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Parenteral Corticosteroids After Fragility Fracture Increases the Odds of a Repeat Fracture

Justin David
LSU Health Sciences Center- New Orleans, jdav45@lsuhsc.edu

Marc R. Zucker
LSU Health Sciences Center- New Orleans, mzucke@lsuhsc.edu

Timothy F. Carroll
LSU Health Sciences Center- New Orleans, tcarr6@lsuhsc.edu

Ross E. Straughan
LSU Health Sciences Center- New Orleans, rstrau@lsuhsc.edu

Mishra Jaya
LSU Health Sciences Center- New Orleans

See next page for additional authors

Presenter Information

Justin David, Marc R. Zucker, Timothy F. Carroll, Ross E. Straughan, Mishra Jaya, Jessie R. Gills, and M Westerman

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Justin David, BS; Greg Benes, BS; Vinod Dasa, MD[1]; Peter Krause, MD[1]; Deryk Jones, MD[2]; Lauren Leslie, DO[2]; Andrew Chapple, PhD[3]

1. LSUHSC School of Medicine, Department of Orthopaedics; 2. Ochsner Health;
3. LSUHSC School of Public Health

Introduction

- Osteoporotic fractures are associated with significant morbidity and mortality in the elderly population. As patients age, their risk for a fracture increases, and having one fracture increases the risk for a repeat fracture.
- Interventions to decrease the incidence of a repeat fracture should be implemented.
- Corticosteroids are known to increase fracture risk by stimulating apoptosis of osteoblasts and increased activity of osteoclasts. Due to this detrimental effect on bone integrity, their use should be limited in high-risk patients.
- Studies have shown that medications that increase fall risk, such as corticosteroids, are still widely used before and after fracture, and their use is not changed after the first fracture.
- This study will investigate the association of corticosteroid use with the odds of a repeat fracture and explore trends in their use in these patients.

Corticosteroids and Repeat Fracture

Variable	OR (CI)	P-value
Oral Steroids	1.19 (0.96-1.49)	0.117
Intravenous Steroids	1.37 (1.08-1.74)	0.008
Steroids Before Fracture	0.94 (0.6-1.48)	0.794
Steroids After Fracture	1.52 (1.2-1.91)	<.001
Steroids in both periods	0.95 (0.54-1.67)	0.867
Oral Steroids Before Fracture	0.88 (0.56-1.38)	0.566
Oral Steroids After Fracture	1.22 (0.94-1.59)	0.131
Oral Steroids in both periods	1.44 (0.79-2.64)	0.232
Intravenous Steroids Before Fracture	0.96 (0.53-1.76)	0.902
Intravenous Steroids After Fracture	1.52 (1.18-1.96)	0.001
Intravenous Steroids in both periods	0.61 (0.27-1.38)	0.235

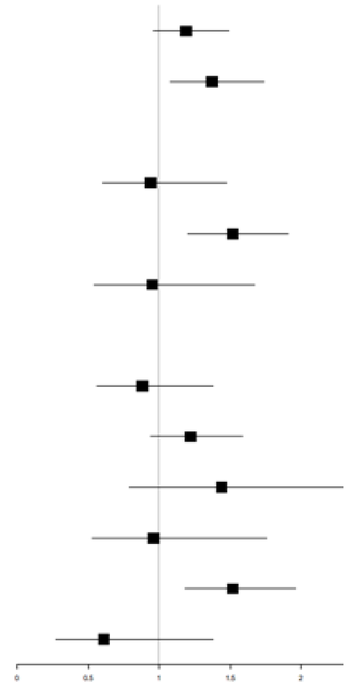

Figure 1: Multivariable logistic regression results showing corticosteroid timing, corticosteroid type, and corticosteroid type and timing's effect on re-fracture odds.

