Adolescent idiopathic scoliosis case series

2023

The medical records of 129 adolescents (10-18 years old) with AIS undergoing multilevel PSF at a major academic institution from 2013 to 2020 was reviewed. Patients were categorized by IV to oral opioid transition time: normal (≤2 days) vs prolonged (≥3 days). Patient demographics, comorbidities, deformity characteristics, intraoperative variables, postoperative complications, and LOS were assessed. Multivariate analyses were used to determine odds ratios for risk-adjusted extended LOS.

Results: Of the 129 study patients, 29.5% (n = 38) had prolonged IV to oral transitions. Demographics and comorbidities were similar between the cohorts. The major curve degree (P = 0.762) and median (interquartile range) levels fused (P = 0.447) were similar between cohorts, but procedure time was significantly longer in the prolonged cohort (normal: 6.6 ± 1.2 hours vs prolonged: 7.2 ± 1.3 hours, P = 0.009). Postoperative complication rates were similar between the cohorts. Patients with prolonged transitions had significantly longer LOS (normal: 4.6 ± 1.3 days vs prolonged: 5.1 ± 0.8 days, P < 0.001) but similar discharge disposition (P = 0.722) and 30-day readmission rates (P > 0.99). On univariate analysis, transition time was significantly associated with extended LOS (OR: 2.0, 95% CI [0.9, 4.6], P = 0.014), but this association was not significant on multivariate analysis (adjusted OR: 2.1, 95% CI [1.3, 4.8], P = 0.062).

Conclusions: Longer postoperative IV to oral opioid transitions after PSF for AIS may have implications for Length of Hospital Stay [1].

2022

684 pedicles in 57 adolescent idiopathic scoliosis patients aged 10-20 years, who underwent preoperative computed tomography (CT), and had Lenke type 1 or 2 with right convex main thoracic curves (MTC), were evaluated. Pedicle diameters of the MTC were assessed. They defined and compared the region containing two vertebrae adjacent to the apical vertebra (AV) (APEX±1) and the region containing two vertebrae adjacent to the neutral vertebra. They analyzed the pedicle diameter and laterality ratio of APEX±1 and performed multiple linear regression analyses to identify the radiographic factors associated with the laterality of the pedicle diameter.

On the concave side of APEX±1, the pedicles of 15 patients (26.3%) did not accept a 4-mm-diameter pedicle screw (PS), even with 25% cortical bone width expansion. Laterality ratio differences in the pedicle diameters of the cortical bone width in APEX±1 were large in patients with more proximal AV level (p < 0.001) and smaller apical vertebral rotation (AVR) (p = 0.029).

Preoperative planning to accurately select and insert the pedicle screw (PS) in AIS should be based on the anatomical limitations in APEX±1, AV level, and AVR degree. In APEX±1, the correlation between AVR and the laterality ratio of the pedicle diameter may be useful for pathobiological interpretation of the AIS deformity [2].

2020

Parental risk aversion (RA) questionnaires were administered preoperatively to parents of 58 Adolescent idiopathic scoliosis patients undergoing spinal fusion (SF). RA is the likelihood of a parent to consent to their child's SF (1- least likely, 10- most) with increasing allotments of data about potential complications at each stage (S1-complication named, S2-explained, S3-incidence given, S4-all information). A statistically significant mean difference in answers for each stage was assessed using paired sample t test or Wilcoxon rank t test. Normality was assessed by performing Shapiro-Wilk test.

AIS patients (age 14.2 years, 85% female, major curve 61°) were included. Mean scores for each of the stages were 4.4 ± 3.1, 4.9 ± 3.1, 6.5 ± 3.0, 6.6 ± 3.0, respectively. Highest and lowest RA were reported for death and infection, respectively. The greatest increase in likelihood to proceed with surgery was seen after education on malposition of implants and on death, 2.6 and 2.5, respectively ($p < 0.001$). The lowest increase in likelihood to proceed with surgery was seen after education on infection, 1.5 ($p < 0.001$). For all complications, there was an increase in parent willingness to proceed after providing descriptions and occurrence rate with a mean increase from S1 to S4 of 2.1 (95% CI 1.4-2.4), $p < 0.001$.

As more detailed information was made available regarding potential complications with SF for AIS, parental RA toward surgery decreased and their willingness to proceed with surgery for their child improved [3)].

2015

A retrospective study of 77 consecutive cases involving 56 female and 21 male patients with Lenke Type 1 main thoracic curve AIS who underwent single-stage posterior correction and instrumented spinal fusion with pedicle screw fixation between July 2009 and July 2012.

The patients' mean age at surgery was 15.79 ± 3.21 years. All patients had at least 1 year of follow-up.

Radiological parameters in the coronal and sagittal planes, including Cobb angle of the major curve, side-bending Cobb angle of the major curve, thoracic kyphosis (TK), correction rates, and screw density, were measured and analyzed. Screw densities (calculated as number of screws per fusion segment × 2) of < 0.60 and ≥ 0.60 were defined as low and high density, respectively. Titanium rods of 5.5 mm and 6.35 mm diameter were defined as low and high stiffness, respectively.

Patients were divided into 4 groups based on the type of rod and density of screw placement that had been used:

Group A, low-stiffness rod with low density of screw placement

Group B, low-stiffness rod with high density of screw placement

Group C, high-stiffness rod with low density of screw placement

Group D, high-stiffness rod with high density of screw placement.

The mean coronal correction rate of the major curve, for all 77 patients, was (81.45% ± 7.51%), and no significant difference was found among the 4 groups ($p > 0.05$).

Regarding sagittal plane correction, Group A showed a significant decrease in TK after surgery ($p < 0.05$), while Group D showed a significant increase ($p < 0.05$); Group B and C showed no significant postoperative changes in TK ($p > 0.05$).

The thoracic kyphosis (TK) restoration rate was highest in Group D and lowest in Group A (A, -39.32% ± 7.65%; B, -0.37% ± 8.25%; C, -4.04% ± 6.77%; D, 37.59% ± 8.53%). Screw density on the concave side was significantly higher than that on the convex side in all the groups ($p < 0.05$).

For flexible main thoracic curve AIS, both rods with high stiffness and those with low stiffness combined with high or low screw density could provide effective correction in the coronal plane; rods with high stiffness along with high screw density on the concave side could provide better outcome with respect to sagittal TK restoration [4].

1)
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2)
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3)
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