THERAPEUTICS

A prophylactically implanted cardioverter defibrillator reduced all-cause mortality in myocardial infarction

Moss AJ, Zareba W, Hall J, et al., for the Multicenter Automatic Defibrillator Implantation Trial II Investigators. **Prophylactic implantation of a defibrillator in patients with myocardial infarction and reduced ejection fraction.** N Engl J Med. 2002;346:877-83.

QUESTION

In patients who have had a previous myocardial infarction (MI) with a current left ventricular ejection fraction ≤ 0.30, is a prophylactically implanted cardioverter defibrillator (ICD) more effective than conventional therapy for reducing all-cause mortality?

DESIGN

Randomized (unclear allocation concealment*), unblinded,* controlled trial with a mean follow-up of 20 months.

SETTING

76 hospital centers; 71 in the United States and 5 in Europe.

PATIENTS

1232 patients who were > 21 years of age (mean age 64 y, 84% men) and had had an MI ≥ 1 month before entry into the trial. MI was documented by the finding of an abnormal Q wave on electrocardiography, elevated cardiac-enzyme levels on laboratory testing during hospitalization for suspected MI, a fixed defect on thallium scanning, or localized akinesis on ventriculography with evidence of obstructive coronary disease on angiography, and an ejection fraction ≤ 0.30.

Exclusion criteria included an indication approved by the U.S. Food and Drug Administration for an ICD and New York Heart Association functional class IV at enrollment. Follow-up was 100%.

INTERVENTION

Patients were allocated to prophylactic ICD (Guidant, St. Paul, MN, USA) (n = 742) or conventional medical therapy (n = 490). The defibrillators were tested during implantation, and every effort was made to achieve defibrillation within a 10-Joules safety margin. The appropriate use of β-blockers, angiotensin-converting enzyme inhibitors, and lipid-lowering drugs was encouraged in both study groups.

MAIN OUTCOME MEASURE

All-cause mortality.

MAIN RESULTS

Analysis was by intention to treat. The rate of all-cause mortality was lower in the ICD group than in the conventional-therapy group (Table).

CONCLUSION

In patients who have had a previous myocardial infarction with a current left ventricular ejection fraction ≤ 0.30, a prophylactically implanted cardioverter defibrillator was more effective than conventional therapy for reducing all-cause mortality.

Source of funding: Guidant.

For correspondence: Dr. A.J. Moss, University of Rochester Medical Center, Rochester, NY, USA. E-mail heartajm@heart.rochester.edu. ■

*See Glossary.

A prophylactically implanted cardioverter defibrillator (ICD) vs conventional medical therapy (CMT) for myocardial infarction at 2 years†

Outcome	ICD	CMT	RRR (95% CI)	NNT (CI)
All-cause mortality	14.2%	19.8%	31% (7 to 49)	18 (11 to 82)

†Abbreviations defined in Glossary; RRR, NNT, and CI calculated from data in article.

COMMENTARY

The ICD is effective in treating ventricular tachycardia (VT) and ventricular fibrillation (VF). In patients who have had an episode of spontaneous VT or VF, results from randomized trials are consistent and show that the ICD reduces all-cause mortality by about 28% (1). These results suggest that the ICD might also be effective in patients at increased risk for sudden cardiac death but who have never had spontaneous VT or VF. This hypothesis has now been tested in several randomized trials. The Coronary Artery Bypass Graft Patch trial showed an insignificant 7% relative risk increase in all-cause mortality in patients who received the prophylactic ICD (2), whereas the Multicenter Automatic Defibrillator Implantation Trial (MADIT)-I showed a 54% relative risk reduction (RRR) after prophylactic ICD implantation (3). These conflicting results prompted additional randomized trials, the first of which is MADIT-II, conducted by Moss and colleagues. The 31% RRR in all-cause mortality found in this trial is midway between the results of the 2 previous trials of prophylactic ICDs (2, 3) and close to the 28% RRR found in trials enrolling patients with previous VT or VF (1).

Should all patients with a previous MI and an ejection fraction ≤ 30% get an ICD on the basis of the MADIT-II results? I don't think so, based on 2 considerations. First, the generalizability of the trial results is uncertain: MADIT-II did not report details of how patients were screened for entry—they may have been highly selected. Second, the large number of potentially eligible patients and the high cost of prophylactic ICDs suggest that we should be cautious before expanding the indications for their use. The MADIT-II results should be confirmed by other ongoing trials before recommending widespread use of prophylactic ICDs.

Mark A. Hlatky, MD
Stanford University
Stanford, California, USA

References
1. **Connolly SJ, Hallstrom AP, Cappato R, et al.** Eur Heart J. 2000;21:2071-8.
2. **Bigger JT Jr.** N Engl J Med. 1997;337:1569-75.
3. **Moss AJ, Hall WJ, Cannom DS, et al.** N Engl J Med. 1996;335:1933-40.