

Our experience of two staged surgery in scoliotic deformities with stiff and larger curves

Waqar Alam, Ashfaq Ahmed, Qazi Muhammad Amin, Abdullah Shah, Faaiz Ali Shah, Muhammad Ayaz Khan, Amer Aziz

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Abstract

Background: Cranio-femoral traction could gradually modernize the coronal and sagittal deformity and restore the trunk wastefulness through the elongation of the spine. The aim of this prospective study was to determine the outcome of two staged surgery in patients having severe spinal deformities in scoliosis i.e. anterior-spinal release followed by cranio-femoral traction for 5 to 7 days followed by posterior release and instrumentation in the management. **Materials and Methods:** This study was conducted in Orthopaedics and Spine Centre of Ghurki Trust Teaching Hospital, Pakistan from 1st April 2010 to 31st July 2014 on 17 patients. The patients with idiopathic and congenital scoliotic deformity were included in the study. All patients underwent anterior release followed by Cranio-femoral traction for 5 to 9 days and then followed by posterior release and spinal instrumentation. The difference of curves was measured from pre-operative, traction and post-operative scoliotic series x-rays. The data were analyzed through SPSS 17.0 Software.

Results: There were 17 patients, among them 8 were boys and 9 were females with an average age of 14.2 years (range 10-16 years). The average total cranio-femoral traction interval were 7 days (range 5-9 days). There were 14 idiopathic and remaining congenital scoliosis patients. The average pre-operative thoracic and lumbar scoliosis were 106.5° (range 92°–142°) and 87° (range 77°–110°), respectively. The post-operative magnitude curve was 50.6° (range 47.5° to 56°). The difference in magnitude of curve was statistically significant. One of our patient got bad chest in the interval of two stages and we postponed her and operate her for her second stage after one month when she was recovered from her chest infection and was excluded from our results. There was no neurological complication in any of our patient. One of our patient got superficial wound infection which responded to oral antibiotics and resolved.

Conclusion: In this study we found that two staged surgery for stiff and larger curves in scoliosis deformities is an excellent, safe, cost effective and less complicative method.

Ghurki Trust Teaching Hospital, Lahore

W Alam
A Ahmed
QM Amin
A Shah
A Aziz

Lady Reading Hospital, Peshawar

FA Shah

Khyber Teaching Hospital, Peshawar

MA Khan

Correspondence:

Dr Waqar Alam,
Department of
Orthopedics and Spine
Surgery, Ghurki Trust
Teaching Hospital, Lahore.
Cell: 0345-9522215
Email: waqaryousafzai@yahoo.com

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Introduction:

Scoliosis (meaning “crooked”) is a medical condition where a person’s spine is curved from side to side.¹ Patients may moreover have pelvic obliquity, hip dislocation, limited wastefulness and worthiness to sit, when pain, and, in some instances, a significant subtract in pulmonary function.² The therapeutic efficacy of scoliosis is influenced by many factors, such as the severity of deformity, spine flexibility, patient’s age, type

of deformity, and combined other deformities. Severe scoliosis is increasingly difficult to treat than usual ones.³ The treatment of rigid and severe scoliosis and kypho scoliosis is a surgical challenge.⁴ Great progress has been made in the treatment of scoliosis, but some scoliotic patients, expressly those with severe scoliosis, develop post-operative pulmonary complications as a result of various factors during hospitalization.⁵ The surgical correction of scoliosis

Table-1: Outcome of surgery

Mean Age	14.2 years± 6.56years
Mean blood loss	735ml ± 67.5ml
Surgical time in mins	431 ± 48.5 mins
Pre-operative curve	106.5° (range 92°–142°) and 87° (range 77°–110°)
Post-operative curve	50.6°(range 47.5° to 56°)
Complications	One chest infection/ one perflicial wound infection

has improved with the use of spinal instruments. With the introduction of Harrington instrumentation, and subsequently Luque and Cotrel–Dubousset instrumentation, posterior approaches have been wontedly used for the treatment of scoliosis. However scoliosis correction in severe curves commonly necessitates combined proemial release and posterior instrumentation to unzip a satisfactory result.⁶ The proemial and posterior tideway can obtain comparable coronal correction, transpiration values of thoracic kyphosis, and incidence of proximal junctional kyphosis. The proemial tideway saves injudicious one increasingly fusion segment, and the posterior tideway can obtain a larger increasing Cobb wile of lumbar lordosis, from pre operation to final follow-up.⁷ Pre-operative determination of lines flexibility is a fundamental stage in the surgical planning, since it guides the selection of levels that are to be fused.⁸ Halo-femoral traction was a safe, well-tolerated and constructive method for the treatment of severe and rigid scoliosis patients. The posterior correction rate obtained without proemial release and traction was significant superior than that recorded from side limp mucosa in current study.⁹

The main aim of this study is to determine the outcome of combine proemial and posterior release surgery in rigid scoliosis.

