



Outcomes and national trends for the surgical treatment of lumbar spine trauma

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Introduction

Treatment of lumbar spine fractures has included surgical fusion with instrumentation and cement augmentation (kyphoplasty, vertebroplasty). To analyze national trends, we studied population demographics, treatment patterns, outcomes and complications.

Methods

Searching Nationwide Inpatient Sample database using ICD-9-CM codes, we identified adults treated 2004-2009 with primary diagnosis of lumbar fracture who underwent: fusion, kyphoplasty or vertebroplasty. Demographics and hospital characteristics were analyzed. Mortality, hospitalization length, safety indicators and complications were calculated as outcomes. Logistic regression correlated demographic risk factors with outcomes.

Results

75,384 surgical patients: fusion (28.7%), kyphoplasty (17.0%), vertebroplasty (51.8%), multiple surgeries (2.5%). Year-over-year, fusions decreased 7.4% and augmentation increased >450%. Fusion patients were significantly younger (<44 vs >65, $p < 0.001$) with >3 comorbidities (20.6% vs. 50.6%, $p < 0.0001$). Mortality rates: fusion (0.7%), kyphoplasty (0.6%), vertebroplasty (0.3%) ($p < 0.001$). Complication rates: fusion (23.0%), kyphoplasty (19.9%), vertebroplasty (14.3%). Augmentation complications significantly increased (13.5-20.1%, $p < 0.0001$).

Hospitalization days: fusion (10.1), kyphoplasty (5.9), vertebroplasty (4.4). Consistently increasing trends (mortality, non-routine discharge) were observed with older age. Fusion patients had significantly higher safety indicators and complications, independent of age (13.9% vs. 6.1%, $p < 0.001$). Age had significant increments for mortality (OR 2.2, 95%CI:1.6-2.9). Factors correlating with higher non-routine discharges: older age (OR 1.5, 95%CI:1.5-1.7), females (OR 1.2, 95%CI:1.1-1.3), increased comorbidities (OR 1.3, 95%CI:1.2-3.5). Factors associated with increased complications: older age (OR 1.1, 95%CI:1.0-1.1), white (OR 1.2, 95%CI:1.0-1.5), increased comorbidities (OR 1.7, 95%CI:1.6-1.7), kyphoplasty (OR 1.2, 95%CI:1.0-1.4), fusion (OR 2.5, 95%CI:2.1-3.0).

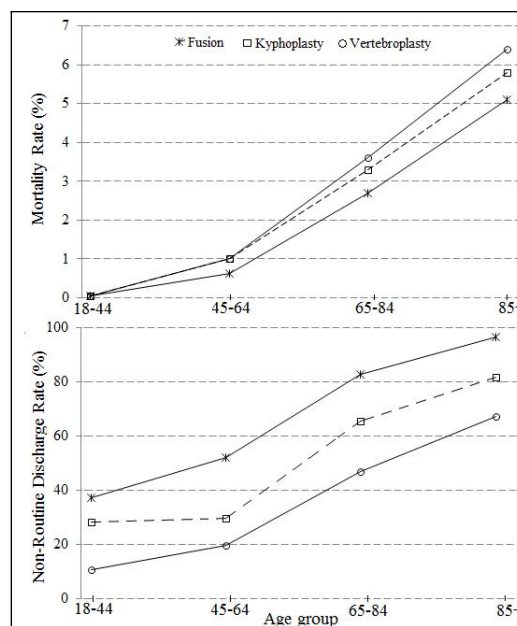


Figure 1. Mortality and non-routine discharge rates.

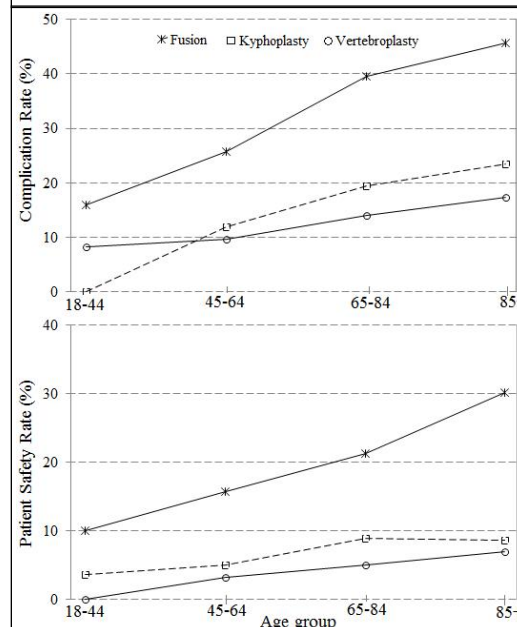


Figure 2. Complications and patient safety rates.

Conclusions

Fusion had the highest adverse outcomes and longest hospital stays. Previously considered low risk, augmentation complication rates rose year-to-year and kyphoplasty had mortality rates comparable to fusion. Age and medical comorbidities were independent risk factors for poor outcomes (all intervention types). A national trend favoring cement augmentation over fusion showed a dramatic (450%) increase.