» Case Report «

Experience with Vacuum-Assisted Wound Closure of Mediastinitis Following Graft Replacement of the Ascending Aorta: Success of Treatment by Preservative Therapy Only

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A 76-year-old woman underwent ascending aorta replacement due to acute type A aortic dissection. She suffered from a deglutition disorder, had a gastric fistula and received enteral nutrition after the operation. Two months later, a large amount of pus was discharged from the sternotomy wound. Methicillin-resistant Staphylococcus aureus (MRSA) was detected from the pus culture. She was successfully treated by two applications of sufficient debridement and vacuum-assisted closure therapy. Her nutritional status was normal during the period of the tubal feeding. At the 1-year follow-up, there was no sign of recurrence.

Keywords: mediastinitis, vacuum-assisted wound closure, methicillin-resistant staphylococcus aureus (MRSA)

INTRODUCTION

Mediastinitis following cardiac surgery is one of the most serious complications, with reported incidence ranging from 1% to 5%.¹⁾ Mediastinitis following thoracic aorta replacement in particular is the most serious challenge to surgeons and is associated with a high mortality rate.

We report a patient who incurred a periprosthetic purulent collection due to Methicillin-resistant Staphylococcus aureus (MRSA) two months after undergoing ascending aortic replacement. This infection was treated successfully by intensive debridement and vacuum-assisted closure (VAC) therapy.

CASE REPORT

A 76-year-old woman suffering from a disturbance of

consciousness and left hemiplegia and was taken to the hospital. Computed tomography (CT) revealed acute type A dissection with innominate artery and right cervical artery occlusion. She was transferred to our institution after intubation with sedation. Her blood pressure was 118/60 mmHg, and her heart rate was 64 beats per minute on admission. She had a paroxysm and needed an anticonvulsant drug. The maximum diameter of the ascending aorta was 45 mm, and transthoracic echocardiography revealed trivial aortic valve regurgitation and no pericardial fluid. CT revealed acute type A dissection with innominate artery and right cervical artery occlusion. An operation was performed through a median sternotomy. The entry resection and ascending aorta replacement was performed using hypothermic circulatory arrest.

She suffered from a deglutition disorder, had a gastric fistula and received enteral nutrition after the operation.

Two months later, a large amount of pus was discharged from the sternotomy wound, and she had an increased white blood cell count with a rise in temperature. A chest CT scan revealed a collection that was localized in the anterior mediastinum all around the ascending aorta tube graft (**Fig. 1**). She underwent initial surgical revision with the removal of all the sternal wires on the same day. Pus was found surrounding the ascending aortic graft. No

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Fig. 1 Chest computed tomography (CT) scan before initial surgical revision.

anastomotic leaks, false aneurysm, or suture rupture were present. All adjacent infected and necrotic tissues were debrided. After sufficient irrigation, vacuum-assisted closure (VAC) therapy was adopted. Application of VAC involved the use of a polyurethane sponge to fill the wound. An evacuation tube that communicated with the reticulated form was embedded in the foam, thus ensuring equal distribution of the applied negative pressure to all the spaces within the system. The wound site was covered with a transparent adhesive film. MRSA was detected by the cultures from pus.

The VAC dressings were changed twice a week. Culture samples were collected frequently to assess for the right antimicrobial therapy. However, she suffered severe pain when the VAC dressing was changed, and drainage around the ascending aortic graft was insufficient because the aperture created by the sternotomy was narrow. Therefore, 17 days after the initial surgical revision, she underwent a second surgical revision under general anesthesia. Complete sternectomy was performed in order to obtain sufficient drainage. After that, the pain subsided, allowing us to irrigate around the ascending aortic graft sufficiently (**Fig. 2**).

Her nutritional status remained normal during the period of the tubal feeding. Antimicrobial therapy was changed from intravenous antibiotics to oral antibiotics two months after the second surgical revision, and the wound

Fig. 2 Chest computed tomography (CT) scan after second surgical revision showed sufficient drainage.

healed gradually and closed completely. At the one-year follow-up, her white blood cell count was normal and there was no sign of recurrence.

DISCUSSION

VAC therapy was successfully adapted for surgical wound management by Morykwas, et al. in 1997.²⁾ The constant negative pressure to the wound increases blood flow, rate of granulation tissue formation, and decreases tissue bacterial counts.³⁾ The VAC system requires to be changed every three or four days unlike twice a day changes with traditional dressings. Demkowski and colleagues reported 96 patients with mediastinitis.⁴⁾ Of these, 53 had debridement followed by VAC system treatment and were allowed secondary closure. While the remaining 43 patients had additional surgical procedures such as the omental flap or pectoralis flap.

In the case reported here was a case of severe life-threatening infection. We considered it highly risky to perform re-grafting in such a patient. We therefore decided to adopt conservative therapy. After the initial surgical revision, we could not obtain sufficient drainage around the ascending aorta graft; therefore, we performed a second surgical revision such that the negative pressure could reach all the spaces. One important finding with the VAC therapy was the supply of sufficient negative pressure to all the infectious spaces. Hence we consider that we should not hesitate to administer surgical intervention for sufficient debridement and negative pressure.

Another important factor for treating infectious mediastinitis is to keep the patients' nutrition status healthy. Treating infectious mediastinitis patients is time consuming. Long-term administration of intravenous antibiotics

is also needed. The patients often feel stress and anxiety about the treatment. Consequently, the patients sometimes lose their appetite and their nutritional status become worse. Thereafter, their immune functions become weaker. However, in the present case reported, the patient had a gastric fistula and received tubal feeding. Her nutrition status could be kept healthy during the period. She did not need any additional procedure such as omental transposition or a pectoralis flap. One of the reasons for this was that her nutrition status promoted the formation of granulation tissue. Enteral nutrition is superior to intravenous hyperalimentation. Therefore, when patients suffering from mediastinitis lose their appetite, one should initiate tubal feeding immediately.

In conclusion, we suggest that the VAC therapy is a valuable and effective adjunct for mediastinitis, but sufficient negative pressure to all infectious space is an important factor. In such cases, however, careful patient monitoring and long-term follow up must be performed to avoid missing any sign of recurrence.

DISCLOSURE STATEMENT

We have no conflict of interest.

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