High Concordance of Invasive and Echocardiographic Mean Pressure Gradients in Patients with a Mechanical Aortic Valve Prosthesis


Background and aim of the study
Conflicting data exist regarding the accuracy of echocardiographic Doppler gradients compared to invasive pressure gradients in the hemodynamic assessment of patients with prosthetic aortic valves. The study aim was to determine the correlation between these measurements for mechanical single- and double-leaflet aortic valve prostheses in vivo.

Methods
Forty-four patients with an aortic valve prosthesis were included in this prospective study. Transthoracic echocardiography was performed immediately before the invasive measurements. Left ventricular pressure measurements were achieved by either atrial transseptal puncture and antegrade, transmitral left ventricular catheterization or - in the case of mitral valve replacement - direct left ventricular puncture.

Results
Comparison of echocardiographic and invasive mean pressure gradients of all examined aortic prosthetic valves revealed a Pearson correlation r=0.59 (p<0.001). The mean pressure gradient was overestimated by 7.4 mmHg with echocardiography. Classifying patients into clinically relevant categories (mild, moderate, severely increased pressure gradient) resulted in a kappa value of 0.72 and an agreement of 86.4%. There was no relevant difference between single- and double-leaflet valves.

Conclusion
A high concordance was found between echocardiographic and invasive mean pressure gradients in vivo. Invasive measurements of the prosthetic valve gradients therefore seem to be indicated only in patients with contradictory echocardiographic and clinical findings.