The Cost of After-Hours Operative Debridement of Open Tibia Fractures

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Introduction

Open long-bone fractures occur at a rate of 11.5 per 100,000 persons per year.[1,2] These severe injuries are associated with a high rates of complications, such as infections, with reported rates ranging from 4% to 63% of patients.[3] These injuries are associated with significant health care expenditures, with the lifetime per-patient cost of the most severe injuries reported to be as high as $509,275.[4] The cost of infection following open fractures has not been specifically calculated; however, the overall individual and socioeconomic burden of musculoskeletal infection is significant.[5] Historically, timing to operative debridement has been regarded as an important factor in reducing infection rates following open fractures. However, a recent meta-analysis revealed no difference in infection rates between early and delayed initial surgical debridement of open long bone fractures, even in the most severe injuries.[3] The aim of this study was to evaluate the additional cost associated with performing after-hours operative debridement of open fractures within six hours of injury.

Materials and Methods

Economic modeling was performed based on population estimates obtained from the National Trauma Database and the National Inpatient Sample. The number of open tibia fractures that occur annually in the United States, including the number that presented after-hours (defined as between the hours of 6:00pm and 2:00am) that underwent operative debridement within six hours were calculated. This model estimates incremental cost for after-hours surgery based on overtime wages for on-call surgical personnel (nurses and surgical technicians) required to staff after-hours cases, as published by the United States Department of Labor and obtained from our own institution. As many Level 1 hospitals are capable of performing after-hours cases without additional cost, a sensitivity analysis was performed to determine the effect of designated level of care of the trauma hospital.

Results

A total of 17,414 open tibia fractures were recorded in the National Inpatient Sample for

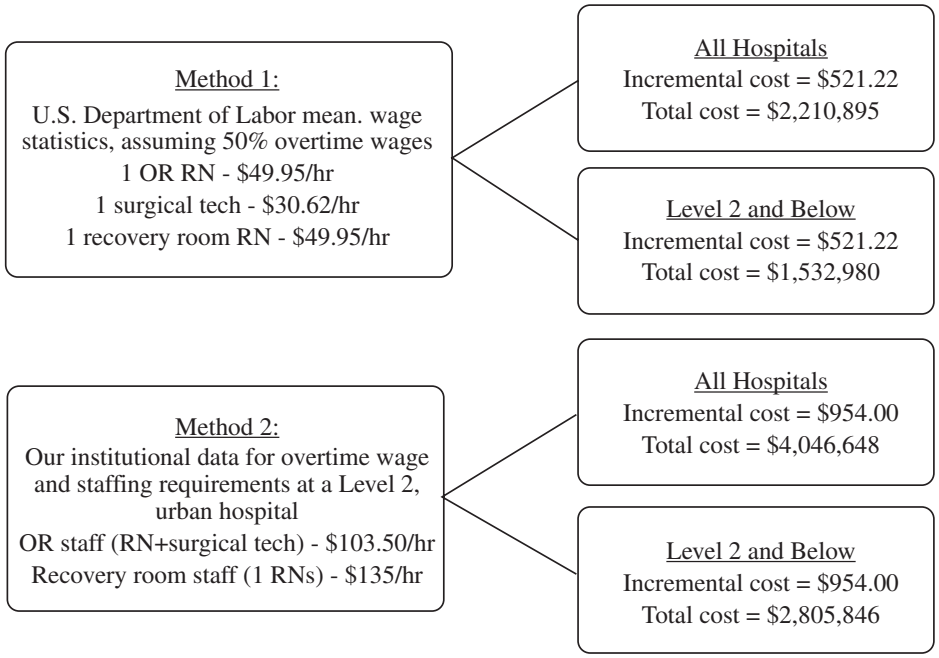

Figure 1. Methods for determination of incremental and total costs associated with after-hours debridement of open tibia fractures.

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2009. An estimated 7,485 open tibia fractures presented after-hours, of which 4,242 underwent operative debridement within six hours of presentation. Overtime wage data yielded an estimated total additional cost for after-hours operative debridement of open tibia fractures within six hours of $2,210,895 to $4,046,648 annually, respectively. For hospitals without Level 1 designation, the cost of performing after-hours operative debridement of open tibia fractures was calculated at $1,532,980 to $2,805,846 annually (Figure 1).

Discussion

Our data indicated that the overall cost of performing after-hours operative debridement of open tibia fractures is as high as $4,046,648 annually. Given that there is little to no documented benefit of this practice, and with increased pressures from federal and state governments and insurers to practice cost containment, elective delay of operative debridement of open fractures may be one means of decreasing the economic burden associated with such injuries. This conclusion remains contingent upon prospective confirmation that delayed operative debridement of open fractures is associated with outcomes equivalent to those of emergent after-hours debridement.

References

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