Differential diagnosis in narrow QRS complex tachycardias

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Overview

- A simple and useful algorithm to differentiate narrow complex tachycardias
- Clinical applicability
- Easy to remember
- Real clinical cases
- Some less frequent presentations

“There is no algorithm that can cover ALL clinical scenarios”...
Algorithm

3 Questions:
1. Narrow vs. Wide
2. Regular vs. Irregular
3. Where is the P-wave
Tachycardias

- SUPRAVENTRICULAR
  - SINUS TACHYCARDIA
  - ATRIAL FIBRILLATION
  - ATRIAL FLUTTER
  - ATRIAL TACHYCARDIA
  - AVNRT
  - AVRT

- VENTRICULAR
  - MONOMORPHIC VT
  - POLYMORPHIC VT
  - TORSADES DES POINTES
  - VENTRICULAR FIBRILLATION

NARROW COMPLEX TACHYCARDIA

90%

WIDE COMPLEX TACHYCARDIA
Algorithm Narrow Complex Tachycardia

Narrow Complex Tachycardia

- P before QRS
  + ST
  - LAT
  Saw tooth
  A Flutter

- No P waves
  AVNRT
  JT

- P after QRS
  RP<PR
  AVNRT
  AVRT
  RP>PR
  Atypical AVNRT

Atrial Fibrillation
A. Flutter w/variab. con.
Cardiac tamponade

- Sinus tachycardia
- Electrical alternans
- Low QRS voltage

Case 1

ECG tracings showing...

- aVR
- V1
- V4
- aVL
- V2
- V5
- aVF
- V3
- V6
- II
Low Atrial Tachycardia

- P-wave inf. leads
- P-wave in lead I
- Activation caudo-cranial left to right

Negative P-waves in inferior leads
Atrial Flutter

- Saw tooth
- Think in AFL if HR 150 bpm @ rest!!!
- CSM: variable conduction
Sinus Tachycardia

Vagal maneuvers
- SVT: “all or none”
- A Flutter: ↑ degree of block
- Sinus Tach: slow the rate

Case 4
Case 5

Typical AVNRT

- regular, narrow complex
- retrograde P-waves
- RP < PR
- RP < 80 ms
Orthodromic AVRT

- regular, narrow complex
- retrograde P-waves
- RP < PR
- RP > 80 ms
Infrequent Presentations
2:1 AVNRT

- P-wave in the middle of RR
- Retrograde P-waves
- Pseudo ‘R-waves
“2 x 1” Tachycardia

Case 8

- Narrow complex
- Slightly irregular
- 1 P-wave, 2 QRS

Fast pathway

Slow pathway

P QRS QRS
Do you want to learn more about ECGs?

The Atlas of Advanced ECG Interpretation

Find it at:
www.ecgatlas.com
Once again...

Narrow Complex Tachycardia

- Regular
  - P before QRS
    - + ST
    - - LAT
    - Saw tooth
    - A Flutter
  - No P waves
  - AVNRT
  - JT
  - AVNRT
  - JT

- Irregular
  - - P after QRS
    - Atrial Fibrillation
    - A. Flutter w/variab. con.
    - AVNRT
    - RP>PR
    - AVRT
    - RP<PR
    - Atypical AVNRT

Thanks for your attention!
Differential diagnosis in wide QRS complex tachycardias

**SUPRAVENTRICULAR**
- SINUS TACHYCARDIA
- ATRIAL FIBRILLATION
- ATRIAL FLUTTER
- ATRIAL TACHYCARDIA
- AVNRT
- AVRT

**VENTRICULAR**
- MONOMORPHIC VT
- POLYMORPHIC VT
- TORSADES DES POINTES
- VENTRICULAR FIBRILLATION

NARROW COMPLEX TACHYCARDIA

90%

WIDE COMPLEX TACHYCARDIA
Case 1

What’s your diagnosis?

- Palpitations, SOB
- BP 80/55
- CABG 1 year ago

![ECG waveform with annotations]

- R-s > 100 msec
- r/S < 1
- AV dissociation
- Morphological criteria

[ECG waveform]
The Differential Diagnosis of a Regular Tachycardia with a Wide QRS Complex on the 12-Lead ECG: Ventricular Tachycardia, Supraventricular Tachycardia with Ablated Intraventricular Conduction, and Supraventricular Tachycardia with Antegrade Conduction Over an Accessory Pathway

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Absence of an RS complex in all precordials?

YES

VT

NO

P to S interval ≤ 100 ms in 1 precordial?

YES

VT

NO

More QRS complexes than P waves?

YES

VT

NO

Morphology criteria for VT present in leads V1 and V6?

YES

VT

NO

SVT with aberrant conduction

Sens=99%
Spec=97%

Predominantly negative QRS complexes in the precordial leads V4 to V6?

Yes

VT

No

Presence of a QR complex in one or more of the precordial leads V2 to V6?

Yes

VT

No

AV relation different from 1:1? (More QRS complexes than P waves?)

Yes

VT

No

Preexcited tachycardia

Clin Cardiol 1994;17:306

The Differential Diagnosis on the Electrocardiogram Between Ventricular Tachycardia and Preexcited Tachycardia

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Case 2

- male 36 y/o, cocaine abuse
- palpitations

Sustained VT

- AV dissociation
- RS > 100 msec
- R/S < 1

VENTRICULAR
- MONOMORPHIC VT
- POLIMORPHIC VT
- TORSADES DES POINTES
- NON SUSTAINED VT
- VENTRICULAR FIBRILLATION
Case 3

What’s your diagnosis?
Case 4

- ICU, BP 100/60, talking
- Nurse got this ECG
- Diagnosis?
Case 5

What’s your diagnosis?

- Syncope
- Ramipril, Furo, Eritrom.
- CAD, previous CABG
Artifact mimicking VT

Case 6

Thanks for your attention!

Arrhythmia Service, Queen’s University