Clinical: Fusion
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Introduction: Since the earliest descriptions of spinal fusion by Hibbs and Albee in 1911, arthrodesis has been one of the most commonly employed procedures for treating conditions of the spine including deformity, trauma, degenerative disc disease and spondylolisthesis. Today, fusion is the standard treatment for various spinal conditions, with degenerative causes being the most common indication. This current study provided an analysis on the utilization of spinal fusion procedures during the period of 1998 to 2008, while also reporting detailed patient and healthcare system related characteristics associated with spinal fusion. In this report, we compared trends in spinal fusion to other notable inpatient procedures, including laminectomy, hip replacement, knee arthroplasty, percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass graft (CABG). The goal was to provide the most recently available epidemiologic data on spinal fusion and other inpatient procedures to clinicians, researchers and administrators. This will allow for assessment of need and allocation of hospital resources. It may also serve to stimulate future research.

Methods: Data were obtained from the Healthcare Cost and Utilization Project Nationwide Inpatient Sample for the years 1998-2008. Discharges were identified using International Classification of Diseases, Ninth Revision, Clinical Modification procedure codes for the following procedures: spinal fusion, laminectomy, hip replacement, knee arthroplasty, percutaneous transluminal coronary angioplasty and coronary artery bypass graft. Population-based utilization rates were calculated from United States census data.

Results: Between 1998 and 2008, the utilization rate for spinal fusion increased by 2.1-fold (111%) from 64.5 cases per 100,000 adults in 1998 to 135.5 in 2008 (p< 0.001). In contrast, during the same time period, laminectomy decreased by 1.2%, hip replacement increased by 32.4%, knee arthroplasty increased by 101.4%, PTCA increased by 23.2% and CABG decreased by 46.8%. For primary cervical fusion, lumbar fusion and thoracic fusion, the utilization rates increased by 1.9-fold, 2.4-fold, and 1.6-fold, respectively(p< 0.001). Between 1998 and 2008, mean age for spinal fusion increased from 48.8 years-old to 54.2 years-old (p< 0.001), in-hospital mortality decreased from .29% to .25% (p< 0.01) and mean total hospital charges associated with spinal fusion increased 3.3-fold (p< 0.001). The national bill for spinal fusion increased 7.9-fold (p< 0.001).

Discussion: Frequency, utilization and hospital charges of spinal fusion have increased at a higher rate than other notable inpatient procedures in this study from 1998 to 2008. This increase could be influenced by multiple factors, such as recent advances in spinal fusion technology, improved understanding of the human spine, increased number of fellowship trained spine specialists and a general push towards minimally invasive surgery. In addition, patient demographics and hospital characteristics changed significantly, particularly noting that while the average age for spinal fusion increased, the in-hospital mortality decreased. The changes in utilization and demographics associated with spinal fusion identified in this study can be used to assess the effect of changes in medical care, direct health care resources, and future research.