Trends in Corticosteroid Use

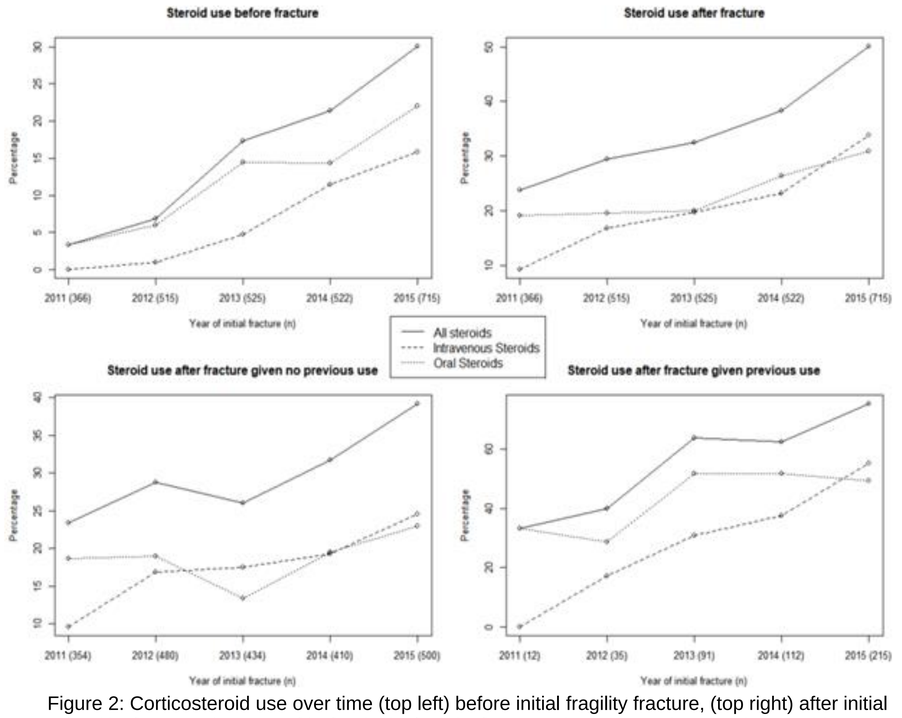

Figure 2: Corticosteroid use over time (top left) before initial fragility fracture, (top right) after initial fragility fracture, (bottom left) after initial fragility fracture given no previous corticosteroid use, (bottom right) after initial fragility fracture given previous corticosteroid use.

Methods

2,643 patients with repeat fractures were identified in the Research Action for Health Network (REACHnet) database, which consists of multiple partner health systems in Louisiana and Texas. Each patient selected had a non-traumatic fracture diagnosis code with at least one year of medical history prior to the fracture and at least two years of follow-up time.

Multivariable logistic regression was used to identify corticosteroid trends over time, predictors of a repeat fracture, and the effect of timing and type of corticosteroid on repeat fracture.

Results

- 42.6% of our patients received corticosteroids within 1 year prior or 2 years after an initial fragility fracture, and they were more likely to receive them after the first fracture.
- Corticosteroid use was associated with a significantly increased risk of a second fragility fracture (Adjusted Odds Ratio, aOR = 1.39, 95% CI = 1.13-1.71).
- Parenteral corticosteroids, but not oral, were associated with significantly increased odds of re-fracture (aOR = 1.37. 95% CI = 1.08-1.74).
- Corticosteroid usage after initial fracture showed significantly increased odds of repeat fracture (aOR = 1.52, 95% CI = 1.20-1.91).
- Parenteral corticosteroid use after fracture was associated with an increased risk of re-fracture (aOR = 1.52, 95% CI 1.18-1.96).
- Only 44.4% of patients receiving parenteral corticosteroids had a diagnosis that required its use

Conclusions

- Corticosteroid use is very high in patients at risk with fragility fractures, and its use increases over time. In addition, patients on corticosteroids before their initial fracture are much more likely to continue corticosteroids after the fracture despite its high risk for a repeat fracture.
- Because corticosteroid use is a risk factor for repeat fractures, patients should only be taking them if it is necessary. Our study showed that only about half of patients taking corticosteroids had a medical condition that requires corticosteroid use. This shows that steroid overutilization for inappropriate or nonspecific diagnoses may contribute to increased fracture rates.
- Physicians should take caution in prescribing parenteral corticosteroids in osteoporotic patients, especially after the initial fracture, in order to prevent the high morbidity and mortality associated with repeat fractures.