Failure of the Stryker Gamma-3 nailing system due to nail breakage: types of failure, prevalence, and possible causes

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Introduction

Extra-capsular proximal femur fractures:

- Very common injury
- High morbidity and mortality
Devices used for stabilization of peri & Subtrochanteric fractures
The Stryker Gamma-3 IM
Nailing System®

• The most widely used device for peri & sub trochanteric fractures
  In the US
• Outcome is comparable to DHS
• Suitable for all types of trochanteric fractures (3A1-3A3)
Nail failure

• Although the common use of the Stryker Gamma-3 IM Nailing System®

We had a few cases of nail failure
Study objectives

1. Evaluate types of implant failure and seeks for possible explanations for these events

2. Find typical patient, fracture and implant characteristic leading to implant failure
Methods

- Retrospective review
- All extra-capsular (AO/OTA 31A3) femur fractures
- Managed:
  - Single hospital
  - 2009-2012
  - Short and long nails both were distally locked
- Data collected for all cases of nail failure
study cohort

- 582 patients operated
- **nail failures:** 5 cases (0.85%)
- F=3, M=2, Mean age was 74
- 2 patients had Parkinson’s disease
- 1 patient had Bisphosphonate Tx
- **Time to failure** 5.5m (2-14 months post-op)
Results

• In all cases the nail failed through the lag-screw hole
• In 3 patients the fractures healed WITHOUT nail replacement
• In 2 cases exchange with other type of nail led to union
Discussion

- Breakage of the gamma nail is a rare complication (0.8%)
  - Reported incidence ranges from 0.2% - 5.7%
- Most common etiology is metal fatigue
  - secondary to delayed or non-union of the fracture.
- Location of failure:
  - Lag screw hole (70%)
  - Distal locking screw (smaller nail diameter)
- The weak point of this implant is the lag screw hole
- Failure occurs late (6-10 months post-op)
- Correlation with background disease should be investigated
Discussion

- Is it activity related?
1 case of failure in:
  - 60y old, very active patient
  - had hip fracture and a contralateral humerus frc.
  - Used a tripod cane on the same side of the hip fracture.
Limitations

- A retrospective review
  - some failures may have not been detected
- Very small cohort of failure cases
- Laboratory evaluation of retrieved implants was not performed
Conclusions

- The Gamma-3 nail system is appropriate implant for fixation of proximal femoral fractures and has an acceptable failure rate
  - this study report failure rate similar to a worldwide reported rates
- We could not attribute failure cases to any other disease or medication (limited number of cases...)
- If delayed union is detected, nail may fail
Thank you

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