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Evidence-Based Medicine

IS EMERGENCY DEPARTMENT CARDIOVERSION OF RECENT-ONSET ATRIAL FIBRILLATION SAFE AND EFFECTIVE?

Brian G. Cohn, MD,* Samuel M. Keim, MD, MS,† and Donald M. Yealy, MD‡

*Division of Emergency Medicine, Washington University School of Medicine, St. Louis, Missouri, †Department of Emergency Medicine, The University of Arizona College of Medicine, Tucson, Arizona, and ‡Department of Emergency Medicine, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania

Reprint Address: Samuel M. Keim, MD, MS, Department of Emergency Medicine, The University of Arizona College of Medicine, PO Box 245057, Tucson, AZ 85724

☐ **Abstract—Background: Atrial fibrillation (AF) is a very common dysrhythmia presenting to Emergency Departments (EDs). Controversy exists regarding the optimal clinical therapy for these patients, which typically focuses on rhythm rate-control and admission or cardioversion and discharge home. Clinical Question: Is ED cardioversion of recent-onset atrial fibrillation safe, effective, and does it result in positive meaningful patient outcomes? Evidence Review: Five observation studies with nearly 1600 ED patients with atrial fibrillation treated with either rate-control or cardioversion were reviewed and results compiled. Results: Overall, ED cardioversion for recent-onset AF seems safe and effective, with success rates ranging from 85.5% to 97% in these studies. Although further research should seek to identify patients at low risk for thromboembolic complication, more rigorously assess patient satisfaction, and show cost savings, emergency physicians should feel comfortable using this approach in select patients. Conclusion: ED cardioversion for recent-onset AF seems safe and effective.** © 2013 Elsevier Inc.

☐ **Keywords—atrial fibrillation; cardioversion; effectiveness; recent onset; Emergency Department**

CASE REPORT

A 35-year-old woman presents to your Emergency Department (ED) with palpitations beginning 10 h prior. She has no significant past medical history and denies alcohol or illicit substance abuse. On review of systems, she notes no chest pain, syncope, shortness of breath, or neurologic symptoms. She is well appearing, in no distress, and has stable vital signs, with a blood pressure of 110/50 mm Hg and an irregular heart rate of 135 beats/min. She is breathing comfortably with no rales on pulmonary auscultation. The electrocardiogram (ECG) demonstrates atrial fibrillation (AF), which was not present on the only other ECG that you can find, which was from 5 years ago; there are no ST-segment changes and no T-wave inversions. You consider your treatment options; your standard practice in patients with new-onset AF is to control the ventricular rate, initiate anticoagulation, and admit to the cardiology service. However, because the patient is young and healthy, with a recent onset of symptoms, you consider the possibility of cardioversion, either chemical or electrical, which would allow for much earlier discharge home directly from the ED. Do you become an "early adopter," or do you reflexively admit this patient to "work-up" her new-onset AF, justifying your plan by telling the patient that she needs to be monitored for worsening AF or hypotension while awaiting an inpatient echocardiogram and serial cardiac enzymes? How comfortable are you with the data and do you want to be "the early adopter"?

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CLINICAL QUESTION

In patients presenting to the ED with recent-onset AF or atrial flutter (defined as onset < 48 h before presentation), is there a subset of patients for whom ED cardioversion followed by discharge home is safe, cost-effective, and results in improved patient satisfaction?

CONTEXT

AF is a common cardiac dysrhythmia in the United States (US), with an estimated prevalence of 1.1% in patients presenting to the ED (1). There were an estimated 2.7 million US ED visits for AF between 1993 and 2004, with an increase in visit rate from 0.6 to 1.2 per 1000 US population over this time period; 64% of these visits resulted in hospital admission, with an average cost of $8412 per hospitalization (2,3). In one study, 21% of patients presenting to the ED had recent-onset AF, defined as symptom onset < 48 h before presentation (4).

There has been research into the optimal management of chronic AF and atrial flutter, with the debate between rate control and rhythm control still unresolved (5–7). Although some studies of chronic AF suggest that rate control strategies are more cost-effective than rhythm control strategies, there has been far less research into the management of recent-onset AF (8,9). Current management in the US often involves rate control with anticoagulation and hospital admission, allowing echocardiography to be performed before elective cardioversion to assess for atrial thrombus.

An ED management algorithm incorporating early electrical cardioversion of patients with recent-onset AF may be safe and effective (10,11). Although this method may not be current standard of care in the US, the potential economic impact cannot be ignored. Primary concerns among US emergency physicians are likely to include the risks of the procedural sedation, the electrical cardioversion itself, and subsequent risk of thromboembolic (TE) events in patients discharged without anticoagulation. Although emergency physicians are acquainted with the safety of procedural sedation, and the safety of electrical cardioversion in AF has been well established, TE risk remains a primary concern.

Chronic AF, defined as dysrhythmia lasting at least 7 days, is known to cause a significant increase in the risk of TE events, with a risk of 1–7% observed in patients undergoing electrical cardioversion in the absence of anticoagulation (12–15). Systematic reviews of the literature have shown no increased risk of stroke in patients undergoing pharmacologic rhythm control versus rate control, but a statistically non-significant trend towards increased stroke in patients undergoing electrical cardioversion (16,17). However, recent evidence suggests that in patients with < 48 h of symptoms before conversion to sinus rhythm, the risk is as low as 0.8% (18). This small study suggests that electrical cardioversion of ED patients with recent-onset AF may be safe, with a low risk of adverse outcomes.

One barrier often encountered is concern over the accuracy of the estimated time of onset of AF. Although it is known that patients with AF may be asymptomatic, there is no evidence that patients presenting to the ED with symptoms related to AF are unreliable in estimating the time of onset of the dysrhythmia (19–21). This often-propagated myth may underlie much of the resistance to early cardioversion in the US.

The question then remains whether ED cardioversion of recent-onset AF is safe and effective, and whether such a management strategy will provide any benefit. Potential benefits include decreased length of stay, decreased cost, and improved patient and physician satisfaction. In addition to TE complications, risk of recurrent AF requiring subsequent ED visits must be addressed.

EVIDENCE SEARCH

A PubMed search was performed using the combined keywords “atrial fibrillation,” “emergency department,” and “cardioversion.” This search yielded 124 citations. These were reviewed along with the bibliographies of relevant articles. A search was performed of the Cochrane Database of Systematic Reviews using the same strategy, which yielded no relevant reviews. Articles were excluded that compared different cardioversion strategies or pharmacologic agents, or included patients without recent-onset AF. Five articles were selected for review specific to the topic of ED cardioversion for recent-onset AF.

EVIDENCE REVIEW

Thirty-day Outcomes of Emergency Department Patients Undergoing Electrical Cardioversion for Atrial Fibrillation or Flutter, 2010 (22)

Population. Subjects included consecutive eligible patients presenting to St. Paul’s Hospital and Mt. St. Joseph’s Hospital in Vancouver, BC, Canada between January 1, 2000 and September 30, 2007 undergoing direct-current cardioversion (DCCV) for AF or flutter. A total of 1830 ED encounters were identified for AF or flutter, with 409 undergoing DCCV. Of these, 150 random charts were reviewed for detailed descriptive analysis, with nine of these encounters excluded from the final analysis. The mean age of the remaining 141 encounters was 57 $\pm$ 14 years. There were 400 total remaining