Increasing Time to Flap Coverage is Associated with Surgical Site Infections in Open Fractures of the Lower Extremity

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INTRODUCTION:

Open fractures are associated with soft tissue injury and may require reconstruction via delayed flap coverage. The timing of coverage is critical as prolonged time to coverage is associated with increased risk for wound complications. Few studies have included all lower extremity fractures when analyzing time from definitive fixation to coverage. We analyzed the effect of time to flap coverage from both admission and definitive fixation, on surgical site infection in patients admitted with open fractures of the lower extremity.

METHODS: The National Inpatient Sample was queried from 2015-2019 for open fractures of the tibia, fibula, and femur that required flap coverage. Patients who underwent simple skin grafts only, or fixation prior to admission were excluded. The number of days to coverage and days from fixation to coverage was determined using the inpatient stay day on which the flap closure procedure was conducted. The primary endpoint was hospital stay surgical site infection (SSI). Multivariate regression was used to quantify the risk of SSI for every day of delayed coverage.

RESULTS: Our study included 3,285 patients who underwent flap coverage for open fractures of the LE. Tibia fractures constituted the majority (81.9%), followed by fibula (39.4%), tibia/fibula (36.6%), and femur (27.7%). The rate of SSI was 5.1%. The median times from admission to flap coverage (5 days vs 11 days) and definitive fixation to flap coverage (1 day vs 5 days) were significantly greater in the SSI group compared to the nSSI group (p<0.001 and p<0.001, respectively). After controlling for confounding variables, time to flap coverage and time from fixation to coverage were significantly associated with SSI (OR: 1.078 p<0.001, and 1.077 p<0.001, respectively). Sub analysis of isolated tibia fractures showed that time from admission to coverage was slightly more predictive of SSI (OR:1.077 p<0.001 vs 1.059 p<0.001)

DISCUSSION AND CONCLUSION:

Our study is distinct in that we did not utilize arbitrary classifications such as "late" and "early" coverage. Instead, we present comprehensive evidence favoring prompt flap coverage. Our findings indicate that each additional day of delay in definitive flap closure correlates with an approximate 7% increase in the risk of SSI. Thus, treatment protocols should prioritize achieving definitive wound closure at the earliest feasible time.