Ankle-Arm Doppler Blood Pressure Measurement

see ankle-arm blood pressure data set

PURPOSE

The ratio of the ankle blood pressure to the arm blood pressure provides a measure of lower extremity arterial disease (circulation problems).

A. Equipment:

1. 8 megahertz Doppler pen probe
2. Ultrasonic Doppler Flow Detector
3. Doppler conducting jelly
4. Standard mercury column sphygmomanometer: Wall-mounted Baumanometer
5. Calibrated V-Lok BP cuffs in three sizes:

   2 large adult cuffs
   2 pediatric cuffs
   4 regular adult cuffs

6. Washcloths to remove conducting jelly

B. Exclusions:

1. Persons with venous stasis ulceration or other pathology that precludes placing a BP cuff around the ankle (e.g. open wounds).
2. Persons with rigid arteries such that an occlusion pressure cannot be reached.
3. Persons with bilateral amputations of legs.
4. Subjects who fit any of the above categories are recorded as missing data.
5. If a subject has undergone a mastectomy, blood pressure measurement will be excluded in that extremity only, and recorded as missing data.

13

see ankle-arm blood pressure data set

C. Set-up Procedure:

1. Ask participant to remove shoes and stockings so that the ankles are bare to mid-calf.

2. Lay participant supine on the examining table.

3. Keep participant supine for at least five minutes before measuring BP.

4. Place four BP cuffs on the participant (be sure to check for appropriate cuff size):

    a. Right arm
    b. Left arm
    c. Right ankle
    d. Left ankle

5. Apply ankle cuffs with midpoint of bladder over posterior tibial artery, with lower end of bladder approximately 3 cm above medial malleolus.

D. General Guide to Blood Pressure Readings:

1. Following any previous inflation, wait at least 30 seconds after cuff has completely deflated.

2. By closing the thumb valve and squeezing the bulb, inflate the cuff at a rapid but smooth, continuous rate to the maximal inflation level (30 mmHg above systolic pressure).

3. The examiner's eyes should be level with the mid-range of the manometer scale and focused at the level to which the pressure will be raised.

4. By opening the thumb valve slightly, and maintaining a constant rate of deflation at approximately 2 mmHg per second, allow the cuff to deflate.

5. Listen through the entire range of deflation, past the systolic reading (the pressure where the first regular sound is heard), for 10 mmHg. **Two subsequent beats should be heard for any valid systolic blood pressure reading, but continue to listen as the cuff is deflated 10 mmHg below the level of the systolic pressure.**

6. Deflate the cuff fully by opening the thumb valve.

7. Neatly enter the systolic readings in the spaces provided on the form.

(14)

see ankle-arm blood pressure data set

E. Right and Left Arm Systolic Blood Pressure Measurement:

1. Attach right arm cuff tubing to manometer.

2. Apply ultrasound jelly over brachial artery.

3. Locate brachial artery using Doppler pen probe.

4. **Hold the Doppler probe *absolutely* still.** It can easily slip off the artery.

5. Measure the systolic blood pressure:

   a. Inflate cuff quickly to maximal inflation level (30 mmHg above systolic pressure).
   b. Deflate at 2 mmHg/second, to appearance of systolic pressure.
   c. Follow down for 10 mmHg. Two subsequent beats should be heard for any valid systolic blood pressure reading.
   d. Remove Doppler pen probe.
   e. Deflate cuff quickly and completely.

6. Neatly record systolic blood pressure.

7. Follow same procedure for left arm.

F. Right and Left Ankle Systolic Blood Pressure Measurement:

1. Connect right ankle cuff to the manometer.

2. Apply ultrasound jelly over posterior tibial artery.

3. Locate posterior tibial artery using Doppler pen probe.

4. **Hold the Doppler probe *absolutely* still.** It can easily slip off the artery.

5. Measure the systolic blood pressure:

   a. Inflate cuff quickly to maximal inflation level (30 mmHg above systolic pressure).
   b. Deflate at 2 mmHg/second to appearance of systolic pressure.
   c. Follow down for 10 mmHg. Two subsequent beats should be heard for any valid systolic blood pressure reading.
   d. Remove Doppler pen probe.
   e. Deflate cuff quickly and completely.

6. Neatly record ankle systolic blood pressure.

see ankle-arm blood pressure data set

7. Disconnect right ankle cuff from manometer. Connect left ankle cuff to manometer and repeat procedure.

NOTE: If the posterior tibial pulse cannot be found with palpation or Doppler pen probe, use the dorsalis pedis artery for the measurement. Have another examiner verify the absent posterior tibial pulse.

G. Repeat of Ankle and Arm Blood Pressure Measurements:

1. Repeat the sequence of measures in reverse order:

   a. Left ankle
   b. Right ankle
   c. Left arm
   d. Right arm

NOTE: If initial and repeat blood pressures measured at any one site (Right arm, Left arm, Right ankle or Left ankle) differ by more than 10 mmHg, please take a third measurement at that site.

H. Completion:

1. Review form for completeness and legibility.

2. Remove cuffs and conducting jelly.

16