Short Communication

Fungal Endocarditis at the Aortotomy Site after Aortic Valve Replacement

VINCENT L. SORRELL, M.D., FACC, THEODORE C. KOUTLAS, M.D.,* CHRISTOPHER OHL, M.D.†

East Carolina University School of Medicine, Sections of Cardiology, *Cardiothoracic Surgery, and †Infectious Diseases, Greenville, North Carolina, USA

Summary: This brief report presents a patient with fungal endocarditis involving the suture location in the ascending aorta after aortotomy to replace a stenotic aortic valve. It emphasizes the importance of expanding the diagnostic investigation for endocarditis beyond the prosthesis, which was normal in this case. It also reiterates the value of transesophageal echocardiography during the evaluation of prosthetic valves and reminds the echocardiographer to visualize the aortotomy site carefully.

Key words: aorta, candida, diagnosis, endocarditis, prosthetic valve, transesophageal echocardiography

Introduction

Endocarditis is a relatively common problem and is serious when it affects a prosthetic cardiac valve.¹ Surface echocardiography often assists in the diagnosis or provides the initial clues of suspicion. When inadequate images are obtained with this study, transesophageal echocardiography (TEE) has become the diagnostic procedure of choice. Certainly, the focus of attention to the echocardiographer is the function and appearance of the prosthetic valve. It is important that the other cardiac valves and para-aortic potential spaces (abscess development) be imaged in detail. Until this report, careful evaluation of the aortotomy and cannulation sites with TEE has not been recommended.

Case Report

A 65-year-old man with an aortic valve replacement for congenital aortic stenosis 2 years earlier presented with a prolonged history of low-grade fever, fatigue, and weight loss. Multiple blood cultures yielded *Candida parapsilosis*. During his evaluation, an echocardiogram was performed, but it was technically limited and led to the performance of TEE. The aortic valve appeared to function normally, but approximately 3 cm distal to this valve, a large, echodense, mobile mass was seen attached to the anterior wall of the aorta. The patient remained gravely ill with severe metabolic and hematologic abnormalities that, despite the high intraoperative risk, were deemed only salvageable by urgent surgery.

Intraoperative echo (IOE) more clearly identified the aortic mass and its exact size and location (Fig. 1). This location is the usual site of aortotomy placement by cardiothoracic surgeons when approaching the aortic valve. The aortic endocardium appeared uniform except in a small region near the attached mass which was slightly thicker and more echogenic, and we suspect that this was the aortotomy site with a superimposed, much smaller mycotic aneurysm.

Gross anatomic inspection was consistent with a vegetating mass attached to the aortic endocardium and a normal appearing aortic valve prosthesis (St. Jude mechanical bileaflet valve, St. Jude Medical, St. Paul, Minn., USA) (Fig. 2). The surgeon resected the mass (Fig. 3) and replaced the aortic valve with a 24-mm aortic homograft and the aortic root with a Bentall procedure. The patient survived surgery and a lengthy rehabilitation period. He is receiving a prolonged course of intravenous amphotericin B.

Microscopic examination of the mass showed an organizing chronic inflammatory process with yeast forms on gram stain. Cultures yielded *Candida parapsilosis*.

Postoperative TEE showed a normal aortic graft and functioning aortic valve homograft (Fig. 4) and provides a comparison for the unusual preoperative findings.

Discussion

We believe this case illustrates the importance of expanding the diagnostic approach to the postoperative patient with

Address for reprints:

Vincent L. Sorrell, M.D.
Medical Director
Graphics and Exercise Physiology Labs
Sections of Cardiology and the Cardiovascular Center
East Carolina School of Medicine
University Health Systems of Eastern North Carolina TA-378
Greenville, NC 27858, USA

Received: May 25, 1999

Accepted with revision: August 2, 1999

FIG. 1 Intraoperative transesophageal echocardiogram. This is a longitudinal plane, off-axis image, highlighting the fungal mass and attachment site in the ascending aorta.

suspected endocarditis. Whether this postoperative complication is a rare occurrence related to various technical factors in the surgery, such as suture placement, tissue alignment, or method of aortotomy, is not known. Of some concern is whether this has previously occurred in other patients, but has been overlooked by the echocardiographic approach that did not image the aortotomy site optimally. Since this mass was

FIG. 2 Direct surgical view. The fungal mass (F) is seen attached to the aortotomy site and an exposed suture (S) was readily visible.

