Defibrillators and Ventricular Dysfunction

Kim et al. recently addressed the influence of left ventricular function on clinical outcome in patients who received implantable cardioverter defibrillators (ICDs). In 68 recipients of the ICD, there was an overall perioperative mortality of 4.4%. In the 28 patients with an ejection fraction (EF) <30%, there was an 11% perioperative mortality. Two conclusions drawn from this study were that the perioperative mortality in patients with poor EF’s is extremely high and that the overall surgical mortality of ICD implantation is greater than 3%. We believe the conclusions reached by this relatively small study must be interpreted with caution.

Although other studies such as Veltri et al. and Gohn et al. have reported comparable operative mortality at 4.9% and 4.4%, respectively, we disagree with Kim’s statement that “surgical mortality of defibrillator implantation without concomitant surgery remains at more than 3%.” Winkle et al., in a study of 270 patients, reported an operative mortality of 1.5%. Our center recently reported no operative deaths in 150 consecutive patients who received ICD’s. In a multicenter series including 3,610 recipients of the ICD, Thomas et al. reported an operative mortality of 2.5%. Thus, although some centers have an operative mortality of >3%, this clearly is not the case for all centers.

The reasons for the differences in perioperative mortality between centers are unclear. Although concomitant surgical procedures may play a role, Kim’s addressed this issue and found no difference.

Patient selection may play a significant role, because implanting ICD’s in patients with severe medical illnesses might be expected to result in increased operative morbidity and mortality. Our low perioperative mortality is associated with the practice of avoiding implantation of the ICD in patients whose general medical condition is such that survival after surgery or for an extended period of time after surgery seems unlikely.

Another major cause of operative mortality appears to be postoperative ventricular arrhythmias. Two of the three operative deaths in Kim’s study were secondary to incessant arrhythmias. Similarly, Veltri’s and Gohn’s studies reported that 50% and 58% of their surgical mortality, respectively, was caused by arrhythmic complications during the postoperative period. Exacerbation of ventricular arrhythmias in the postoperative period after implantation of an ICD is a difficult management problem, because arrhythmias occurring in this setting often do not respond to usual measures such as electrical cardioversion. Nevertheless, a high incidence of death from this complication is not inevitable. In Winkle’s study, only one death occurred from postoperative ventricular arrhythmias in 270 ICD recipients; in our series, there were no perioperative deaths secondary to ventricular arrhythmias, despite several occurrences of difficult-to-manage postoperative ventricular tachyarrhythmias in our patients. The prevention of death from postoperative arrhythmias would reduce the perioperative mortality reported in many series by approximately one half. Discussions of management strategies for dealing with these arrhythmias are not present in the literature, but they are needed.

Although we agree that implanting ICD’s in patients with poor left ventricular function may lead to a relatively high operative mortality, it is clear that a >10% operative mortality in any subgroup of patients receiving an ICD is unacceptable. Two previous studies that addressed the use of the ICD in patients with left ventricular dysfunction found a much lower perioperative mortality than that reported by Kim. Tchou et al. had one perioperative death in 44 ICD recipients with EFs <40%. In a previous report from our center, there were no perioperative deaths in 40 recipients of the ICD with EFs <30%.

We therefore make the plea that the relatively high perioperative mortalities reported by Kim and others not be accepted as the “standard” mortality for this procedure. Instead, the experiences reported by these authors should be used to try to identify areas on which to focus efforts to improve the mortality associated with implanting ICD’s. Patient selection and postoperative management are two such areas; no doubt there are others.

References

Reply
In a recent study, we addressed the influence of left ventricular function on outcome of patients treated with implantable cardioverter defibrillators (ICDs). Bonnet et al. are raising questions regarding the surgical mortality rates addressed in our study. In our study, the surgical mortality was 4.4%. Our results, although limited by the small number of patients, are similar to many other larger studies. Examples are as follows: Cleveland Clinic Foundation (4.0% in 271 patients), the Johns Hopkins and Sinai Hospital of Baltimore (4.9% in 163 patients), the University of Washington, Seattle (4% in 101 patients), Massachusetts General Hospital and the Good Samaritan Hospital,
Defibrillators and ventricular dysfunction.
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