A Novel Text Messaging Alert System Used with Continuous Tissue Oximetry Monitoring to Improve Free Flap Outcomes

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INTRODUCTION: The time to detection of vascular compromise is a significant predictor of free flap salvage outcomes as early re-exploration has been shown to improve the salvage rate for failing free flaps. Continuous transcutaneous near-infrared tissue oximetry is an objective, quantitative method of detecting flap vascular compromise and has been shown to allow earlier re-exploration and higher salvage rates than clinical assessment alone. We designed a novel text messaging system to improve communication using tissue oximetry monitoring.

MATERIALS AND METHODS: A retrospective review was performed of a prospectively collected database of all microsurgical breast reconstructions from 2008 to 2015. A novel text messaging system was introduced in 2013 and programmed to send text messages alert when the tissue oximetry readings suggested potential flap compromise based on established thresholds. Patient demographics and complications, including rate of re-exploration and flap loss (partial and total) were assessed.

RESULTS: There were 900 autologous microsurgical breast free flaps during the study period: 614 were monitored with standard clinical monitoring and tissue oximetry compared with 286 flaps with the additional text messaging system. There were 27 unplanned returns to the operating room in the tissue oximetry group and 5 in the text messaging group with 1 complete flap loss in each group. Re-exploration occurred sooner as a result of these text message alerts (17.5 vs. 26.6 hours postoperatively), however, did not achieve statistical significance.

CONCLUSIONS: We were able to demonstrate the use of a novel text messaging system for tissue oximetry. This alert system shows promise in identifying impending flap loss with rapid notification of the surgical team. Improved communication and identification of failing free flaps will allow for an even further improvement of salvage rates.