Coronary Blood Flow Velocity Measurement by Transthoracic Parametric Doppler, a New Technique for Mapping Blood Flow Along Coronary Artery

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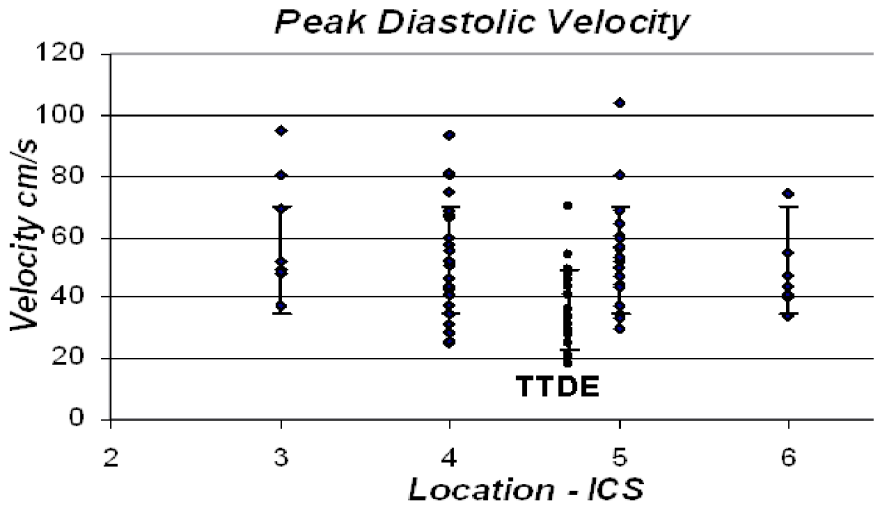
Background: Coronary blood flow velocity measurement by transtoracic Doppler echocardiography (TTDE) has been shown to be a reliable diagnostic and prognostic approach. However these measurements provide the flow velocity at a single location along the coronary artery, usually the mid distal segment of LAD. Therefore we tested the feasibility of a new non-imaging multi-gating Doppler technique: the transthoracic parametric Doppler (TPD), in measuring coronary blood flow velocity along the LAD coronary artery.

Methods: coronary blood flow velocity in LAD was acquired by TTDE and TPD in 20 consecutive patients (52 ± 19 yrs) who were referred to Echocardiography. The measurements with TTDE (Acuson, Philips) were acquired at mid-distal segment of LAD, while measurements with TPD (Echosense) were acquired at four locations along the pathway of LAD. These locations were related to the intercostal spaces (ICS).

Results: successful measurements with TTDE were achieved in all patients and at 2.9±0.8 (2-4) locations/patient by TPD. Blood flow velocity was acquired along 15-20 mm into the LAD at each location by TPD. The peak diastolic velocity by TTDE was significantly lower compared to the corresponding location by TPD, 36.2 ± 13.2 vs 5 3.2 ± 17.2 cm/s ($p<0.01$, t-test), whereas velocity time integral was 12.6 ± 6.0 vs 18.6 ± 5.5cm ($p=0.08$) respectively. The velocities by TPD along LAD were similar in all locations.



Conclusions: TPD enables the measurement of blood flow velocity along coronary artery thus having the potential for further quantitative assessment of coronary flow and early identification of coronary artery disease.