

Wound Surface Area as a Risk Factor for Flap Complications Among Patients with Open Fractures

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Purpose: Soft-tissue complications often dictate the success of limb salvage and the overall outcome of open fractures. Based on prior work at our institution, we hypothesize that wounds greater than 200 cm² are associated with a greater likelihood of both flap-related reoperation and wound complications among open fracture patients requiring soft-tissue reconstruction with a rotational flap or free tissue transfer.

Methods: To explore the association between wound size and the success of flap coverage, we conducted a secondary analysis on patients from the FLOW (Fluid Lavage in Open Wounds) trial. All patients that required a rotational or free tissue flap for their open fracture were included in the analysis. Our primary outcome was flap-related reoperation within 12 months of injury, and the indications were restricted to surgeries for deep infection, wound dehiscence, or necrosis. Our secondary outcome was wound complication, which included events treated operatively or nonoperatively (wound dehiscence, death of flap, necrosis, failure to close, expansion of wound, failed granulation, and infection). The primary predictor variable of interest was wound size, reported in cm². Multivariable logistic regression was used to assess the association between wound size and the outcomes, adjusting for relevant covariates.

Results: Of 112 patients included in the analysis, the mean age was 44.2 years (SD: 17.4) and the majority were male (78.6%). The median wound size was 29 cm² (interquartile range [IQR]: 9.25-120 cm²), with 22 patients (19.6%) of the sample having a wound size >200 cm². 50.0% of the sample had free flaps, 48.2% had rotational flaps, and 1.4% were unrecorded. 17.0% of the patients required a flap-related reoperation. A wound size >200 cm² was not associated with reoperation in an unadjusted model (P = 0.64) or when adjusting for Gustilo type (P = 0.69). The sample had an overall wound complication rate of 47.3%. Patients with a wound size >200 cm² were 3 times more likely to experience wound complications (odds ratio: 3.57, 95% confidence interval 1.22-10.42, P = 0.02) when adjusting for diabetes, wound contamination, and wound closure in the operating room.

Conclusion: The findings of this study demonstrate that wound surface area is an integral determinant for wound complication following soft-tissue flap treatment, but found no association between wound surface area and flap-related reoperation rates.