Cardioversions and Transthoracic Echocardiography

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KEYWORDS

• Atrial fibrillation • Cardioversion • Anesthesia • Sedation
• Transthoracic echocardiography

KEY POINTS

- Anesthesia for transthoracic echocardiography and cardioversions are routinely done outside of the operating room.
- Patients require similar preoperative evaluation as they would for before a surgical procedure.
- A complete check of all necessary supplies and rescue items must be completed before cardioversion or transthoracic echocardiography to ensure patient safety, as most patients will not have a secured airway.
- Appropriate medications for anesthesia should be selected based on patients' comorbidities, and hemodynamic supportive medications, such as phenylephrine, epinephrine, and atropine, should be readily available.

Cardioversion is typically used for conversion of atrial fibrillation and flutter back to normal sinus rhythm. Cardioversion is routinely performed as a non–operating room procedure for which anesthesiologists are requested to provide analgesia and sedation. The anesthetic goals are to provide amnesia of the shock and prevent residual pain. Although these patients often present with other cardiopulmonary comorbidities that will add to the complexity of providing a short effective anesthetic, these patients typically are discharged home after the procedure.

Atrial Flutter

Atrial flutter is a re-entrant circuit in the right atrium. Boundaries for this re-entrant circuit include the tricuspid valve ring and an area of block, which is in the region

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between the venae cavae. A myocardial isthmus of conduction is also present, which is bound by the tricuspid ring and the inferior vena cava, the Eustachian ridge, and the coronary sinus.[1] Atypical atrial scar tissue from a prior atrial incision or around the pulmonary veins can result in atrial flutter.[2] Transthoracic echocardiography (TEE) is the preferred method of evaluation, as it can assess biventricular function and atria size.

Treatment

Treatment goals are centered around ventricular rate control, restoration of sinus rhythm, prevention of recurrent episodes of arrhythmia, and minimizing risk of thromboembolism. Overall, compared with atrial fibrillation, catheter-based ablation is superior to pharmacologic interventions. Cardiologists may consider cardioversion for flutter less than 48 hours in duration or if the patient is hemodynamically unstable.[3]

Atrial Fibrillation

Atrial fibrillation is characterized as a supraventricular tachyarrhythmia with uncoordinated atrial activation and, consequently, ineffective atrial contraction. Atrial fibrillation is the most common sustained cardiac arrhythmia and is associated with a 6-fold increase risk in stroke and 2-fold increase in mortality.[4] Complications associated with atrial fibrillation are related to both loss of atrial contraction and the irregular and rapid ventricular rate. Treatment plans are centered around minimizing risk of embolic events, rate control, and attempting to restore sinus rhythm.

Classification

The 2014 American Heart Association guidelines classify atrial fibrillation from the first detected episode usually presenting for medical attention (**Table 1**). Guidelines describe the persistence of each episode. If the arrhythmia terminates in less than 7 days, it is classified as paroxysmal. If arrhythmia lasts longer than 7 days, the rate is classified as persistent atrial fibrillation. Permanent atrial fibrillation describes patients who have undergone failed cardioversions.

Classifications help to guide treatment options for patients. Based on the classification, patients might have rate or rhythm controlled by either medical or interventional therapies.[5]

Table 1
Atrial fibrillation classifications and definitions

Classification	Duration	Definition
Paroxysmal Atrial Fibrillation	Within 7 d of onset	Episodes reverting to sinus rhythm spontaneously or with intervention Episodes can recur
Persistent Atrial Fibrillation	Greater than 7 d	Continuous atrial fibrillation
Long-standing Atrial Fibrillation	Greater than 12 mo	Continuous atrial fibrillation
Permanent Atrial Fibrillation		No further attempts made to restore sinus rhythm
Non-valvular Atrial Fibrillation		Atrial fibrillation with no evidence of mitral valve disease or intervention (rheumatic mitral stenosis, mitral valve repair or bioprosthetic valve)

Data from January CT, Wann LS, Alpert JS, et al. 2014 AHA/ACC/HRS guideline for the management of patients with atrial fibrillation: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the Heart Rhythm Society. J Am Coll Cardiol 2014;64(21):e1–76.