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Oral Platform Abstracts

OUTCOMES COMMITTEE AWARD

100. Determining the Quality and Effectiveness of Spine Surgery: Patient Satisfaction is Not a Valid Proxy

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Introduction: Patients' satisfaction with care has emerged as a proxy for quality due to its feasibility of collection. We set out to determine whether patient satisfaction is a valid measure of quality and effectiveness of care in a prospective longitudinal spine registry.

Methods: All patients undergoing spine surgery over 6-month period were enrolled into a prospective registry and followed for 3 months. Patient reported outcomes, patient satisfaction with outcome and with provider care, and 90-day morbidity were recorded. ROC curve analysis was used to determine if improvement in quality of life (QOL,SF-12 PCS) and disability (ODI/NDI) accurately predicted patient satisfaction [Area under the curve (AUC): <0.7: poor, 0.7-0.8: fair, >0.8: good accuracy]. Multivariate logistic regression was performed to determine if surgical morbidity (quality) or improvement in disability and QOL (effectiveness of care) were independently associated with patient satisfaction.

Results: 422 (84%) patients completed all questionnaires. Satisfaction with provider care: In ROC analyses, extent of improvement in QOL and disability predicted satisfaction with very poor accuracy, Figure 1 & 2. In regression analysis, 3-month morbidity, re-admission, improvement in QOL, or improvement in general health (HTI) were not associated with satisfaction with care, Table 1. Satisfaction with outcome: In ROC analyses, improvement in QOL and disability predicted satisfaction with fair accuracy, Figure 1 &2. In regression analysis, improvement in QOL, disability, and general health were independently associated with satisfaction with outcome, Table 2. Neither 90-day morbidity nor re-admission were associated with satisfaction with outcome.

Conclusion: Patient satisfaction with provider care is not a valid measure of quality or effectiveness of surgical spine care. Patient satisfaction with outcome may be used as a fair proxy for effectiveness but is not a valid measure of quality. Patient satisfaction metrics represent patient's subjective contentment with healthcare experience and should not be used as a measure of quality or effectiveness.

101. The National Neurosurgery Quality and Outcomes Database (N2QOD) Pilot: Patient-centered Measurement of Quality and Effectiveness of Care

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Introduction: The Institute of Medicine (IOM) and the American Recovery and Reinvestment Act of 2009 have called for the establishment of prospective registries to capture patient-centered data from real-world practice to guide evidence-based reform. As a result, the AANS launched the National Neurosurgery Quality and Outcomes Database (N2QOD) March,2012 as a twenty-five center pilot project: a web-based, prospective, longitudinal one-year outcomes registry(the lumbar spine module).

Methods: Using a centrally coordinated (Vanderbilt Institute of Public Health) and standardized process of representative sampling, six patients per week per site undergoing surgery for one of five diagnoses(Table 1) were prospectively entered into the REDCapTM web-based portal. Site-specific and risk-adjusted national norms are reported back to sites, Figure 1. Pilot year goals are to 1)generate an accurate quality measurement and reporting infrastructure for neurosurgeons, and 2)accurately define risk-adjusted national benchmarks of outcome using manual data entry, validated outcomes instruments, and high degree of quality control from which to subsequently validate automated data entry tools.

Results: Within five months, 1481 patients were enrolled, representing 140 surgeons, 32 hospital systems, 22 U.S. states. Cumulative missing registry data was 1.8%. Three-month follow up was 87.3%. 90-day re-admission and re-operation was 8% and 3%, respectively, and varied as a function of lumbar diagnosis, Table 2. Significant improvements in pain, disability, QALY and return to work were reported by patients with all five diagnoses, Figure 2. Utilization of arthrodesis (Figure 3) and extent of surgical effectiveness varied across centers, Figure 4. Significant variation in the risk-profile and disease-severity of patients was observed across sites, highlighting the need for robust risk adjustment, Figure 5.

Conclusion: Initial results suggest that a prospective, nation-wide, outcomes-based registry will be feasible. N2QOD aims to provide practice-specific evidence that empower subscribing sites to demonstrate the quality, effectiveness, and value of their care specific for their unique patient population in an emerging culture of public profiling and value-based purchasing.

102. Spine Surgery Referrals Redirected through a Multidisciplinary Care Pathway: Appropriateness of Non-surgeon Triage and Effects on Imaging Utilization

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Introduction: In attempt to address rising costs and clinical variability including the rate of imaging utilization and surgical referral, multidisciplinary care pathways for back pain have been implemented around the world, each with unique approaches to classification, triage, and provision of care. No comparative studies have been

performed to determine efficacy. The Saskatchewan Spine Pathway (SSP) includes triage clinics staffed by specialized physiotherapists. During the early implementation of the SSP, these clinics screened a backlog of elective spine surgery referrals. There is very limited data regarding the efficacy of non-surgeon triage of lumbar spine referrals.

Methods: A retrospective analysis of 87 patients with lower back and leg pain initially referred to a spine surgeon but triaged by the SSP clinic between May 1-November 30, 2011. Diagnosis was by the classification of Hall et al. Pain and disability were scored by visual analog pain scale (VAS), modified Oswestry Disability Index (ODI) and EuroQol EQ5D.

