PULSES

Carotid Arterial
Jugular Venous

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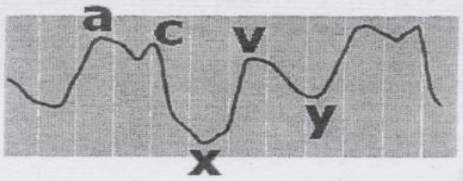
PULSES: Causes

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.
- Dicrotic Notch (Dn) or Incisura – It is due to closure of aortic valve.
- Dicrotic limb – Due to elastic recoil of arterial wall, pressure is maintained to 80 mmHg in the artery during ventricular diastole.

JUGULAR VENOUS PULSE (J.V.P.)



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.

PULSES: Causes Cont…

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.
- Dicrotic Notch (Dn) or Incisura - It is due to closure of Aortic valve.
- Dicrotic limb:- Due to elastic recoil of arterial wall, pressure is maintained to 80 mmHg in the artery during ventricular diastole.

JUGULAR VENOUS PULSE (J.V.P)

Causes of these waves are:

'a' wave: It is due to right atrial contraction.

'c' wave: Due to bulging of tricuspid valve into the right atrium, during isovolumetric contraction.

'v' wave: Increased pressure in right atrium due to filling of atrium with blood, when tricuspid valve is closed.

'x' descent: Due to downward displacement of AV ring during ventricular systole

'y' descent: Opening of tricuspid valve, with rapid flow of blood from right atrium to right ventricle.

ARTERIAL PULSES: Parts

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

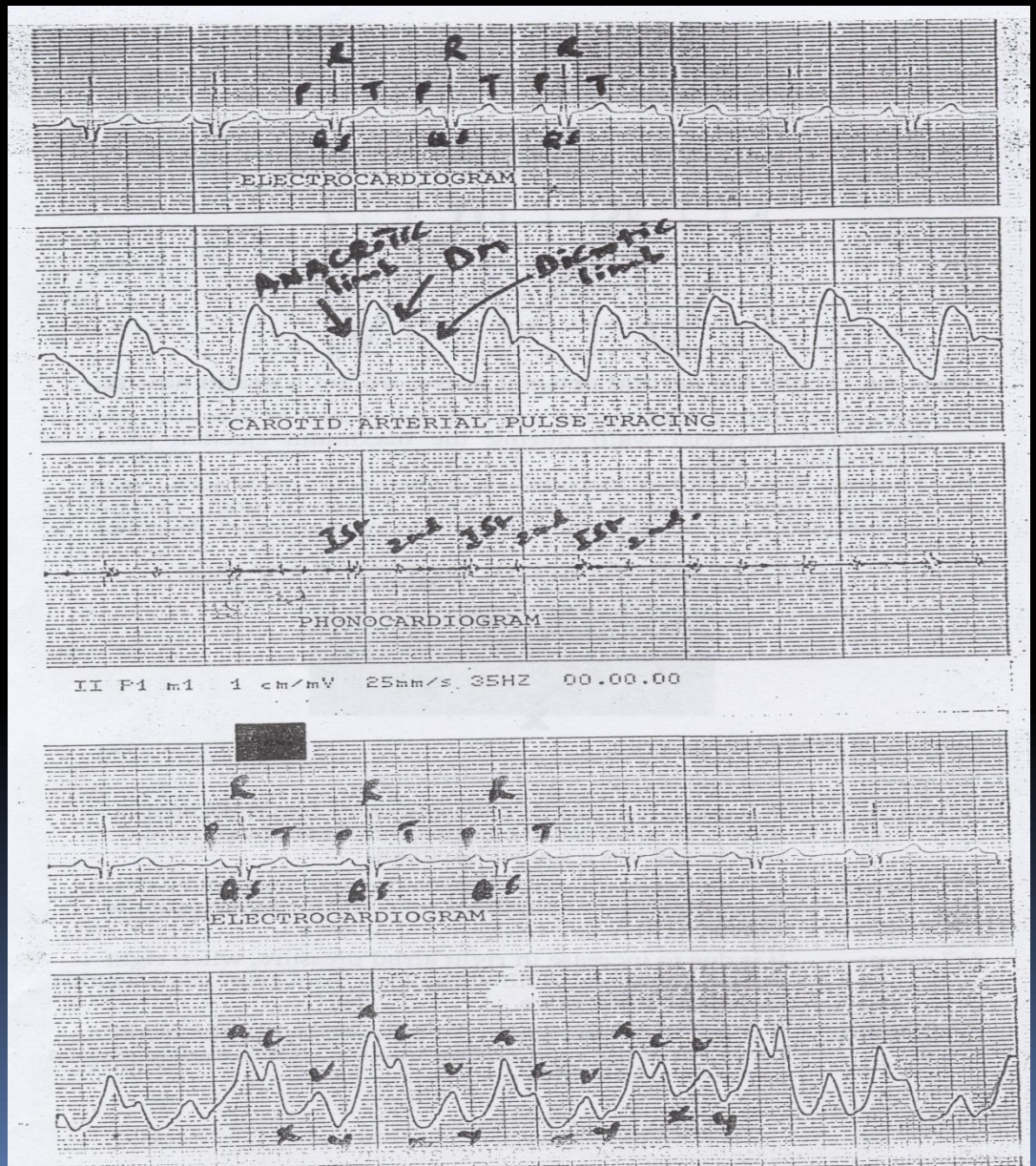
- An "Anacrotic Limb" (Ana = Up): It is a pressure wave in the arterial wall during the Max. Ejection period of the Systole.
- "Dicrotic Notch" or Incisura: Due to the closure of the Aortic Valve.
- "Dicrotic Limb": Due to the elastic recoil of the arterial wall causing the pressure in the arterial wall during Diastole.

