

Fusion Raises Risk Of Cesarean Section But Not Pregnancy Complications Or Conversion To Cesarean In First-time Mothers With Adolescent Idiopathic Scoliosis

Alexandros F. Pappajohn,¹ Anthony E. Seddio,¹ Om B. Jahagirdar,¹ Rachel X. Shi,¹ Albert H. Lee,¹ Mert O. Bahtiyar,² Jonathan N. Grauer¹
¹Yale School of Medicine, Department of Orthopaedics & Rehabilitation, New Haven, CT
²Yale School of Medicine, Departments of Obstetrics, Gynecology and Reproductive Sciences, New Haven, CT

Financial disclosures/conflicts of interests: JNG is the North American Spine Society Journal Editor-in-chief, Journal of American Academy of Orthopaedic Surgeons Deputy Editor, and former member of the North American Spine Society Board.

INTRODUCTION: Women with adolescent idiopathic scoliosis (AIS) who have undergone posterior spinal fusion (PSF) prior to pregnancy may have altered pregnancy related courses. Therefore, the current study uses a large national database to evaluate AIS patients with or without history of PSF for rates of cesarean (C)-section in addition to maternal and fetal complications in first-time pregnancies.

METHODS: First-time pregnancies in women diagnosed with AIS were identified using the 2010 - Q1 2023 PearlDiver M170 database. Patients were categorized into those without PSF prior (AIS no fusion) and those with prior PSF (AIS fusion). Those without versus with fusion were matched 4:1 based on age and comorbidity burden. Rates of vaginal delivery, conversion to C-section, and C-section were compared using multivariate analyses. Additionally, maternal and fetal complications for both vaginal and C-section deliveries were compared using multivariate analyses.

RESULTS SECTION: In the matched samples (AIS no fusion, n=2,623; AIS fusion, n=656), compared to women without history of PSF, those with history of PSF had lower rate of vaginal delivery and were more likely to deliver by C-section (OR 1.61, p < 0.001), but not more likely to need to convert to C-section. The incidence of complications during pregnancy and delivery were not statistically different between AIS no fusion and AIS fusion groups for either the C-section or vaginal delivery groups.

DISCUSSION: Women with AIS and PSF undergo C-section more often, despite equivalent safety profiles for vaginal delivery. This suggests that higher C-section rates may stem from provider bias, patient counseling, or misperceptions about fusion rather than physiologic necessity.

SIGNIFICANCE/CLINICAL RELEVANCE: PSF does not increase obstetric complications in women with AIS. Orthopedic counseling can reassure patients that vaginal delivery is safe and that elevated C-section rates likely reflect misconceptions rather than physiologic limitations.

IMAGES AND TABLES:

Table 1. Type of 1st pregnancy delivery for AIS patients without versus with history of fusion

	Univariate Analysis			Multivariate Analysis	
	AIS no fusion n = 2,623	AIS fusion n = 656	p-value	Odds Ratio	p-value
Type of Delivery					
Vaginal Delivery	2,143 (81.70%)	482 (73.48%)	< 0.001	0.62 (0.51-0.76)	< 0.001
Conversion to C-section	66 (2.52%)	19 (2.90%)	0.6813	1.56 (0.80-2.97)	0.196
C-section	480 (18.30%)	174 (26.52%)	< 0.001	1.61 (1.32-1.97)	< 0.001

Table 2. Vaginal delivery complications for AIS patients without versus with history of fusion

