ORAL PRESENTATION GROUP 3 – PRESENTATION 4

Timing of Microsurgical Reconstruction in Lower Extremity Trauma: An Update of the Godina Paradigm

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Background:
Marko Godina in his landmark paper in 1986 established the principle of early flap coverage for reconstruction of traumatic lower extremity injuries. The aim of this study was to determine how timing influences perioperative outcomes in free flap reconstruction for lower extremity trauma.

Methods:
A retrospective review of our institutional flap registry from 1979-2016 identified 358 soft tissue free flaps for below knee trauma performed within one year of injury. Patients were stratified based on timing of coverage: ≤3 days (early), 4-90 days (delayed) and >90 days (late). A receiver operating curve (ROC) was generated and Youden index was used to determine the optimal time of reconstruction for predicting flap success. Based on this, the delayed group was further divided into two groups: 4-9 days and 10-90 days. Multivariate logistic regression was performed to determine whether timing of reconstruction independently predicts complications and flap failures, controlling for injury-related and operative factors.

Results:
77 free flaps (21.5%) were performed ≤3 days after initial injury, 233 (65.1%) were performed within 4-90 days and 48 (13.4%) flaps were performed after 90 days Univariate analysis demonstrated no association between time to coverage and rates of partial flap failure (p=0.11), total flap failure (p=0.44), takebacks (p=0.79) or major complications (p=0.14). Multivariate logistic regression analysis demonstrated that flaps performed within 3 days after injury had decreased risk of major complications (OR 0.40, p=0.04), trend towards decreased risk of partial flap failures (OR 0.13, p=0.06) and any flap failures (OR 0.41, p=0.10) compared to flaps performed between 4-90 days. Our ROC curve demonstrated day 10 to be the optimal day for predicting flap success (AUC=0.56). Multivariate logistic regression analysis demonstrated that flaps performed ≤3 days vs. 4-9 days had no differences in major complications (p=0.08), partial flap failure (p=0.92) or total flap failure (p=0.35). In contrast, flaps performed 10-90 days from

injury compared to ≤3 days had increased risk of major complications (OR 2.67, p=0.002) and total flap failure (OR 3.40, p=0.03).

Conclusions:
Early free flap reconstruction performed within 3 days of injury had superior outcomes compared to the delayed (4-90 day) group, consistent with Godina's original findings. However, as an update to his paradigm, this ideal early period of reconstruction can be safely extended to within 10 days of injury without an adverse effect on outcomes.