STETHOSCOPE

> "Analytic and integrating auscultation skills are far more important than the brand name of the stethoscope."
> (Jonathan Abrams, Professor of Medicine – University of New Mexico)

Components:

- ✓ Chest Piece with a valve to switch from the bell to the diaphragm
- ✓ Binaural connectors
- ✓ Earpieces (These should be durable, and without air leaks.)

The bell is used for detection of low frequency sounds (30-150 Hz). The bell should be able to rest lightly on the skin with a complete seal. A one-inch bell will usually work but on smaller patients or thin with a bony rib cage this size will not be able to fit in an interspace and seal. In that case a smaller bell will need to be used. Most stethoscopes have chest pieces that are changeable. **A cracked bell will never transmit sounds well enough to be heard!** I went more than a year with a cracked bell, never hearing a third or fourth heart sound.

The diaphragm is used for high frequency sounds (generally over 300 Hz). Again a crack will decrease sound transmission.

The tubing should be 10-12 inches. A separate tube should connect the chest piece to each ear (binaural). A single tube will attenuate high frequency sounds. Many devices are available to prevent the chest pieces from rubbing together and some manufacturers wrap the two pieces in an outer tube. This is perfectly fine.

The earpieces and binaurals must be comfortable and fit properly. Generally the tips should point slightly anterior to align with the external auditory canal.

More important than any of the above is to be in as quiet an environment and to be as comfortable as possible. "Snaking" the stethoscope down a gown/shirt, or over the clothing is a great way to complete and incomplete cardiac exam. Ideally the patient should be in a supine position with easy access to the entire chest. In addition, the position of the bed and patient should be able to be changed.

Think while you listen and correlate your thoughts to what you want to know about each individual patient.

References

Bedside Cardiology 4th Edition, Jules Constant, M.D. Little, Brown and Company
Comparison of the acoustic properties of six popular stethoscopes. Manuel Abella, John F J. acoustic Society Am. 91(4);Pt 12224, 1992
Acoustical Performance of the stethoscope: A comparative analysis. John Kindig et al American Heart Journal 102,#2:269, 1981.

SCREENING EXAM

Step 6: Check blood pressure in both arms.

Elevated arterial BP is important because it is common, clinically silent, leads to cardiovascular disease, and decreased life expectancy.

Technique: (Suggested readings: Reeves: JAMA 273; 1211-1218, 1995.)

1. Seated with arm supported so the midpoint of the upper arm is at the level of the heart.

2. Select an appropriate size cuff and position around the upper arm so that the lower edge is 1-2 cm above the antecubital fossa.

3. Inflate the cuff while palpating the radial artery. Note the pressure that it disappears and reappears at.

4. With the stethoscope over the brachial artery using the bell, re-inflate to a pressure about 20 mmHg above the palpated pressure. Lower the pressure at a rate of 2 mmHg/second and note the FIRST KOROTKOFF SOUND.

5. Continue to lower the pressure until the sounds are muffled (PHASE IV KOROTKOFF SOUNDS), and then disappear (PHASE V KOROTKOFF SOUND).

6. Record the systolic (Phase I Korotkoff Sound) diastolic (Phase V Korotkoff Sound). * In children and when sounds are heard nearly to a level of zero, the Phase IV pressure should also be recorded (e.g., 126/74/46).

Notes:

- Blood pressure should be measured in both arms at the first visit, and the arm with the higher pressure should be used thereafter.

- Short-term variation in pressure can be 4/2-3 mmHg.

- Long-term variation can be up to 15/12 mmHg.

- With an irregular pulse you should lower the pressure even slower (e.g., atrial fibrillation).

- Compared to direct intra-arterial pressure measurement:
    - The Korotkoff phase I sound appear 4-15 mmHg lower
    - The phase V sounds disappear 3-6 mmHg above

Step 33: Inspect neck veins

The jugular venous pressure is a "dipstick" to the diastolic filling pressures on the right side of the heart. Every patient has a level of jugular venous pressure. Not all pressures are the same; therefore, there is no set angle at which to examine the jugular venous pressure. Since the normal right ventricular diastolic, right atrial pressure is between 0-5 cm H20 then neck veins should be visible at 0 degrees and not visible when the right atrium is more than 5 cm below the visible reference point (angle of Louis which sits above 5 cm above the right atrium).