Results: 62 (71.26%) patients (Group A) were discharged after patient education, self-care advice and/or referral for additional mechanical therapies. 25 (28.74%) patients (Group B) were referred for surgical assessment. The surgical yield in Group B was 44%, compared to 15% for all new spine referrals prior to implementation of the SSP: an almost three-fold increase. For the combined cohorts, we estimate that the triage clinic prevented 50/87 (57.5%) MRI studies. Non-surgeon triage captured all red flags detected by the surgeon. Patients in Group B were much more likely to have a leg-dominant pain pattern ($p = 0.0088$) and had significantly greater ODI ($p = 0.0121$) and EQ5D Mobility ($p = 0.0484$) scores.

Conclusion: The SSP is an effective clinical spine pathway for reducing unnecessary imaging and surgical referrals.

103. Comparative Effectiveness, Cost Utility and Cost Benefit Analysis of Intra-Operative Neuromonitoring in Cervical Spine Surgery: Where is the Value?

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Introduction: The use of Intra-operative neuromonitoring (IOM) modalities has not been clearly demonstrated to influence patient outcomes favorably compared to the added cost it incurs. We set out to assess the value of IOM in patients undergoing cervical surgery in a prospective cohort study.

Methods: All patients undergoing elective cervical spine surgery for degenerative spondylosis over a 1-yr period at a single institution were enrolled into a prospective registry. Data collected included demographics, treatment variables, IOM parameters, and 90-day surgical morbidity. Patient reported outcomes (PRO), return to work and medical resource utilization were prospectively recorded at baseline and 3-months. CPT codes 95920[baseline electrophysiologic testing (charged per hour)], 95295 and 95926[SSEP monitoring], 95928 and 95929[MEP monitoring], and 95937[neuromuscular junction testing] were used to calculate the direct cost of using IOM for cervical surgery(Payer perspective). The cost of IOM per reduction in surgical morbidity (Cost-benefit analysis), and the difference in mean total cost per QALY-gained with IOM via incremental cost-effectiveness ratio[ICER](Cost-utility analysis), was assessed.

Results: A total of 180 patients underwent cervical spine procedures (102 IOM and 78 non-IOM). Baseline characteristics were similar between the two groups ($p>0.05$), Table 1. IOM changes were noted in only 4(4.0%) patients undergoing IOM and surgical strategy was modified in only 1(1.0%). There was no significant difference in 90-day morbidity and improvement in PROs at 3-months ($p>0.05$) between the two groups, Table 1. The average added cost of IOM per patient was $1,208(Medicare) and $2,054(private payer) with no associated reduction in surgical morbidity. The ICER for IOM versus not was $358,205/QALY.

Conclusion: In a real comparative effectiveness study of patients undergoing elective cervical spine surgery, IOM was associated with significant added cost without a corresponding benefit in safety or patient outcomes. This resulted in a non-cost effective ICER score. IOM appears to be an area where cost can be saved without sacrificing surgical quality or patient safety.

104. Incidence and Clinical Outcomes of Patients Requiring Repeat ACDF Surgery Due to Adjacent Level Disease

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Introduction: To study the long-term effects of repeat ACDF surgery approached anteriorly versus posteriorly for adjacent segment disease (ASD) in the cervical spine.

Methods: 888 patients received ACDFs for symptomatic degenerative disease of the cervical spine over the past 22 years at our institution. Of these, 108 patients received repeat ACDF surgeries due to symptomatic ASD. 77 received revision surgeries anteriorly, and 31 received posterior surgeries. Pre, intra, peri, and post-operative data were collected via clinical notes and patient interviews. Patients were followed up for an average of 111.8±76.5 months after the first ACDF.

Results: In general, patients who were operated on posteriorly were older (53.2±12.6 vs 47.7±9.3, $p<0.01$), and were more likely to be female (67.7% vs. 36.4%, $p<0.01$). There were no statistical differences between the two cohorts in terms of comorbidities such as diabetes, COPD, CAD, osteoporosis, obesity, smoking history, hypertension, and depression. Patients operated on posteriorly were more likely to have myelopathy (41.9% vs. 15.6%, $p=0.03$) and scored worse on the Nurick and ASIA scales ($p<0.01$). Patients approached posteriorly had 2.0±1.3 spinal levels fused, compared with 1.3±0.6 ($p<0.01$) in the anterior cohort, and experienced more blood loss ($p<0.01$). Peri-operatively, patients receiving revision surgeries posteriorly had significantly longer lengths of stay (5.7±4.1 vs. 2.7±3.26, $p<0.01$), higher rates of wound infection (22.6% vs. 0.0%, $p<0.01$), lower rates of dysphagia (6.45% vs 10.4%, $p<0.01$), higher rates of rehabilitation (22.6% vs. 0.0%, $p<0.01$), but no differences in rates of DVT, PE, pneumonia, hematoma, wound dehiscence, C5 nerve root palsy, or death. Post-operatively, patients in both cohorts experienced a significant self-reported improvement in symptoms (43.8% vs. 44.4% in the anterior vs. posterior cohort, respectively), but patients approached posteriorly had a statistically significantly higher risk of recurrent radiculopathy ($p=0.04$).

Conclusion: The pathophysiology behind adjacent segment disease after ACDF has yet to be unambiguously established. Here, we present one of the largest Western cohorts of patients undergoing repeat ACDF due to adjacent segment disease. This study provides one of the longest and most comprehensive follow-ups of this challenging patient population.

105. Lateral Mass Screw Fixation in the Cervical Spine: A Systematic Review

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Introduction: The purpose of this study is to describe the safety profile and effectiveness of lateral mass screw fixation (LMSF) when used for stabilization and fusion of the posterior cervical spine.

Methods: A systematic search was conducted in MEDLINE and the Cochrane Collaboration Library for articles published between January 1, 1980 and December 31, 2011. We included all articles