

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 NCTs originate above the level of the atrioventricular node and 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, their legs 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 and ideally through a proximal IV site. Patients often complain of a flushing sensation or of a metallic taste in their mouth during adenosine administration. This is normal and to be expected, indicating 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.

General Information

- Atrial fibrillation is the result of electrical activity at multiple ectopic foci in the atria that overwhelm the atrioventricular node and can produce rapid heart rates. The rhythm in atrial fibrillation is irregularly 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.
- NCTs 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 NCT 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 NCT, whether atrial fibrillation, atrial 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 NCT patients, both for their own clinical purposes and 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 a diagnostic for atrial flutter; adenosine should not, however, be used by paramedics solely as a diagnostic tool.
- 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 cardioverted; use caution if the onset of the atrial fibrillation is believed to be > 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 (see ACP interventions below).

Interventions

First Responder

- Keep the patient warm and protect from further heat loss
- Place the patient in a position of comfort, as permitted by clinical condition; in general, limit patient movement
- Provide supplemental oxygen where indicated
 - → [A07: Oxygen Administration](#)
- Conduct ongoing assessment and gather collateral information, such as medications and identification documents
- Establish ingress and egress routes from the patient's location
- Communicate patient deterioration to follow-on responders

Emergency Medical Responder – All FR interventions, plus:

- Oxygen as required to maintain SpO₂ ≥ 94%
 - → [A07: Oxygen Administration](#)
- Convey early
- Consider intercept with additional resources

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 larger) catheter is preferred
 - Consider fluid bolus if hypovolemia is suspected
- For atrial fibrillation with a rapid ventricular response (> 120/minute):
 - If stable, convey and observe
- For suspected atrial flutter:
 - If stable, convey and observe
- For suspected supraventricular tachycardia:
 - [Modified Valsalva maneuver](#)

- [Adenosine](#) - [OnCall consultation required](#) if conversion fails after 2 doses.
 - The use of sedation prior to the administration of adenosine is neither supported by evidence nor recommended by BC Emergency Health Services
- **For all rhythms, if unstable:**
 - Synchronized cardioversion 100-300J (procedural sedation will be required)
 - [OnCall consultation required](#) prior to synchronized cardioversion of atrial fibrillation if onset is believed to be > 48 hours of EMS contact.
 - → [PR17: Procedural Sedation](#)
 - → [PR20: Synchronized Cardioversion](#)

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

- Consider sodium channel blockade
 - May consider [procainamide](#)
- Consider beta blockade
 - May consider [metoprolol](#)
 - May consider [Propranolol](#)
 - May consider [Esmolol](#)
- Consider potassium channel blockade
 - [Amiodarone](#)
- Consider calcium channel blockade
 - May consider [diltiazem](#)

Evidence Based Practice

Stable Narrow Complex Tachycardia

Supportive

- [Antiarrhythmic - Class I \(Na+ channel blockers\)](#)
- [Antiarrhythmic - Class IV \(Ca+ channel blockers\)](#)
- [Antiarrhythmic - Class V \(other mechanism\)](#)
- [Electrical Cardioversion](#)
- [Modified Valsalva](#)
- [Treat and Release-SVT](#)

Neutral

- [Antiarrhythmic - Class III \(K+ channel blockers\)](#)
- [Beta Blockers](#)
- [Carotid Massage](#)
- [Valsalva maneuver](#)
- [Vagal Maneuvers](#)

Against

Unstable Tachycardia (Wide or Narrow Complex)

Supportive

- [Electrical Cardioversion](#)

Neutral

- [Vagal Maneuvers](#)

Against**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. [\[Link\]](#)
2. Prutkin JM, et al. 2020. Overview of the acute management of tachyarrhythmias. UpToDate. 2020.
3. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Procainamide: Drug information. UpToDate. 2020.
4. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Metoprolol: Drug information. UpToDate. 2020.
5. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Propranolol: Drug information. UpToDate. 2020.
6. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Esmolol: Drug information. UpToDate. 2020.
7. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Amiodarone: Drug information. UpToDate. 2020.
8. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Verapamil: Drug information. UpToDate. 2020.
9. Lexicomp. (2021). Copyright 1978-2021 Lexicomp, Inc. Diltiazem: Drug information. UpToDate. 2020.

Practice Updates

- 2023-07-05: removed verapamil from critical care interventions