Technique: Bates – 270-271, 281-282

Below is a diagram on right atrial pressure. Imagine what the jugular veins would look like. (See Table A)

Table A

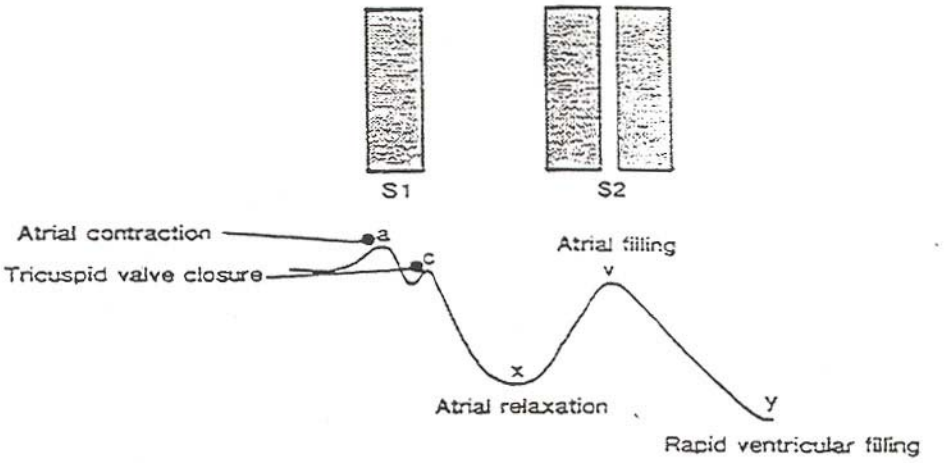


Figure 3.11 *The jugular venous pressure, and its relationship to the first (S1) and second (S2) heart sounds.*

Below are actual recordings of Jugular Venous pressures. Label the waves. (See Figure B)

