Original Article

Comparison of one-stage anteroposterior and posterior-alone hemivertebrae resection combined with posterior correction for hemivertebrae deformity

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Abstract

Background: The surgical technique of hemivertebrae excision varies from anteroposterior procedures to posterior-alone resections according to the experience and preference of surgeons. Both the approaches are reliable and give relatively good results. This study aims to evaluate and compare the clinical and radiological results of these two approaches for hemivertebrae resection.

Materials and Methods: Sixty patients were retrospectively enrolled between 2006 and 2009. The subjects included 32 women and 28 men, with a mean age of 12.9 years (range: 5–24 years). Thirty patients who underwent one-stage anteroposterior hemivertebrae resection (the AP group) were followed for 38.5 months, and the other 30 patients who underwent posterior resection (the P group) were followed for 20.6 months. Clinical and radiological assessments were performed preoperatively, 1 week postoperatively, and at the final follow-up. The operation time, blood loss, degree of correction of the main curve/segmental curve/kyphosis, the average hospital stay, and complications were reviewed and compared between the two groups.

Results: The mean operation time, blood loss, and hospital stay of the AP group and the P group were 451 min vs 248.5 min, 1290 ml vs 910 ml, and 21.93 days vs 18.97 days, respectively ($P<.05$). The average correction rate of the main curve/segmental curve/kyphosis of the AP group and the P group was 68.5% vs 66.2%, 71.5% vs 69.6%, and 57.4% vs 56.1%, respectively ($P>.05$). Overall complication rate was 6.7% in the AP group vs 10% in the P group ($P>.05$).

Conclusion: Posterior hemivertebrael resection is a promising approach for congenital scoliosis in terms of relative safety, degree of correction achieved, reduced operative time and blood loss.

Key words: Hemivertebrae deformity, hemivertebrae resection, anteroposterior resection, posterior resection.

Introduction

Vertebral deformity causing congenital scoliosis may be caused by a failure of vertebral formation and vertebral segmentation or by a combination of both these factors.[1] Complete failure of vertebral formation results in a hemivertebrae, which is the most familiar cause of congenital scoliosis. The hemivertebrae has growth potential similar to normal vertebra and this growth can lead to an unbalanced trunk. Surgical treatment is required in most cases with curve progression. There are four basic methods available to the surgeon treating congenital scoliosis: Posterior fusion, combined anterior and posterior fusion, convex growth arrest, and excision of the hemivertebrae.[2-6] Of these, hemivertebrae excision is the most reasonable plan because, in contrast to the other three techniques, it can correct the deformity directly and thus allows reliable correction immediately. The surgical technique of hemivertebrae excision varies from anteroposterior procedures to posterior-alone according to the experience and preference of the surgeon. Both the approaches seem to be reliable and give relatively good results. We are aware of few studies that have focused on comparing the anteroposterior and posterior alone approach for hemivertebrae resection. The goal of this study is to compare the clinical and radiological results of these two approaches for hemivertebrae resection.

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Materials and Methods

Between 2006 and 2009, 60 consecutive cases of congenital scoliosis were enrolled for hemivertebrae resection in our hospital. Cases in this retrospective study were assigned into two groups: Anteroposterior approach group (AP group; n=30) [Table 1] and posterior approach group (P group; n=30) [Table 2]. The surgical approach was selected according to the progression of surgical skills and methods. The AP method was used in patients operated earlier (form March 2006 to January 2008) while the P method was used in patients operated more recently (form January 2008 to August 2009). In the AP group, 21 cases had a single progressive hemivertebrae and 9 cases had two progressive hemivertebrae. Among these 5 cases had an associated contralateral bar (3 lateral bars and 2 anterolateral bars), that comprised up to 12 segments; 5 cases had rib synostosis (11 ribs were involved in). In the P group, 28 cases had a single progressive hemivertebrae and 2 cases had two progressive hemivertebrae. Among these 7 cases had an associated contralateral bar (3 lateral bars and 4 anterolateral bars), that comprised up to 16 segments; 4 cases showed rib synostosis (n=8).

