Ankle-Brachial Pressure Index (ABPI) with the moorVMS-VASC
Application note #116

Application

The measurement of ABPI is a useful, non-invasive test performed during investigations of vascular function and has long been used to aid detection and diagnosis of peripheral arterial disease (PAD). Deriving the ABPI, by dividing the systolic blood pressure at the ankle by the systolic blood pressures in the arm is relatively simple to perform and is widely used. Some patients presenting with PAD are asymptomatic, and an abnormal ABPI the first indication of the presence of disease. Calculation of the ABPI is also used in some studies to classify patients with peripheral arterial occlusive disease (Urbančič-Rovan, 2006).

ABPI is known to be unreliable on patients with arterial calcification which results in less or incompressible arteries, as the stiff arteries produce falsely elevated ankle pressure. This is often found in patients with diabetes mellitus (41% of patients with peripheral arterial disease (PAD) have diabetes, renal failure, or heavy smokers. The moorVMS-VASC system enables you to perform toe brachial pressure index (TBPI) in cases where diabetes patients may have calcified medial artery in the ankle, TBPI has been shown to be useful in this patient group (Potier et al, 2011).

The American diabetes association recommend screening for patients over 50 years of age every 5 years for ABPI and also indicate that pulse volume recordings are also of use (American Diabetes Association, 2003).

ABPI ratios shown below (TASCII) are of interest in several conditions and clinically important values for ABPI values < 0.9 & >1.3 should be investigated further regardless (TASCII, American Diabetes Association 2003).

- Normal if 0.91–1.30
- Mild obstruction if 0.70–0.90
- Moderate obstruction if 0.40–0.69
- Severe obstruction if <0.40
- Poorly compressible if >1.30

Method

- Measurements should be made with the patient in the supine position with the limb to be measured at heart level.
- The patient should remain in the resting supine position for 10 minutes prior to recording pulse volume.
- Place an appropriate sized pressure cuff around the limb (sites commonly include the high thigh, above the knee, below the knee, the ankle and the toe).

Equipment Required

The following equipment is needed for this application:

- moorVMS-VASC ‘cart optional’
- moorVMS-VASC PC software
- VP1T combined optic and temperature skin probe(s)
- Easy Care Cuff (Inflatable pressure cuff)*

*The cuff size selected will depend upon patient and limb size e.g. arm, thigh, lower leg etc.
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Select your pre-defined test using the moorVMS-VASC PC software (adjust for preferred protocol, see moorVMS-VASC User Guide for details or ask your Moor Instruments Representative for further information).

The software will guide you through the test sequence simplifying and standardizing the sequence.

The cuff will:
- Inflate automatically to the pre-set pressure level.
- Hold at pre-set pressure for the pre-set duration.
- Deflate at the pre-set rate.

Each of the above settings can be determined by the user and the test procedure saved to enable a standard protocol to be used repeatedly.

Analysis

An ABPI analysis chart can be viewed (as shown below):

Practical Suggestions

Microvascular blood flow can be affected by many things. The following practical suggestions are provided as a guide and are not exhaustive:

- Perform measurements in a quiet room whilst maintaining a comfortable temperature (typically 22 °C). Ensure the patient is acclimatised to the room temperature for 30 minutes prior to measurements.
- Patients should avoid caffeine, high salt food, alcohol, vigorous exercise, and smoking for 24 hours prior to the study.
- During measurements ask the patient to breathe normally. Coughing, talking and yawning can all affect microvascular blood flow readings.
- Measurements should be taken with the patient in the supine position in order to eliminate pressure variations caused by the hydrostatic pressure difference between the higher and lower limbs in relation to the heart.
- The patient should be in a comfortable, relaxed position and avoid movement during all measurements.

Related Fields

Contact us for Application Notes for: Post Occlusion Reactive Hyperaemia (PORH), Pulse Volume (PV), Toe Pressure (TP), and skin perfusion pressure (SPP) measurements with the moorVMS-VASC.

Publications

Clement D. Diagnosis and evaluation of peripheral artery disease – non invasive vascular laboratory and imaging techniques. Based on the Inter-Society Consensus. www.tasc-2-pad.org


Further Reading

www.moor.co.uk – information about moorVMS-VASC and available probes and pressure cuffs.

moorVMS-VASC user manuals for instrument operation.

Please feel free to consult sales@moor.co.uk for further advice or support with issues not covered in this application note and for details of other application notes using the moorVMS-VASC system.
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