An initial energy of 360 J for elective cardioversion was more effective than 100 or 200 J in persistent atrial fibrillation

Joglar JA, Hamdan MH, Ramaswamy K, et al. **Initial energy for elective external cardioversion of persistent atrial fibrillation.** Am J Cardiol. 2000 Aug 1;86:348-50.

QUESTION

In patients with persistent atrial fibrillation (AF), what is the effectiveness of 3 commonly used energies during elective direct-current cardioversion?

DESIGN

Randomized {allocation concealed*},† unblinded,* controlled trial with follow-up to a maximum of 5 shocks.

SETTING

University of Texas Southwestern Medical Center and the Dallas Veterans Affairs Medical Center in the United States.

PATIENTS

64 patients (mean age 62 y, 72% men) with AF > 48 hours in duration who were referred for elective cardioversion. Exclusion criteria included recent myocardial infarction or surgery, presence of an epicardial implantable defibrillator system, active pericarditis, and neuromuscular disease.

INTERVENTION

Patients were allocated to initial energy of 100 J (n = 21), 200 J (n = 23), or 360 J (n = 20). Patients who were unable to achieve conversion after the first shock received subsequent shocks in a step-up protocol.

MAIN OUTCOME MEASURES

The primary end point was successful restoration of sinus rhythm after the first shock. A secondary end point was number of shocks given.

MAIN RESULTS

The success rate after the first shock was higher in the 360-J group than in the other 2 groups ($P < 0.001$) (Table). Fewer shocks were given in the 360-J group than in the 200- or 100-J groups (1.2 vs 2.2 or 2.8, $P < 0.001$).

CONCLUSION

In patients with persistent atrial fibrillation, an initial energy of 360 J for elective direct-current conversion was more effective than 100 or 200 J.

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For correspondence: Dr. J.A. Joglar, Division of Cardiology, Department of Internal Medicine, University of Texas Southwestern Medical Center, Room CS7.102, 5323 Harry Hines Boulevard, Dallas, TX 75235-9047, USA. FAX 214-590-0402.

*See Glossary.

†Information provided by author.

Successful restoration of sinus rhythm after the first shock of energy at 100, 200, or 360 J for cardioversion in persistent atrial fibrillation‡

Comparison	Success rates	RBI (95% CI)	NNT (CI)
360 vs 200 J	95% vs 39%	143% (56 to 331)	2 (2 to 4)
360 vs 100 J	95% vs 14%	565% (171 to 1814)	2 (2 to 2)
200 vs 100 J	39% vs 14%	174% (5 to 759)	Not significant

‡Abbreviations defined in Glossary; RBI, NNT, and CI calculated from data in article.

COMMENTARY

Direct-current cardioversion plays an important role in the treatment of AF, but the success rate is influenced by technique (1). The study by Joglar and colleagues provides the first randomized data to confirm that higher initial shock energies are more likely to result in successfu1 cardioversion. This study found no evidence of myocardial damage among a subgroup of patients after cardioversion, which was in keeping with previous studies (1). Indeed, energies of 720 J have been proved efficacious for cardioversion of resistant AF among patients with a high body mass index while showing no clinical evidence of resulting cardiac damage (2).

Mild first-degree skin burns are a complication of external cardioversion that can be more severe at higher peak energies (1), but cumulative shock energies may also affect the severity of skin burn. Joglar and colleagues show that an initial shock energy of 360 J can lead to a lower cumulative energy requirement, certainly over "step-up" methods beginning at 100 J, and thus may not confer an extra risk for burns, although this is not specified in the article. Furthermore, no information is provided on body mass index and patient stature, and conceivably, some patients with a higher body mass index, larger stature, or both may have greater transthoracic impedance requiring higher energies for cardioversion (1). For now, starting with an initial shock energy of 360 J during cardioversion of AF seems safe and may improve outcomes without excess risk for procedural complications.

Dwayne S.G. Conway, MB, ChB
Gregory Y. Lip, MD
City Hospital
Birmingham, England, UK

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