Economic Burden of Inpatient Admission of Ankle Fractures

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Disclosures

• Author Disclosures

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Introduction

Epidemiology

- 5th most common type of fracture
- 9% of all musculoskeletal injuries
- 11 per 1,000 persons annually
- Bimodal distribution – young adult males & elderly females

Background

- Historically, nearly all patients sustaining ankle fractures have been uniformly admitted regardless of what their subsequent management may require.2, 5-7
- The decision to admit often precedes the treatment decision-making pathway.
- Cost and patient outcomes are two variables offering recent challenges the historical approach.8,9
- Delayed operative treatment of ankle fractures have been reported to have equivocal outcomes to immediate surgery.10,11
- Inpatient surgery with admission has an associated increased length of stay.9,11
- Length of hospital stay has a strong correlation with increased treatment cost.9
- Patients report increased satisfaction with outpatient ankle fracture surgery.8,9
Introduction

HYPOTHESES

- Isolated closed ankle fractures including unstable lateral malleolus, bimalleolar, and trimalleolar fractures may be safely and effectively managed almost entirely on an outpatient basis.

- Cost-savings may be generated by managing ankle fractures requiring surgery on an outpatient basis.
Methods

Retrospective Review
• IRB approval
• EMR reviewed for ALL lateral malleolus, bimalleolar, trimalleolar fractures fractures treated with outpatient ORIF by a single Foot & Ankle orthopaedic surgeon in 2012.
  • All cases evaluated for inpatient admission post-operatively.

Data
• NIS (National Inpatient Sample) query: Median length of stay for lateral malleolus, bimalleolar, trimalleolar fractures based on ICD-9 codes.¹²
  • Estimated operative management:
    • Lateral malleolus – 80%.
    • Bimalleolar and Trimalleolar – 98%. 

¹² http://www.cdc.gov/nchs/about/major/hus/nis/whatis.htm
Methods

Costs

• Medicare Acute Inpatient Prospective Pricer for maximum allowable medicare inpatient facility reimbursements - Diagnostic Related Group (DRG) 494.13
• Private facility reimbursement rates estimated at 139% of inpatient Medicare reimbursement and 280% of outpatient reimbursements.

Stochastic Model

• A unique decision tree model was built to simulate cohorts of patients with ankle fractures either theoretically managed with inpatient admission, or treated in an outpatient setting. The model was analyzed with a modified Monte Carlo simulation of the age stratified at risk US population as estimated by our NIS query. The associated costs of treatment in each of the treatment arms was accrued over the course of simulation.
Results – Case Review

2012 Cases

- 76 bimalleolar or trimalleolar ankle fractures.
- 9/76 cases performed on inpatients.
  - 5 cases performed on patients admitted with polytrauma.
  - 4 cases performed on patients admitted for medical co-morbidities.
- 67/76 (88.2%) performed as outpatient procedures.
- 0/76 post-operative complications requiring inpatient admission.
Results – Patient/Cost data

NIS data estimates
• 48,044 combined closed lateral malleolus, bimalleolar, and trimalleolar ankle fractures admitted to an inpatient facility in 2012.
• Median length of stay:
  • 2 days – lateral malleolus,
  • 3 days – bimalleolar or trimalleolar
• Inpatient Medicare facility reimbursements:
  • Lateral Malleolus - $12,920,
  • Bimalleolar or trimalleolar fractures - $13,391.
• Inpatient private facility reimbursements:
  • Lateral Malleolus - $17,959,
  • Bimalleolar or trimalleolar fractures - $18,613.

Outpatient data
• Medicare facility reimbursements: $4,125 – all fracture types.
• Private facility reimbursements: $11,549 – all fracture types.
Results - Model

Simulation Model
• $796,033,050 - Facility reimbursements with routine inpatient admission.

IF primary utilization of outpatient procedures (with a 25% admission rate)
• $513,503,791 - Facility reimbursements.
• $282,529,079 - Cost savings of 35.5%.
Discussion

- Over the past 30 years cost containment has been practiced in earnest, with a goal of providing the best outcomes at the lowest cost with efficient continuum of care.\textsuperscript{14}
- Acute traumatic orthopaedic injuries including acute ankle fractures this optimization has centered on reducing surgical complications and reducing overall length of hospital stay.\textsuperscript{15}
- Historically, ankle fractures have been managed with perioperative hospital admission. This is often associated with increased length of stay and has been an area identified as one that could have implications on healthcare expenditures.\textsuperscript{9,11,16}
- With cost savings, good outcomes, low rates of complications and patient satisfaction there has been a recent rise in outpatient procedures.\textsuperscript{17}

Annual Incidence of Inpatient Ankle Fractures

Although NIS data shows a decline in the number of ankle fractures being treated it is unlikely that such trends are indicative of actual epidemiology, and may indicate orthopaedic surgeons have already identified the value and cost savings associated with outpatient procedures.\textsuperscript{12}
Conclusion

Our study suggests that closed lateral malleolus, bimalleolar and trimalleolar ankle fractures can be safely and effectively treated with delayed outpatient surgery and can result in significant cost savings.

- In the US, routine perioperative hospital admission for ankle fractures represents a $367 million annual economic burden of facility reimbursements.
- Even with an assumed 25% necessary admission rate, outpatient management of ankle fractures can result in >$280 million in cost savings.

While inpatient admission may be necessary in certain circumstances, understanding the implications of inpatient cost assumption for ankle fracture surgery and recognizing outpatient surgery as an effective alternative in most cases can ultimately result in cost savings to the US healthcare system and on the individual level to patients themselves.
THANK YOU!

References