VENOUS PULSE (JVP): Parts

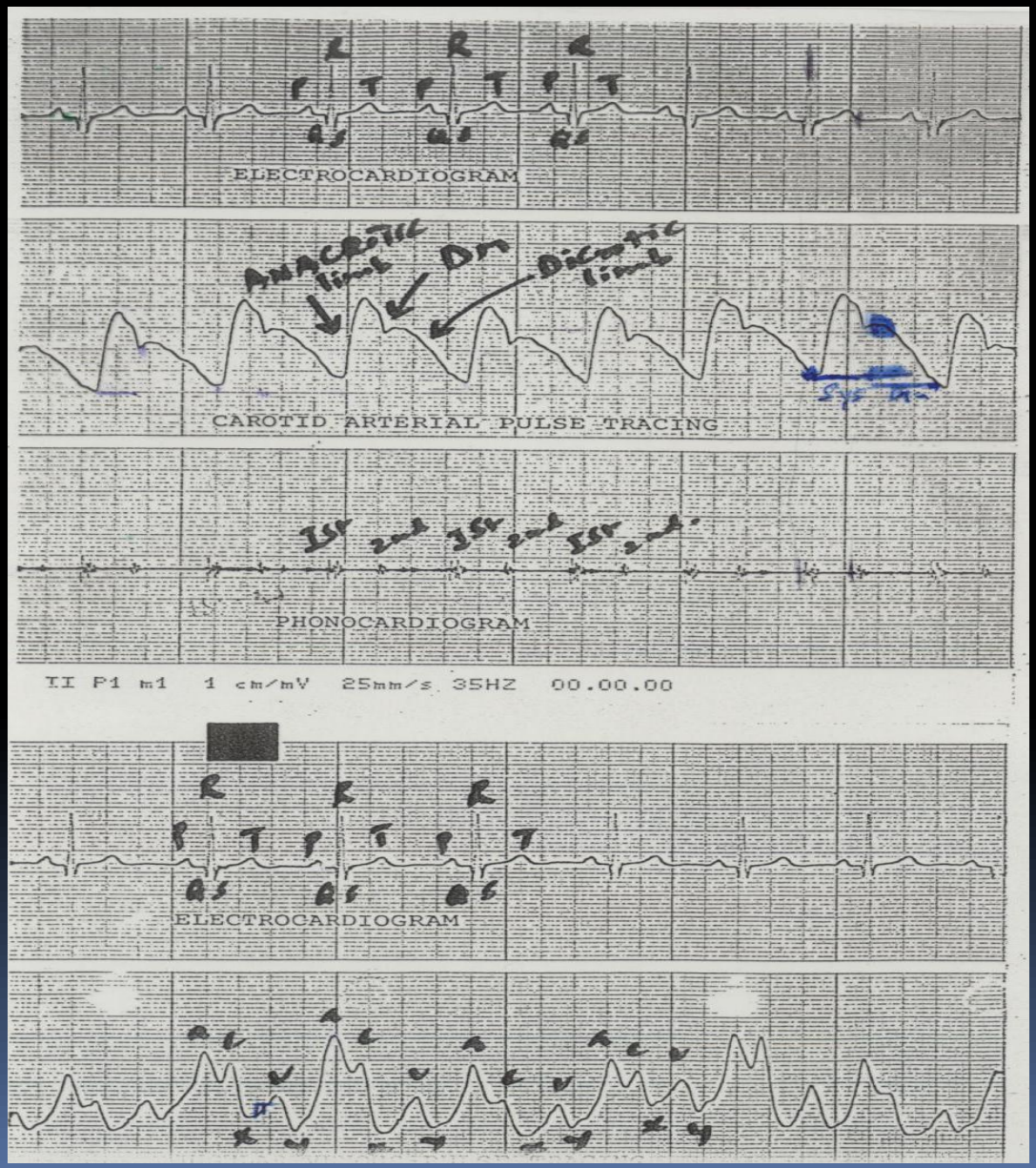
- "a" wave: It is due to Rt. Atrial contraction. (+ve wave)
- "c" wave: It is due to the bulging of the Tricuspid valve into the Rt. Atrium during Isovolumetric Contraction. (+ve wave)
- "v" wave: Due to the filling of the Right Atrium with a closed tricuspid valve. (+ve wave)

