Characterizing the Risk Factors for Incidental Durotomy During Spine Surgery: A Matched Cohort Analysis of a Large, Multicenter Dataset

Michael L. Martini, MD, PhD; Sufyan Ibrahim, MBBS; Anthony Mikula, MD; Nikita Lakomkin, MD; Zachary Pennington, MD; Selby Chen, MD; Kingsley Abode-Iyamah, MD; Eric Nottmeier, MD; Maziyar Kalani, MD; W. Richard Marsh, MD; John L. D. Atkinson, MD; William E. Krauss, MD; Michelle J. Clarke, MD; Benjamin D. Elder, MD, PhD; Jeremy L. Fogelson, MD; Mohamad Bydon, MD

Background

Incidental durotomy occurs in up to 17% of spine surgeries and can significantly impact postoperative morbidity, patient-reported outcomes, and resource utilization

Identifying patients at high risk for durotomy is of interest to patients, payors, and physicians

Here we present a matched cohort analyses to identify critical patient- and procedure-specific risk factors associated with incidental dural tears during spine surgery

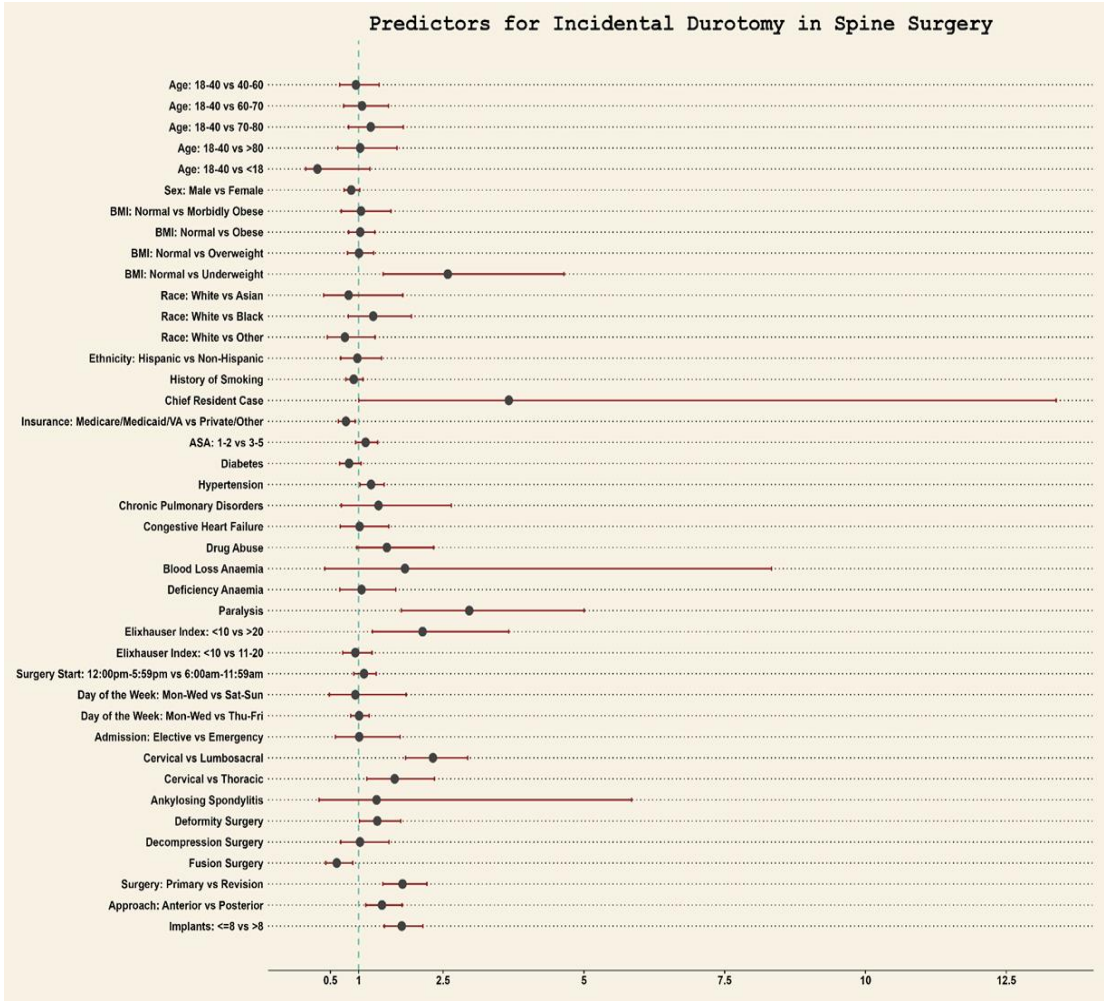
Methods

All patient undergoing neurosurgical spine surgey between January 2018 and July 2023 at a large, multicenter academic institution were identified

Data on baseline demographics and procedural details were gathered and an optimal matching protocol was performed at a 4:1 ratio on 44 baseline variables to create two homogenous cohorts of patients that either did or did not experience intraoperative durotomy

Univariate and multivariate regression analyses were performed to identify independent risk factors of durotomy.

Results



Results

Optimal matching yielded 3,535 patients, of whom 707 experienced a durotomy

On adjusted multivariate logistic regression analysis, patient characteristics independently predictive of durotomy were underweight BMI (OR: 2.58 per kg/m^2, p<0.01), private [versus public] insurance (OR: 0.78, p<0.01), hypertension (OR: 1.22, p=0.03), history of paralysis (OR: 2.95, p<0.01), and total Elixhauser index >20 (OR: 2.14, p<0.01)

Procedure-based factors predictive of durotomy included lumbosacral (OR: 2.32, p<0.01) or thoracic (OR: 1.64, p<0.01) versus cervical procedural level, deformity surgery [versus non-deformity cases] (OR: 1.33, p=0.04), fusion [versus decompression alone] (OR: 0.61, p=0.01), revision [versus index] surgery (OR: 1.78, p<0.01), employing a posterior [versus anterior] approach (OR: 1.41, p<0.01), and placement of >8 implants (OR: 1.77, p<0.01)

Conclusions

Unintentional durotomies appear more common in patients with underweight BMI and higher comorbidity burden

Additionally, revision surgery, placement of implants, and increased surgical complexity appear to be associated with increased risk