

Successful Management of Mediastinitis After Bentall Procedure

Cem Arıtürk¹, Mehmet Hakan Akay², Şahin Şenay³, Ahmet Ümit Güllü³, Hasan Karabulut³, Hüseyin Cem Alhan³

¹Acıbadem Healthcare Group, Kadıköy Hospital, Cardiovascular Surgery, İstanbul, Türkiye

²Acıbadem Healthcare Group, Maslak Hospital, Cardiovascular Surgery, İstanbul, Türkiye

³Acıbadem University, School of Medicine, Cardiovascular Surgery, İstanbul, Türkiye

ABSTRACT

Purulent mediastinitis with an ascending aortic composite valve conduit is a serious dilemma for surgeons who must choose between changing or saving the prosthetic graft. Here, we treated a mediastinitis case without explanting and replacing the ascending aortic prosthetic valve conduit and instead saved the conduit with aggressive debridement, irrigation and omental transposition. The patient was discharged at postoperative 42nd day, control examination revealed no active infection or mechanical complications at 3 month.

Key words: mediastinitis, bentall procedure, omental transposition

BENTALL PROSEDÜRÜ SONRASI GELİŞEN MEDIASTİNİTTE BAŞARILI BİR TEDAVİ SÜRECİ

ÖZET

Bentall prosedürü geçirmiş ve mediastende prostetik konduit grefti bulunan hastalarda mediastinit önemli bir komplikasyondur. Tedavide greftin değişimi söz konusu olabilmekle birlikte, konservatif yöntemler de tercih edilebilir. Biz de Bentall Prosedürü sonrası gelişen mediastinitte, agresif debridman, irrigasyon ve omentum transpozisyonu ile tedavi ettiğimiz bir vakayı sunuyoruz. Hasta postoperatif 42. günde taburcu edildi ve 3. ay kontrolünde enfeksiyon veya mekanik komplikasyon saptanmadı.

Anahtar sözcükler: mediastinit, bentall prosedür, omentum transpozisyonu

Mediastinitis after a Bentall procedure is a serious complication and a great challenge for surgeons. Traditionally, infected aortic graft treatment principles include explantation and replacement of the infected graft, irrigation and debridement of the affected area, administration of intravenous broad spectrum antibiotic treatment and tissue coverage of the infected space (1). However composite graft replacement in this setting is associated with high morbidity and mortality (3,4). Here we report a case who was successfully treated with a series of aggressive interventions and broad spectrum antibiotics without removal of the aortic composite graft.

Case report

The patient was a 40-year-old male transferred from another country who underwent Bentall operation for type I

aortic dissection one week prior of his admission. His surgery had been complicated by bleeding which required multiple blood transfusions and reoperation. During his recovery, the patient developed acute purulent mediastinitis and he was transferred to our hospital for further management of this complication.

When he arrived to our hospital he was in septic shock with high fever (40 C). He was hemodynamically unstable with low urine output and elevated serum creatinine level. He had a single percutaneous drain in the mediastinum with frankly purulent output and his sternum was unstable. A computerized tomographic (CT) scan of the chest showed a hematoma around the aortic prosthetic graft with air in the hematoma, suggesting an aggressive mediastinal infection. Transesophageal echocardiography showed a left ventricular ejection fraction of 35% and an end-diastolic left ventricular diameter of 6.1cm without any sign of active prosthetic valve endocarditis.

The patient was immediately resuscitated medically. Cultures were taken and empiric broad spectrum antibiotic treatment was initiated. The day of his transfer, upon stabilization of his hemodynamic status, the patient was taken to the operating room for exploration of his mediastinum. In the operating room, all debris was cleaned from around the ascending aortic graft, loculated purulent collections were unroofed and extensive debridement was done. Cultures were sent. *Acinetobacter baumannii* and *pseudomonas aeruginosa* were subsequently identified from the mediastinal specimens and appropriately targeted intravenous antibiotics were started. The patient was given intravenous meropenem trihydrate 3 gm/day and moxifloxacin hydrochloride 400 mg/day. At the completion of the debridement procedure, the sternum was left open but the skin was closed. We placed multiple drains in the mediastinum for povidine- iodine irrigation. Continuous local irrigation was performed with 1 % povidine-iodine solution at the rate of 100cc/hr for 3 days. Daily serum creatinine and liver function tests were monitored closely for signs of iodine intoxication. High fever resolved and all laboratory values normalized on post operative (mediastinal cleaning&debridement) day 2. We did obtain a homograft from a local tissue for the possibility of emergent composite graft replacement.

On the 4th postoperative day the patient was taken back to operating room. The mediastinum appeared clean without any sign of active infection. Extensive cultures were taken. Devitalized tissues were debrided. The gram stain did not show any microorganisms but leukocytes were present. We extended the inferior aspect of the incision by 2-3 centimeters and entered the upper abdomen. An omental flap was prepared and transferred from the abdomen to cover the graft and dead space in the mediastinum. The sternum and skin was closed in a standard fashion. The patient remained afebrile with normal leukocyte and C - reactive protein level for the remainder of his hospitalization. His clinical condition improved. On POD 14, a control CT scan of chest was done which showed a 1cm fluid collection between the omental flap and the aortic graft (Figure 1). CT-guided needle aspiration was performed and the specimen was sent for cultures (Figure 2). There was no growth. As the patient remained afebrile without leukocytosis and elevated inflammatory markers intravenous antibiotic regimen was converted to oral antibiotic treatment on POD 36 after 2 days of nausea and vomiting resistant to aggressive medication. The patient was discharged at postoperative 42nd day, a control examination revealed no active infection or mechanical complications at postoperative 3rd month (Figure 3).