- "x" descent: Due to downwards displacement of the AV rings during ventricular systole pressure thus creating a suction or a negative pressure in the Rt. Atrium. (- ve wave)
- "y" descent: Due to the fall in the Rt. Atrial Pressure when the blood starts to flow from the Right Atrium into the Rt. Ventricle during passive filling. (- ve wave)

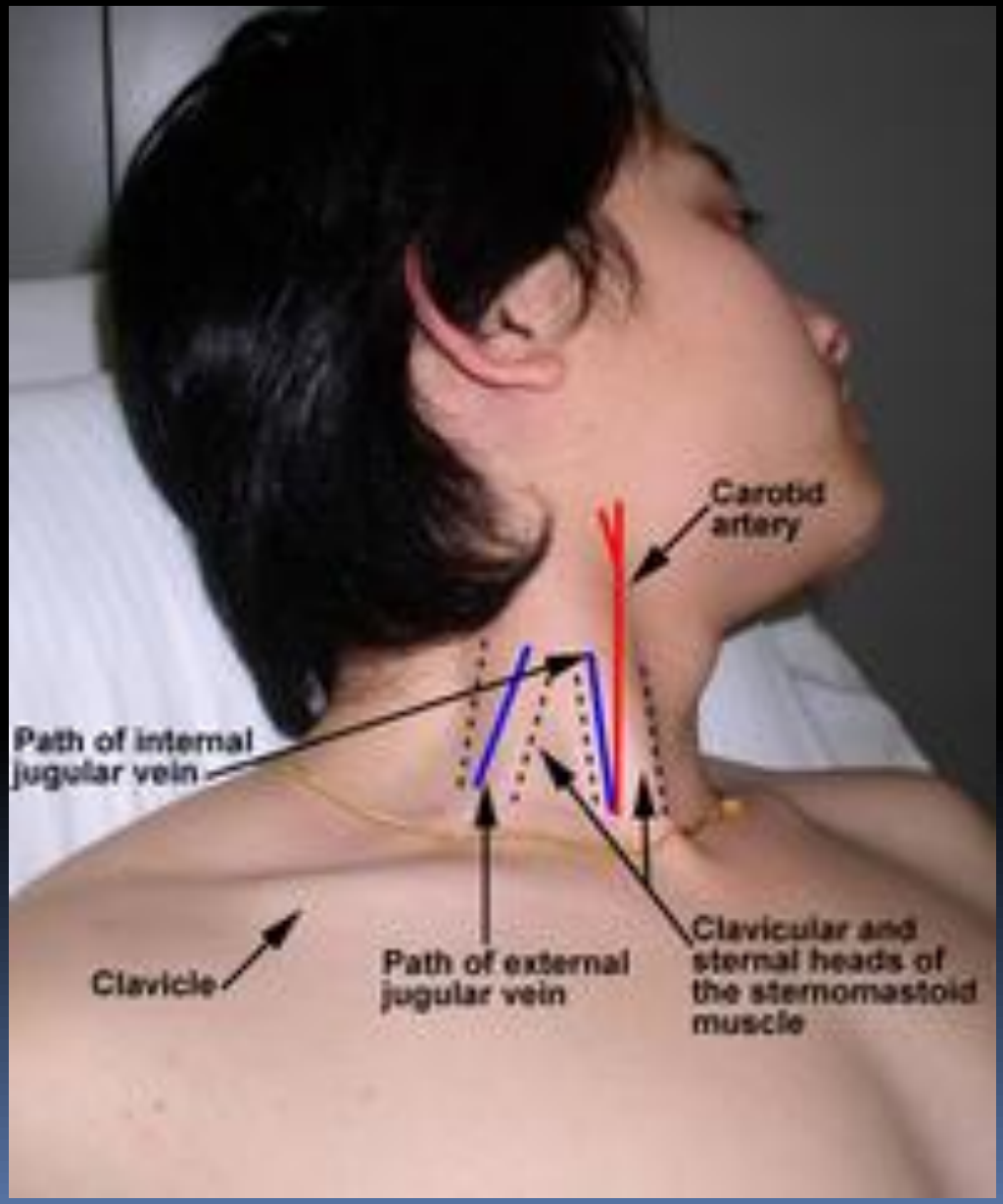
PULSES: Co-relations