Material and Methods:

It was a descriptive case series conducted at Orthopaedics and spine centre, Ghurki Trust Teaching Hospital, Lahore from 1st April 2010 to 31st July 2014. The patients of all ages and both sexes having congenital or idiopathic scoliosis were included in the Study. Detail history, examination, radiographs and investigations were done. The patients underwent two stage surgeries after proper consent and approval from

the hospital ethical committee. In the first stage anterior release with cranio-femoral traction for 5 to 9 days were done. The patients were kept in ICU for 1 or 2 days. Immediately pursuit the proemial release, cranio-femoral traction was started instantly with a small weight (2–4 kg). It was gradually increased at a rate of 1–3 kg/day as tolerated to reach a final maximum of 30–50% of soul weight. Patients were thoughtfully monitored and neurologic viewing was performed every time the weight was increased. After it the patients underwent the posterior release and spinal instrumentation. Posterior correction and instrumentation were performed with traction maintained intra-operatively; the throne of the operating table was slightly elevated to indulge the counter effect of gravity and half the final weight was used. The traction was removed immediately without performing this stage. All the surgeries were performed by same team of surgeons and in the presence of neuro monitoring. The patients were mobilized on 2nd or 3rd day and were discharge on 5 -7 post-operative day after 2nd stage surgery on oral antibiotics for ten days and were followed regularly at intervals and were braced for an average of 3 months then gradually weaned off the brace. The difference in Cobb's Angle was measured from pre and post operativex-rays. The data were initially entered on a pre formedproforma and later on SPSS 17.0 were used for data analysis.

Results:

There were 17 patients, among them 8(47.01%) were boys and 9(52.99%) were females with an mean age of 14.2 years± 6.56 years. The male to female ratio were 1:1.14. The average total cranio-femoral traction interval were 7 days (range 5-9 days). There were 14(82.35%) idiopathic and remaining congenital scoliosis 3(17.65%) patients. The average pre-operative dorsal and lumbar scoliosis were 106.5° (range 92°–142°) and 87° (range 77°–110°), respectively. The post-operative magnitude curve was 50.6°(range 47.5° to 56°). The difference in magnitude of curve was statistically significant. The mean blood loss was 735ml± 67.5ml and mean surgical time were 431± 48.5 mins. One



Figure-1: Pre-operative Lateral view X-ray



Figure-2: Pre-operative AP view X-ray



Figure-3: Peroperative picture after completing anterior release (Stage one)



Figure-4: Peroperative picture after completing posterior instrumentation (Stage two)



Figure-5: Post-operative AP view X-ray



Figure-5: Post-operative Lateral view X-ray

of our patient got bad chest in the interval of two stages and we postponed her and operate her for her second stage after one month when she was recovered from her chest infection and was excluded from our results. There was no neuro-logical complication in any of our patient. One of our patient got superficial wound infection which responded to oral antibiotics and resolved. Outcome has been summarized in table no-1. figures 1 to 6 show the X-Rays and per operative pictures of one of our patient.

Discussion:

The treatment of rigid and severe scoliosis and kyphoscoliosis is a surgical challenge.⁴ The location and type of vertebral oddity can stupefy the severity and prognosis of innate scoliosis. When a large deformity is present at an early age, surgical treatment is necessary. Surgical correction of innate curves is often increasingly successful when high-risk curves of a smaller magnitude are treated early.¹⁰ Neuro-logical deterioration is the biggest snoothing to spinal deformity surgeons.¹¹ The treatment of severe spinal deformi-

ty requires shielding towage of the patient by the orthopaedic surgeon, anesthesiologist, pulmonologist, and neurologist expressly when neuro-logic deficits are present.¹² The nomination of an optimal surgical technique is crucial, not only considering of the stratum of correction needed, but moreover considering of the need to minimize the number of complications and stave imbalance without surgery¹³ Scoliosis curves tend to be stiffer in adults than in adolescents; as a result, release techniques such as facet resections or osteotomies are often tabbed for surpassing lines correction. Posterior post-osteotomies indulge for increased mobilization of the spine and correction in both the sagittal and coronal planes, but surgical time and thorough bred loss increase with performance of osteotomies, and such operative intervention may be considered hazardous in elderly patients, given their increased risk for cardiovascular morbidity.¹⁴

