

The Use of Intraoperative Fluorescent Angiography to Maximize Fasciocutaneous Flap Coverage of Battle Field Extremity Injuries

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Abstract

Background: Battle field extremity injuries are complex and often involve severe boney injuries and soft tissue defects. (1) Successful limb salvage depends on viable soft tissue coverage of vital structures, fractures, or hardware. The use of fasciocutaneous flaps in extremity war trauma reconstruction is preferred for their ease to elevate for secondary procedures. Their use may be limited by angiosome size and partial flap loss is problematic. (2-3)

Methods: Fluorescent indo-cyanine green angiography (Novadaq SPY imaging) was used during reconstructive procedures at the National Naval Medical Center during the last 12 months. Fasciocutaneous flaps were imaged at multiple operative stages to assess flap perfusion. Areas of poor perfusion were excised at time of surgery. Perfusion images taken were correlated with postoperative results. Cases were reviewed for types of flap utilized, flap success and failure rates, and complications.

Results: 18 fasciocutaneous flaps (5 pedicled, 13 free) were imaged. Pedicled flaps included 4 PIA flaps and 1 SIEA flap. Free flaps included 5 ALT, 4 scapular, and 4 lateral arm flaps. Overall flap success rate was 94.4%, 1 flap was lost (5.6%), and no flaps suffered partial flap necrosis (0%). The failed flap, a free ALT flap, was lost due to no-reflow phenomenon despite promising perfusion images after flap elevation. Other complications included 1 free flap hematoma and 1 surgical site infection. 2 of the 4 PIA flaps had poor perfusion after transposition and required surgical delay.

Conclusion: Partial fasciocutaneous flap loss can be avoided with the routine application of intraoperative tissue perfusion imaging, such as fluorescent indo-cyanine green angiography. This technology can also aid the reconstructive surgeon in the operative decision to perform surgical delay, preventing perfusion related complications. At our institution, it has provided us the opportunity to maximize flap size while minimizing morbidity for complex extremity war wound reconstruction.

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