Equation helps assess blood flow to flaps for breast reconstruction

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For women undergoing breast reconstruction using the advanced "DIEP" technique, a simple formula can reliably tell whether there will be sufficient blood flow to nourish the DIEP flap, reports a paper in *Plastic and Reconstructive Surgery—Global Open, the official open-access medical journal of the American Society of Plastic Surgeons (ASPS).*

Drs Joseph Richard Dusseldorp and David G. Pennington of Macquarie University Hospital, Sydney, performed an ultrasound study to see how well the flap viability index (FVI) equation predicted blood flow in vessels used for deep inferior epigastric perforator (DIEP) flap breast reconstruction. They believe the FVI can help to ensure "optimal flap perfusion and complete flap survival" in women undergoing this procedure.

Equation Helps Surgeons Assess Blood Flow for DIEP Reconstruction

The DIEP flap is a relatively new option for delayed reconstruction after breast cancer surgery. In this technique, skin and tissue from the patient's abdomen is elevated for use in reconstructing the breast. The DIEP technique is an increasingly popular technique because it provides a reconstructed breast with a natural appearance and feel, using the patient's own tissues.

The DIEP flap preserves the patient's own breast tissue as much as

possible. In a major advantage over other reconstructive approaches such as the TRAM flap, it also leaves the patient's abdominal muscles intact.

Dr Pennington developed the FVI as a way of calculating the tissue weight that can be safely nourished by the available donor arteries, or "perforators." The FVI is calculated using data on the diameter of the available vessels and the weight of the final flap. The authors' experience has shown that if the FVI is over ten, total flap survival is likely. At lower FVI scores, blood supply will likely be inadequate, and partial tissue death (necrosis) is likely.

FVI Shows Close Correlation with Blood Flow Measurements

The study included ten women undergoing breast reconstruction using the DIEP flap. Within 24 hours after the procedure, the researchers measured actual blood flow in the perforating arteries, using color Doppler ultrasound. The patients had an average FVI score of 14.2—above the "safe" value.

The blood flow measurements were highly correlated with the diameter of the perforating arteries. The weight of the DIEP flap was also correlated with the perforator diameter, although to a lesser extent.

Since the FVI equation takes both of these factors into account, the results support its value in predicting the safe level of blood flow needed to fully perfuse the flap. The findings confirm that the size of the perforating vessels is "a critical factor in optimizing blood flow" to the DIEP flap, the researchers write.

The results also suggested a decreased flow rate in DIEP flaps with two or more perforating arteries. Further studies will be needed to understand the "flow dynamics" of flaps based on multiple perforators,

the researchers write.

Drs Dusseldorp and Pennington encourage plastic and reconstructive surgeons to incorporate the FVI into their routine planning for DIEP reconstruction. The equation provides a simple and reliable tool for maximizing the amount of viable tissue available for reconstruction—thus increasing the chances for surgical success and patient satisfaction. The researchers add, "Since routinely ensuring FVI values greater than 10, we have had no flap necrosis in any of our DIEP flaps."

More information: journals.lww.com/prsgo/Abstrac … Flap___An.99764.aspx

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