Yaminet all terminated that staged operation and halo-pelvic traction offer a unscratched and constructive way in treatment of severe rigid

scoliosis. Patients whose Cobb angle was increasingly than 80° and the flexibility of the spine was less than 20% should be treated in this way, and those whose flexibility of the spine was less than 10% and the Cobb angle remained increasingly than 70° without 1st stage proximal release and halo-pelvic traction should undergo pedicle subtraction osteotomy (PSO) in the second surgery.¹⁵ Limited halo-gravity traction is an efficient, unscratched modality in the treatment of severe rigid younger scoliosis. The using of gradual traction over a limited period of 2 weeks led to largest correction, shorter operative time with no significant complications

Despite the advantages of halo-gravity traction, several halo-related complications were reported. Wilkins and McEwen¹⁶ reported that in 6 of 70 patients treated on skeletal traction, cranial nerve complications developed. Ginsburgh and Bassett¹⁷ reported a hypoglossal nerve injury caused by halo-gravity traction using traction that was 40% of the patient's soul weight. Avascular necrosis of the odontoid process and cervical spondylosis have been previously reported with spinal traction as a result of prolonged periods of lack of the odontoid and apophyseal joints, respectively.¹⁸ Several authors have reported pin loosening and superficial pin-tract infections.¹⁹⁻²¹ Anand et al found that the mid point thorough blood loss was 613ml for one-stage surgery and 763 ml for two-stage surgery. Mid point operative time was 351 minutes for one-stage surgery and 482 minutes for two-stage surgery. Mid point Cobb angle and sagittal vertical turning decreased from 42° and 51 mm pre-operatively to 16° and 27 mm post-operatively (both $p < 0.001$). An 88% fusion rate was confirmed on CT scan.¹⁴ Barbara et al in their study found that two-stage treatment of very severe scoliosis enables stable correction with some resurgence of spinal waste-fulness in both the coronal and sagittal plane. The mid point lines surpassing surgery was 129 degrees and it is corrected upto 44%. Moreover there is no loss of correction in their 5 years follow up.¹³ On the other hand the study of BelalElnady et al terminated that additional proximal surgery requires increased time for the unstipulated anesthe-

sia and may have a negative impact on pulmonary function, longer hospital stay, increasingly thorough blood loss and longer operative time.²² Mehlman et al. presented 24 patients who had halo-femoral traction and a spinal release; 11 of whom had idiopathic scoliosis. The pre-traction lines had an stereo type of 95° and the pre-traction lines in limp had an stereo type of 73° ; the final traction lines had an stereo type of 44° . Traction weight was increased to an stereo type of 54% of soul weight and final correction had an stereotype of 71%.²³ Later, Rinella et al. performed a retrospective wringer of 33 patients with severe scoliosis or kyphoscoliosis. The main coronal lines had a midpoint of 84° (range 22° – 158°). Four patients had idiopathic scoliosis, and in those patients the main coronal lines had a mid point of 101° (range 84° – 131°). The elapsing of perioperative traction was usually 2–12 weeks depending on their overall medical condition. For all 33 patients, the main coronal lines reduced 38° or 46% without posterior spinal fusion.²⁴

Although our patients in traction had a longer hospital stay and consequently had a restrictedly higher cost, yet this appears justified with their significantly largest clinical and radiologic outcomes.

Conclusions:

Cranio femoral traction is a safe, well-tolerated modality of applying gradual, sustained traction to maximize correction in patients with severe rigid scoliosis in two stage surgery. Complications can be minimized with gradual increases in traction to a maximum of 50% of the patient's soul weight and thorough daily neurologic examinations. The use of traction should be considered in all patients with severe rigid younger idiopathic scoliosis, provided that both patient and his family are compliant with the procedure

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Role and contribution of authors:

Dr Waqar Alam, collected the data, references

and wrote the initial write up.

Dr. Ashfaq Ahmed, collected the data and references

Dr. Qazi Muhammad Amin, collected the data and references and introduction writing.

Dr. Abdullah Shah, analysis of the data and material and method writing

Dr. Faaiz Ali Shah, interpreted the data and helped in result and discussion writing.

Prof. Muhammad Ayaz Khan, critically review the study

Prof. Amer Aziz, critically review the study and made the final changes.

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