

Does a Preoperative Mental Health Diagnosis Affect Pain Management in Patients with Adolescent Idiopathic Scoliosis Undergoing Surgery?

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INTRODUCTION:

Patients with adolescent idiopathic scoliosis (AIS) are typically treated surgically with posterior spinal fusion (PSF) when the curve continues to progress beyond 45-50 degrees. In the adult literature, studies have shown that preoperative psychiatric diagnoses are associated with poorer clinical outcomes after lumbar spine surgery, including decreased patient-reported quality of life, worse postoperative pain, and failure to return to work after surgery. In addition, idiopathic scoliosis has been shown to be associated with mental health disorders. Despite this, there is a paucity of literature exploring the effect of underlying mental health disorders on postoperative outcomes of children treated for scoliosis. This study aims to address whether a preoperative mental health disorder affects outcomes in patients with adolescent idiopathic scoliosis treated with PSF.

METHODS:

We conducted a retrospective study of pediatric patients (0-18 years) with a history of adolescent idiopathic scoliosis requiring operative treatment with PSF at a single center between Jan 1, 2010 – Jan 1, 2020 with a minimum of 2-year follow up. These patients were split into two groups: a subset who had a preoperative mental health disorder (MHD), and a control group (CG) of those who did not have any such preoperative diagnoses. The MHD subset included patients with anxiety disorder (AD), major depressive disorder (MDD), bipolar disorder (BD), manic disorder (MD), obsessive compulsive disorder (OCD), attention deficit hyperactivity disorder (ADHD), and stress disorder (SD). We collected patient demographic data, operating room data, pain management data, and patient outcomes including complications. The two groups were compared using independent student's t-test and Chi-square analysis.

RESULTS:

A total of 417 patients were included in the study. Ninety-three patients were included in the MHD group, and 324 patients were included into CG. There were 27 patients with AD, 16 with MDD, 6 with BD, 1 with MD, 4 with OCD, 1 with SD, and 58 with ADHD in the MHD group. The mean age of the MHD and CG cohorts were similar (14.6 years and 14.1 years respectively, $p=0.06$). There was a similar amount of male and female patients (69.4% female and 77.1% female respectively, $p=0.12$), and the preoperative major Cobb angles were similar (56.7 deg and 58.8 deg respectively, $p=0.11$) (Table 1).

The mean number of levels fused was also similar between the groups (11.0 levels and 10.9 levels respectively, $p=0.74$). The time spent in the operating room (OR) were similar (400.6 min and 401.0 min respectively, $p=0.94$), and there was similar amount of blood loss during the operation (468.5 cc and 500.3 cc, respectively, $p=0.44$) (Table 2). There was also a similar number of postoperative complications between the two groups (3/93, 3.2% in the MHD group and 5/324, 1.5% in the CG, $p=0.30$).

The complications in the MHD group included a wound dehiscence which healed uneventfully, a superficial infection which was treated with postoperative (PO) antibiotics, and a pleural effusion requiring a chest tube. The complications in the CG included a bladder infection treated with PO antibiotics, 2 superficial wound infections which resolved with PO antibiotics, a pneumothorax requiring a chest tube, and a pleural effusion requiring a chest tube.

The mean pain score (0-10) for the MHD group was greater (3.93) compared to the control group (3.34) ($p=0.01$). The patient-controlled analgesia (PCA) demand during inpatient stay for the MHD group was also greater (236.7) compared to the control group (140.0) ($p=2.7 \times 10^{-6}$). There was no significant difference for length of stay (LOS) in the hospital between the MHD group and CG (4.7 days and 4.6 days, $p=0.22$). However, there was a significantly greater number of patients in the MHD cohort (25.8%) still using narcotic pain medication at first follow up compared to the CG (12.0%) ($p=0.01$) (Table 3).

DISCUSSION AND CONCLUSION:

This study suggests that patients with adolescent idiopathic scoliosis with a preoperative mental health disorder undergoing PSF experience more pain after surgery, and require more pain medication during their recovery. Although this did not appear to affect hospital length of stay, we feel this is valuable information for the surgeon to be able to counsel this cohort of patients preoperatively and set appropriate pain management expectations. Further research will be necessary to determine whether a mental health consultation has any impact on pain management in patients with adolescent idiopathic scoliosis with a preoperative mental health disorder undergoing PSF.

Table 1: Patient Demographics

	Age (Years)	Gender: (% Female)	Cobb Angle (Degree ± SD)
MHD (N=93)	14.6	69.4	56.7 ± 11.4
Control (N=324)	14.1	77.2	58.8 ± 10.6
p-value	0.06	0.12	0.11

Table 2: OR Data

	Time in OR (Min ± SD)	Blood Loss (cc ± SD)	Mean Number of Levels Fused (n ± SD)
MHD (N=93)	400.6 ± 84.0	468.5 ± 317.7	11.0 ± 2.5
Control (N=324)	401.0 ± 86.2	500.3 ± 338.6	10.9 ± 2.2
p-value	0.94	0.44	0.74

Table 3: Pain Data

	Mean Pain Score	Mean PCA Demand	Mean Length of Stay (days)	Patients Using Pain Medication at First Follow-up (%)
MHD (N=93)	3.93 ± 1.63	236.7 ± 259.0	4.7 ± 1.29	25.8
Control (N=324)	3.34 ± 1.51	140.0 ± 138.9	4.6 ± 1.23	12.0
p-value	0.0012	2.8x10 ⁻⁶	0.22	0.002