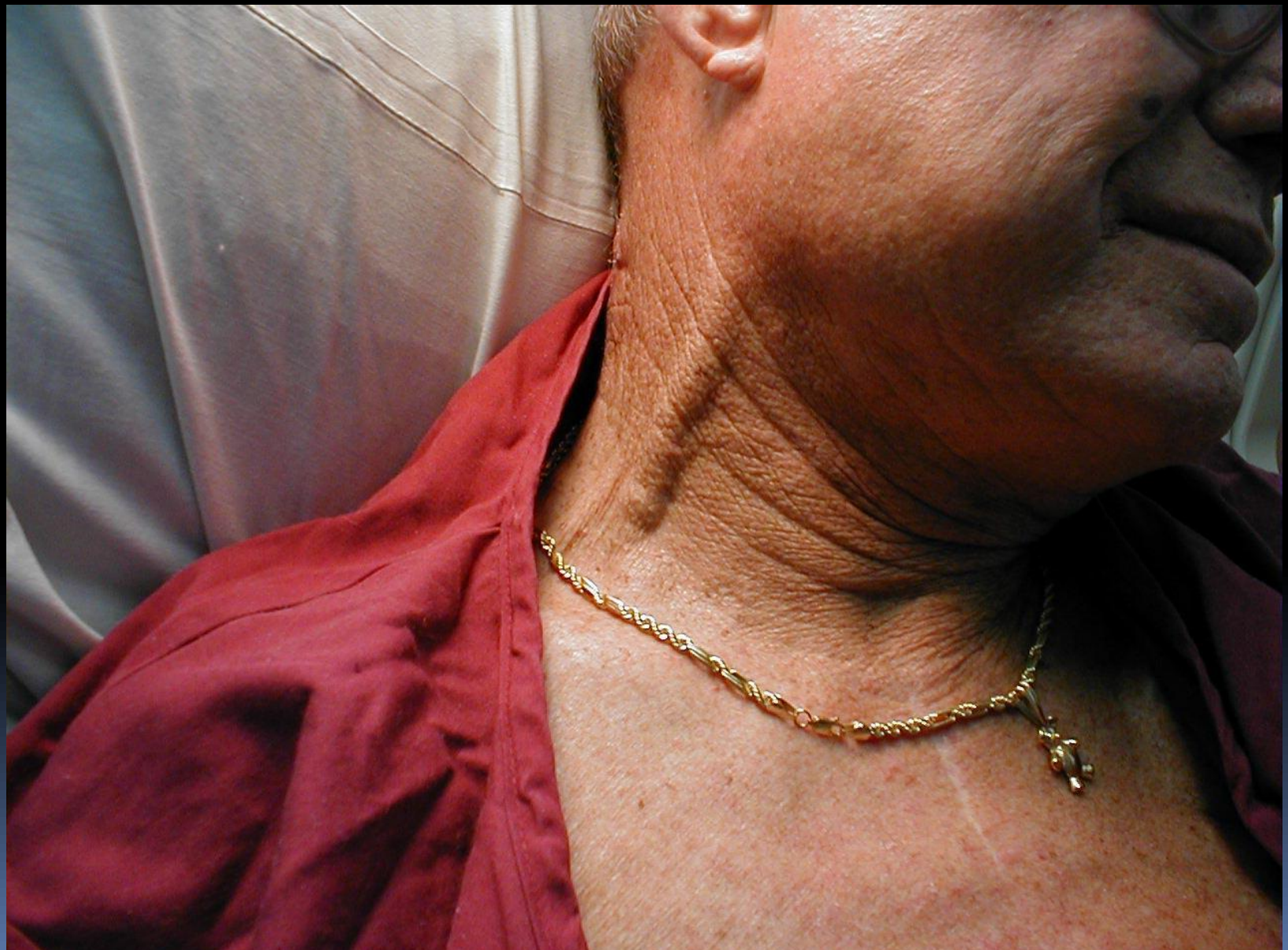
Pulses: Co-relations



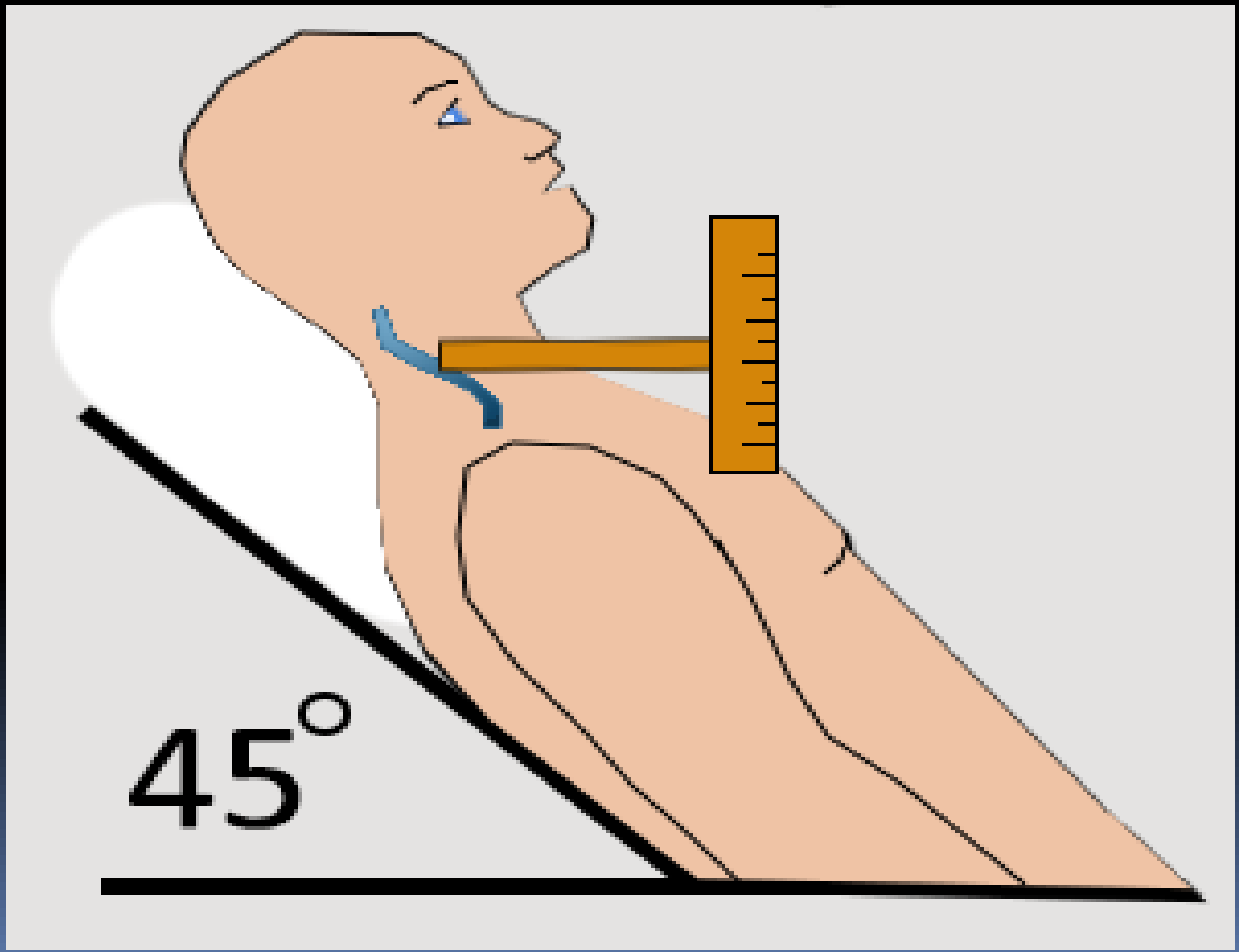
JVP: Method and position of Measurement



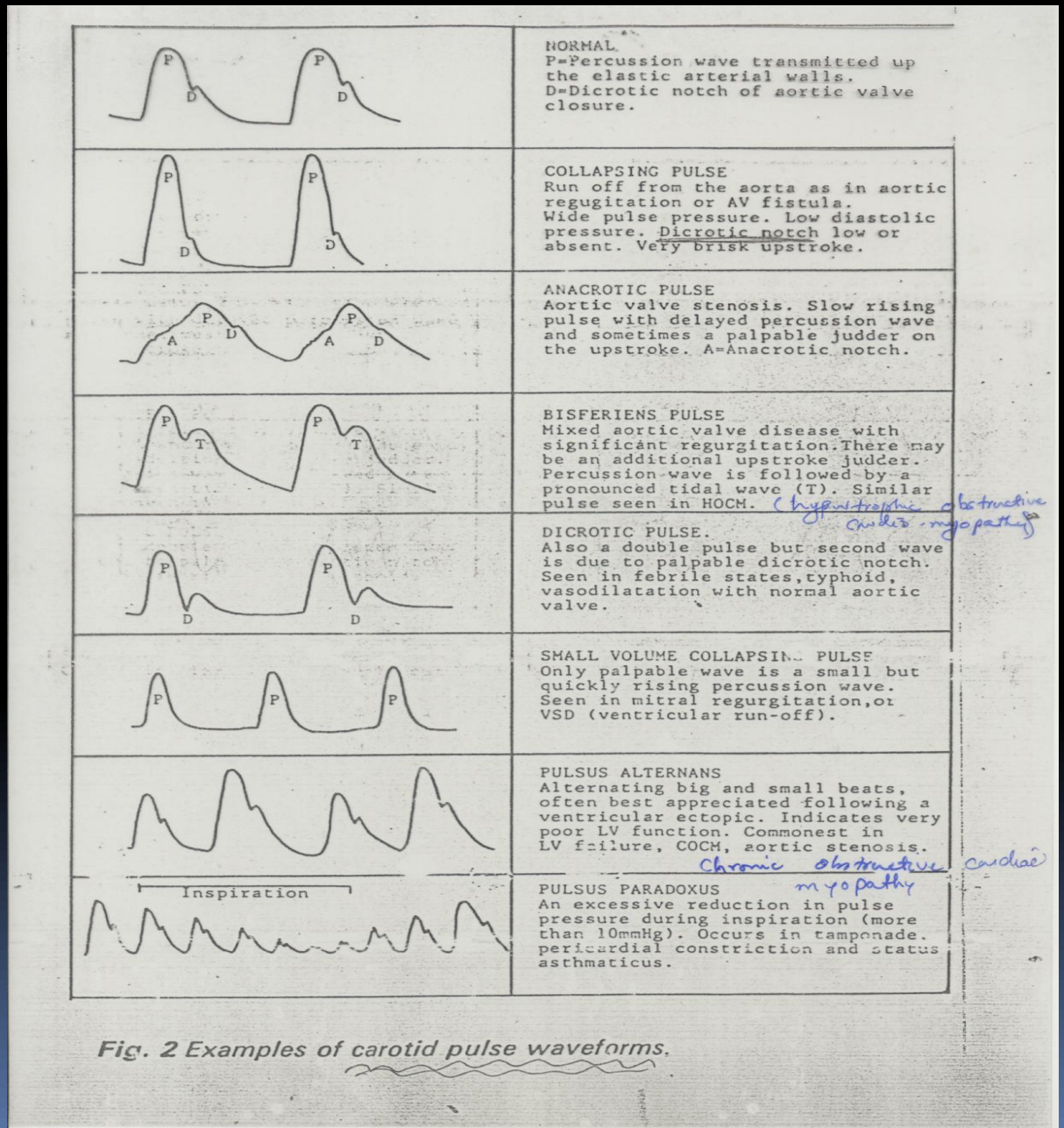
JVP: Raised



JVP: Method of Measurement



Various Arterial Pulses Extra



NORMAL
P=Percussion wave transmitted up the elastic arterial walls.
D=Dicrotic notch of aortic valve closure.

COLLAPSING PULSE
