

## C03: Narrow Complex Tachycardia

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### Introduction

The narrow complex tachycardias (NCT) are a number of clinical conditions that are defined primarily by their ECG findings but differ in their significance. All narrow complex tachycardias originate above the level of the atrioventricular node, and all use the ventricles' normal conduction pathways.

### Essentials

- Do not attempt to control heart rate or rhythm, using either medications or cardioversion, if the tachycardia is believed to be compensatory (e.g., pain, hypovolemia, fever, hypoxia). A thorough history must be obtained prior to initiating therapy. Manage any of these major underlying conditions prior to addressing the tachycardia.
- Adenosine is the preferred treatment option for patients experiencing mild to moderate symptoms believed to be associated with a supraventricular tachycardia, and whose dysrhythmias cannot be terminated through a modified Valsalva maneuver.
- Electrical cardioversion should be reserved for those patients with severe symptoms or who show signs of significant hemodynamic instability, regardless of the underlying rhythm.

### Additional Treatment Information

- Print rhythm strips during all conversion attempts.
- The modified Valsalva (as described by Appelboam et al) has been demonstrated to be effective at terminating paroxysmal supraventricular tachycardia in some settings. It has very few risks, and can be used in stable patients while vascular access is being established. The standard Valsalva maneuver is modified by having the patient attempt to bear down, or blow the plunger out of a 10 cc syringe, for 15 seconds. The patient is then laid supine and their legs are raised to maximize venous return to the core, and held in this position for 15 seconds.
- Owing to its extremely short half-life, adenosine must be administered rapidly, ideally through a proximal IV site. Patients often complain of a flushing feeling, or of a metallic taste in their mouth during adenosine administration – this is normal and to be expected, and indicates that an effective dose has been delivered. The monitor should be printing during adenosine administration to record changes to rhythm.
- Patients should, however, be warned of common adenosine side effects prior to administration. These include facial flushing, shortness of breath, palpitations, chest pain, and light headedness. Paramedics must be prepared for rare complications of adenosine, such as bradycardia or prolonged asystole following administration.
- The use of amiodarone to control atrial fibrillation is reasonably well documented through research but its applicability to prehospital care is unknown. Patients with atrial fibrillation who are hemodynamically unstable should be electrically cardioverted; amiodarone, in consultation with CliniCall, may be considered as a therapeutic option of last resort in the context of a prolonged transport.

### Referral Information

Individuals with known re-entry tachycardias may be referred to follow-up care in consultation with CliniCall after termination of their dysrhythmia using adenosine if they are asymptomatic and have no complaints.

### General Information

- Atrial fibrillation is the result of electrical activity at ectopic foci in the atria that overwhelm the atrioventricular node, and can produce rapid heart rates. The rhythm in atrial fibrillation is irregular, and there are no discernable P waves on the ECG.
- Atrial flutter is produced by a re-entry circuit within the atria, coupled with an AV node that fails to consistently conduct impulses to the ventricles – conduction to the ventricles usually follows a 2:1 or 3:1 ratio, which

produces a difference between atrial activity and ventricular activity. The rhythm is generally regular, with characteristic “sawtooth” P waves on the ECG. Both atrial fibrillation and atrial flutter are associated with structural heart disease, as well as age.

- Paroxysmal supraventricular tachycardia (PSVT or SVT) is the result of the development of an accessory conduction pathway between the atria and the ventricles, separate from the AV node. SVT can develop in any individual, at any age, and can be triggered by caffeine or other stimulants, exertion, or – in many cases, nothing at all.
- Narrow complex tachycardias may present with chest pain, palpitations, dizziness, pounding in the chest, shortness of breath, or weakness. A history of previous episodes, with similar symptoms, is highly suggestive of a recurrent disease process. Consider a patient with a narrow complex tachycardia to be unstable when presenting with:
  - An altered level of consciousness
  - A systolic blood pressure < 80 mmHg
  - Ischemic-type chest pain
  - Significant shortness of breath and / or evidence of acute cardiogenic pulmonary edema.
- The formal diagnosis of narrow complex tachycardia, whether atrial fibrillation, flutter, or SVT often requires prolonged Holter monitoring, at some significant cost to the health care system (as the arrhythmias often do not develop during monitoring); paramedics should therefore endeavour to acquire a high-quality electrocardiogram on all narrow complex tachycardia patients, both for their own clinical purposes but also for the patient’s benefit as well – particularly if no formal diagnosis has been made.
- In atrial flutter, adenosine may temporarily suppress ventricular activity allowing the flutter waves to be seen more clearly. This is diagnostic for atrial flutter; adenosine should not, however, be used by paramedics solely for the purpose of diagnosis.
- Many patients with atrial fibrillation are only mildly symptomatic, and require no care beyond monitoring and reassurance. Patients with atrial fibrillation who are symptomatic can be electrically cardioverted; use caution if the onset of the atrial fibrillation is believed to be greater than 48 hours prior to EMS contact as there is a risk of embolization if the patient is not anticoagulated. Consultation with CliniCall is mandatory in these cases.

## Interventions

### First Responder

- Position of comfort
- Supplemental oxygen as required
  - → [A07: Oxygen and Medication Administration](#)

### Emergency Medical Responder – All FR interventions, plus:

- Oxygen as required to maintain SpO<sub>2</sub> ≥ 94%
  - → [A07: Oxygen and Medication Administration](#)
- Transport early
- Consider ACP intercept

### Advanced Care Paramedic – All FR, EMR, and PCP interventions, plus:

- Obtain and interpret 12-lead ECG, with additional precordial leads as required. If significant ischemia is present, manage according to ACS/STEMI guidelines.
  - → [PR16: 12 Lead ECG](#)
  - → [C01: Acute Coronary Syndrome](#)
- Establish vascular access
  - → [D03: Vascular Access](#)
  - If adenosine administration is anticipated, a proximal large-bore (18 g or better) catheter is preferred
  - Consider fluid bolus if hypovolemia is suspected
- For atrial fibrillation with a rapid ventricular response (> 120/minute):
  - If stable, transport and observe

- May consider [amiodarone](#) in consultation with CliniCall
- For suspected atrial flutter:
  - If stable, transport and observe
- For suspected supraventricular tachycardia:
  - Modified Valsalva maneuver
  - [Adenosine](#). CliniCall consult required if conversion fails after two doses.
- **For all rhythms, if unstable:**
  - Synchronized cardioversion, 100-300 J (procedural sedation will be required)
  - → [PR17: Procedural Sedation](#)
  - → [PR20: Synchronized Cardioversion](#)

**Critical Care Paramedic – All FR, EMR, PCP, and ACP interventions, plus:**

- May consider verapamil
- May consider procainamide
- May consider [metoPROLOL](#)

## Evidence Based Practice

[Narrow Complex Tachycardia](#)

[Unstable Tachycardia: Wide or Narrow Complex](#)

## References

1. Appelboam A, et al. Postural modification to the standard valsalva manoeuvre for emergency treatment of supraventricular tachycardias (REVERT): A randomised controlled trial. 2015. [\[Link\]](#)

