satisfactory patient outcomes. Intraopertive neurophysiologic monitoring (IONM) using posterior tibial nerve somatosensory evoked potentials (PTN SSEP) is an accepted technique for monitoring neural pathways during spinal procedures. Several case reports have reported on SSEP as potentially useful for identifying occult vascular injury.
PURPOSE: The purpose of this research is to verify and characterize the ability of PTN SSEP to identify occult vascular injury during anterior lumbar spine surgery.
STUDY DESIGN/ SETTING: Retrospective review of a large patient data base maintained by a private neurophysiologic monitoring company.
PATIENT SAMPLE: The data base of approximately 6000 patients undergoing PTN SSEP monitoring between September 2005 and July 2007 was utilized. Inclusion criteria identified patients who had undergone an anterior lumbar or retroperitoneal approach for access to the lumbar spine.
OUTCOME MEASURES: Subjects who were considered to have had a significant vascular event by PTN SSEP were identified by age, sex, type of surgery and number of levels involved. The event was measured by the number of minutes from the significant change in potentials to the time of corrective action and the subsequent time to full recovery. Charts were reviewed for postop sequelae of neurologic injury or vascular insufficiency.
METHODS: Patients were screened for "significant" change from baseline which was defined as a decrease of 50% in amplitude and/or increase of 10% in latency. PTN SSEP was performed by certified IONM technologists who were overseen by a neurophysiology fellowship trained neurologist. Cases were excluded if there was incomplete data regarding the type of neurophysiologic changes and or the corrective measures used.
RESULTS: Of the 215 patients, 14 patients demonstrated significant pathologic changes in the left lower extremity (6.5%). Four cases had to be excluded from further analysis due to inadequate documentation as to the corrective measures taken by the surgeon. The ten cases (4.6%) involved 12 incidences of significant changes from PTN SSEP baseline values that were felt secondary to vascular compression. Two cases had recurrent episodes of neurophysiologic changes from compression. The corrective measures involved the surgeon releasing the tension or repositioning the abdominal retractors away the vasculature. Once a significant change was detected the average time for the performance of the corrective measure was 9.33 minutes. All changes occured in the left lower extremity. Once the corrective measure was performed there was, on average, a 3.00 minute delay until there was evidence of initial improvement and 19.82 minute delay until the SSEP returned to baseline. All cases had eventual complete recovery of potentials and there were no temporary or permanent sequelae identified.
CONCLUSIONS: PTN SSEP appears to be a reliable adjunctive measure for identifying occult vascular insufficiency due to intraoperative compression. Once significant changes are identified, corrective measures such as retractor repositioning or removal results in reliable return of baseline potentials.
FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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40. Radiation Exposure to Operating Room Personnel During Minimally Invasive Spine Surgery: A Comparison of Single vs. Simultaneous Dual Fluoroscopy

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BACKGROUND CONTEXT: Lifetime incidence of LBP is 60–90% Disability from LBP has increased 14 times the rate of population growth, and is the leading cause of decreased productivity and is the second leading cause of time lost from work. LBP secondary to degenerative disc disease peaks at approximately 40 years and radiologic evidence of lumbar degenerative disc disease increases with age. The goal of spinal fusion is a solid and stable arthrodesis that is disc height maintaining and load sustaining . Approaches used are posterior lumbar interbody fusions, anterior lumbar interbody fusions, combination 360o fusions, and transforaminal lumbar interbody fusion. Complications of the PLIF; dural laceration, nerve root injury, pseudarthrosis; are fewer with the TLIF. TLIF patients mobilize and resume activities earlier. The posterior approach requires dissection of the paraspinous muscles above and below the level of the affected disc for placement of pedicle screws and the interconnecting rod, with increased pain, slower to mobilization times, and more hospital days. The CD Horizon Sextant rod insertion set applies the posterior instrumentation with minimal access, with less post-op pain, earlier mobilization, and less hospital days. This minimal access technique requires biplanar fluoroscopy. Radiation exposure in other spine procedures has been well documented. However, there are no studies to date that quantify the radiation exposure to the patient, surgeon, and O.R. staff during the placement of posterior instrumentation with the CD Horizon Sextant rod insertion set.
PURPOSE: The use of the CD Horizon Sextant rod insertion set for minimal access spinal instrumentation decreases morbidity relative to invasive techniques. However, the need for fluoroscopic imaging throughout this technique may expose involved personnel to levels of radiation that exceed acceptable genetic, embryo/fetal, and gonadal doses. Our study assessed the ionizing radiation exposure to the patient, surgeon, and O.R. staff during the use of the CD Horizon Sextant set for single and multilevel spinal instrumentation.
STUDY DESIGN/ SETTING: Spine OR.
PATIENT SAMPLE: Spine Patient.
OUTCOME MEASURES: see results.
METHODS: This is a prospective study of 20 single-level spinal fusions using MASTPI; ten using two simultaneous C-arms an ten using one C-arm that transitions from A/P to lateral planes. Thermoluminescent dosimeters were placed on the surgeon, scrub tech, anesthesia, and operating room nurse. We compared MASTPI time, total surgical time, and cumulative exposure dose of each badge after ten operations.
RESULTS: Normalized radiation exposure for single vs dual C-arm to surgeons was 1.05 vs 0.38 mrems/mAs ($p=0.0001$), scrub technicians 0.205 vs 0.12 mrems/mAs ($p=0.003$), and O.R. staff was 0.199 vs 0.13 mrems/mAs ($p=0.007$). MISS surgical time was 12.3 minutes less in the two C-arm group ($p=0.023$). Total surgical time was 55 minutes less in the two C-arm group, but was not statistically significant.
CONCLUSIONS: In experienced hands, MISS is safely within accepted guidelines with single or dual fluoroscopy. However, simultaneous bi-planar fluoroscopy decreases radiation exposure and operative time.
FDA DEVICE/DRUG STATUS: Horizon Sextant rod insertion set: Approved for this indication.

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41. Analysis of Risk Factors of Adjacent Segment Degeneration after Fusion Using Pedicle Screws for Degenerative Lumbar Disease

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BACKGROUND CONTEXT: There has been increasing concerns regarding adjacent segment degeneration (ASD) following lumbar spinal fusion. However there are much argues about the risk factors.
PURPOSE: We tried to investigate the risk factors in the patients with radigraphic ASD after pedicle screw fixation and fusion in degenerative lumbar disease. Also the relationship between ASD and clinical result was analyzed.
STUDY DESIGN/ SETTING: A retrospective review of radiographs and medical records
PATIENT SAMPLE: Fifty-five patients associated with degenerative lumbar disease who underwent lumbar spinal fusion using pedicle screws