INTERPRETING CENTRAL VENOUS PRESSURE WAVEFORMS

INTRODUCTION
A central venous pressure waveform provides important information about the hemodynamic state of the patient and compliance of the system.

CENTRAL VENOUS PRESSURE (CVP) WAVEFORMS
- Measures pressure in the central venous circulation
- Obtained by using a central venous catheter ideally placed at the junction of the superior vena cava (SVC) and the right atrium
- Depends on:
  1. Compliance of the cardiovascular system
  2. Overall volume status

INTERPRETING CVP WAVEFORMS
Remember that the waveform represents atrial pressure which is the relationship between atrial compliance and volume. One CVP Waveform represents one complete beat of the heart.
- **a-wave**: atrial contraction
  - Corresponds with timing of P wave on ECG
  - Noncompliant right atrium: = large a-wave
- **c-wave**: movement of the tricuspid valve into the right atrium
  - Corresponds with timing of R wave on ECG
  - Transient decrease in atrial compliance/increase in atrial pressure
  - c-wave and a-wave can be difficult to differentiate when patient is tachycardic
- **x-descent**: atrial relaxation
  - Corresponds with timing of QRS complex on ECG
  - Tricuspid valve descends towards the apex of the right ventricle causing a decrease in right atrial pressure
- **v-wave**: atrial filling
  - Corresponds with timing of T wave on ECG
  - A large v-wave may indicate tricuspid regurgitation
  - If right atrium is very compliant, tricuspid regurgitation is possible without generation of large v-wave
- **y-descent**: atrial emptying
  - Corresponds with timing just prior to P wave on ECG

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Figure 1: Central venous catheter placement at the SVC-RA junction

Figure 2: The different parts of a central venous pressure waveform

Figure 3: ECG showing timing of CVP waveform components