Successful surgical treatment approach for mitral valve vegetation of infective endocarditis after severe soft tissue infection with mediastinitis.

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Abstract

An independent 59-year-old Asian man presented with a current history of fever, left shoulder pain and unconsciousness.Contrast-enhanced computed tomography revealed mediastinitis with expansive fluid collection. During the mediastinitis treatment, huge vegetation was sequentially confirmed at the annulus of the mitral valve and was successfully treated via small right thoracotomy.

Title page

Successful surgical treatment approach for infective endocarditis following severe mediastinitis.

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Abstract

An independent 59-year-old Asian man presented with a current history of fever, left shoulder pain and unconsciousness. Contrast-enhanced computed tomography revealed mediastinitis with expansive fluid collection. During the mediastinitis treatment, huge vegetation was sequentially confirmed at the annulus of the mitral valve and was successfully treated via small right thoracotomy.

KEYWORDS

infective endocarditis; mediastinitis; sepsis; mitral valve; small right thoracotomy.

INTRODUCTION

Infective endocarditis is commonly lethal, and currently there are several guidelines recommending indications for surgical interventions.[1-4] However, there are many unsolved and debatable problems related to the appropriate timing of surgery, the surgical approach and minimizing the risk of comorbidities. Usually, there is evidence of mobile vegetation of over 10 mm in size, for which the guidelines recommend immediate surgical vegetectomy,[1] however, sometimes the patient's condition does not allow surgical intervention to proceed.

CASE REPORT

A 57-year-old Asian man with a medical history of hypertension and type II diabetes mellitus was hospitalized because of fever, left shoulder pain and mild unconsciousness. He also had frozen shoulder syndrome and had undergone brachial plexus block anesthesia administered by a local physician about one week before admission. Physical examination showed a significant skin rash and warmth around his neck, anterior thoracic wall and left upper arm with tenderness. No cardiac murmur or abnormal respiratory sounds were heard on auscultation. His blood pressure was 142/108 mmHg, heart rate was regular at 122 beats/min, respiratory rate was 30 breaths/min, and his body temperature was 38.3°C. Serial hematologic workup is showed in Table 1.

Contrast enhanced computed tomography (CECT) on admission revealed expansive fluid collection dorsal to the sternal notch, between the pectoralis major and minor muscles, and around the axillary nerve (Figure 1). No valve regurgitation or signs of vegetation were observed on transthoracic echocardiography (TTE) at this time.

After patient admission, we immediately performed surgical debridement with an adequate incision from the suprasternal notch to the axilla and brachial lesion. After washing out pus-like fluid collection, we irrigated the site for the next 4 days. As the targeted bacteria was revealed to be methicillin-sensitive *Staphylococcus aureus* (MSSA) and surgically debrided site became uncontaminated, we applied negative pressure wound therapy (NPWT). We also deescalated the antibiotic therapy to cefazoline from initial teicoplanin, doripenem hydrate and clindamycin and was continued 8 weeks after admission.

At 4 days after admission, as Osler's node on the patient's left thumb and Janeway spot on the dorsal side of his left hand were detected (Figure 2), we performed the TTE again and found only mild mitral regurgitation. However, subsequent TEE performed the next day revealed a vegetation of 12×15 mm in size at the border of the left ventricular posterior wall and posterior mitral leaflet annulus (Figure 3).

The site and size of the vegetation were clear indications for surgery, however as the patient had no signs of heart failure or major thrombotic event, we decided to prioritize treatment of mediastinitis prior to planned cardiac surgery. The original surgical wound was sutured at day 36, after treatment with interval irrigation and NPWT. The cerebral magnetic resonance image performed prior to surgery had no signs of mycotic aneurysm or infarctions.

The vegetectomy and additional mitral valvuloplasty were performed 40 days after it was detected and diagnosed as infective endocarditis.

The operation began with the patient in a left half-lateral position, and femoral arteriovenous cardiopulmonary bypass was established. We approached from the right 4th intercostal space with an 8-cm incision. After opening the left atrium via right-side left arteriotomy, we detected a huge vegetation between the mitral annulus and left ventricular posterior wall that surrounded the papillary muscle and its P1 segment of the posterior mitral valve leaflet. The vegetation was resected and the P1 was concomitantly repaired with quadrangular resection using interrupted sutures. Because mitral regurgitation was still present, we performed an annuloplasty with a 28-mm Physio-ring II (Edwards Life Sciences, USA) along with A1-P1 edge-to-edge suturing. The resected vegetation specimen measured 12×15 mm, and culture of the specimen revealed the same MSSA.

The patient was continued on an additional 3 weeks of antibiotic therapy and was discharged from hospital 20 days after the surgery without any complications.

DISCUSSION

Infective endocarditis is a severely infectious disease with high rates of mortality and morbidity.[5-7] Although the recommended timing of surgery for IE is documented in guidelines for prevention and treatment of infective endocarditis[1,8], we usually have to decide appropriate timing for surgery on the basis of each patient's characteristics, conditions and comorbidities. The greater than 10 mm size and site of the vegetation were clear indications for urgent surgical vegetectomy[1,9], however it was difficult to proceed directly to surgical vegetectomy for three reasons. First was the timing of bleeding complications that were a contraindication for cardiac surgery. Second, since the infected site was concomitant with the mediastinitis, we wanted to prevent worsening of the mediastinitis after open heart surgery. Third, the patient was in septic shock and also suffered acute kidney injury following the septic shock.

Generally, a right thoracotomy approach offers better exposure to the mitral apparatus in patients with a small left atrium, allowing easy repair or replacement of the mitral valve.[10-12] This advantage results in reducing the volume of blood transfused and the length of stay in the intensive care unit.[11,12)]

Several current papers discuss the sensitivity and specificity of TTE and TEE.[13-15] The sensitivity of TTE for native valve vegetation seems to be approximately 70%.[15] As we could not detect vegetation on TTE initially, therefore we herein re-emphasize the necessity of performing TEE in patients highly suspected of having infective endocarditis and especially in those with positive blood cultures for Staphylococcus. The patient had no caries on his mouth and no current episode of dental treatment. The only cause we could determine for this soft tissue infection was brachial plexus block anesthesia performed by a local physician performed to control the patient's frozen shoulder syndrome.

CONCLUSION

We successfully treated a patient with infective endocarditis following severe mediastinitis. By considering appropriate timing for cardiac surgery and approaching via a right thoracotomy, vegetectomy and mitral valvuloplasty were safely performed and the patient was discharged without any complications.

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None.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. There was no external funding in the preparation of this manuscript.

ETHICAL APPROVAL

Written informed consent was appropriately obtained from the patient.

AUTHOR CONTRIBUTIONS

KU: involved in patient care as well as the drafting, review, and revision of the initial manuscript. YT: involved in patient's treatment decision as well as the review and revision the initial manuscript. TS and YM: involved in patient care as well as the review and revision of the initial manuscript. All authors approved the final manuscript submission and agree to be accountable for all aspects of the study.

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FIGURE LEGEND

FIGURE 1. Preoperative contrast-enhanced computed tomography image shows massive intra-soft tissue fluid collection from the neck to pectoralis major and minor muscles that extends to the axillary line, dorsally to the sternal notch.

FIGURE 2. Photographs showing Osler's node on the patient's left thumb and Janeway spot on the dorsal side of the left hand found at admission.

FIGURE 3. Images of the vegetation detected on transesophageal echocardiography. The vegetation was present at the border of the posterior wall of the left ventricle and surrounded the papillary muscle and chordae of the posterior mitral leaflet.

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