Value of surgery for infective endocarditis in dialysis patients

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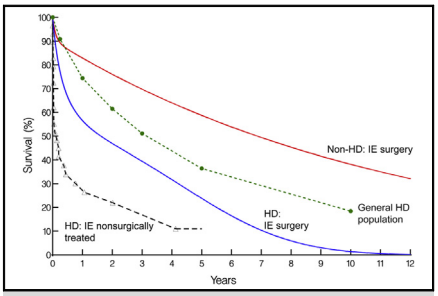
ABSTRACT

Objectives: To determine the value of surgery for infective endocarditis (IE) in patients on hemodialysis by comparing the nature and invasiveness of endocarditis in hemodialysis and nonhemodialysis patients and their hospital and long-term outcomes, and identifying risk factors for time-related mortality after surgery.

Methods: From January 1997 to January 2013, 144 patients on chronic hemodialysis and 1233 nonhemodialysis patients underwent valve surgery for IE at our institution. Propensity matching identified 99 well-matched hemodialysis and nonhemodialysis patient pairs for comparison of outcomes.

Results: *Staphylococcus aureus* infection was more common in hemodialysis patients than in nonhemodialysis patients (42% vs 21%; $P < .0001$), but invasive disease was similar in the 2 groups (47%; $P = .3$). Hospital mortality was 13% and 5-year survival was 20% for hemodialysis patients, 20% below that expected in a general hemodialysis population but 15% above that of hemodialysis patients treated nonsurgically for IE. For matched patients, hospital mortality was 13% for hemodialysis patients versus 5.1% for nonhemodialysis patients ($P = .05$), and survival at 1 and 5 years was 56% versus 83% and 24% versus 59%, respectively ($P < .004$). Use of an arteriovenous graft for dialysis access ($P = .01$) and preoperative placement of a pacemaker ($P < .0001$) were risk factors for late mortality in hemodialysis patients. For matched patients, freedom from reoperation was similar in the hemodialysis and nonhemodialysis groups ($P > .9$).

Conclusions: Intermediate-term survival after surgery for IE in hemodialysis patients is substantially worse than that in nonhemodialysis patients, but only slightly worse than that in the general hemodialysis population and substantially better than that in hemodialysis patients with IE treated nonsurgically, supporting continued surgical intervention for IE. (J Thorac Cardiovasc Surg 2017;154:61-70)



Survival of patients with infective endocarditis (*IE*) on or not on hemodialysis (*HD*).

Central Message

With a 5-year survival of 24%, surgery for infective endocarditis should be considered for patients on hemodialysis.

Perspective

Survival after surgery for infective endocarditis (IE) in patients receiving hemodialysis is substantially worse than for otherwise similar patients not receiving hemodialysis, but only somewhat worse than that for the general hemodialysis population and substantially better than that for hemodialysis patients with nonsurgically treated IE, supporting surgical intervention for IE in this high-risk population.

See Editorial Commentary page 71.

Vascular access exposes patients on hemodialysis to a persistent source of environmental pathogens at the entry site. Consequently, the incidence of infective endocarditis (IE) is 18 times higher in hemodialysis patients than in the general US population.[1] With more than 400,000 patients on hemodialysis in the US, the morbidity and

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Abbreviations and Acronyms
IE = infective endocarditis
PVE = prosthetic valve endocarditis

Scanning this QR code will take you to a supplemental video, appendix, figures, and tables. To view the AATS 2016 Webcast, see the URL next to the video thumbnail.

mortality associated with IE in these patients is an important healthcare issue.[2] In reports published a decade ago, operative mortality after surgery for IE in these patients ranged from 24% to 73%,[3-5] and survival was recently reported to be as low as 25% at 3 years and 0% at 5 years.[6,7] To evaluate the value of surgery for IE in patients on hemodialysis, we compared the nature and invasiveness of IE and the hospital and long-term outcomes in hemodialysis and nonhemodialysis patients, contrasted their survival with that of hemodialysis patients with IE not treated surgically, and identified risk factors for time-related mortality after surgery for IE.

