COSTS AND HEALTHCARE UTILIZATION OF TRAUMA CASES WITH COMMINUTED GUSTILO-ANDERSON TYPE III FRACTURES

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INTRODUCTION

- Comminuted open Gustilo-Anderson (GA) type III tibial fractures are associated with high risks of complications and may require multiple surgeries
- No standard treatment protocol exists for comminuted open type III tibial fractures
- Treatment options include induced membrane (Masquelet) technique, distraction osteogenesis, structural bone-grafting and amputation

OBJECTIVES

To evaluate typical patient costs and payments over a 2-year treatment pathway following comminuted open GA type III fractures

METHODS

Study Design: Retrospective, observational cohort study

Data Source:

- Healthcare claims from the IBM® MarketScan® Commercial (IMCD) and Medicaid® Databases (IMD) and the Premier Hospital Database (PHD)
- The IMCD and IMD databases were used to analyze patient outcomes over 2 years post fracture as these databases provide enrollment data, critical to track patients over time
- The PHD database was used to evaluate in detail the care received at time of surgery, as the PHD is a hospital billing database with detailed per-admission healthcare utilization information

Study population:

- Patients with Type III comminuted tibial fractures or open tibial fractures requiring saucerization between 2007 and 2018 based on International Classification of Disease (ICD) diagnostic and common procedural terminology (CPT) codes within inpatient admissions were identified in IMCD, IMD and PHD
- The date of initial tibial fracture management was defined as the index date
- Patients with amputation of lower limb at time of index were excluded from the analysis

Outcomes:

- Costs and payments at index (PHD) and for up to 2-years post-index (IMD) were analyzed
- All costs per patients (including all readmissions) in PHD were added, costs were adjusted for inflation
- Readmissions and associated payments for up to 2-years post-index (IMD) were analyzed

Statistical Analysis:

- Means and standard deviations were provided for continuous variables
- Frequency counts and proportions were provided for categorical variables

RESULTS

- From the PHD database, 1,500 patients were identified
- There were 21.6% female with average age 41.3 (SD: 17.7) (**Table 1**)
- Major comorbidities present on admission included uncomplicated hypertension (21.9%), obesity (11.8%) and chronic pulmonary disease (10.7%) (**Table 1**)

Table 1. Patient demographic and clinical characteristics

Patient Characteristics	N (%)
Total	1,500 (100%)
Gender	
Female	324 (21.6%)
Age	
Mean (SD)	41.3 (17.7)
Race Category	
White	1044 (69.6%)
Black	236 (15.7%)
Other	170 (11.3%)
Unspecified	50 (3.3%)
Payer Category	
Commercial	586 (39.1%)
Other	410 (27.3%)
Medicaid	330 (22.0%)
Medicare	174 (11.6%)
Marital Status	
Single	912 (60.8%)
Married	368 (24.5%)
Other	210 (14.0%)
Missing	10 (0.7%)
Elixhauser Comorbidity Index	
Mean (SD)	1.64 (1.9)

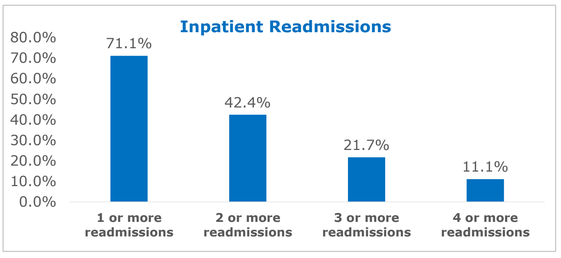
RESULTS

Table 1. Patient demographic and clinical characteristics (cont.)

Patient Characteristics	N (%)
Hypertension Uncomplicated	328 (21.9%)
Fluid and electrolyte disorders	250 (16.7%)
Drug abuse	244 (16.3%)
Alcohol abuse	242 (16.1%)
Obesity	177 (11.8%)
Chronic pulmonary disease	161 (10.7%)

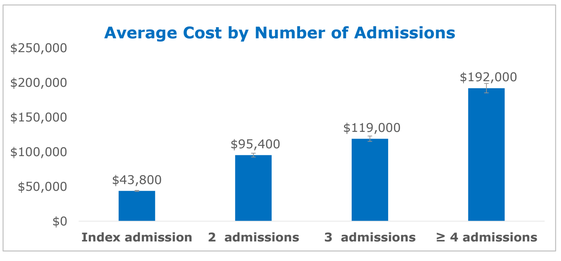
- The index admission lasted on average 11.9 days (SD: 14.2) and included a surgical operation with a median duration of 308 minutes
- Over the 2-year post-index, 71% patients had 1 or more inpatient readmission, with 11.1% requiring 4 or more readmissions (**Figure 1**)

Figure 1. Percent of patients with inpatient readmission over 2-year post initial tibial repair



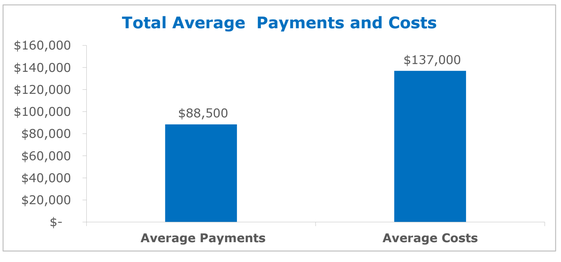
- Hospital cost at index averaged US$ 43.8K (standard deviation (SD): US$ 26.7)
- The hospital cost per patient was as follows: Patients with two admissions (index plus one) incurred an average cost of US$ 95.4K (SD US$ 104K), patients with three admissions: US$ 119K (SD US$ 150K) and ≥ 4 admissions: US$ 192K (US$ 263K)

Figure 2. Average hospital cost per patient by number of admissions over the 2 years follow-up



- For commercial insurance, total payments averaged US$ 204K (SD: 123.2K - median payment: US$ 186K)
- For Medicaid patients, only 19.6% patients had reported payments over the 2-year period. Among Medicaid patients, when payments were shown, total payments averaged US$73.6K (SD: 130.9K - median payment: US$ 29.8K)
- Overall, the average reimbursement per patient was US$88.5K, far below the average hospital cost per patient, estimated at US$137K (SD 211K) (**Figure 3**)

Figure 3. Overall average total hospital payments and costs per patient over the 2 years follow-up



CONCLUSION

- Comminuted open GA Type III tibial fractures represent significant healthcare challenges as patients require multiple admissions and high costs that can exceed average reimbursements
- Overall, the average costs were shown to exceed the average reimbursements by US$48.5K

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