



Cardiovascular Block

Physiology Team 430

2nd Lecture

The recording of Jugular
venous and carotid arterial
pressures

Practical

This Lecture is Done By :

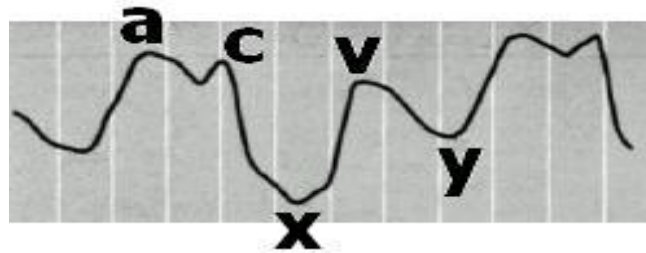
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JUGULAR VENOUS PULSE (J.V.P.)



Classically three upward deflections and two downward deflections have been described.

Causes of these waves are:

“a” wave: It is due to right atrial contraction.

“c” wave: It is due to bulging of tricuspid valve into right atrium during isovolumetric contraction phase of ventricular systole. OR it is a Carotid Artifact.

“x” descent: It is due to downward displacement of tricuspid valve by the contraction of papillary muscles during ventricular systole.

“v” wave: It is due to increase in right atrial pressure, when right atrium continues to fill with blood from great veins against closed tricuspid valve.

“y” descent: It is due to fall in right atrial pressure, when the blood flows out of the right atrium into the right ventricle as soon as the tricuspid valve opens.

The jugular venous pressure is used to measure the central venous pressure indirectly.

The internal jugular vein connects to the right atrium without any valves so that any pressure change in right atrium is reflected by the jugular venous pulse that can be recorded and used to diagnose certain conditions such as atrial fibrillation and tricuspid stenosis.

Abnormalities of the waves:

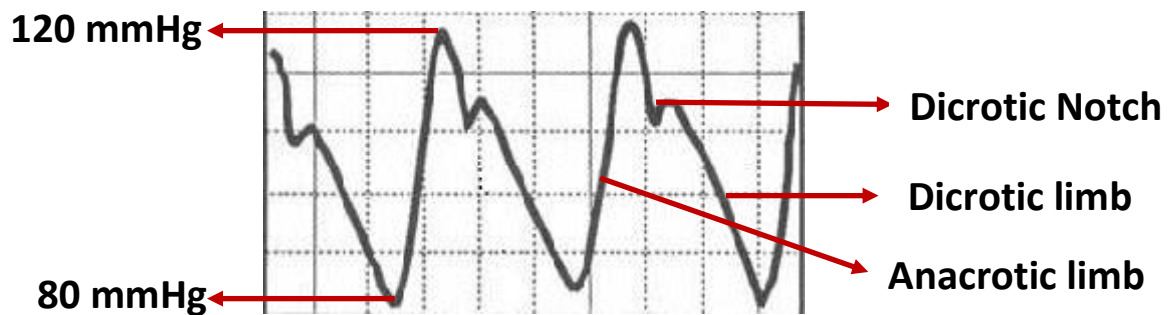
Abnormalities of the "a" wave:

- 1- Disappears or absent in atrial fibrillation
- 2- Large "a" waves occur in any cause of right ventricular hypertrophy (pulmonary hypertension and pulmonary stenosis) and tricuspid stenosis.
- 3- Extra large "a" waves (called "cannon" waves) in complete heart block and ventricular tachycardia.

Abnormalities of the "v" wave : Prominent v waves

Tricuspid regurgitation - called "cv" or large "V" waves and occur at the same time as systole (combination of "c" and "v" waves and loss of "x- descent").

CAROTID ARTERIAL PULSE



When we record the carotid arterial pulse, **we get a graph having:**

- ❖ **Anacrotic limb (ANA means up)** It is a record of pressure wave in the artery (arterial wall) during the maximum ejection phase of ventricular systole.
It is shown as the rising phase of the carotid arterial pulse tracing.
- ❖ **Dicrotic Notch (Dn) or Incisura** It is due to closure of aortic valve and coincides with the second heart sound and marks the beginning of ventricular diastole.
It is shown as a notch in the carotid arterial pulse tracing.
- ❖ **Dicrotic limb** Due to elastic recoil of arterial wall, pressure is maintained to 80 mmHg in the artery during ventricular diastole.
It is shown as the falling phase of the carotid arterial pulse tracing after dicrotic notch.

A tracing of the normal carotid pulse involves a smooth, rapid upstroke with a dome-shaped peak

Questions and problems:

1. What is the significance of:

a- The anacrotic limb?

It is the ascending limb. It is a record of pressure wave in the artery (arterial wall) during the maximum ejection phase of ventricular systole.

b- The dicrotic notch?

It is due to closure of the aortic valve.

c- The dicrotic limb?

It is due to elastic recoil of the arterial wall.

2. What is the arterial blood pressure likely to be at the start and the peak of the carotid arterial pulse tracing?

At the start of the anacrotic limb, the blood pressure is likely to be 80 mmHg.

At peak of the anacrotic limb, the blood pressure is likely to be 120 mmHg.

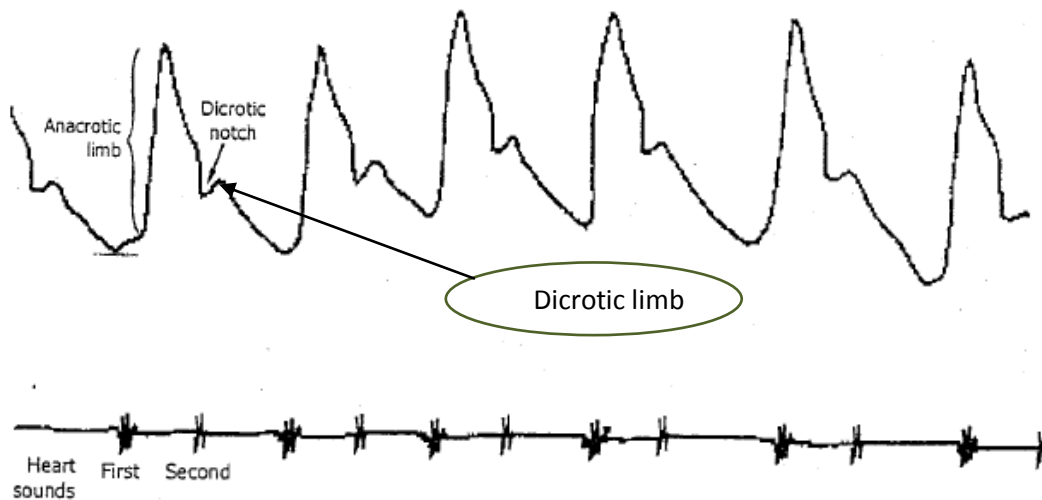
3. What are the causes of all waves in JVP?

Already answered

4. What are the abnormalities of waves in JVP?

Already answered

Carefully label the different waves of the carotid arterial pulse tracing:



Carefully label the different waves of the jugular venous pulse tracing:

Look for "W" in the diagram, first negative peak of "W" is "x" descent and the second negative peak is "y" descent and between them is positive "v" wave.



Before "x" descent is "c" wave and before "c" wave is "a" wave.