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Doppler echocardiographic assessment of pulmonary prostheses: a comprehensive assessment including velocity time integral ratio and prosthesis effective orifice area.

Sadeghpour A¹, Saadatifar H, Kiavar M, Esmaeilzadeh M, Maleki M, Ojaghi Z, Noohi F, Samiei N, Mohebbi A.

Author information

Abstract

OBJECTIVE: Few reports have been published on the Doppler-derived echocardiographic data for pulmonary valve prostheses (PVPs). The aim of this study was to provide a comprehensive Doppler echocardiographic assessment of PVPs.

METHODS: We studied 40 patients (mean age 24.2) with PVPs: 13 (32.5%) mechanical and 27 (67.5%) bioprosthetic valves. After clinical evaluation, all patients underwent complete, two-dimensional and Doppler studies.

RESULTS: In 30 patients with normally functioning PVPs, the mean (SD) peak velocity was 2.33 (0.36) m/s with an average peak pressure gradient of 22.69 (6.7) mm Hg and an average mean pressure gradient of 12.5 (4.1) mm Hg. The mean PVPs velocity time integral (VTI) was 47.49 (12.78) cm with mean right ventricle outflow tract/peak velocity (PV) VTI ratio 0.43 (0.14), mean PVPs effective orifice area was 1.63 (0.36) cm². Metallic PVPs had significantly better hemodynamic Doppler study compared with biologic PVPs. In 9 patients with PVP malfunction, average peak PVPs velocity, average peak pressure gradient, mean pressure gradient, PV VTI, PV/left ventricle outflow tract VTI ratio was significantly increased ($P < 0.05$).

CONCLUSION: This study contributes to establishing the normal range for Doppler hemodynamics in various PVPs.

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