Updated Algorithm for Recipient Vessel Selection in Traumatic Lower Extremity Reconstruction

Presenter:	Z-Hye Lee, MD
Co-Authors:	David A. Daar, MD, MBA, Lavinia Anzai, MD, Vishal D Thanik, MD, Pierre Saadeh, MD, Jamie P Levine, MD
Affiliation:	New York University Langone Health, New York, NY

Background:

Proper selection of recipient vessels in traumatic lower extremity reconstruction remains challenging given that many patients with severe lower extremity trauma is challenging due to concomitant vascular injury and large zones of injury. The aim of this study was to examine outcomes based on recipient vessel selection and to provide a general guideline for selection of proper recipient vessels in traumatic lower extremity reconstruction.

Methods:

A retrospective review of our institutional flap registry from 1979-2016 was performed and a total of 392 soft tissue free flaps used for below knee trauma were identified. Demographics, flap characteristics and outcomes were compared using Chi-square and one-way ANOVA. Outcome measures included major perioperative complications, takebacks, partial and total flap failures.

Results:

The mean age was 36.2 years (range 4-83) and 76.3% (n=273) of patients were male. Arterial injury was present in 31.8% (n=126) of reconstructions (15.2% with 2-vessel runoff, 8.8% with 1-vessel runoff and 6.6% with 0-vessel runoff). The anterior tibial artery (n=116, 29.3%) and posterior tibial artery (n=209, 52.8%) were the most commonly used as recipients. When comparing them in 3-vesesl runoff legs, there was no significant difference in major complications (p=0.31), flap failures (p=0.32) or operative takebacks (p=0.48). For both vessels, there was no significant difference in complication rates between end-to-end (E-E) vs. end-to-side (E-S) arterial anastomosis although E-S anastomosis was more commonly performed in the posterior tibial artery compared to the anterior tibial artery (67.1% vs. 32.9%, p<0.001). Utilizing a traumatized vessel as a recipient significantly increased major complications (OR 3.59, p=0.02) on logistic regression analysis. Specifically, for a 2-vessel runoff leg, utilizing an injured artery in E-E fashion compared to a healthy vessel in E-S fashion significantly increased rates of major complication (p=0.01) and partial flap failures (p=0.04). For 1-vessel runoff leg, an intact artery was utilized in 43% of cases and of these, a vein graft was utilized in 28%. On logistic regression analysis, the use of vein graft significantly predicted complications (OR 6.03, p=0.003).

Conclusions:

Appropriate recipient vessel selection remains a key to optimizing traumatic lower extremity reconstruction and we present an algorithm based on our institutional experience. Specifically, the use of an injured recipient artery and the use of vein grafts significantly increased complications.

Figure 1. Algorithm for Recipient Vessel Selection by Vessel Runoff