Dorsalis pedis arterial pulse: palpation using a bony landmark

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Introduction: The unreliability of the pulse examination of the foot has primarily been due to variability of technique between examiners. Whereas the groove between the medial malleolus and the Achillies tendon more readily defines the location of the posterior tibial pulse, the location of the dorsalis pedis pulse remains vague. In this paper a novel method of locating the dorsalis pedis pulse by physical examination is described.

Methods: Forty one consecutive patients admitted to a general surgery service of a tertiary medical centre within a two month period were examined. Using the dorsal most prominence of the navicular bone as a landmark, the distance to the dorsalis pedis pulse in bilateral lower extremities was measured by palpation and compared to Doppler ultrasound. Measurements were confirmed by two separate examiners blinded to each others’ results.

Results: The dorsalis pedis artery was palpable in 78% of extremities and present by Doppler ultrasound in 95%. The location of the left dorsalis pedis artery was a mean (SD) 9.8 (1.4) mm by palpation and 11.1 (2.1) mm by Doppler ultrasound from the dorsal most prominence of the navicular bone. The right dorsalis pedis artery was 10.4 (3.4) mm by palpation and 11.5 (0.7) mm from the dorsal most prominence of the navicular bone. No significant differences in location of the dorsalis pedis artery were observed bilaterally between Doppler ultrasound and palpation; No significant differences were observed comparing contralateral dorsalis pedis arteries nor any differences between the examiners’ results.

Conclusion: The dorsal most prominence of the navicular bone provides a bony landmark to readily locate the dorsalis pedis artery. Reliability of the examination may be increased as to the potency of the dorsalis pedis artery by using this dependable anatomic landmark.

SUBJECTS AND METHODS

Forty one random, consecutive subjects who were admitted to the hospital under the care of the surgical team were selected as our subjects. The location of the dorsalis pedis artery pulse was recorded using two finger palpation and subsequently verified using a handheld Doppler. The dorsal most prominence of the navicular bone was marked (fig 1). Pulse palpation was evaluated by using two fingers, the index and middle fingers of the dominant hand (fig 1). Attempted detection of the pulse was initiated at the dorsal most prominence of the navicular bone and carried out following an arc over the dorsum of the foot towards the lateral malleolus in a posterior-lateral direction (fig 2). Palpable pulses and Doppler signal distances were measured from the tuberosity of the navicular bone using a surgical caliper. Pulse palpation and Doppler signal locations were measured blindly by two independent examiners (a fourth year medical student and third year plastic surgery resident). These distances were tabulated and statistical analysis using Student’s t test was completed by a staff statistician using Jandel Scientific (version 2.0, San Rafael, CA).

RESULTS

We present descriptive analysis of the location of the dorsalis pedis arterial pulse as measured from the dorsal most prominence of the navicular bone in 41 hospital subjects. The age of the patients ranged from 21 to 94 years old with a mean (SD) of 65 (20) years. Patients included 28 females and 13 males and had a wide range of past medical histories. Of the 82 pulses evaluated, detection was completed in 64 (78%) by palpation and in 78 (95%) by Doppler signal. No difference was detected in the location of the left dorsalis pedis arterial pulse
The dorsum of the foot towards the lateral malleolus in a tuberosity of the navicular bone and carried out following an arc palpation was performed using two fingers, the index and middle fingers of the dominant hand.

...artery is a continuation of the anterior tibial artery distal to the ankle anteriorly. Distal to the ankle, the dorsalis pedis artery travels lateral to the extensor hallucis tendon along its course to the great toe. Previous studies have reported the dorsalis pedis pulse palpable in 3.1% to 13.8% of healthy patients. Sensitivity of palpation has been proposed to be increased by avoidance of plantar flexion. Plantar flexion of the foot is believed to increase tension of the skin along the extensor hallucis tendon thus obliterating an underlying pulse. Alternatively, it is possible that...