Figure 1. CT scan image of fluid collection between the omental flap and the aortic graft

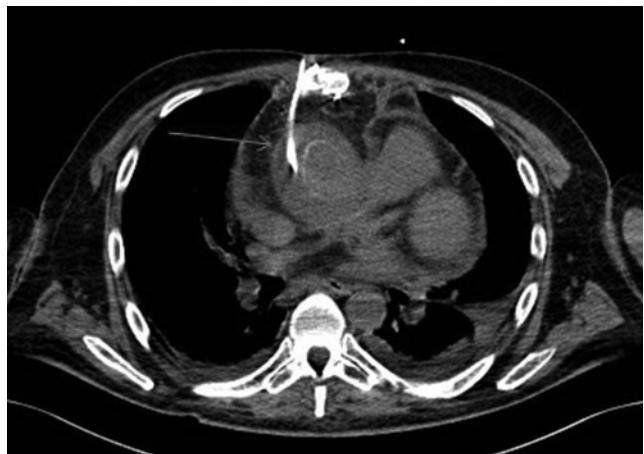


Figure 2. CT guided needle aspiration of perigraft collection.

Discussion

The reported incidence of mediastinitis after cardiac surgery is 0.5% to 5% (1). The incidence of graft infections after thoracic aortic operations is reported at 0.9% to 1.9% and explantation of the infected graft with extranatomic bypass through a clean field is recommended as standard of care (2). However, this approach might be unrealistic if the infected aortic graft is placed in the aortic root as a composite graft. Additionally, a patient's clinical condition may not tolerate such an aggressive operation, particularly if there is septic shock, compromised left ventricular function and other end-organ failure. Villavicencio et al. from Mayo clinic have reported that left ventricular ejection fraction of 35 % and lower is a predictor of operative mortality (3). Coselli et al. reported a 42% early hospital mortality with surgical intervention in this clinical setting (4).

Another accepted treatment modality involves surgical debridement and cleaning of the infected field with



Figure 3. CT control examination, 3 months postoperatively

continuous povidone-iodine irrigation. This intervention, along with omental flap coverage of the graft, has been reported with success (5-8). This is not an acceptable treatment, however, in cases of mediastinal infection associated with grave complications such as prosthetic valve endocarditis and pseudoaneurysm formation.

To our knowledge, there has been no prior report of a CT-guided aspiration of a peri-graft fluid collection between an omental flap and an aortic graft. We have found one report by LeMaire et al. in which the authors did not drain a similar fluid collection despite pseudomonas bacteremia (9). Their patient was treated with antibiotic therapy alone. Our

patient did not have any clinical signs of infection and the aspirated fluid did not grow any microorganisms. However, we elected to aspirate the fluid to assess for ongoing infection. If cultures had been positive, we would have proceeded with graft explantation and replacement with a homograft.

Finally, this case demonstrates a successful early hospital outcome despite the particularly challenging situation. The patient will be treated with lifelong oral antibiotics and followed with CT scans of the chest with monitoring of pseudoaneurysm formation.

References

1. Hargrove WC, Edmunds LHJ. Management of infected thoracic aortic prosthetic grafts. *Ann Thorac Surg* 1984;37:72-7.
2. Bitkover CY, Gårdlund B. Mediastinitis after cardiovascular operations: a case-control study of risk factors. *Ann Thorac Surg* 1998;65:36-40.
3. Villavicencio MA, Orszulak TA, Sundt III TM et al. Thoracic aorta false aneurysm: What surgical strategy should be recommended?. *Ann Thorac Surg* 2006;82:81-9
4. Coselli JS, Koksoy C, LeMaire SA. Management of thoracic aortic graft infections. *Ann Thorac Surg* 1999;67:1990-3.
5. Nakajima N, Masuda M, Ichinose M, Ando M. A new method for the treatment of graft infection in the thoracic aorta: in situ preservation. *Ann Thorac Surg* 1999;67:1994-6.
6. Krabatsch T, Hetzer R. Infected ascending aortic prosthesis: Successful treatment by thoracic transposition of the greater omentum. *Eur J Cardiothorac Surg* 1995;9:223-5.
7. Samoukovic G, Bernier PL, Lachapelle K. Successful treatment of infected ascending aortic prosthesis by omental wrapping without graft removal. *Ann Surg Thorac Surg* 2008;86:287-9
8. Mo A, Lin H. Successful therapy for a patient with aortic graft infection without graft removal. *Ann Vasc Surg* 2011;25:698.e1-e4
9. LeMaire SA, DiBardino DJ, Köksoy C, Coselli JS. Proximal aortic reoperations with composite valve grafts. *Ann Thorac Surg* 2002;74:S1777-80