

Surgical Interventions

Spine Surgery Statistics

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Mody MG, Nourbakhsh A, Stahl DL, Gibbs M, Alfawareh M, Garges KJ. The prevalence of wrong level surgery among spine surgeons. Spine. 2008 Jan 15;33(2):194-8

A questionnaire study was performed to evaluate the prevalence of wrong level surgery among spine surgeons and their use of preventive measures to avoid its occurrence. All members of the American Academy of Neurologic Surgeons (n = 3505) were sent an anonymous, 30-question survey with a self-addressed stamped envelope. RESULTS: A total of 415 (12%) surgeons responded. Sixty-four surgeons (15%) reported that, at least once, they had prepared the incorrect spine level, but noticed the mistake before making the incision. Two hundred seven (50%) reported that they had done 1 or more wrong level surgeries during their career. From an estimated 1,300,000 spine procedures, 418 wrong level spine operations had been performed, with a prevalence of 1 in 3110 procedures. The majority of the incorrect level procedures were performed on the lumbar region (71%), followed by the cervical (21%), and the thoracic (8%) regions. There is a high prevalence of wrong level surgery among spine surgeons; 1 of every 2 spine surgeons may perform a wrong level surgery during his or her career. Although all spine surgeons surveyed report using at least 1 preventive action, the following measures are highly recommended but inconsistently adopted: direct preoperative communication with the patient by the surgeon, marking of the intended site, and the use of intraoperative verification radiograph.

Jhawar BS, Mitsis D, Duggal N. Wrong-sided and wrong-level neurosurgery: a national survey. J Neurosurg Spine. 2007 Nov;7(5):467-72.

Perhaps the single greatest error that a surgeon hopes to avoid is operating at the wrong site. In this report, the authors describe the incidence and possible determinants of incorrect-site surgery (ICSS) among neurosurgeons. Neurosurgeons recognized fatigue, unusual time pressure, and emergent operations as factors contributing to ICSS. For spine surgery, in particular, unusual patient anatomy and a failure to verify the operative site by radiography were also commonly reported contributors. Neurosurgical ICSSs do occur, but are rare events. Although there are significant limitations to the survey-based methodology, the data suggest that the prevention of such errors will require neurosurgeons to recognize risk factors and increase the use of intraoperative imaging.

Juratli SM, Mirza SK, Fulton-Kehoe D, Wickizer TM, Franklin GM. Mortality After Lumbar Fusion Surgery. Spine. 2009 Mar 10.

Among the 2378 lumbar fusion subjects in the study cohort, 103 were deceased by 2004. The 3-year cumulative mortality rate was 1.93% (95% confidence interval, 1.41%-2.57%). The 90-day perioperative mortality rate was 0.29% (95% confidence interval,

0.11%-0.60%). The risk of perioperative mortality was positively associated with repeat fusions. The age- and gender-adjusted all-cause mortality rate was 3.1 deaths per 1000 worker-years (95% confidence interval, 0.9-9.8). Analgesic-related deaths were responsible for 21% of all deaths and 31.4% of all potential life lost. The risk of analgesic-related death was higher among workers who received instrumentation or intervertebral cage devices compared with recipients of bone-only fusions (1.1% vs. 0.0%; $P = 0.03$) and among workers with degenerative disc disease (age- and gender-adjusted mortality rate ratio, 2.71) (95% confidence interval, 1.17-6.28). The burden was especially high among subjects between 45 and 54 years old with degenerative disc disease (rate ratio, 7.45). Analgesic-related deaths are responsible for more deaths and more potential life lost among workers who underwent lumbar fusion than any other cause. Risk of analgesic-related death was especially high among young and middle-aged workers with degenerative disc disease.

Lad SP, Patil CG, Berta S, Santarelli JG, Ho C, Boakye M. National trends in spinal fusion for cervical spondylotic myelopathy. Surg Neurol. 2009 Jan;71(1):66-9; discussion 69. Epub 2008 Jun 2

Cervical spondylotic myelopathy is one of the most common disorders treated by spine surgeons. There was a nearly 7-fold increase in the number of spinal fusions for CSM from 1993 to 2002. Despite continued increases in patient medical comorbidities, overall complication rates have remained stable at approximately 10.3% and mortality rates constant at 0.6%.