PATIENTS AND METHODS

Patients

From January 1997 to January 2013, 1413 patients underwent valve surgery for active IE at Cleveland Clinic. Of these, 144 (10%) were on chronic hemodialysis (more operated on in recent years; Figure 1), 8 (0.6%) were on chronic peritoneal dialysis (Appendix E1), and 28 (2%) were on dialysis for acute renal failure; 1233 (87%) were not on any form of dialysis (nonhemodialysis patients). The 28 patients on dialysis for acute renal failure are not considered in this report.

Study Design

Surgically treated chronic hemodialysis patients and nonhemodialysis patients are the 2 primary comparison groups in this study. In addition, for survival, 3 reference groups are considered: 29 hemodialysis patients with IE not treated surgically, diagnosed between July 2007 and January 2015; age-, race-, and sex-matched individuals in the general population[8]; and hemodialysis patients in general (US Renal Data System, 2015 Annual Data Report Reference Tables; Reference Table I: Patient Survival).[9]

Data

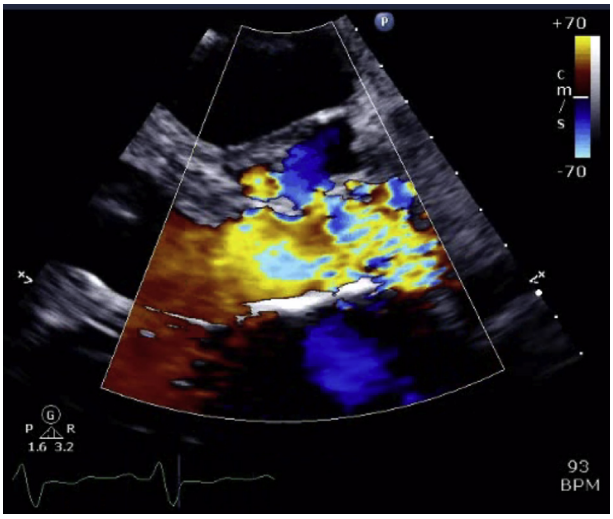
All data used in this study were approved for use in research by the Cleveland Clinic's Institutional Review Board, with the requirement for patient consent waived. Preoperative, operative, and postoperative variables were retrieved from the prospectively maintained Cardiovascular Information Registry. Dialysis-related variables were collected through chart review, and infecting agents were adjudicated by infectious disease experts. Invasiveness data were available only for patients with IE who underwent surgery from 2002 onward (119 of 144 hemodialysis patients and 873 of 1233 nonhemodialysis patients), as described previously.[8,10]

FIGURE 1. Hemodialysis patients undergoing surgery for active IE by year.

Surgery for IE

Surgical principles followed for patients with IE at Cleveland Clinic have been reported previously.[10,11] A dedicated multispecialty team treats all patients presenting with IE. Preoperatively, all patients undergo brain imaging and many undergo imaging of the chest and abdomen to identify embolic complications. Surgery is advocated as soon as an indication is established, and the operation is expedited to avoid additional embolization and clinical deterioration. At surgery, radical debridement of all infected tissues and foreign material is followed by generous irrigation. Local antiseptics and antibiotics are used sparingly (Video 1).

The choice of replacement valve is based on pathology, overall complexity of the medical situation, life expectancy, and ability to comply with anticoagulation. Most hemodialysis patients received a tissue prosthesis to avoid anticoagulation (Table E1). In patients with aortic valve IE with annulus destruction and invasive disease, an allograft remains our preferred choice for aortic root reconstruction, which was used in 47% (38 of 81) of the hemodialysis patients undergoing aortic valve replacement. Severe mitral annular calcification is not uncommon in hemodialysis



VIDEO 1. Complete debridement and allograft root reconstruction in an extreme case of aortic root infective endocarditis. Video available at: http://www.jtcvsonline.org/article/S0022-5223(17)30553-6/addons.

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