Transonic
Laser Doppler
Protocol #124

TRAM Flap Perfusion

APPLICATION
For studies of the physiology of flaps, the rat provides a safe, inexpensive, but comparable model for some flaps, notably the transverse rectus abdominis musculocutaneous (TRAM) flap. The laser Doppler flowmeter provides a useful tool for continuous monitoring of the blood flow to the tissue of the flap in the rat as it does in human flap surgery.

Site:	skin over TRAM flap
Species:	rat
Type	Sprague Dawley, male
Body Wgt:	360-520 gm
Duration:	acute

PROBE TYPE: R (right angle)

Type R (Right Angle) (ABLPHR)

head: epoxy, diameter, 15 mm
height, 7 mm
suture holes optional

Surgical Approach

Rats were anesthetized with enflurane induction and a mixture of ketamine and acetylpromazine given intramuscularly. The rat's hair was removed with a depilatory agent. A rectangle was marked out on the abdomen from the tip of the xiphoid to just above the pubis, overlying the rat's rectus abdominis muscle. TRAM flaps were then raised. Flaps were bipedicle with both a superior pedicle *(supplied by the cranial epigastric artery - a continuation of the internal thoracic artery)*, and an inferior pedicle *(supplied by the caudal epigastric artery - excluding anastomosis to the deep circumflex iliac artery)*. Only certain ipsilateral rectus abdominis musculocutaneous perforators were left intact to connect the abdominal wall. Contralateral muscle perforators, superficial epigastrics and other collateral vessels were ligated. The linea alba was incised and lifted to observe the blood supply to the flap. The pedicles were individually cross clamped with micro clamps to observe the contribution to the tissue perfusion by each individual pedicle. The flaps were isolated with a Silastic sheet to prevent neo-vascularization and reset into its original position after dividing one of the pedicles. The survival of the flaps were evaluated at 48 hours post surgery.

Flow Measurements

The right angle probe was placed in the middle of the flap's quadrant overlying the ipsilateral rectus abdominis muscle and was fixed in place with two-sided adhesive tape. The analog signal was recorded and averaged over five minutes to obtain values. Readings were made prior to incision *(initial)*, following incision with both pedicles perfusing the tissue *(baseline)*, and with each pedicle cross-clamped, in turn.

Flow Ranges Observed

Mean Perfusion of TRAM as a % of Baseline Flow

Number	Initial	Baseline	Superior Pedicle	Inferior Pedicle
10	185	100	92	44

References

Hallock, G.G., Rice, D.C., "Physiologic Superiority of the Anatomic Dominant Pedicle of the TRAM Flap in a Rat Model," Plastic & Reconstruc Surg, 1995; 96(1): 111-8.

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