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109. Quantifying the Effects of Age, BMI, Degeneration, Adjacent Degeneration, and Other Patient Factors on Lumbar Segmental Range of Motion Using Multivariate Analysis

Jesse Bible, BS[1], Andrew Simpson, MD[1], Debdut Biswas, BA[1], John Emerson[2], Jonathan Grauer, MD[1]; [1]Yale University School of Medicine, New Haven, CT, USA; [2]Yale University, Department of Statistics, New Haven, CT, USA

BACKGROUND CONTEXT: Prior studies have investigated the roles of age and degeneration on lumbar segmental ROM only using univariate analyses. However, multivariate analyses are also required to differentiate the multiple factors that may affect ROM and quantify their relative effects.
PURPOSE: To assess lumbar spine segmental ROM with flexion/extension (F/E) radiographs and determine the relation to clinical variables.
STUDY DESIGN/ SETTING: Retrospective review and multivariate analysis.
PATIENT SAMPLE: This study retrospectively reviewed 376 patients who presented to our clinic with lumbar or radicular complaints and had F/E radiographs taken. 118 patients were excluded for previous surgery, sacralized L5, scoliosis, fracture, spondylolisthesis, poor radiographic exposure, radiographic technical difficulties, or unavailable weight/height. The radiographic series of the remaining 258 patients were analyzed, including 137 females and 121 males with ages ranging from 18 to 92 years.
OUTCOME MEASURES: Segmental ROM was assessed for L1-S1.
METHODS: The interobserver reliability of Kellgren Score (KS) and segmental ROM were evaluated for three observers. Multivariate regression analyses were performed for each level. The predicting variables evaluated were: (1) KS at the level of interest, (2) KS at the level above, (3) KS at the level below, (4) age, (5) gender, (6) weight, (7) height, (8) BMI, and (9) smoking. Significance was defined as $p<0.05$.
RESULTS: Interobserver reliabilities for assessing KS (ICC 0.70) and segmental ROM (ICC 0.80) were good to excellent. In the multivariate analyses, age had a significant negative association with ROM at L1/L2, L2/L3, L3/L4, and L4/L5. BMI had a significant negative association with ROM at L2/L3, L3/L4, and L4/L5. KS at the level of interest had significant negative association with ROM only at L5/S1. KS at adjacent levels, gender, weight, height, and smoking did not have a significant association with ROM at any level.
CONCLUSIONS: The results of this study provide the clinician with insight into factors that influence segmental lumbar ROM. Age was the strongest statistical predictor of ROM and was associated with declining motion, amounting to an approximate 3 degree decrease in total sagittal lumbar ROM in the superior four segments every 10 years. Given our findings that age is the strongest predictor of lumbar ROM analyzed, we can now appreciate a natural history of declining lumbar ROM with age that is independent of degenerative disease. Further, factors related to general body habitus, such as BMI, may be more important predictors of lumbar motion than previously recognized. When controlling for these factors, degenerative disease itself seems to have a lesser role in effecting lumbar ROM than previously accepted.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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Thursday, October 16, 2008
5:15–6:15 PM
Special Interest Paper Presentation 4: Lumbar

110. Evaluation of the Treatment Costs after Balloon Kyphoplasty vs. Conservative Treatment in Osteoporotic Vertebral Fractures: An Economical Analysis

Stephan Becker, MD[1], Karl-Peter Pfeifer[2], Ogon Michael, MD[1]; [1]Orthopaedic Hospital Vienna - Speising, Vienna, Austria; [2]Department f. Med. Statistics, Informatics and Health Economics (MSIG), Innsbruck Medical University, Innsbruck, Austria

BACKGROUND CONTEXT: Operative treatment of osteoporotic vertebral fractures seems to result in higher primary costs compared to conservative treatment. However it is still unclear whether the inpatient related follow-up costs don't result in a different outcome.
PURPOSE: The aim of this analysis was a nationwide comparison of spine related inpatient treatments after balloon kyphoplasty versus conservative treatment of balloon kyphoplasty patients.
STUDY DESIGN/ SETTING: Retrospective nationwide analysis.
PATIENT SAMPLE: 110 patients after conservative treatment and 141 patients after balloon kyphoplasty treated primarily between 2002 and 2005 in one center were followed up via a nationwide analysis of spine related inhospital treatment.
OUTCOME MEASURES: Data from the Austrian DRG-system, which includes all inpatients treated in Austria have been used to identify admission of the target population between 2002 and 2006. Because no unique patient identifier is available in the data set, a matching according to data of birth, gender and postal code was used. Outpatient visits are not included. From these data the number of admissions, the length of stay and the scores can be determined. Furthermore each admission was classified as spine related or not.
METHODS: To calculate the exact follow up times the data were matched against the Austrian death registry. If a patient has died this data was used to calculate the follow up time otherwise December 31st 2006 was used.
RESULTS: The mean age of the conservative group was 75.49 and of the kyphoplasty group 71.16 years. The total follow up time was 324.55 years(mean +-standard deviation 2.92+-1.40) for the conservative and 354.25 (2.53+-0.96) for the kyphoplasty group. The shorter mean follow up interval for the kyphoplasty group is due to the fact that in the years 2004 and 2005 more patients have been treated by kyphoplasty. The mean number of admissions in the kyphoplasty group is 0.779 or 0.308 per follow up year whereas in the conservative group these figures are approximately twice, namely 1.757 and 0.601. Considering the average length of stay the kyphoplasty group shows less inhospital days (9.2 per patient or 3.6 per follow up year), whereas in the conservative group this is 14.4 and 4.6 inpatient days. Finally the scores per admission in the follow up period are lower in the kyphoplasty group (3146 and 1243 DRG related treatment points) whereas in the conservative group these values are 3824 and 1308.
CONCLUSIONS: These data show a strong superiority of kyphoplasty compared to conservative treatment of spine problems based on the data of one big hospital in Austria where 251 patients have been treated between 2002 and 2005. We demonstrate a long term superiority of balloon kyphoplasty compared to non-surgical treatment regarding inpatient treatments.
FDA DEVICE/DRUG STATUS: Balloon kyphoplasty: Approved for this indication.

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111. A Prospective Randomized Controlled Study to Evaluate the Use of a Synthetic Fibrosis Inhibitor in the Reduction of Low Back Pain Following Lumbar Microdiscectomy

Patrick Fransen, MD; Centre Neurochirurgical de Bruxelles, Brussels, Belgium

BACKGROUND CONTEXT: Postoperative fibrosis following lumbar disc surgery can cause pain by restriction of mobility of the nerve roots in the spinal canal, and make surgery for recurrent disc herniation more difficult with increased risks of tearing the dura and damaging the nerve roots. Numerous material and surgical techniques have been used to minimize fibrosis, but none is accepted as reliable, safe and effective to date.
PURPOSE: We report the results with 6 month- F/U of a prospective randomized controlled study to evaluate the use of a polyethylene glycol