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Results of posterior only approach for adolescent idiopathic scoliosis

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Abstract

Introduction: Adolescent Idiopathic Scoliosis (AIS) is most common type of scoliosis which is affecting girls more than boys. Affecting children between age 10 to 18. AIS curves progress during rapid growth period of child. Located usually at thoracic level and involves right convex curve. Due to cosmetic reasons, pain and in some cases due to neurological involvement such cases need operative involvement. In this study involves 20 such patients operated with posterior spinal approach and fixation for the same and followed up for one month for radiographic and clinical outcomes.

Materials and Methods: 20 patients out of which 5 male and 15 female with AIS were managed with posterior spinal pedicle screws instrumentation and follow-up with various criteria regarding its outcomes such as postoperative pain relief, Cobb's angle, average screws insertion, average level of fixation, mean duration of surgery, blood loss, and post-operative complications such as neurological deficit, infection or implant failure.

Results: In this study which was done on 20 patients. Most common type of Lenke's curve is Type-1. Average Pre-operative VAS score was 8.5 that reduced to 1.9 Post-operative. Average Pre-operative Cobb's angle in all patients was 57.15 which is average 11.65 post-operative, after 1 year of follow-up average Cobb's angle was 17.2 degrees. So average loss in correction after 1 year is 5.55. Average screw needed in this fixation is 15.6. Range minimum of 12 to maximum 19 screws required in fixation. In all 20 patients average 1.35 screws were fixed per level vertebrae. So basically, it is low density pedicle screw fixation. Average duration of surgery time is mean 6 hours 25 minutes. Range from minimum of 5 hours to max 9 hours. Mean age was 16.1. Mean blood loss was 773.5 mL. One patient developed post-operative neurological deficit which progressively recovered within six months, no other significant complication in any patient was observed.

Conclusion: Based upon the results obtained from this review of 20 patients of AIS with minimum one year of follow-up we suggest that the all-screw method is efficient and safe.

The outcomes in three-dimensional correction are satisfactory and comparable.

The curve maintenance is good with minimal loss of correction. Compared with age-matched healthy populations, these patients did present some limitations on their physical health, as assessed by the SRS-30 questionnaire.

Keywords: Adolescent idiopathic scoliosis (AIS), SRS (scoliosis research society), posterior pedicle screws fixation, kyphosis

Introduction

Adolescent idiopathic scoliosis (AIS) is the most common type of scoliosis. AIS is defined as a scoliosis that starts after the age of ten. Affecting children between ages 10 to 18; it's found in as many as 4 in 100 adolescents. The aim of present study is to compare the clinical, radiological and functional outcome of posterior only surgical approach in patients with adolescent idiopathic scoliosis.

Objectives

To study surgical management of Adolescent idiopathic scoliosis by comparing different patients operated with posterior approach in terms of

1. Neurological deficit
2. Operative time and blood loss
3. Deformity correction

4. Return to work
5. Fusion status
6. Functional outcome.

Materials and Methods

Between 2015 to 2018 series of 20 patients having AIS were operated with posterior only instrumentations and were followed for mean duration of one year.

Type of Study

Comparative prospective and retrospective study. (Level 2)

Inclusion Criteria

Adolescent idiopathic scoliosis.
Posterior only approach.
Fixation with pedicle screws.
Patients with no neurological deficit.
Non progressive curves.
Preoperative Cobb's angle >40 degree.
Age at surgery between 10-20 years

Exclusion Criteria

Patients with Congenital scoliosis
Patients with Adult scoliosis
Patient with degenerative & dysplastic scoliosis
Patient operated with Harrington rod or hooks
All patients were followed up with various clinical and radiological parameters for one year of durations. Criteria were post-operative pain relief, Cobb's angle correction, instrumentations related analysis, duration of surgery, osteotomy level, average blood loss, neurological assessment and post-operative complications if any.

Results

20 patients were included in this study out of this 5 were males and 15 were females suggests that AIS is more common in females as compare to male. Average age of patients were 16.1. Most common type of lenke's curve in our study is Type 1. In almost all patients post operatively pain relief seen. We used VAS scoring system for pain notification. Average Pre-operative VAS score was 8.5 that Reduced to 1.9 Post-operative. All patients examined and inquired according SRS (scoliosis research society)-30 system. Best is 5 and worst is 1. Preoperative average score was 1.7 which improved to 3.9 post-operative and upto 4.2 at 1 year of followup. In our patient almost all patients having normal thoracic kyphosis ranging from 10 to 40 degrees. Average Pre-operative Cobb's angle in all patients were 57.15 which is average 11.65 post-operative, after 1 year of follow-

up average Cobb's angle were 17.2 degrees. So average loss in correction after 1 year is 5.55. In our study numbers of vertebral level fixations range from minimum 8 to maximum 14. Average is 11.6. Average screw needed in this fixation is 15.6. Range minimum of 12 to maximum 19 screws required in fixation. In all 20 patients average 1.35 screws were fixed per level vertebrae. So basically, it is low density pedicle screw fixation. In 4 patients osteotomy at different level needed, we did Ponte osteotomy of average 4 level in this patients. Average duration of surgery time is mean 6 hours 25 minutes. Range from minimum of 5 hours to max 9 hours.

Discussion

This is a prospective study of 20 patients having adolescent idiopathic scoliosis and was operated and observed in between 2015 to 2018 in civil hospital Ahmedabad. All patients having normal neurology pre operatively and not having any associated congenital anomaly or disease. Having average preoperative coronal plane Cobb's angle 57.5 degrees and after correction it is 11.65 and at one year follow-up it is 17.2 degrees. Intraoperative neuromonitoring were used. Two patients show intraop decrease in SSEP and out of it one patient developed post-operative neurological deficiency and it required 6 months to complete recovery. No patient having any implant failure of back out. And no patient having post-operative significant infection that required active management. Significant improvement in SRS-30 score

Conclusion

Based upon the results obtained from this review of 20 patients of AIS with minimum one year of follow-up we suggest that the all-screw method is efficient and safe. The outcomes in three-dimensional correction are satisfactory and comparable. The curve maintenance is good with minimal loss of correction. Compared with age-matched healthy populations, these patients did present some limitations on their physical health, as assessed by the SRS-30 questionnaire.

Case Discussion

Case 1

A 15 year old Female patient having scoliotic deformity of back and having complain of back pain. Patient having normal neurology and having no any other complain. We did radiographic investigations in terms of Xrays, CT scan and MRI. Pre-operative coronal plane Cobb's angle was 54 degrees.





Pre-Operative Clinical Pictures and X-rays



Post-operative X-rays Cobb's angle reduced to 24 degrees.

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