Figure B

Figure C

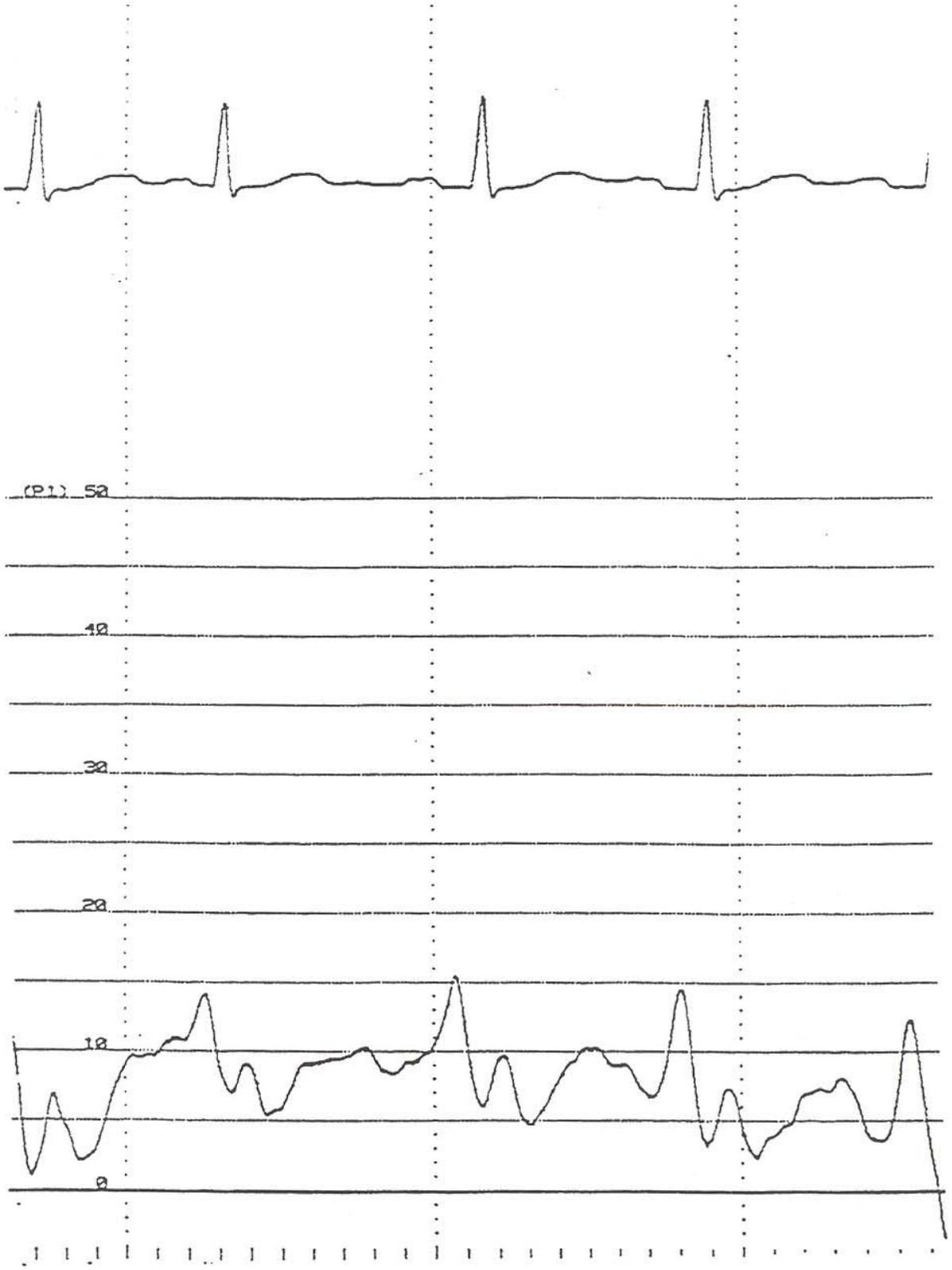


Figure D

Step 34: Palpate carotid arteries
35: Auscultate carotid arteries

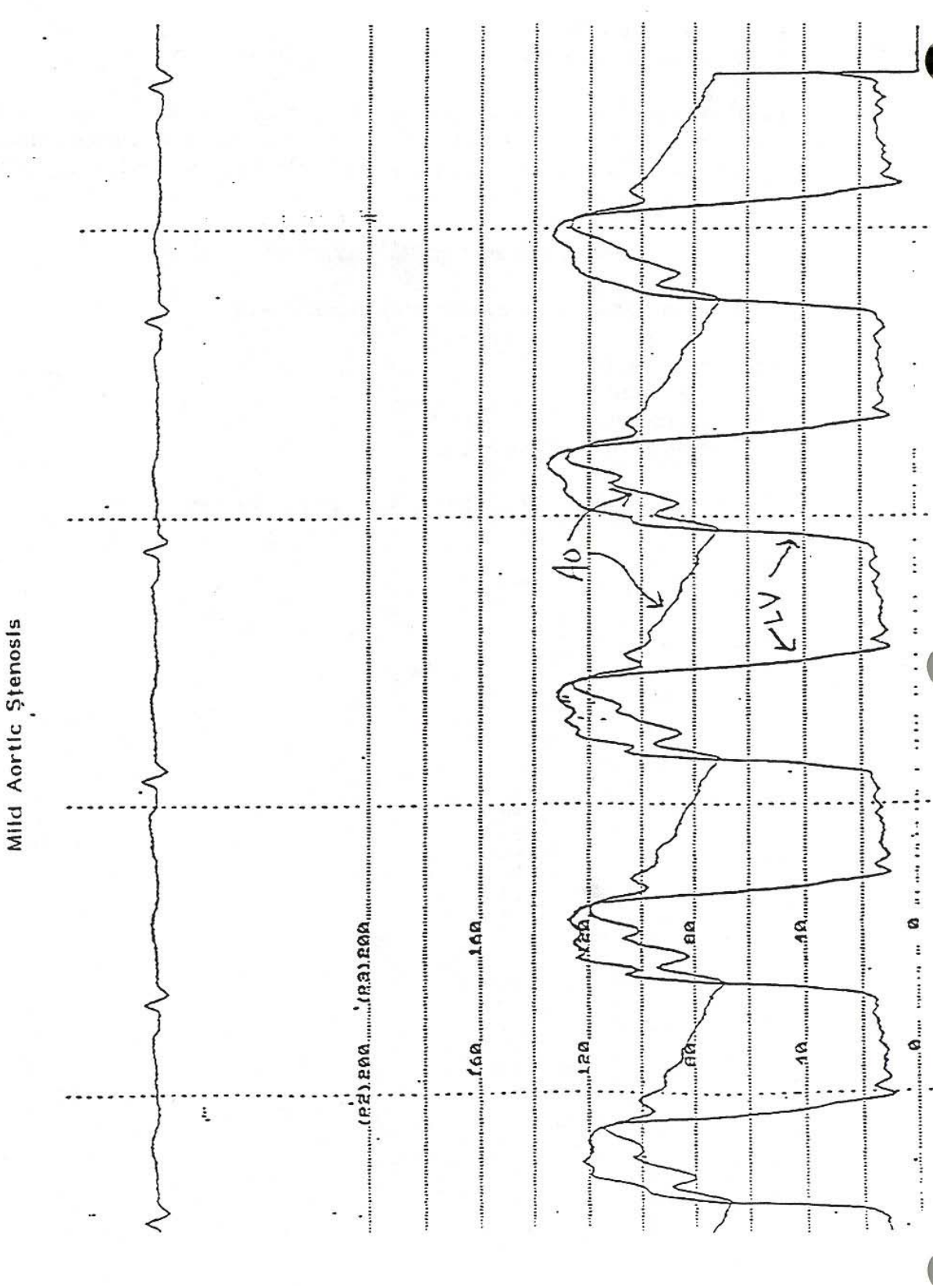
The carotid arterial pulse provides the most accurate evaluation of the arterial pulse volume because it is the largest palpable proximal vessel to the aortic valve. Its contour resembles the central aortic pulse. The more normal carotids you feel the better you will get at the detection of abnormalities.