Category	Complication	AIS no fusion n = 1,928	AIS fusion n = 482	p-value	OR (95% CI)	p-value (OR)
Labor and Delivery Complications	Prolonged Labor	26 (1.35%)	11 (< 2.28%)	0.491	0.61 (0.18-1.98)	0.362
	Obstructed Labor	42 (2.18%)	11 (< 2.28%)	0.407	0.66 (0.27-1.59)	0.316
	Breech or Malpresentation	82 (4.25%)	25 (5.19%)	0.443	1.23 (0.76-1.92)	0.375
Laceration/Hemorrhagic Complications	Abnormal Forces of Labor	86 (4.44%)	25 (5.19%)	0.576	1.17 (0.73-1.83)	0.496
	Perineal Laceration	592 (30.71%)	153 (31.74%)	0.700	1.06 (0.85-1.30)	0.659
	Cervical Laceration	< 11 (< 0.57%)	< 11 (< 2.28%)	1.00	0.80 (0.14-4.90)	0.838
	Postpartum Hemorrhage	82 (4.25%)	23 (4.80%)	0.810	1.14 (0.68-2.30)	0.679
Fetal/Neonatal Complications	Pregnancy Hemorrhage	668 (34.65%)	177 (36.72%)	0.424	1.10 (0.89-1.25)	0.390
	Fetal Growth Restriction	229 (11.88%)	57 (11.83%)	1.00	0.99 (0.72-1.35)	0.974
	Preterm Delivery	307 (15.92%)	76 (15.77%)	0.989	0.99 (0.74-1.30)	0.932
Cord Complications	Cord Complications	127 (6.59%)	40 (8.30%)	0.221	1.28 (0.88-1.84)	0.186
	Placenta Previa	38 (1.97%)	< 11 (< 2.28%)	0.795	0.84 (0.36-1.72)	0.653
Maternal and Placental Complications	Hypertension Complicating Pregnancy	313 (16.23%)	75 (15.56%)	0.771	0.95 (0.72-1.25)	0.715
	Gestational Diabetes	195 (10.11%)	40 (8.30%)	0.265	0.80 (0.55-1.13)	0.226
	Prolonged Pregnancy	304 (15.77%)	76 (15.77%)	1.00	1.00 (0.76-1.32)	1.00
	Maternal Depression and Mood Disorders	48 (2.49%)	11 (< 2.28%)	0.921	0.91 (0.45-1.71)	0.792
	Other Pregnancy Complications	1732 (89.83%)	429 (89.00%)	0.652	0.91 (0.66-1.28)	0.583

Table 3. C-section complications for AIS patients without versus with history of fusion

Category	Complication	AIS no fusion n = 694	AIS fusion n = 174	p-value	OR (95% CI)	p-value (OR)
Labor and Delivery Complications	Prolonged Labor	111 (< 1.59%)	11 (< 6.32%)	0.00	0.97 (0.15-3.94)	0.972
	Obstructed Labor	36 (2.31%)	11 (< 6.32%)	0.257	1.50 (0.53-3.70)	0.408
	Breech or Malpresentation	132 (19.02%)	30 (17.24%)	0.667	0.88 (0.56-1.35)	0.576
Hemorrhagic Complications	Abnormal Forces of Labor	26 (3.75%)	11 (< 6.32%)	0.00	0.90 (0.33-2.08)	0.811
	Postpartum Hemorrhage	34 (2.02%)	11 (< 6.32%)	0.400	1.05 (0.64-1.76)	0.222
Fetal/Neonatal Complications	Pregnancy Hemorrhage	362 (37.75%)	60 (34.48%)	0.477	0.86 (0.68-1.22)	0.405
	Fetal Growth Restriction	109 (15.71%)	34 (19.59%)	0.211	1.38 (0.83-1.98)	0.343
	Preterm Delivery	122 (17.58%)	25 (14.37%)	0.370	0.75 (0.45-1.20)	0.244
Cord Complications	Cord Complications	58 (8.03%)	11 (< 6.32%)	0.621	0.70 (0.26-1.83)	0.461
	Placenta Previa	17 (0.02%)	11 (< 6.32%)	0.21	0.23 (0.03-1.73)	0.154
Maternal and Placental Complications	Hypertension Complicating Pregnancy	390 (27.38%)	37 (21.26%)	0.123	0.71 (0.47-1.05)	0.092
	Gestational Diabetes	12 (1.03%)	2 (0.90%)	0.213	0.54 (0.12-1.16)	0.165
	Prolonged Pregnancy	11 (1.60%)	7 (10.92%)	0.385	0.72 (0.54-1.56)	0.259
	Maternal Depression and Mood Disorders	11 (1.59%)	11 (< 6.32%)	0.201	1.19 (0.74-5.36)	0.428
	Other Pregnancy Complications	439 (72.07%)	111 (66.78%)	0.919	0.55 (0.35-0.95)	0.0282