In all, 68 hemivertebrae were operated upon out of which 53 were fully segmented and 15 were semisegmented. There were 15 thoracic hemivertebrae (T1-T9), 36 in the thoracolumbar region (T10-L2), and 17 in the lumbar region (L3-L6). Twenty-eight patients showed associated anomalies: Eighteen in the spine, four in the central nervous system, four in the cardiopulmonary system, and one in the genitourinary system; two patients had Goldenhar syndrome [Tables 1 and 2]. To assess intraspinal anomalies, magnetic resonance imaging (MRI) was performed for all patients. This detected one case of syringomyelia and three of tethered cord. These four cases underwent our surgical management without neurosurgical treatment. The neural function of one of these patients (patient 21 in the AP group) improved to nearly normal level. A 7-year-old girl (patient 16 in the P group) underwent a diastematomyelia resection by a neurosurgeon in the same operation.

Operative procedure

Three surgical patterns were used in the AP method (n=30): Sternotomy for resection of upper thoracic hemivertebrae (n=2), thoracoscopy combined with another small

Table 1: Clinical data of the AP group

Sex	Age (yr)	Hemivertebrae	Instrumentation	Segmentation	Bar	Associated anomalies
M	16	T11	USS pediatric	Segmented		(-)
M	18	T12	USS pediatric	Segmented		(-)
F	13	T10	CD M8 pediatric	Segmented		(-)
M	22	T11 and L2	CD M8 pediatric	Semisegmented	(+)	Hemivertebrae T4; rib synostosis
F	16	T10	CD M8 pediatric	Segmented		(-)
M	11	T12 and L5	CD M8 pediatric	Semisegmented		Rib synostosis
M	12	L1	CD M8 pediatric	Segmented		(-)
M	15	T9 and T10	CD M8 pediatric	Segmented		(-)
F	14	T9 and T10	CD M8 pediatric	Semisegmented	(+)	Rib synostosis
F	12	T4 and T7	CD M8 pediatric	Semisegmented		Several other vertebral anomalies
F	14	L3	CD M8 pediatric	Segmented		(-)
F	9	T6	CD M8 pediatric	Segmented		No lamina in T8
F	13	T8 and T11	CD M8 pediatric	Semisegmented	(+)	6 lumbar vertebrae; rib synostosis
F	11	T12	CD M8 pediatric	Segmented		(-)
M	13	T12	CD M8 pediatric	Segmented		(-)
F	10	L3	CD M8 pediatric	Semisegmented		Tethered cord
F	17	T6	CD M8 pediatric	Segmented		(-)
M	6	T10	CD M8 pediatric	Segmented		Butterfly vertebrae; syringomyelia Paraparesis. Babinski+;tetralogy of Fallot
F	13	L3	CD M8 pediatric	Segmented		(-)
F	24	T10	CD M8 pediatric	Segmented	(+)	(-)
M	16	L1	CD M8 pediatric	Segmented		Tethered cord
F	12	L2 and L3	CD M8 pediatric	Segmented		Several other vertebral anomalies
M	15	T10	CD M8 pediatric	Semisegmented		(-)
F	14	T10	CD M8 pediatric	Semisegmented		(-)
F	15	L3	CD M8 pediatric	Segmented		(-)
M	15	T7	CD M8 pediatric	Segmented		Goldenhar syndrome
F	16	T7	CD M8 pediatric	Semisegmented	(+)	Rib synostosis
F	9	T11	CD M8 pediatric	Segmented		Atrial septal defect; bronchopulmonary dysplasia
M	7	T10 and T12	CD M8 pediatric	Segmented		Butterfly vertebrae; spina bifida
M	11	T11 and L1	CD M8 pediatric	Segmented		L3 and L4laminae fused

