

New Monitoring System to Decrease Microsurgical Flap Loss in Breast Reconstruction

The Problem

Deep inferior epigastric artery perforator (DIEP) and superior gluteal artery perforator (SGAP) flaps are the latest innovations in microsurgical breast reconstruction after mastectomy. Vascular compromise in these free flaps can be difficult to detect in the immediate post-operative period, potentially leading to flap loss and subsequent patient distress. Early detection and intervention increases the salvage rate. Traditionally, clinical evaluation includes assessment of the capillary refill, color, temperature and turgor; however, these criteria are highly subjective and dependent on the assessor's clinical experience in free flap monitoring.

The new ViOptix monitoring system potentially offers a more objective method for detecting venous congestion. It is a non-invasive monitor of real-time flap perfusion through the emission of near-infrared light and measurement of local tissue oxygen saturation.



Aim

By using the ViOptix device to measure flap perfusion, we aim to improve the monitoring of the DIEP and SGAP flaps in breast reconstruction and ultimately decrease the rate of flap losses.

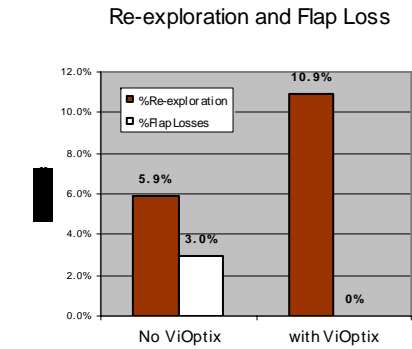
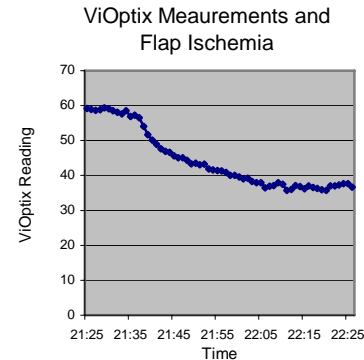
The Team

- Recovery Room Nurses
- Floor Nurses
- Residents
- Fellows
- Attendings
- Technical Representative

The Interventions

- ViOptix is used immediately after the completion of the surgery and provides continuous monitoring of the flap.
- Education of nurses, residents, and fellows on the usage and interpretation of monitor readings, including signs of potential flap loss:
 - 20 point decrease within 1 hour, or
 - Absolute reading below 30
- Operative re-exploration by surgeons when ViOptix criteria are met

The Results



	No ViOptix N = 372	with ViOptix N = 64	p-value
Total number of Flaps			
Re-exploration	22 (5.9%)	7 (10.9%)	0.136
Flap Losses	11 (3.0%)	0 (0%)	0.164

Lessons Learned

Since utilizing the ViOptix monitor, we have seen a higher re-exploration rate, but more importantly, no flap losses. The primary reason for this improvement in patient care is the earlier detection of vascular problems and intervention before significant flap ischemia or necrosis occurs.

Next Steps/What Should Happen Next:

Our data reflect the preliminary experience with the ViOptix monitoring system. Additional usage will be necessary to further define the parameters of the system. We feel that the increased rate of re-exploration reflects our initial learning curve as the prevention of flap loss represents a major improvement in patient care. Continuing education of nursing staff and residents will be necessary for accurate interpretation of the monitor. We are also evaluating technological advancements with the monitor, including the ability for remote computer access.



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