FIG. 3 Ex vitro, magnified view, of the fungal mass (F). The adjacent aortic wall and suture (S) at the attachment site is again noticed.

so large, it was readily identified. Had it been much smaller, as it most certainly was at one time during the patient's previous, earlier evaluations, would we have noticed it without careful inspection?

A review of the literature revealed a few previous reports of aortotomy (or aortic cannulation site) infections; however, none were examined by TEE. In 1980, Middleton *et al.*² first reviewed aortotomy infections and identified a total of 11 cases. They noted a high percentage of fungal infections (8/11 cases) and a high mortality (10/11 cases). In 1988, Sullivan *et al.* performed an extensive literature search; they reported a total of 31 postsurgical pseudoaneurysms and identified an in-

FIG. 4 Postoperative transesophageal echocardiogram. This is a longitudinal image, similar to Figure 1, and acts as comparison showing a normal aortic valve homograft and aortic root repair.

fectious organism in 15.³ More recently, Sabri *et al.* reviewed the literature and clarified the circumstances surrounding the development of infectious aortotomy pseudoaneurysms.⁴ Although they highlighted the likely superiority of TEE in these investigations, no cases with TEE diagnosis were presented. Other case reports have been published in foreign language journals or at necropsy.⁵⁻⁸ Each case report consistently noted a high mortality and reiterated the importance of early detection and surgical intervention for any hope of a successful outcome. Most of these reports predated the advances in TEE and this tool was not utilized in any of these previous reports.

Conclusion

Surgeons must maintain the utmost care during the closing stages of an aortotomy and be certain not to leave a structural flaw, such as markedly exposed suture lines or redundant tissue spaces, that could become the nidus of infection.⁹ Infectious pseudoaneurysms have been reported at the aortotomy and cannulation sites and appear more common in patients with hypertension, aortic calcification, or sternal wound infections. Generally, fungal infections are certainly rare, especially in nonimmunocompromised patients, and often are not detected until they become large, since bacterial blood cultures are negative. The high proportion of fungal infections identified within these sites supports the possibility that smaller bacterial infections are inconspicuous and overlooked.

Although computed tomography, magnetic resonance imaging, and aortography have been recommended and previously utilized for diagnosis, it is most likely that both trans-thoracic echocardiography and TEE are more frequently performed for the evaluation of suspected endocarditis. There-

fore, echocardiographers should remember that a detailed evaluation of the aortotomy and cannulation sites should be included during the investigation of suspected prosthetic valve endocarditis.

References

1. Cowgill LD, Addonizio VP, Hopeman AG, Harken AH: A practical approach to prosthetic valve endocarditis. *Ann Thorac Surg* 1987;43:450-457
2. Middleton J, Chmel H, Tecson F, Sarkaria JS, Neville WF: Aortotomy site infections: Case presentation and review of the literature. *Am J Med Sci* 1980;279:105-109
3. Sullivan KL, Steiner RM, Smullens SN, Griska L, Meister SG: Pseudoaneurysm of the ascending aorta following cardiac surgery. *Chest* 1988;93:138-143
4. Sabri MN, Henry D, Wechsler AS, DiSciascio G, Vetrovec GW: Late complications involving the ascending aorta after cardiac surgery. *Am Heart J* 1991;121(6 part 1):1779-1783
5. Seki K, Abe T, Kuribayashi R, Sekine S, Shibata Y, Yamagishi I: Aortic dissection with giant pseudoaneurysm as a rare late complication of aortic valve replacement—a case report. *Nippon Kyobu Geka Gakkai Zasshi - J Jpn Ass Thorac Surg* 1994;42:1382-1387 (in Japanese)
6. Richaud M, Bors V, Thomas D, Artigou JY, Aupart M, Cabrol C, Grosgeat Y: Infected false aneurysm at the level of an aortotomy cicatrix 5 years after mechanical replacement of the aortic valve. *Arch Mal Coeur Vaiss* 1990;83:101-103 (in French)
7. Allevato PA, Eisses JF, Mezger E, Fisher EJ, Roming DA, Morales AR: Nocardia asteroides aortitis with perforation of the aorta. *Hum Pathol* 1985;16:743-746
8. Eigel P, Elert O, Hopp H, Silber R, Romen W, Schmidt-Rotte H: Nocardial endocarditis after aortic valve replacement. Report of two cases. *Scand J Thorac Cardiovasc Surg* 1988;22:289-290
9. Allwork SP: The anatomical basis of infection of the aortic root. *Thorac Cardiovasc Surg* 1986;34:143-148