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# String phantom in calibration of Doppler ultrasound systems

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## Abstract

Doppler ultrasound system is of great importance among the diagnostic modalities. To ensure the output of such systems that measure the physiological quantities, performance tests were carried out using AIUM and BSI protocols on 20 pulsed wave Doppler systems in 9 reference centers in Tehran. In these tests, velocity of Doppler ultrasound systems as an acoustic parameter was assessed. To evaluate the performance of pulsed wave Doppler, an in-house string phantom was designed for the first time in the country. This phantom was used to investigate pulsed Doppler ultrasound systems. The results show that the minimum and maximum errors in blood flow velocity measurement on 20 Doppler systems were 23 (cm/s) and 83 (cm/s), respectively. The mean±SD for velocity measurement errors in 6 Doppler systems (7.5 MHz) and 12 systems (3.5 MHz) were 11±16 and 28±9 (cm/s), respectively, the velocities ranged 10-140 (cm/s). These errors emphasize the necessity for doing performance tests in Doppler ultrasonic systems.

**Keywords:** Doppler ultrasound systems, Performance tests, String phantom.

pp. 67-76 (In Persian)

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