Run off from the aorta as in aortic regugitation or AV fistula. Wide pulse pressure. Low diastolic pressure. Dicrotic notch low or absent. Very brisk upstroke.

ANACROTIC PULSE
Aortic valve stenosis. Slow rising pulse with delayed percussion wave and sometimes a palpable judder on the upstroke. A=Anacrotic notch.

BISFERIENS PULSE
Mixed aortic valve disease with significant regurgitation. There may be an additional upstroke judder. Percussion wave is followed by a pronounced tidal wave (T). Similar pulse seen in HOCM. (hypertrophic obstructive cardiac myopathy)

DICROTIC PULSE.
Also a double pulse but second wave is due to palpable dicrotic notch. Seen in febrile states, typhoid, vasodilatation with normal aortic valve.

SMALL VOLUME COLLAPSING PULSE
Only palpable wave is a small but quickly rising percussion wave. Seen in mitral regurgitation, or VSD (ventricular run-off).

PULSUS ALTERNANS
Alternating big and small beats, often best appreciated following a ventricular ectopic. Indicates very poor LV function. Commonest in LV failure, COCM, aortic stenosis. Chronic obstructive cardiac myopathy

Inspiration

PULSUS PARADOXUS
An excessive reduction in pulse pressure during inspiration (more than 10mmHg). Occurs in tamponade. pericardial constriction and status asthmaticus.

Fig. 2 Examples of carotid pulse waveforms.

