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Research Article

**SURGICAL OUTCOMES OF MINIMAL INVASIVE WILTSE
APPROACH AND CONVENTIONAL OPEN APPROACH IN
SINGLE SEGMENT THORACOLUMBAR FRACTURES**¹Dr. Mudassir Siddique, ²Dr. Farhan Majeed, ³Dr. Ahmad Shams Nasir,⁴Dr. Maham Ashraf^{1,2}Senior Registrar Orthopaedics, Services Hospital, Lahore³PGR Orthopaedics, Services Hospital, Lahore⁴Children's Hospital, Lahore**Article Received:** January 2019**Accepted:** February 2019**Published:** March 2019**Abstract**

This study aimed to compare surgical outcomes of pedicle screw fixation of thoracolumbar fractures in single segment through minimal invasive Wiltse method and conventional open method.

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INTRODUCTION:

Thoracolumbar fractures are one of the most common fractures in spine injuries. These are usually unstable fractures caused most commonly by road traffic accidents and accidental falls. Both surgical and conservative approaches are used in the treatment of thoracolumbar spine injuries [11]. Transpedicular screw fixation is a popular modality of treatment in cases where surgical intervention is required. Posterior approach is usually used for this purpose along with pedicle screws and rods. In 1963, Roy-Camille performed first pedicle screw fixation with clinical success. In 1968 Wiltse et al. used the paramedian incision to reach the space between multifidus and longissimus muscle. This provides easy access to transverse processes and thus helped in the pedicle screw placement. In 1986, Louis and Maresca did modification in the Roy-Camille technique to achieve lumbar stabilization. Fritz Magerl presented the concept of angle-stable pedicular fixation. In 1982, Steffé shaped a segmental spinal plate with pedicle screw system for thoracic spine and sacrum. Yves and Cotrel and Jean Dubousset introduced new screw-rod system that is widely used in the spine surgery in the last 10 years. This pioneer work with great clinical success formed a ground for other fixation systems.

The mainstay of treatment in thoracolumbar spine fractures is to relieve pain, provide stability to spine, neural decompression, prevent or relieve neurological deficits and early mobilization. Conventional open approach, through posterior midline incision, used for spinal fixation has the disadvantage of large incision size, excessive soft tissue damage and extensive muscle dissection [12]. Thus, chances of post-operative infection at surgical site, backache and muscle atrophy are significantly higher, although one study we came across reported no significant difference in the degeneration of paraspinal muscles between the two surgical techniques with the passage of time [5].

Percutaneous pedicular screw fixation is a recently developed surgical technique and is widely used in recent years for treatment of thoracolumbar fractures. Minimizing skin incision and decreased muscle and bone damage are the features favoring this type of surgery. However, it requires specialized equipments and long learning curve. So, percutaneous pedicular

screw fixation technique might not be a viable option in many setups of the world where cost is an issue.

In this study, we evaluated and compared between minimally invasive Wiltse approach and conventional open technique in terms of blood loss, duration of surgery, post-operative infection rate, hospital stay, mobilization. The aim of this study was to assess the feasibility, safety, reliability and clinical outcome after stabilization by minimal invasive Wiltse technique and comparing it with conventional open technique.

Objective:

In this study, we did comparison between both approaches in terms of blood loss, duration of surgery, post-operative pain, post-operative drainage, post-operative infection rate, hospital stay and mobilization. The aim of this study was to assess the feasibility, safety, reliability and clinical outcome.

Study Design

Prospective cohort study

Place of Study

The study was conducted in the department of orthopedics at Services Hospital, Lahore

MATERIALS AND METHODS:

Patients admitted and operated for pedicular screw fixation, in the department of orthopedics at Services Hospital, Lahore for single-segment thoracolumbar fractures without neurologic injury, in the year 2018. Total study subjects were 46 in which conventional open approach was used in 23 Patients and minimal invasive approach¹⁰ was used in 23 patients. Operative timing, blood loss, post-operative drainage, complications during the procedure and post-operative pain and infection rates were compared. On follow up the patients were evaluated using the Visual Analogue Scale and the Japanese Orthopaedic Association (JOA) score.

RESULTS:

Significant difference was noted in the operative time, blood loss during surgery, post-operative drainage, post-operative infection rate, post-operative pain and post-operative hospital stay between the two study groups

Table 1. Result (mean±SD)

Variable	MIS Wiltse approach (n= 23)	Conventional open approach(n= 23)	P
Age	43.35±6.08	42±5.14	0.535
Sex (male/female)	16/7	14/9	0.856
Operative time(min)	80.13±10.07	101.17±14.2	0.0017
Blood loss (ml)	45.00±7.94	160.22±38.42	<0.001
Post op drainage(ml)	16.39±2.8	65.35±12.46	<0.001
Post op hospital stay (Days)	4.53±0.67	8.00±1.04	<0.001

Outcome:

The results show a much better clinical significance and outcome with minimal invasive wiltse method than the conventional open method in significant clinical aspects. Outcome of the patients on follow up as evaluated by the VAS and JOA showed improvement pre and post-operatively

Follow up:

The patients were followed up to more than 2 years and were assessed for Wound infection, pain, mobility and bone fusion as seen in the CT- scan. Patients were examined on each follow up for wound evaluation, pain and mobility were assessed using the VAS and JOA. After 2 years of follow up CT- Scan showed complete fusion of the bone.

DISCUSSION:

Minimal invasive wiltse approach, in contrast to the conventional open approach has a shorter duration of surgery with less blood loss and decreased post operative drainage and less post operative hospital stay as seen in the **Table 1**.

All patients from the minimally invasive wiltse approach group were mobile with the protection of the waist brace 24 hours after surgery and discharged after an average of 5.3 days postoperatively. However, for those patients who underwent the open surgery, the drainage tubes were removed on postoperative day 2, the mean postoperative hospital stay was 8.2 days, and activity was permitted at least two weeks after surgery.

The lower infection rate in minimal invasive wiltse technique compared to the open conventional approach has also been reported previously.^{1,2,3}

One advantage the open conventional approach has over the minimal invasive wiltse technique is the identification anatomical landmarks which made it easier for the insertion of pedical screw. The disadvantage of prolonged procedure time for conventional approach can be explained by more soft

tissue dissection required to access the pedical. This procedure has also been described to provide access for removal of spinal tumors⁷⁸. Very few complications have been associated with the MIS wiltse technique have been described⁹, making it the preferred approach over the conventional approach.

In conclusion, the minimal invasive wiltse technique as seen in previous studies and the current study, in contrast to the conventional open approach offers a better surgical approach, less operative time, decreased blood loss and less number of post-operative hospital stay. It is in our opinion the best choice of procedure when operating single segment thoracolumbar fractures.

CONCLUSION:

The comparison between the minimally invasive wiltse method and conventional open method was done. Minimally invasive wiltse method stands out better in safety and efficacy and by our observation should be the procedure of choice when dealing single segment thoracolumbar vertebral fractures with no neurological injury.

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