Singhal B, Mohammed A, Samuel J, Mues J, Kluger P. Neurological outcome in surgically treated patients with incomplete closed traumatic cervical spinal cord injury. Spinal Cord. 2008 Sep;46(9):603-7. Epub 2008 May 13

Retrospective study based on a reference paper. Neurological outcome in patients who were managed surgically with closed traumatic cervical spine injury was evaluated using the ASIA motor scoring system and Frankel grading. The neurological outcome in surgically treated patients is comparable to the conservatively treated patients. The Frankel grading and ASIA motor charting combined is a powerful tool in assessing the neurological outcome in closed traumatic cervical spinal injured patients. Until now there has been no evidence to suggest that the obvious advantages of surgical management of closed cervical spine injuries (better alignment, easier manual handling and early mobilization) is traded for poorer neurological outcome.

Sobottke R, Cs  csei G, Kaulhausen T, Delank S, Franklin J, Aghayev E, Zweig T, Eysel P. Spinal surgery in the elderly: does age have an influence on the complication rate? Orthopade. 2008 Apr;37(4):367-73.

However, a review of the existing literature, the results of the European spine register "Spine Tango" and our own results show that the rate of complications after minimally invasive spinal surgery is as low in the elderly as it is in the younger population. But the higher the complexity of surgery, the higher the rate of complications with increasing age. However, even elderly (>65 years) and very elderly (>80 years) patients seem to benefit from surgical treatment, independent of the extent of spinal surgery. Because chronic pain leads to physical limitations, an impaired quality of life as well as a declined state of health, and because surgery can significantly improve these factors, even while remaining aware of the operational risks, age itself should not be considered as a contraindication for spinal surgery.

Olsen MA, Nepple JJ, Riew KD, Lenke LG, Bridwell KH, Mayfield J, Fraser VJ. Risk factors for surgical site infection following orthopaedic spinal operations. J Bone Joint Surg Am. 2008 Jan;90(1):62-9

Surgical site infections are not uncommon following spinal operations, and they can be associated with serious morbidity, mortality, and increased resource utilization. Diabetes was associated with the highest independent risk of spinal surgical site infection, and an elevated preoperative or postoperative serum glucose level was also independently associated with an increased risk of surgical site infection. The role of hyperglycemia as a risk factor for surgical site infection in patients not previously diagnosed with diabetes should be investigated further. Administration of prophylactic antibiotics within one hour before the operation and increasing the antibiotic dosage to adjust for obesity are also important strategies to decrease the risk of surgical site infection after spinal operations.

Browne JA, Cook C, Pietrobon R, Bethel MA, Richardson WJ. Diabetes and early postoperative outcomes following lumbar fusion. Spine. 2007 Sep 15;32(20):2214-9

Retrospective cohort study using data from the Nationwide Inpatient Sample administrative data from 1988 through 2003. The primary objective was to examine perioperative morbidity and mortality for patients with and without diabetes mellitus following lumbar spinal fusion. This nationally representative study of inpatients in the United States provides evidence that diabetes is associated with increased risk for postoperative complications, nonroutine discharge, increased total hospital charges, and length of stay following lumbar fusion. Prospective studies to determine causality as well as the potential impact of diabetes control on these variables have not yet been done.

Cook C, Tackett S, Shah A, Pietrobon R, Browne J, Viens N, Richardson W, Isaacs R. Diabetes and perioperative outcomes following cervical fusion in patients with myelopathy. Spine. 2008 Apr 15;33(8):E254-60.

Database study using the Nationwide Inpatient Sample administrative data from 1988 through 2004. The primary objective was to examine perioperative morbidity and mortality for patients diagnosed with myelopathy, with and without diabetes mellitus (DM) (and subclassifications) following cervical spinal fusion. DM has been associated with worse outcomes in a variety of orthopedic procedures including spinal surgery. Evidence that patients with DM have more complications following cervical fusion, specifically those treated for myelopathy, has been suggested within the literature but has been poorly explored. Data from 37,732 patients within Nationwide Inpatient Sample database (1988-2004) with diagnostic codes specifying the presence of myelopathy and who underwent cervical fusion were included in the analysis. This nationally representative study of inpatients in the United States provides evidence that patients with DM who received cervical fusion secondary to myelopathy are associated with greater perioperative complications, nonroutine discharge, and increased total charges. Subanalyses suggest that uncontrolled DM is a significant associative factor in outcome.