical Case of an 80-year-old Patient with Type A Acute Aortic Dissection Complicated by Preoperative Multiple Organ Failure

Mitsumasa Hata, MD, Akira Sezai, MD, Isamu Yoshitake, MD, Shinji Wakui, MD, Ayako Takasaka, MD, Takashi Ino, MD, and Motomi Shiono, MD

An 80-year-old woman was hospitalized in a state of shock accompanied by blood acidosis due to type A acute aortic dissection complicated by respiratory, liver, and kidney failure. A warning was given to her family that lack of intervention may possibly lead to an early death, and permission for the intervention was obtained. After undergoing a “less invasive quick replacement (LIQR),” a newly modified procedure that we had developed, the patient improved gradually, went home without any complications, and continues to be well. Emergency surgery for octogenarians remains controversial, particularly for patients with a preoperative, compassionate indication. Here, we report a survival case for an emergency operation using LIQR to treat an octogenarian diagnosed with type A acute aortic dissection complicated by multiple organs failure.

Key words: aortic dissection, octogenarian, multiple organs failure

Introduction

According to the international registry for type A acute aortic dissection (AAD), the mortality rate for emergency surgical intervention of AAD is reported to be approximately 25%. However, it should be taken into account that, in an aging society, there is an ever increasing number of elderly patients with cerebrovascular or respiratory disorders requiring emergency procedures, and this may negate the impact of the beneficial advances. The most recent report from a multi center study demonstrated that surgical mortality in octogenarians with AAD was 45.6%, and the incidence of operative death for octogenarians with a preoperative, compassionate indication was 100%. In 2008, we established a new procedure called “less invasive quick replacement (LIQR),” in which moderate hypothermic circulatory arrest without cerebral perfusion is utilized, followed by aggressive, rapid re-warming to shorten the duration of brain ischemia, cardiopulmonary bypass (CPB) and overall surgery. All of the octogenarians that have undergone this procedure have survived. Here, we report the successful case of an octogenarian who was hospitalized due to AAD complicated with multiple organs failure and underwent surgical treatment utilizing the new LIQR method.

Case Presentation

An 80-year-old woman, in a semi-unconscious state, was admitted to the emergency unit of our department. Her family reported that she had previously complained of back pain. On admission, her blood pressure was 60/50 mmHg, her heart rate was 110 beats/min (BPM) and her serum creatinine and GOT levels were 4.8 mg/dl and 490 IU/L, respectively. She was suffering from blood acidosis (pH 6.8), and was put on a ventilator when she finally lost...
Hata M, et al.

Fig. 1 Chest (left) and abdominal (right) X-ray on admission. The mediastinal and cardiac shadows are markedly dilated (left). Huge gas pockets are present in the digestive organs (right).

Fig. 2 Plain CT findings on admission. A dissecting cavity (left) and extensive hemopericardium (right) were found. CT, computed tomography

consciousness. Chest and abdominal X-rays showed massive dilatation of the mediastinal shadow and malperfusion of the digestive organs (Fig. 1). Plain computed tomography (CT) revealed AAD with an extensive hemopericardium (Fig. 2). Immediately after being transferred to the cardiac unit for emergency surgery, she required cardiopulmonary resuscitation because of pulseless tamponade complications. The surgical theater was rapidly prepared. In spite of warning her family that she was dying and that surgical intervention may possibly lead to an early death, her family was very keen to consent to emergency surgical treatment, and LIQR was performed. The cardiac tamponade was immediately released, and she was put on a CPB. Circulatory arrest was implemented at a rectal temperature of 28 without any cerebral perfusion. The intimal tear was located on the mid-portion of the ascending aorta. During open distal anastomosis, circulating blood in the CPB circuit was warmed to 40 °C by heat exchanger and the patient’s body was also warmed using hyper-hypothermia system, Medi-Term II (GAYMAR Inc., USA) except for the patient’s head. The distal aortic stump was trimmed, and the geratin-resorcin-formarin glue was applied between the two dissected walls and reinforced with Teflon felt strips both inside and outside the aorta. Dacron prosthesis was then fixed with one stitch on the posterior side and then continuously sutured with almost one action between the prosthesis and native aorta. As soon as distal anastomosis was completed, antegrade systemic circulation was established through a side branch of the Dacron prosthesis and rapid re-warming was initiated by 40°C blood perfusion. Finally, emergency ascending aortic replacement was completed with the durations for circulatory arrest, CPB, and overall surgery of 16, 72, and 121 minutes, respectively. Immediately after surgery, her blood pressure rose to 120/90 mmHg, and urine output rose to 200 ml/hour upon starting the administration of inotropes and a diuretic. The patient woke up at four hours post-operation, and the mechanical ventilator was removed at 22 hours post-operation. She gradually improved to almost normal levels as indicated by the laboratory data, and hemodyalysis was not required. Finally, she was discharged from hospital without any complications and has been very well to date.

Discussion

With the ever increasing human lifespan, cardiovascular
surgery is recommended as soon as possible for octogenarian patients with AAD unless the patient or patient’s family refuse the surgery. However, elderly patients are a high-risk group for neurological complications even though the surgery was successful. Therefore, in this era of diminishing economic resources for health care, the question of whether such expensive surgery should be offered to such elderly patients is extremely relevant. Piccardo and colleagues recently reported from multicenter study that surgical mortality in octogenarians with AAD was 45.6%. The same study also reported that those who died during hospitalization were significantly more likely to have undergone surgical procedure with a cardiocirculatory arrest time exceeding 80 minutes or CPB time exceeding 200 minutes. In particular for octogenarians, performing surgery with the minimum invasive stress is considered to be a key factor for saving lives and maintaining of quality of life. In the aim to minimize operative time and postoperative complications, LIQR reduces the re-warming and CPB periods. In our initial series of LIQR, average durations of circulatory arrest, CPB, and overall operation were 18.8 ± 6.2, 84.4 ± 14.3, and 148.6 ± 20.2 minutes, respectively. Regarding the present case, the patient was very ill on admission due to being in shock and her condition being complicated by pulseless tamponade. For people with AAD, tamponade is present in most cases. It does not always mean aortic rupture, but always threatens the patient’s life and may be fatal, if not relieved. A previous study demonstrated that preoperative severe cardiac tamponade without a palpable pulse was associated with preoperative death. Several investigators recently reported that preoperative clinical status was the most significant factor in predicting in-hospital death, that surgery was an effective treatment only for octogenarian patients with a good preoperative clinical status, and that medical treatment should be reserved for patients with critical preoperative conditions. Regarding this case, however, even though the patient suffered from preoperative shock and vital organs failure, her quality of life status was still good after the emergency surgery. We believe that octogenarians of any preoperative clinical status should be allowed emergency surgical intervention and that performing operations with a minimum of invasive stress is a key factor in reducing the mortality rate. The utilization of LIQR aims at reducing the re-warming period; thus, LIQR could be a good compromise between surgical aggressiveness and invasive stress.

A review of the current literature revealed that the case reported here is a considerably rare survival case of an octogenarian with preoperative multiple organs failure due to aortic dissection. We now believe that the use of appropriate less invasive surgical intervention gives hope for octogenarians with pulseless tamponade and multiple organs failure resulting from AAD.

**Conclusion**

Here, we reported a successful recovery for an octogenarian who underwent LIQR surgical treatment when hospitalized due to aortic dissection complicated by multiple organs failure. Regardless of whether or not it is an emergency surgical intervention for this condition in octogenarians remains controversial.

**References**