Publication Brief

Pulsatility Index Variations Using Two Different Transit-time Flowmeters in CABG Surgery
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INTRODUCTION
This study compared coronary bypass graft flows and pulsatility indexes (PI) generated by the Transonic Flowmeter (HT313, Ithaca, NY) and by a MediStim Flowmeter (VeriQ, Trondheim, Norway). This full paper grew out of a 2007 study that compared measurements by the two Flowmeters in different patient populations, Italy and Norway. Prior to the study, Pulsatility Index (PI) literature was analyzed that demonstrated that Transonic graft flow measurements had consistently lower PIs than MediStim’s.

STUDY: TWO STEPS
1) PI, as calculated by Transonic and MediStim Flowmeters, calculated simultaneously from 19 coronary grafts in 10 patients weaning from CP bypass and after administration of protamine, were compared. All patients were operated on by the same surgeon.
2) Changes in MediStim’s flow curves and PIs at six different filter settings (5, 10, 20, 30, 50, 100 Hz) of eight grafts in four patients, were evaluated.

REPORTED RESULTS
Transonic HT313: Mean PI: 1.8 ± 0.6
MediStim VeriQ: Mean PI: 2.7 ± 1.2
The Transonic Flowmeter consistently arrived at lower PIs with the degree of difference between the Transonic and MediStim PIs depending on the flow pattern. A spiky flow curve with the MediStim Flowmeter produced a high PI and a greater difference between the two Flowmeters’ measurements. A smoother flow pattern produced similar values. As PI increased, the difference between measurements by the two Flowmeters increased.

STUDY’S CONCLUSION
The study concluded that Transonic and MediStim measurements are not directly comparable because they use different filter settings (10 Hz vs 20 Hz) which presumably account for the different shapes of flow curves and different PI values. They note that the difference in waveforms could have important clinical repercussions when assessing the waveform to assess graft patency. They suggest that MediStim’s spiky flow curves make it difficult to evaluate graft flow with that type of waveform, but that the lower Transonic filter setting might inadvertently make the graft assessment appear better than it is.

TRANSONIC® OBSERVATIONS
• STUDY CRITERIA: Small sample: 19 grafts of 10 patients
• NEUTRAL CONCLUSION: The authors were careful not to state that one Flowmeter’s result was more accurate than the other, but concluded that the measurements were not comparable because of their different filter rates.
• TRANSONIC LONGER SAMPLING TIME: Transonic calculates mean flow over 8 seconds while MediStim calculates mean flow over 2 seconds.
• Noise Factor: A legitimate question can be asked, “Are MediStim’s higher flows due to actual physiological flows or are they the result of electronic noise which has not been filtered out?” Spiky waveform peaks indicate the latter?

REFERENCES
2 Nordgaard H et al, “Pulsatility Index Differs with Different Flowmeter Devices in CABG Surgery,” ISMICS. Rome, June 2007 (Transonic Reference # 7505AH)