
Abstracts

□ EARLY OR DELAYED CARADIOVERSION IN RECENT-ONSET ATRIAL FIBRILLATION.

Pluymakers NAHA, Dudink EAMP, Luermans
JGLM, et al. *N Engl J Med.* 2019;380:1499-1508



Recent onset symptomatic atrial fibrillation is a common presenting complaint in the emergency department (ED). Patients frequently undergo cardioversion either in the ED or after admission, but it is not currently known whether this provides any benefit as atrial fibrillation frequently converts back to sinus rhythm spontaneously. The purpose of this study was to demonstrate if rate control with observation and late cardioversion was non-inferior to early cardioversion in new-onset atrial fibrillation.

This study was a multicenter, open-label, non-inferiority trial that randomized patients with new onset atrial fibrillation to one of two groups: early cardioversion or an observational “wait and see” approach. Hemodynamically stable patients age 18 and older with new onset atrial fibrillation and symptom duration of <36 hours were selected. Other inclusion criteria included ability to provide informed consent, electrocardiogram (ECG) consistent with atrial fibrillation, and heart rate (HR) >70. Exclusion criteria consisted of: signs of myocardial infarction (MI), pre-excitation syndrome, history of sick sinus syndrome, unexplained syncope, persistent atrial fibrillation for more than 48 hours, acute heart failure, enrollment in another clinical trial, and at the attending physician’s clinical discretion. Patients in the early cardioversion arm underwent chemical cardioversion, preferably with flecainide. Patients with contraindications to or previous unsuccessful attempts at chemical cardioversion were treated with electrical cardioversion and discharged from the ED once deemed clinically stable. Rate controlling medication titrated to achieve a HR of 110 bpm or less was used to treat the “wait-and-see” arm. These medications included beta-blockers, calcium channel blockers, and digoxin. Clinically stable patients were discharged with 48-hour follow-up. Patients with persistent atrial fibrillation at 48 hours were referred to the ED for delayed cardioversion. All patients were followed up at 4 weeks for repeat EKG. During the trial, patients were anticoagulated appropriately per their CHA₂DS₂-VASc score. The primary endpoint was restoration of sinus rhythm at 4 weeks. Secondary endpoints reported included total time spent in the ED, total adverse events, all-cause mortality, the need for rescue rate control medication after the index visit, and hospitalization for cardiovascular complications.

Out of 3,706 patients screened, 437 were randomized with 218 assigned to the “wait-and-see” group and 219 assigned to

the early cardioversion group. Ten patients were lost to follow up, leaving 415 and 412 patients analyzed in the delayed and early cardioversion groups, respectively. Baseline characteristics were similar between the two groups. Ninety one percent of patients in the delayed-cardioversion group and 94% of patients in the early cardioversion group achieved the primary endpoint of sinus rhythm at 4 weeks. This –2.9% difference between groups had a CI of –8.2 to 2.2 and a p value of 0.005, indicating that the delayed cardioversion option was non-inferior. Of the 218 patients in the delayed cardioversion group, 69% converted to sinus rhythm within 48 hours of receiving rate control therapy. Twenty-eight percent did not convert and required cardioversion. Sixteen percent of patients in the early cardioversion group converted spontaneously, and 78% had successful cardioversion, of which 83 underwent pharmacologic cardioversion and 88 underwent electrical cardioversion. Atrial fibrillation recurred in 30% of patients in the delayed cardioversion and 29% of patients in the early cardioversion group at the 4-week follow-up visit. For secondary outcomes, emergency department visit length was shorter in the delayed cardioversion group at a mean of 120 minutes compared to a mean of 158 minutes in the early cardioversion group. Seven percent of patients in both groups presented to the emergency department for recurrence of atrial fibrillation prior to their 4-week follow-up appointment. Rates of cardiovascular complications were not significantly different between the two groups with 10 events in the delayed cardioversion group and 8 in the early cardioversion group. Only one patient in each group experienced a cerebrovascular accident. No deaths occurred in either group.

This study showed that a delayed approach to cardioversion is non-inferior to early cardioversion in recent onset atrial fibrillation in symptomatic patients presenting to the emergency department. Rates of conversion to sinus rhythm were not statistically different between the two groups. The authors note that this is beneficial because adverse effects associated with cardioversion could potentially be avoided in a large number of patients. More instances of spontaneous conversion were observed in the delayed group, which could lead to fewer diagnoses of persistent atrial fibrillation, possibly alleviating the complex treatment regimen for patients with persistent atrial fibrillation. One limitation of this study was a lack of power to determine the safety of the wait-and-see strategy, though incidence of cardiovascular complications was low and similar between the two groups. Authors note that this study underestimates rates of recurrence of atrial fibrillation because they did not use continuous monitoring, though the similar recurrence rates in the two groups indicates that recurrence

was not altered by treatment plan. In conclusion, the results of this study show that a delayed cardioversion approach to management of recent-onset atrial fibrillation is not inferior in obtaining sinus rhythm at 4 weeks.