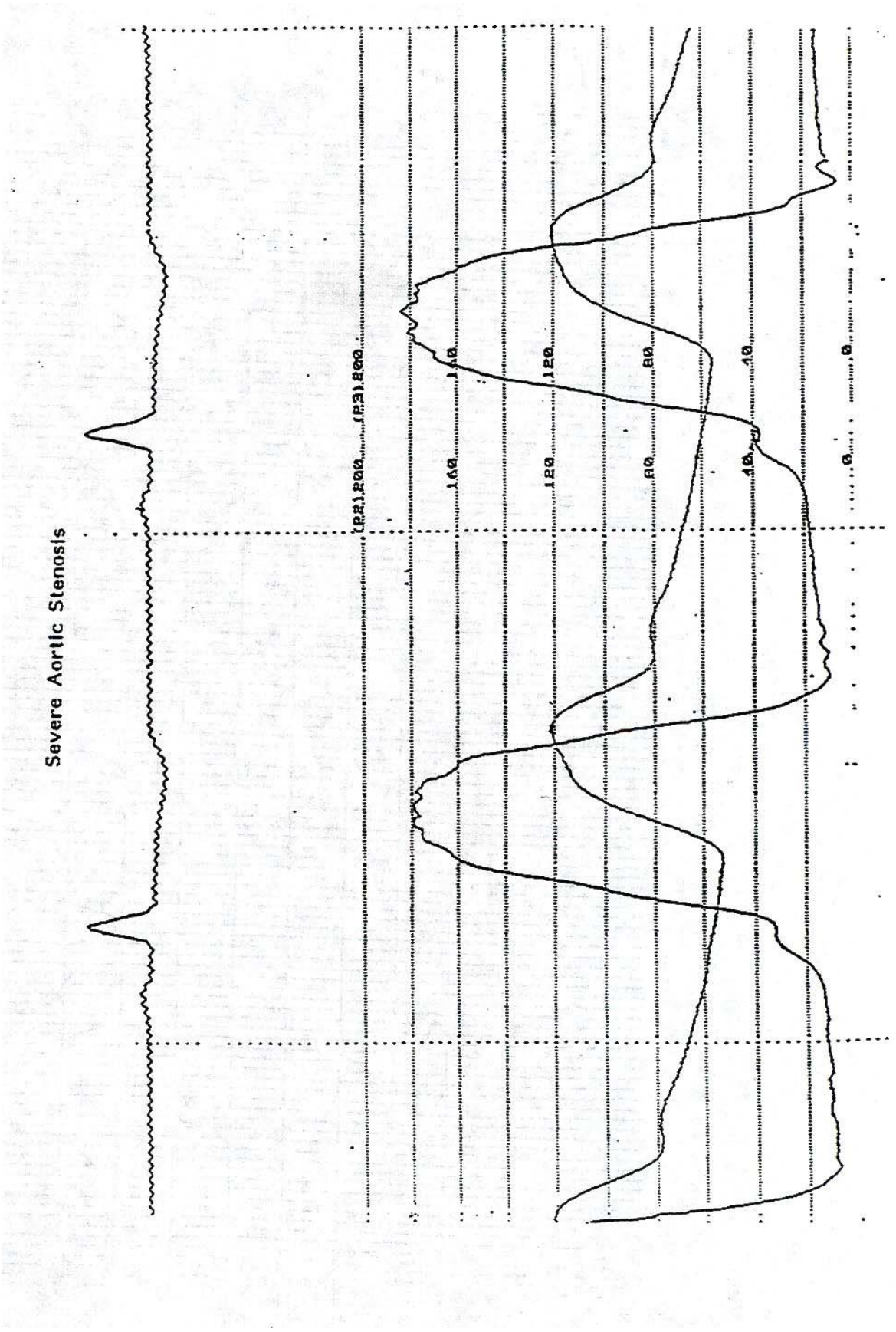
Technique: Bates pages 287-289; 293-294; Table 9-3

On the following pages are 4 direct arterial pressure tracings.

