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**Mechanical support in cardiogenic shock after  
synchronised electrical cardioversion**

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**Abstract**

Synchronised electrical cardioversion is a standardized treatment approach for the rhythm control of patients with atrial fibrillation. Its application can occur both in emergency and non emergency settings. This is a case of a cardiogenic shock following a synchronized electrical cardioversion and the necessity of mechanical circulation to resolve it. This case report underlines the need of performing this procedure in intensive monitor environment, where all possible ways of circulation support are present.

**Background**

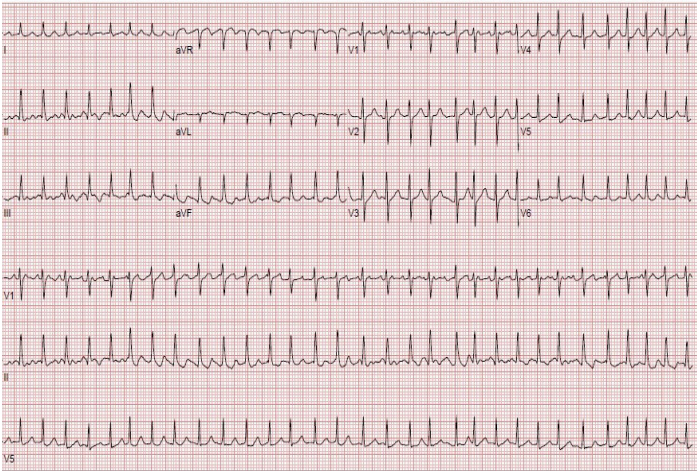
Atrial fibrillation (AF) represents the most prevalent form of supraventricular tachycardia [1]. While, historically, the management of AF encompassed only anticoagulation, rate control, or rhythm control, the latest European guidelines have reassessed this approach [1]. Significantly, risk factor limitation has emerged as an essential consideration. Synchronized electrical cardioversion is a standard therapeutic intervention for rhythm control in AF patients. It may be implemented in both emergency and non-emergency settings [1]. The most frequent contraindication for electrical cardioversion is a thrombus in the left atrial appendage (LAA) [1]. Additionally, other complications may arise besides stroke, with arrhythmia being the second most common complication [2]. Bradycardic arrhythmias occur more frequently, while other possible complications include skin burns, electrocardiographic changes, and myocardial injury [3].

**Case Study**

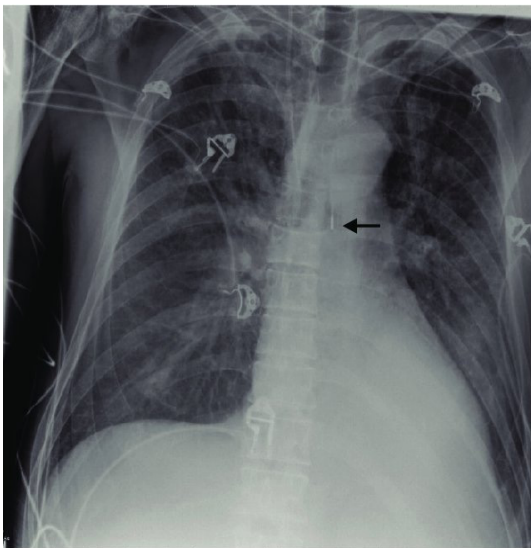
A 53-year-old male patient presented to our emergency department with a worsening dyspnea that had reached clinical status new York heart association (NYHA) level III to IV. The patient had been hospitalized for approximately one week, three months prior, in the neurology department due to a minor stroke that left no current deficit. During this hospitalization, a newly diagnosed atrial fibrillation was found to be the cause of the stroke, and oral anticoagulation was initiated after a few days. At that time, a transthoracic echocardiogram showed a normal left ventricular ejection fraction with no moderate or severe structural or functional valvulopathies.

At the time of the current presentation, the patient was still experiencing atrial fibrillation, and reported excessive alcohol and cigarette consumption. Clinical examination revealed signs of congestive heart failure, and intravenous diuretics were initiated. A new transthoracic echocardiogram showed a severe limitation of the left ventricular pump function with the ejection fraction now around 20%. As tachycardia-induced cardiomyopathy was considered a differential diagnosis, synchronized electrical cardioversion was performed after three days of hospitalization. A total of 6 ml of Propofol 1% was used for sedation, and the cardioversion was successful in achieving sinus rhythm.

During the recovery phase, while still being monitored, the patient went rapidly into shock and developed pulseless electrical activity. A reanimation



**Figure 1:** Electrocardiography with Atrial Fibrillation.



**Figure 2:** Chest radiograph of the patient exhibiting an augmented intrathoracic diameter while utilizing an intra-aortic balloon pump.



**Figure 3:** Intra-aortic balloon pump (IABP).

protocol was initiated, which was successful after approximately 10 minutes. The patient remained intubated and required high doses of inotropes (dobutamine and noradrenaline) for a few hours with no diuresis, when a new worsening of the blood pressure began. At that point, an intra-aortic balloon pump (IABP) was inserted through the left femoral artery. After that, the dose of inotropes could be slowly reduced, and after 72 hours, the patient required no inotropic support anymore. Due to a lung infection treated with tazobactam, the patient remained intubated for four more days, and at day 7 of his stay in the intensive care unit, he could be extubated.

During the rest of his hospital stay, the patient developed atrial fibrillation once more, and amiodarone therapy was initiated. A new transthoracic echocardiogram in sinus rhythm showed an ejection fraction of 20%. A coronary angiogram was also performed, and coronary heart disease could be excluded. At day 19 of his hospital stay, the patient was discharged.

### Discussion

This is a case report detailing a rare complication of a generally safe medical procedure. Although pulseless electrical activity due to Takotsubo syndrome resulting from electrical cardioversion has been previously documented, it was not observed in this particular patient. This case report highlights the necessity of intraaortic balloon pump (IABP) treatment for cardiogenic shock following electrical cardioversion, and suggests that IABP may confer a clear mortality benefit in hospitals where Impella or ECHMO are not available.

Regarding this case, while tachycardia-induced cardiomyopathy cannot be ruled out, alcohol-induced cardiomyopathy is also a possible explanation for the low ejection fraction. In hindsight, a more aggressive therapy with diuretics and optimization of heart failure treatment prior to the electrical cardioversion may have prevented the occurrence of pulseless electrical activity. Furthermore, the patient's deteriorating status could be attributed to sedation, as both cardiac arrest and cardiogenic shock after propofol administration have been reported in the literature [5].

### Conclusion

In this report, we presented a case of cardiogenic shock that occurred following an electrical cardioversion and necessitated mechanical circulatory support for successful treatment. The occurrence of this rare and severe complication may be attributed to the patient's low ejection fraction, sedation, or a combination thereof. The use of more aggressive and optimized medical therapy for heart failure before the cardioversion could have

potentially prevented this adverse event. Additionally, this case highlights the importance of proper patient selection and performing cardioversion in a setting with access to adequate supportive measures such as intensive care units.

**Conflicts of Interest:** There are no conflicts of interest

**Funding:** There is no funding support

**Ethical Approval:** Not required.

**Consent:** Consent was obtained from patient.

## References

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