Various Arterial Pulses Cont… Extra

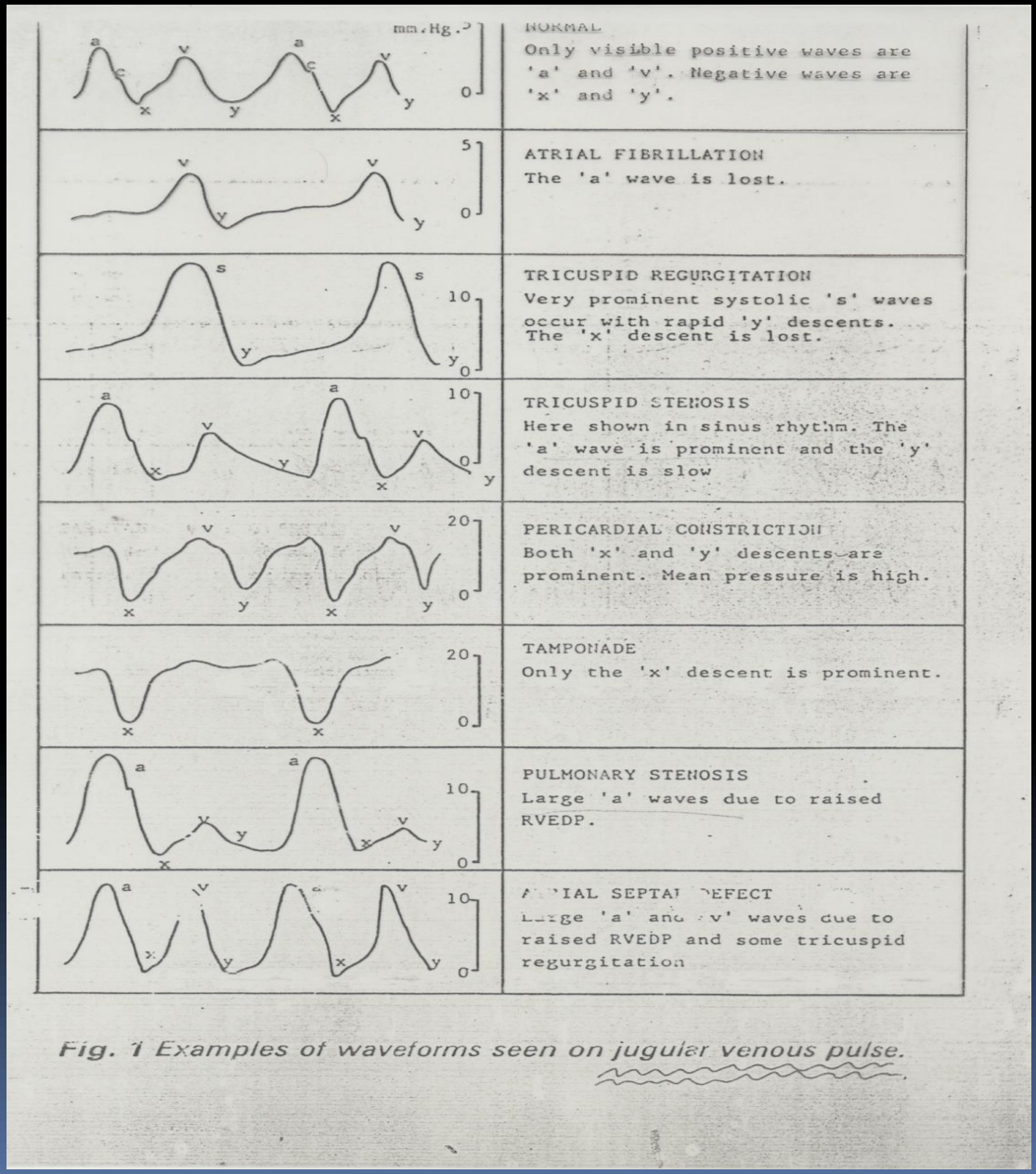


Fig. 1 Examples of waveforms seen on jugular venous pulse.

Thank you