Publication Summary

**Publication:**
Transit-time flow predicts outcomes in coronary artery bypass graft patients: a series of 1000 consecutive arterial grafts

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**Abstract**

**Objective**
This study was undertaken to evaluate transit-time flow (TTF) as a tool to detect technical errors in arterial bypass grafts intra-operatively and predict outcomes.

**Methods**
TTF’s three parameters, pulsatility index (PI, index of resistance), flow (cc min(-1)) and diastolic filling (DF, proportion of diastole with coronary flow), were measured in 990/1000 (99%) of arterial grafts in 336 consecutive patients, prospectively enrolled in a database. Grafts were revised when TTF findings supported the otherwise suspected graft malfunction. If no other signs/suspicion of graft malfunction existed (normal electrocardiogram (EKG), stable haemodynamics and unchanged ventricular function on trans-oesophageal echocardiography (TEE)), and the PI was >5, grafts were not revised. Major adverse cardiac events (MACEs: recurrent angina, perioperative myocardial infarction, postoperative angioplasty, re-operation and/or perioperative death) were related to TTF measurements.

**Results**
The average number of grafts per patient was 3.02, of which 99% were arterial. Satisfactory grafts were achieved in 916/990 (93%) of the grafts, with flows from 34 to 61 cc min(-1), PI ≤ 5 and DF of 62-85%. Fourteen conduits, 20 grafts (2%) suspected to be problematic, were revised. Patients were divided into two groups: 277 (82%) with at least one graft with PI ≤ 5 and 59 (18%) with a PI >5. MACE occurred in 25 (7.4%) patients - 15/277 patients with a PI ≤ 5 (5.4%) and 10/59 with a PI >5 (17%, p=0.005). Mortality following non-emergent surgery was significantly higher in patients with a PI >5 (5/54, 9%) than in patients with a PI ≤ 5 (5/250, 2%, p=0.02). Flow and DF were not predictive of outcomes.

**Conclusions**
A high PI predicts technically inadequate arterial grafts during surgery - even if all other intra-operative assessments indicate good grafts; it also predicts outcomes, particularly mortality.

**Medistim comments**
The data analysed in this study comes from 336 consecutive patients of a single surgeon, making one of the major factors that could influence the clinical outcome constant. This strengthens the investigators claim of correlation between PI value > 5 and the incidence of MACE.

95% of the procedures were on-pump CABG. Revision rate was 2% and mean follow-up was 3 years.

The article includes a transit-time flow algorithm with recommendations for when to inspect or revise grafts. Note that PI between 3 and 5 qualifies for closer inspection.