Table 2: Clinical data of the P group

Sex	Age (yr)	Hemivertebrae	Instrumentation	Segmentation	Bar	Associated anomalies
M	10	L2	USS pediatric	Segmented		(-)
F	24	L4	USS pediatric	Segmented		(-)
F	13	T4	MOSS Miami	Segmented		Rib synostosis; T3 and T4 laminae fused
M	12	T10	MOSS Miami	Segmented	(+)	Hemivertebrae T2
M	6	L1	USS pediatric	Segmented		(-)
M	5	T11	CD M8 pediatric	Segmented	(+)	(-)
F	12	T12	CD M8 pediatric	Segmented		(-)
M	17	L4	CD M8 pediatric	Semisegmented		(-)
F	13	T11	CD M8 pediatric	Segmented		(-)
F	12	T7	CD M8 pediatric	Semisegmented	(+)	Rib synostosis
F	12	T5	CD M8 pediatric	Segmented		(-)
M	14	L3	CD M8 pediatric	Segmented	(+)	(-)
M	12	T5 and T9	CD M8 pediatric	Segmented		L3 and L4 laminae fused
M	8	T4	CD M8 pediatric	Semisegmented		Atrial septal defect
F	8	L3	CD M8 pediatric	Segmented		T10 and L5 vertebrae wedged
F	7	L3	CD M8 pediatric	Segmented	(+)	Spina bifida, diastematomyelia
F	13	L3	CD M8 pediatric	Segmented		(-)
M	17	L4	CD M8 pediatric	Segmented		Tethered cord
F	20	L4	CD M8 pediatric	Segmented		(-)
F	9	T4	CD M8 pediatric	Segmented		Goldenhar syndrome
M	10	T11	CD M8 pediatric	Segmented		(-)
F	6	L2	CD M8 pediatric	Segmented	(+)	Butterfly vertebrae
M	5	L3	CD M8 pediatric	Segmented		(-)
F	6	T10 and L2	CD M8 pediatric	Segmented		Klippel-Feil syndrome; L4 spondylolisthesis; rib synostosis
F	11	T10	CD Legacy pediatric	Segmented		Rib synostosis
M	5	L1	CD M8 pediatric	Segmented		(-)
M	12	T10	CD Legacy pediatric	Segmented		(-)
F	11	L2	CD Legacy pediatric	Semisegmented	(+)	Left side renal agenesis
M	13	L3	CD M8 pediatric	Segmented		(-)
M	6	T10	CD M8 pediatric	Segmented		(-)

incision for the lower thoracic hemivertebrae (n=21), and lumbotomy for L1-L5 hemivertebrae (n=7). In the AP approach, the patient was laid in the lateral position (supine position for sternotomy). The hemivertebrae was identified first and its body, pedicle, and upper and lower discs were excised. Then a titanium cage padded with autogenous bone had been imbedded in the interspace as a strut. The patient was then moved into the prone position and a posterior incision was made to excise the posterior elements, including the hemilamina, transverse processes, and the facet joints. Pedicle screws were placed into the upper and lower vertebrae. Deformity correction was obtained by compressing the pedicle screws on the convex side. Specific fixation and fusion segments were determined preoperatively, according to the main curve and the location of the hemivertebrae.

Thirty patients underwent the P approach. All patients were positioned prone on the Relton-Hall four-poster frame, with the abdomen relieved of all pressure. The posterior aspects of the fusion range were exposed first and the posterior elements of the hemivertebrae were identified. After pedicle screws were inserted, the posterior elements of the hemivertebrae were removed. The spinal cord and nerve roots above and below the pedicle of the hemivertebrae were identified. In the thoracic spine, the rib head and the proximal part of the surplus rib at the convex side were resected. The lateral and anterior parts of the hemivertebrae were exposed by blunt dissection. This exposure was retroperitoneal in the lumbar spine and extrapleural in the thoracic spine. The remnants of the pedicle were removed and the posterior aspect of the vertebral body of the hemivertebrae was exposed. The discs adjacent to the hemivertebrae were cut and the hemivertebrae body was mobilized and removed. The rest of the disc material was removed completely, with debridement of the vertebral endplates. Care was taken to make sure that this meticulous disc removal extended to the contralateral side. In cases of severe kyphosis (exceeds 40 degrees), an anterior column support using a titanium mesh cage was added to create a fulcrum to achieve lordosis. The instrumentation was completed and compression was applied on the convex side until the gap closed completely. Cancellous bone from the hemivertebrae resection was added to facilitate bony fusion. We ensured that the neural structures were protected through out the resection of the hemivertebrae as well as during the corrective process.

In cases of single hemivertebrae without bars, rib synostosis, or other major structural changes of the neighboring vertebrae, only the two vertebrae adjacent to the hemivertebrae were fused. If a high amount of compressive force was necessary to correct the deformity, especially in cases with marked kyphosis, one or two additional segments were included into the instrumentation to avoid overloading of the pedicles with subsequent pedicle fracture. In patients with contralateral bar and rib synostosis, the proximal parts of the synostosed ribs on the concave side were removed and the bar was cut. In these cases, an additional approach at the concave side of the synostosed vertebrae was performed as well. The joint facets of the synostosed vertebrae were removed, and the nerve root was identified. The transverse processes and the proximal parts of the ribs, including the rib heads, were resected, and the lateral aspect of the synostosed vertebrae was exposed by blunt dissection. Because the spinal cord was usually displaced toward the concavity, a spacious rib resection was required to allow a very oblique access to the concave lateral wall of the spine. Permanent visualization of the spinal cord was indispensable. The bar was then osteotomized to achieve the mobility that was necessary for correction. Depending on the length of the bar formation and the required osteotomies, the fusion was then extended with segmental instrumentation to the adjacent vertebrae.

Radiographs of the whole spine (standard standing posteroanterior and lateral radiographic views) were taken preoperatively; postoperatively at 1 week, 3 months, 6 months and annually thereafter. Three-dimensional CT scan of the affected spinal segment was taken preoperatively to display the structure of the hemivertebrae clearly and MRI of the spine was taken preoperatively to reveal whether or not there is coexisting congenital spinal cord deformity. All the radiographs were measured independently by two members of our group. The radiographic details of the typical cases of the two groups are shown in Figures 1a-d and 2a-d.

The Scoliosis Research Society-22 (SRS-22) questionnaires[7] were translated into Chinese and filled in by the patients' parents on the day before surgery, the day of discharge, and at every follow-up visit. The SRS-22 questionnaire contains five parts, which include 22 questions and give a maximum score of 110.

All patients underwent a systematic physical examination of the spine before and after surgery and at the follow-up visits. The main curves, the segmental curves, and the segmental kyphosis were measured from the radiographs by the Cobb's technique.[8,9] The status of the instrumentation was also evaluated and categorized *in vivo* as in place and stable, loose and removed. The operative time, blood loss, the length of stay, degree of correction of the curves, and complications were recorded accurately.

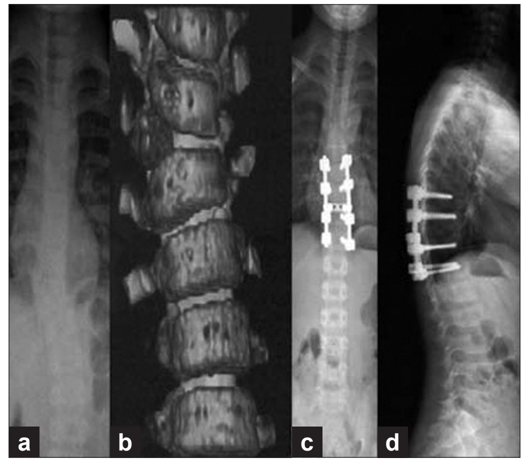

Figure 1: A 6-year-old boy of AP group who underwent hemivertebrae resection of T10: (a) Preoperative anteroposterior X-ray showing hemivertebrae T10; (b) preoperative three-dimensional CT scan showing hemivertebrae T10; (c,d) postoperative anteroposterior and lateral X-rays showing good correction

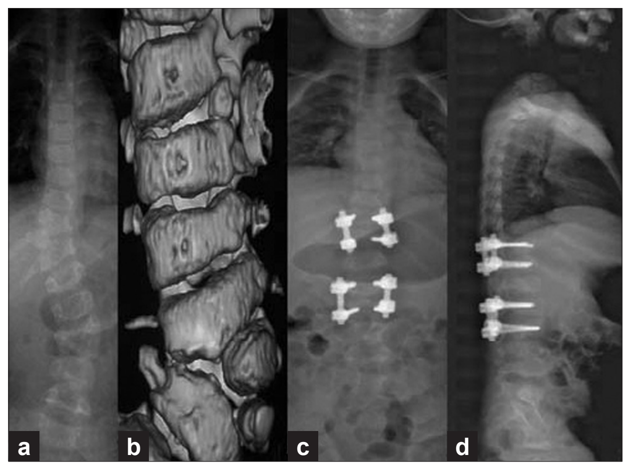

Figure 2: A 6-year-old girl of P group who underwent hemivertebrae resection of T10 and L2: (a) Preoperative anteroposterior X-ray showing hemivertebrae L1; (b) preoperative three-dimensional CT scan showing hemivertebrae L1; (c,d) postoperative anteroposterior and lateral X-rays showing good correction

Statistical analysis was performed with the Mann-Whitney U test and the kappa test using SPSS® v 17.0. $P \leq .05$ was considered as indicating statistical significance. The Pearson correlation test was used to compare parameters such as preoperative scoliosis degree, surgical time, intraoperative blood loss, and hospital stay in the two groups.

Results

In the AP group, 19 patients presenting with a short-segmented deformity underwent localized correction and segmental fusion, 8 underwent a longer instrumentation and fusion, and 3 underwent growing rod placement. In the P group, 21 patients underwent localized correction and segmental fusion, 5 underwent a longer instrumentation and fusion, and 4 underwent growing rod placement. The average intraoperative blood loss was 1290 ml in the AP group and 910 ml in the P group (P=0.023). The average operation times were 451 minutes and 248 minutes in the AP group and the P group, respectively, (P=0.001). The average hospitalization time was 21.93 days and 18.97 days in the AP group and the P group, respectively (P=0.028). The differences between two groups were statistically significant [Table 3]. The results of the Pearson correlation test showed that there was no significant correlation between the preoperative main curve and the other three parameters (operation time, blood loss, and hospital stay) in the two groups [Table 4].

The preoperative average main curve of the AP group (58.1° ± 14.9°) was more than that of the P group (44.6° ± 13.6°) (P=0.0003). The preoperative segmental curve and kyphosis of the AP group were similar to that of the P group (P=0.060 and P=0.491, respectively). At the final follow-up, the average degree of correction of the main curve was 68.5% in the AP group and 66.2% in the P group (P=0.413) and the average degree of correction of the segmental curve was 71.5% in the AP group and 69.6% in the P group (P=0.211). Only seven patients in the AP group and five in the P group had radiographically abnormal spinal kyphosis before surgery; however, at the final follow-up all patients ended up having normal kyphosis. The average degree of correction of the kyphosis was 57.4% in the AP group and 56.1% in the P group (P=0.875). Radiographic spinal fusion was evident in all patients, and the corrective effects were satisfactory during the follow-up without any loosening, rupture, failure/breakage and displacement of the internal fixator [Table 3].

The mean total SRS-22 scores tended to be similar immediately after surgery in both groups: 81.8 in the P group (range: 67–95) vs 81.4 in the AP group (range: 62–97) (P=0.322). At the final follow-up, the total scores were 93.3 (range: 82–102) for the AP group vs 91.9 (range: 80–103) for the P group (P=0.265). The five main domains of the SRS-22-questionnaire are shown in Figure 3a and b.

The overall complication rates were 6.7% (2/30) in the AP group and 10% (3/30) in the P group (P=0.32). In the AP group, there was one superficial wound infection in the posterior exposure wound and one hemothorax 2 days after operation. The infection resolved with daily dressing and intravenous antibiotics and the hemothorax resolved with closed drainage of the pleural cavity. In the P group, one patient had intrapleural effusion and superficial wound infection which resolved with drains and antibiotics. One patient had L2 radiculopathy (patient 20) and one patient had L3 radiculopathy (patient 22) [Table 3], which included

Table 4: The results of the Pearson correlation test comparing parameters in the two groups

	Operation time		Blood loss		Hospital stay	
	AP	P	AP	P	AP	P
Main curve preoperative						
Pearson correlation (R value)	0.339	0.197	0.238	0.118	0.087	0.013
P-value, two-tailed	.067	.298	.205	.535	0.648	0.945
n	30	30	30	30	30	30

Correlation is significant at P=0.01 level (two-tailed)

Table 3: Clinical and radiographic outcomes and complications of the two groups

	AP group	P group	*P* value
No. of cases (n)	30	30	
Mean age at surgery (year)	13.90 ± 3.56	11.97 ± 7.13	0.095
Mean follow-up time (month)	38.5 (range: 22–50)	20.6 (range, 14–28)	
Main curve preoperative (°)	58.1 ± 14.9	44.6 ± 13.6	0.0003
Main curve at final follow-up (°)	16.2 ± 7.1	13.4 ± 6.6	0.059
Correction of the main curve (%)	68.5 ± 11.18	66.2 ± 10.82	0.413
Segmental curve preoperative (°)	52.5 ± 20.4	40.2 ± 28.6	0.060
Segmental curve at final follow-up (°)	14.4 ± 12.6	11.5 ± 11.4	0.354
Correction of the segmental curve (%)	71.5 ± 23.4	69.6 ± 20.6	0.211
Main kyphosis preoperative (°)	46 ± 24.5	36.4 ± 20.4	0.491
Main kyphosis at final follow-up (°)	17.6 ± 5.6	15.6 ± 4.8	0.456
Correction of the kyphosis (%)	57.4 ± 17.75	56.1 ± 8.81	0.875
Operation time (min)	451 ± 93.17	248.5 ± 72.99	0.001
Blood loss (ml)	1290 ± 547.51	910 ± 701.77	0.023
Hospital stay (day)	21.93 ± 6.48	18.97 ± 5.33	0.028
Complication	Superficial wound infection (patient 12) hemothorax (patient 19)	Cerebrospinal fluid leakage and wound infection (patient 9); L2 radiculopathy (patient 12); L3 radiculopathy (patient 16)	
Overall complication rate	6.67% (2/30)	10% (3/30)	0.64

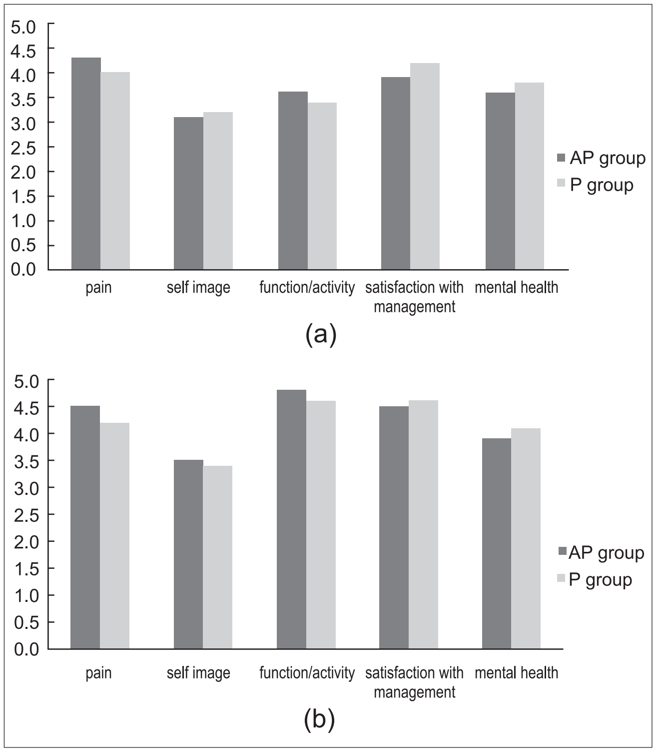

Figure 3: (a) Postoperative results of SRS-22. (b) Final follow-up results of SRS-22. The results of the five domains of SRS-22 were similar between the two groups (*P*>.05). The most significant improvement during the follow-up can be found in function/activity and mental health

numbness of the right thigh and atrophy of the right quadriceps muscle; the nerve root irritation resolved with conservative treatment, and the two patients were fully relieved of their symptoms at discharge. During the follow-up period, no implant failures were observed and no serious or permanent neurologic complications occurred. The preoperative neurological evaluations revealed that two patients in the AP group had pre-existing neurological deficit of lower extremities. One had incomplete paralysis of both legs (patient 18) and the other had incomplete paralysis of the left leg (patient 21). The neurological function of the former was unchanged after surgery, while that of the latter improved to nearly normal level.

Discussion

Congenital spinal deformities occur as a result of abnormal and unbalanced vertebral development.[10,11] Segmental and semisegmental hemivertebrae are the most frequent cause of congenital scoliosis because they have the same growth potential as normal vertebra and can create wedge-shaped deformities, which progress with further spinal growth. The natural history of congenital scoliosis has been well described by previous investigators.[12-15] Conservative treatments, including bracing, usually have been unsuccessful in preventing progression of the spinal deformity, and surgical treatment is necessary for most cases with curve progression.[5,16] The primary goal of surgical intervention of congenital scoliosis is to halt curve progression and correct the deformity. Hemivertebrae resection was first reported in 1928 by Royle[17] in Australia and it has been the predominant form of surgery for congenital scoliosis during the last decade.[18-20]

Numerous authors have reported hemivertebrae resection done through a one- or two-stage anteroposterior approach or through a posterior approach alone.[12,18-22] In the studies on the AP approach, the degree of correction for the main curve ranged from 24.3% to 71.1%.[12,21-26] The mean degree of correction of the main curve of the AP group in our study was 68.5%, which is consistent with the findings of the previous studies. In the P group, our degree of correction of the main-curve was 66.2%, which is similar to the findings of previous studies, such as that of Shono and Hedequist *et al*., where it varied from 64% to 82%.[18,19,22,27,28] The segmental curve measurements regarding the anteroposterior approach have been presented at the study of Bollini *et al*.[21] They had a mean segmental correction of 68%, which was slightly lower than our result of 71.5% in the AP group and 69.6% in the P group. In our study, the mean kyphosis curve at the final follow-up were 17.6° in the AP group and 15.6° in the P group and the degree of correction were 57.4% and 56.1%, respectively. Our results are similar to that of other studies, where kyphosis corrections have varied from 0°–23° with the AP method and 0°–45° with the P method.[12,18-20,23,27,28]

In our study, the mean preoperative main curves tended to be greater in the AP group than in the P group. The results of the Pearson correlation test showed that this difference had no influence on the operative results of the two groups. There were more fully segmented hemivertebrae and preoperative neurological symptoms in the AP group. The mean follow-up time of the AP group is somewhat longer than that of the P group, which is because the AP approach was followed earlier (since June 2006) and the P approach was followed more recently (since April 2008) in clinical practice. Our mean operative time were similar to that reported in other studies, which is approximately 300–420 minutes on average in AP studies and 240–360 minutes in P studies.[12,18-21,24,28] In the earlier studies, intraoperative blood loss with the posterior approach (600 ml on average) has been higher than with the anteroposterior approach (300 ml on average).[12,18-20,24,27,28] In our study, total blood loss was comparatively higher in the two groups but, in contrast to other studies, the blood loss of the P group was significantly lower than that of the AP group. This seems to relate to the single incision and the lesser tissue trauma in the posterior approach. The SRS-22 questionnaire was designed for the evaluation of health-related quality of life of adolescent idiopathic scoliosis patients.[7] The SRS-22 scores in our study revealed that the immediate postoperative subjective satisfaction tended to be better in the P group. The reasons can be easily discovered. For example, the thoracic hemivertebrae excision with the anteroposterior approach requires additional measures, such as thoracotomy or sternotomy, which needs postoperative pleural drainage; this process in the AP group seems to be more painful than P method. However, the SRS-22 questionnaire revealed that, overall, the health-related quality of life of the patients in the P group was similar to that of patients in the AP group.

In previous studies, the surgical complications have been similar in the two methods, varying from 0% to 29%. However, in the most recent studies, complications with the anteroposterior approach were less (approximately 9% on average) than with the posterior approach (approximately 14%).[2,12,19-23,26-28] In our study, two patients in the P group had temporary neurological complications, which resolved within 3 months with conservative treatment and did not require any additional surgical procedure. Implant failure has been found in several studies that have adopted segmental instrumentation using pedicle screw fixation.[19,22] In the current study, all patients were braced for 3–6 months after surgery and we did not therefore encounter any implant failures. In our study, the mean complication rate of the P group (approximately 10%) is little higher than that of the AP group (approximately 6.67%), but the difference has no statistical significance.

Although it is an old surgical method, the anteroposterior technique offers several advantages, for example, the circumferential exposure of the spine, complete excision of the discs above and below the hemivertebrae, and satisfactory degree of correction. In recent years, the posterior approach has been gradually adopted by some surgeons. Many authors have reported good results with the posterior approach and, as a result, it is showing a tendency to replace the anteroposterior approach. The debate is now on about which one is the optimal method. We found few studies that have focused on comparing these two main approaches. Therefore, we conducted this retrospective analysis of patients who were treated at our hospital. Patients of the two groups had good homogeneity such as mean age and mean preoperative curve [Table 3]. All the operations have been performed by the same four surgeons, and all surgeons had similar clinical experience. This study shows that although the anteroposterior approach affords excellent visualization and satisfying correction, the operative time tends to be longer because of the need to reposition and drape the patient.

Conclusion

The posterior approach is a demanding procedure that may be safely performed by an experienced surgeon. It is less time-consuming and is associated with less blood loss than the anteroposterior approach. It is also nearly as safe as the anteroposterior approach and has a comparable degree of correction. Further, it is a better surgical approach for congenital scoliosis when compared with the anteroposterior approach.

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