Use of a Defined Surgical Approach for the Debridement of Open Tibia Fractures

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Background/Purpose: The importance of prompt operative debridement of open fractures is well-established. Extension of the traumatic soft-tissue wound allows exposure of the entire zone of injury and identification and debridement of all nonviable tissues. However, particularly with wounds over the medial face of the tibia, wound extension may prevent closure and result in the need for flap coverage. The use of a defined surgical approach, without disturbing the traumatic wound, has been proposed to minimize soft-tissue-ssociated complications. However, the effectiveness and safety of this technique have not been reported. In this study, the authors hypothesize that a defined approach to open tibia fracture debridement results in a lower incidence of subsequent return to the operating room.

Methods: All patients presenting with open tibia fractures at our institution were prospectively enrolled in the study. The method of debridement was at the discretion of the treating surgeon and consisted of extension of the traumatic wound or the use of a separate, defined approach. The anterolateral approach to the tibia was used in all defined approach cases. Patients underwent fracture fixation with either medullary nailing, internal fixation, or external fixation. Wounds amenable to primary closure were closed during the index procedure while noncloseable wounds were treated with negative-pressure wound therapy or antibiotic-impregnated bead pouch. Subsequent debridements were carried out until traumatic wounds were either amenable to primary closure or soft-tissue coverage was performed. To minimize potential for selection bias, patients presenting with an OTA skin score of III were excluded from analysis. Differences between groups were analyzed with the use of the Fisher exact test for categorical variables and the Student *t* test for continuous variables.

Results: 72 patients with 77 open tibia fractures were enrolled over a 13-month period. 9 patients with an OTA skin score of III were excluded from analysis. Of the remaining 68 open tibia fractures, 47 were managed with direct extension of the traumatic wound and 21 were managed with a defined surgical approach. Mean OTA open fracture score was 6.02 in the Direct group and 5.94 in the Defined group ($P = 0.803$). Mean number of trips to the operating room at time of final follow-up were 1.85 in the Direct group and 1.24 in the Defined group ($P = 0.007$). Soft-tissue flap coverage was needed in 9 patients in the Direct group and 0 patients in the Defined group ($P = 0.048$). There were 7 rotational soleus flaps, 1 rotational gastrocnemius flap, and 1 free latissimus flap performed at a mean 11.9 days from initial debridement in the Defined group. There was 1 deep infection necessitating return to the operating room in each group, and 1 superficial infection that resolved with oral antibiotics in each group ($P = 0.58$). 3 patients from the Defined group and 8 patients from the Direct group were lost to follow-up. Of the remaining 65 patients, mean follow-up was 16.2 weeks.

Conclusion: A defined surgical approach used for the debridement of open tibia fractures is a safe alternative to direct extension of the traumatic wound and may result in a decreased need for both return to the operating room and soft-tissue coverage procedures.

See pages 49 - 106 for financial disclosure information.