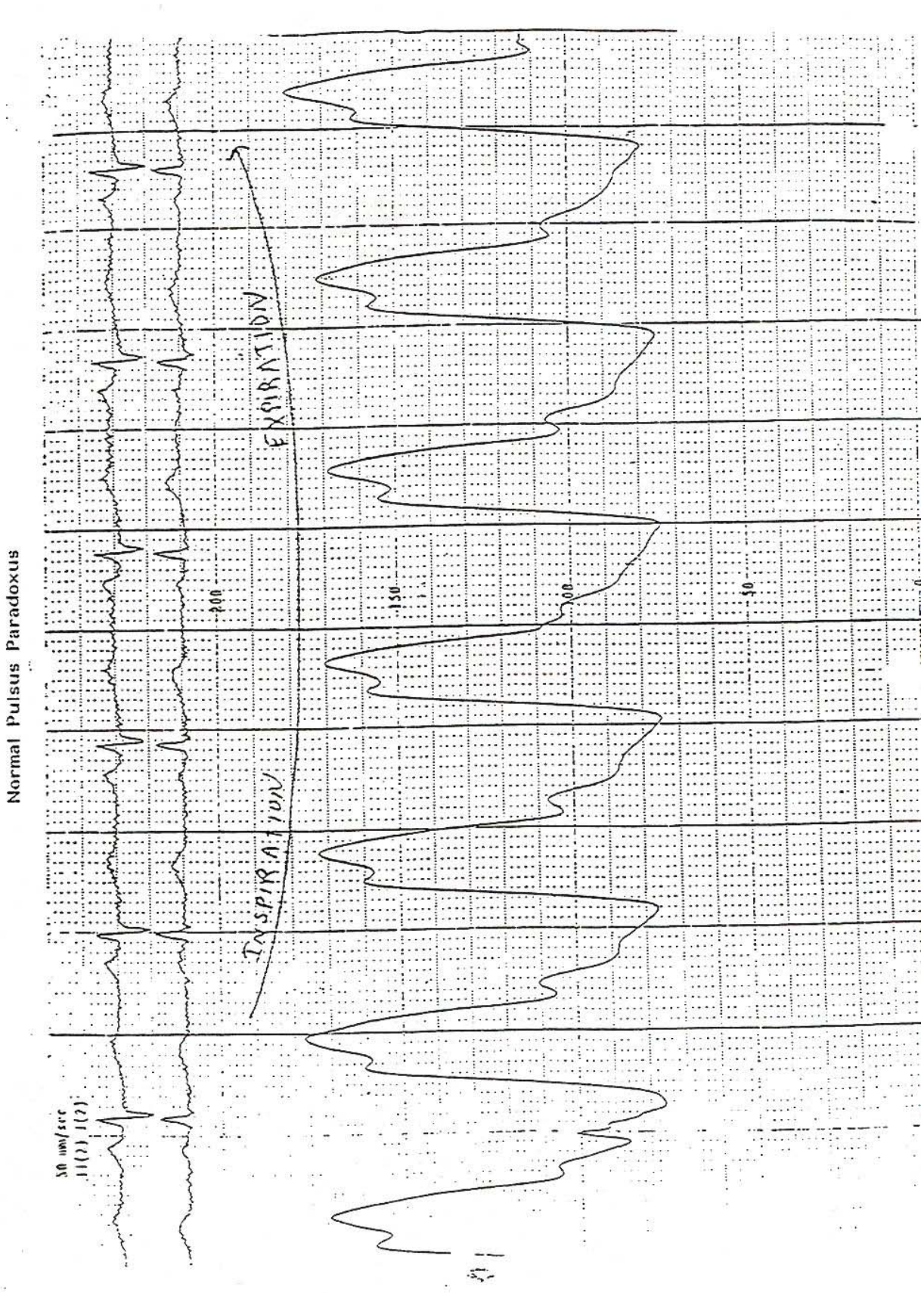
Note: cardiac rhythm
pulse amplitude
pulse contour
speed or rate of rise of ejection

(Mild AS, Severe AS, Atrial fibrillation, Normal Pulsus Paradoxus)


Mild Aortic Stenosis
AO
LV


Severe Aortic Stenosis
200
160
120
80
40
0


Atrial Fibrillation
50 OR 200
25 OR 100
50 OR 200
25 OR 100


Normal Pulsus Paradoxus
EXPIRATION
INSPIRATION
200
150
100
50