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Commentary: Much debate exists about whether or not cardioversion should be attempted in the emergency department for recent onset atrial fibrillation. While a larger patient sample would be needed to ensure safety of a delayed cardioversion, this well-done trial shows that the delayed approach may be promising given that both groups had similar rates of returning to sinus rhythm at 1 month and low rates of adverse events. Showing noninferiority may be particularly helpful for those who are practicing in centers where early cardioversion is not always feasible or where resources are limited. This is also helpful to provide clinicians an opportunity to better practice shared decision making when it comes to the treatment options.

□ DIFFERENCES IN HOSPITAL OUTCOMES FOLLOWING TRAUMATIC INJURY FOR PATIENTS EXPERIENCING IMMEDIATE TRANSFER TO A LEVEL 1 TRAUMA FACILITY VERSUS RESUSCITATION AT A CRITICAL ACCESS HOSPITAL (CAH).



Windsorski J, Reyes J, Helmer SD, et al. *The American Journal of Surgery*. 2019;217:643-647

It is well accepted that trauma patients have better outcomes when they receive definitive care by a specialized trauma team. However data is conflicting on whether initial trauma resuscitation also needs to happen at a specialized trauma center or if critical access hospitals can provide comparable, efficient care with subsequent transfer for definitive care.

The objective of this study was to determine if rural trauma patients who were initially resuscitated at a critical access hospital then subsequently transferred to a tertiary center had similar outcomes compared to patients who were initially transported to a level 1 trauma center from the scene. A retrospective database review was completed of adults trauma patients between January 1, 2009 to May 31, 2014 who arrived at a level 1 trauma center in Kansas either directly from the scene or transferred from a critical access hospital. Critical access hospitals were defined as those having no trauma designation. Out of state and local ground EMS trauma patients were excluded. Patients were stratified within each group based on injury severity score, presence of shock (systolic blood pressure <90), and initial Glasgow coma scale (GCS). The primary outcomes measured were mortality, ventilator duration, intensive care unit length of stay, and hospital length of stay.

Ten thousand one hundred and thirty two trauma patients were identified however after the exclusion of local ground transport, out of state transports, and patient from a hospital with a trauma designation, only 1,478 patients were included in this study. Three hundred and ninety four (26.7%) patients were transported directly to a level one trauma center and the

other 1,084 (73.3%) patients were first resuscitated at a critical access hospital and then transferred to a level one trauma center for definitive care. Overall, the patients transported directly to a level 1 trauma center were younger ($p<0.001$), had a larger percentage with a GCS <9 ($p<0.001$), were more frequently hypotensive ($p<0.001$), and had a higher injury severity index ($p<0.001$). Almost all of the patients in both groups sustained blunt trauma ($p=0.282$). Patients triaged at a critical access hospital had a similar mortality (OR 0.7, 95% CI 0.41-1.2) and hospital length of stay (OR 0.82, 95% CI 0.7-0.97) to patients triaged at a level one trauma center when adjusted for age, index severity score, GCS score, and hypotension. The use of a critical access hospital was associated with decreased intensive care days (<0.001) but no difference in ventilator days ($p=0.082$), however neither of these were adjusted for age, index severity score, GCS score, or hypotension.

There were a few limitations to the study. To start with this study was retrospective which introduces both selection bias and information bias. The study also did not include any information regarding pre-hospital interventions, resuscitation details at the critical access hospital, or transport time. All of these factors could better explain the comparable mortality between the groups and the decreased morbidity in the critical access hospital group.

The authors concluded that the use of critical access hospitals for the initial resuscitation of trauma patients with subsequent transfer to a tertiary care center for definitive care did not increase mortality after adjusting for age, injury severity, hypotension, and GCS. They also concluded critical access hospitals improved morbidity as shown by both decreased hospital and intensive care unit length of stay, but not ventilator days.

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Comment: Given these data showing morbidity benefits without mortality differences, this study highlights the importance of triage and initial trauma resuscitation at a critical access hospitals. However, these differences could also be due to the fact the group transferred directly to the level one trauma center was sicker as evidenced by a lower GCS, more hypotension, and a higher index of injury severity. Also this study was completed within the state of Kansas only so the generalizability of this data to other areas may be difficult depending on the type of trauma network available. Finally, this was a small retrospective study and needs to be reproduced with larger, multi-center prospective studies to better elucidate mortality and morbidity benefits.

□ PREGNANCY-ADAPTED YEARS ALGORITHM FOR DIAGNOSIS OF SUSPECTED PULMONARY EMBOLISM.



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Pregnancy is associated with an increased risk of thromboembolic events, including pulmonary emboli. This study