Publication Brief

Refining Perforator Selection for DIEP Breast Reconstruction Using Transit-time Flow Volume Measurements

OBJECTIVE
To examine the usefulness of transit-time ultrasound volume flow measurements in assessing perforator vessels in deep inferior epigastric artery perforator (DIEP) flap harvesting and to evaluate their correlation with computed tomographic angiography (CTA) and hand-held Doppler signals in identifying perforators.

STUDY
• CTA was used to identify abdominal wall perforators for ten consecutive free DIEP breast reconstructions in eight women (two with bilateral mastectomies, six with unilateral).
• Abdominal wall perforating vessels >1 mm in diameter were evaluated intraoperatively with a conventional hand-held 8-MHz Doppler and a transit-time ultrasound flowmeter.
• The location of the vessels was correlated with preoperative CTA.
• Information about arterial versus venous flow patterns and mean flow values were recorded for each vessel typically, with a 2 mm flowprobe, but occasionally, with a 3 mm flowprobe. Flow values were correlated with both CTA and hand-held Doppler signals.
• Information about arterial versus venous flow patterns and mean flow values were recorded for each perforator.
• Perforators with high volume flows and an arterial waveform were selected to supply the flap.

RESULTS
• Of the 54 eligible perforators identified, transit-time flow measurements showed arterial flow waveforms in 15 of 16 perforators identified by CTA and in 2 of the remaining 38 vessels.
• Mean flow for the 16 arterial vessels was 5.3 mL/min. Mean flows for the remaining 38 dissected vessels was 2.1 mL/min.
• Transit-time flow measurement sensitivity in identifying arterial perforators was 94%; specificity was 95%.
• Hand-held Doppler was misleading in 70% of vessels.

CONCLUSION
• Transit-time flow measurements distinguished arterial from venous waveforms in vessels that appear arterial by hand-held Doppler signals.
• CTA and transit-time flow measurements had high correlation.
• The use of transit-time flow measurements may prevent poor perfusion seen in some DIEP flaps.

DISCUSSION
This group from the University of Toronto tested the use of transit-time ultrasound flowmetry to identify optimal deep inferior epigastric arterial perforators to harvest for breast reconstruction. Moreover, they suggest that transit-time flowmetry may be able to predict early patency in completed microvascular anastomoses, as is the case in CABG surgery.

Reference: