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SURGICAL RESULTS OF PARASPINAL APPROACH IN SPINAL DEFORMITY CASES

SPINAL DEFORMITELI OLGULARDA PARASPINAL YAKLAŞIM SONUÇLARI

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ABSTRACT:

In spinal deformity a midline approach to the spine is associated with increased bleeding and operation time. Exposure of deep muscle layers in lumbar spine leads to extensive tissue damage and blood loss. To our best knowledge there has been no study about using paraspinal approach in spinal deformity cases. Eleven patients with adolescent idiopathic scoliosis underwent posterior instrumentation and fusion. Paraspinal approach was used for the lumbar exposure, instrumentation and fusion.

Mean blood loss and mean time was 106,8cc (range; 65-200cc) and 35,1(range; 25-55 min) for paraspinal part of the surgeries respectively. Mean correction rate of Cobb angle was 70%.

In conclusion, paraspinal approach can be used for long segment arthrodesis as well as deformities including lumbar spine.

Key words: *paraspinal approach, scoliosis, Wiltse, fusion*

Level of evidence: *Retrospective clinical study, Level III*

ÖZET:

Skolyoz gibi spinal deformitelerin cerrahisinde standart olarak kullanılan orta hat yaklaşımı ciddi kas ve ligaman hasarı ve kan kaybı ile beraber seyredebilir. Bu güne kadar paraspinal yaklaşımın kısa segment artrodezlerinde veya enstrümansız dekompresyon vakalarında kullanıldığına dair yayınlar bulunsa da bu açılımın skolyoz cerrahisinde kullanımı ile ilgili bir çalışma bulunmamaktadır.

Çalışmamızda adölesan idiopatik skolyozu bulunan ve posterior enstrümantasyon ile füzyon uygulanan 11 hasta dâhil edildi. Lomber bölge açılımı, enstrümantasyonu ve füzyon uygulaması için paraspinal yaklaşım kullanıldı. Paraspinal yaklaşım sırasındaki kanama miktarı ve cerrahi sure sırası ile 106,8ml ve 35,1 dakika idi. Cobb açısına göre düzelme oranı % 70 olarak hesaplandı.

Sonuç olarak günümüze kadar yapılan çalışmaların dışında paraspinal yaklaşımın lomber omurgayı içine alan deformiteler gibi uzun segment artrodezi için kullanılabileceğini düşünüyoruz.

Anahtar kelimeler: *Paraspinal yaklaşım, skolyoz, Wiltse, füzyon*

Kanıt seviyesi: *Retrospektif klinik çalışma, Düzey III*

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INTRODUCTION:

Various types of surgical approaches to the posterior spine have been proposed [6-7,10,14,17]. The single midline approach which can be accepted as the standard technique necessitates detachment of paraspinal muscles off the posterior spinal elements and significant tissue retraction [5]. Although today's surgical tendencies favor minimally invasive procedures with less damage to the soft tissues Watkins in 1953, already described a paraspinal approach which utilizes the natural cleavage plane between the paraspinal muscles and fascia overlying the transverse abdomens with less bleeding and tissue retraction [2-3,5-6,9]. Also Ray described an approach [7] in which the plane between sacrospinalis and quadratus lumborum muscles was used.

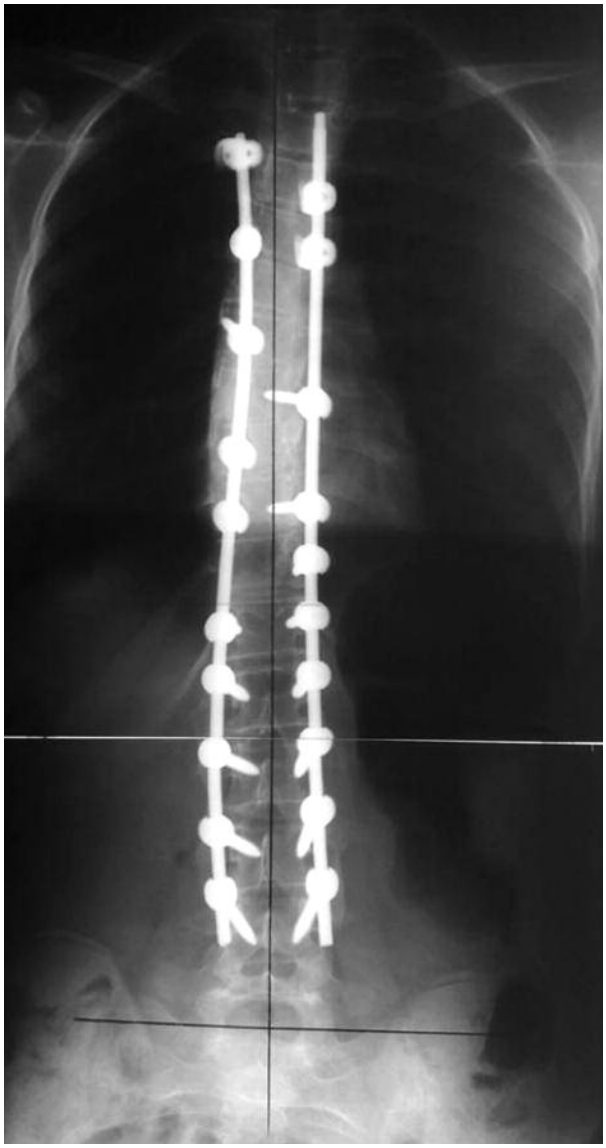
Wiltse popularized paraspinal approach which was mostly remembered with his name to present. In 1968, it was described as a bilateral transsacropinalis approach with two lateral skin incisions. Wiltse revised his approach in 1988 with one midline incision and reasoned this to that midline approach is more acceptable cosmetically [14,17]. However it has been argued by some authors that double-incision technique is more preferable as the incisions are shorter and it requires less dissection [5,14-15,17].

This approach, namely the Wiltse approach, allows direct approach to the transverse processes, facet joint as well as extraforaminal disc space [5-6,14,17]. The original description of Wiltse's approach was for lumbosacral spondylolisthesis [13]. However far-lateral disc herniations, far-out syndrome can be treated and pedicle screw insertion and transforaminal interbody fusion can be performed through this approach [2,8,12,15-16]. To our best knowledge there has been no study about using paraspinal approach in spinal deformity cases. In spinal deformity a midline approach to the spine is associated with increased bleeding and operation time. Exposure of deep muscle layers in lumbar spine leads to extensive tissue damage and blood loss [1,4,11]. This may increase the peri- and post-operative morbidity in children. In this preliminary study we propose that paraspinal approach can be utilized in spinal deformity in which lumbar spine is to be exposed and instrumented.

MATERIALS AND METHOD:

In 2008 from January to December patients with adolescent idiopathic scoliosis were identified. Patients in whom lumbar spine or part of lumbar spine is instrumented and fused were included. All patients underwent posterior instrumentation with pedicle screw-rod construct. After standard midline incision paraspinal approach was used to approach to the lumbar spine. Pedicle screws were applied through this approach and rest of the instrumentation in thoracic spine was completed following midline subperiostal dissection (Figure-1). After completion of instrumentation and reduction, decortications of transverse

Şekil-1.



Şekil-2A.

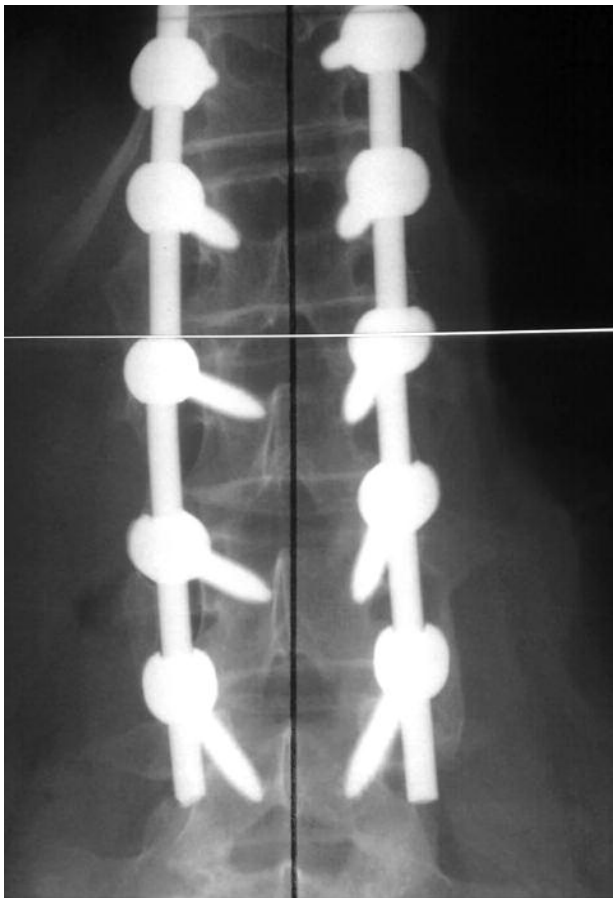
Şekil-2B.

processes and graft placement were done through the same paraspinal corridor in lumbar spine (Figure-2.A- C).

Magnitude of scoliosis was documented according to Cobb angle preoperatively and postoperatively. Amount of bleeding in total time of the surgery and during paraspinal approach was calculated separately. Time of total surgical procedure and of paraspinal approach was also calculated separately.

RESULTS:

Eleven patients with adolescent idiopathic scoliosis were identified. Mean age of the patients was 15.6 years (range; 13-28 years). Of the 11 patients 1 was male and 10 patients were female. The most distal level which was instrumented in lumbar spine was L2 in two patients, L3 in five patients, L4 in three patients and S1 in one patient.



Şekil-2C.

Mean blood loss was 946.4 cc (range; 600-3100cc) and 106,8cc (range; 65-200cc) for total surgery time and for paraspinal part of the surgery respectively. Mean time spent for total surgery and for paraspinal part was 243.2 (range; 160-350 min) and 35.1(range; 25-55 min) minutes respectively (Table 1). Mean preoperative and postoperative Cobb angles of the patients were 61.4º (range; 50º-75º) and 18.3º (range; 6º-28º) respectively.

DISCUSSION:

Standard midline approach leads to detachment of paraspinal muscles off the posterior spinal elements and significant tissue retraction [6]. This is especially true when dealing with a deformity case. Most of the studies which have been reported about paraspinal approach pointed its advantages including; respect to subcutaneous vascularization, avoid the subcutaneous detachment, and direct access to the facet joints. However these studies advocate that the best indications of this approach seem to be short arthrodesis [2-3,5-6,9,12].

In our study we enlarged the classical indications of paraspinal approach and used this approach in adolescent idiopathic scoliosis cases. Main advantage of this

Table-1. Blood loss and operation times for total surgery and paraspinal approach part of the surgeries.

	Age	Levels Instrumented	Total blood loss (ml)	Blood loss in paraspinal	Total time of surgery (min) approach (ml)	Time of paraspinal approach and instrumentation (min)
1	14	T 3 – L 4	1100	95	245	40
2	13	T 3 – S 1	900	85	190	30
3	13	T 3 – L 3	1050	80	210	38
4	16	T 3 – L 2	1000	65	160	35
5	12	T 12 – L 4	800	170	200	30
6	14	T 2 – L 3	1400	100	260	28
7	22	T 3 – L- 3	3100	200	350	40
8	13	T 12 – L 4	600	150	300	55
9	13	T 2- L 3	750	80	240	25
10	14	T 5 – L 2	700	70	270	35
11	28	T 5 – L 3	700	80	250	30

approach multilevel fusion can be performed sparing the supraspinalis and interspinalis ligaments [9]. By this approach we truly believe that surgeon can expose not only the transverse processes but pars interarticularis and lamina with lateral to medial dissection. This allows decortications and bone grafting.

Two different anatomical cadaveric studies have tried to describe the anatomical details of the paraspinal approach [8-9]. They tried to propose a distance between the multifidus and longissimus parts of the sacrospinalis muscle in order to designate the correct level of the natural cleavage. However both concluded as; except for the small arteries and veins which are present at the level of cleavage there is no anatomic landmark. In the present study we also preferred these small vessels to find the natural cleavage.

One of the main shortcomings of this study is the lack of control group. We did not compare our results with the cases which were operated with standard midline subperiostal approach. However this preliminary study which may shed light to the future studies on paraspinal approach.

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