Heart infection involving ICD associated with high rate of complications, risk of death

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Patients with infective endocarditis involving implanted cardiac devices experience a high rate of complications such as valve infections, heart failure, and persistent bacteremia, and high in-hospital and 1-year mortality rates, particularly if there is valve involvement, according to a study in the April 25 issue of *JAMA*.

"Cardiac electronic devices, including permanent pacemakers and implantable cardioverter-defibrillators (ICDs), are increasingly implanted worldwide, with estimates of more than 4.2 million patients with a permanent pacemaker or ICD implanted in the United States between 1993 and 2008. Cardiac device infection is a serious, emerging disease with a 210 percent increase in incidence between 1993 and 2008. In-hospital charges for this complication are estimated to be at least U.S. $146,000 per case," according to background information in the study. "The management of cardiac device infective endocarditis (CDIE) is complex and usually requires prolonged antibiotic therapy, percutaneous or surgical removal of the device, and possible device reimplantation."

Eugene Athan, M.D., of Barwon Health, Geelong, Australia, and colleagues conducted a study to examine the characteristics and outcome of CDIE with attention to health care-associated infection and to determine prognostic factors associated with in-hospital and 1-year mortality and outcomes following device removal. The study, which used data from the International Collaboration on Endocarditis-Prospective Cohort Study (ICE-PCS), was conducted from June 2000 through August 2006 in 61 centers in 28 countries.

Cardiac device infective endocarditis was diagnosed in 177 (6.4 percent) of the total cohort of 2,760 patients with definite infective endocarditis, including 152 (85.9 percent) patients with a permanent pacemaker, 21 (11.9 percent) patients with an ICD, and 4 (2.3 percent) patients with device type not specified. Patients were predominantly men (74.0 percent), with a median (midpoint) age of 71 years. Blood cultures were positive in 149 patients (84.2 percent), and isolates were predominantly staphylococcal (Staphylococcus aureus, 35.0 percent; coagulase-negative staphylococci, 31.6 percent).

The researchers found that 26 of the patients with CDIE (14.7 percent) died during the index hospitalization, including 18 of 141(12.8 percent) who underwent device removal and 8 of 34 (23.5 percent) who did not. Between hospital discharge and 1-year follow-up, 15 patients died and 10 were lost to follow-up. Overall, of the 177 patients with CDIE enrolled, 126 (71.2 percent) were alive at 1 year and 41 (23.2 percent) had died.

Coexisting valve infection was found in 66 patients (37.3 percent); other complications included heart failure (15.3 percent) and persistent bacteremia (15.8 percent). "Several of these complications were found to be associated with in-hospital and 1-year mortality in patients with CDIE. The high rates of mortality emphasize the need for improved preventive measures, including optimal skin decontamination and appropriate antibiotic administration at the time of cardiac device insertion or manipulation, as well as careful attention to any invasive or intravascular procedures performed after device implantation," the authors write.

Health care-associated infection was identified in 81 (45.8 percent) patients with CDIE, including 61 (34.5 percent) with nosocomial (hospital-acquired) and 20 (11.3 percent) with nonnosocomial infections.

Additional analysis showed a survival benefit at 1 year for device removal during the initial hospitalization (28/141 patients [19.9 percent] who underwent device removal during the index hospitalization had died at 1 year, vs. 13/34 [38.2 percent] who did not undergo device removal).

"Given that numbers of cardiovascular implantable electronic devices placed are increasing rapidly, further studies on the prevention and treatment of this serious complication are needed," the authors conclude.

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