

PERCUTANEOUS VERSUS OPEN SURGICAL FIXATION OF LUMBOSACRAL SPINE IN CASES OF DEGENERATIVE SPONDYLOLISTHESIS

Mohammed Galal Mohammed, Mohammed Abd Allah Al werdany, Shafik Tahseen El Molla, Ahmed Roshdy Farghaly and Omar El Farouk Ahmed

ABSTRACT:

Department of Neurosurgery,
Faculty of Medicine, Ain Shams
University, Cairo, Egypt

Corresponding author:

Mohammed Galal Mohammed

Mobile: +20 01005541754

e.mail:

mohammedgalal2011@gmail.com.

Received: 30/4/2023

Accepted: 6/5/2023

Online ISSN: 2735-3540

Background and Objectives: Degenerative spondylolisthesis is frequently associated with LBP and leg pain. When conservative treatment fails to relief symptoms, the surgical spine fixation and neural tissue decompression becomes the treatment of choice as it leads to functional and symptomatic improvement. In this study we compare between percutaneous spine fixations versus open spine fixation in cases of degenerative spondylolisthesis.

Patients and Methods: 40 patients with degenerative spondylolisthesis were divided randomly and equally in two groups, group A of patients underwent spine fixation with conventional open surgery approach, while group B underwent percutaneous spine fixation, we recorded intraoperative difficulties and post-operative outcome in the two groups every 6 months for 18 months.

Results: The mean operation time was 174 minutes in group A and 168 minutes in group B, the mean amount of blood loss in group A was 443 ml, while was 165 ml in group B (p value < 0.001), the mean duration of hospital stay in group A was 2.45 days, while it was 1.8 day in group B (p value <0.002), there is no statistically significant difference between the two groups in reduction of leg pain, back pain and ODI either immediately post-operative or after 6, 12, and 18 months of follow up

Conclusions: Percutaneous spine fixation has the advantage of being less invasive, with less intra operative bleeding, less operation time and post-operative hospital stay than the conventional open spine fixation technique. However, both techniques have the same results of improving patients' leg and back pain on the long term.

Key word: Degenerative spondylolisthesis, Percutaneous lumbar fixation, Open lumbar fixation.

INTRODUCTION:

Degenerative spondylolisthesis (DS) causes slippage of one vertebral body over the one below as a result of the degenerative changes in the vertebral column, which may be associated with spinal canal stenosis and leads to lower back pain (LBP) and leg pain in many cases⁽¹⁾.

It is a common pathology with prevalence of 2.7% in males and 8.1% in females.⁽²⁾

conservative treatment should be considered initially in the treatment of most cases of degenerative spondylolisthesis, either its accompanied by neurological symptoms or not. Medical treatment in the form of NSAIDs and other analgesics can

be tried to control pain; physical methods such as bracing and flexion strengthening exercises are helpful in controlling pain in many cases, while epidural steroid injections can be done in selected cases with poor response to medical treatment.⁽¹⁾

If the medical treatment fails to relief symptoms, surgical treatment is indicated.

In this study we compare between two techniques of spine fixation in cases of degenerative spondylolisthesis, the conventional open surgical spine fixation versus percutaneous spine fixation as regarding intraoperative details and difficulties, post operative complications and recovery, with follow up of patients of the two groups after 6,12 and 18 months.

PATIENTS AND METHODS:

This study is a prospective randomized study held between October 2017 and May 2022 on 40 patients with degenerative spondylolisthesis divided randomly into two groups, group A which includes the odd numbers underwent conventional open surgery for spine fixation, while group B which includes the even numbers underwent percutaneous spine fixation. All patients suffered from single level degenerative spondylolisthesis causing LBP with or without associated leg pain, age should be between 25 and 60 years old, with average body mass index and no history of previous surgery in back, with good general condition without other comorbidities.

Full detailed medical history was obtained before surgery for each patient in study, with full preoperative clinical and neurological assessment of each patient. For each patient we assessed LBP and Leg pain with visual analogue scale (VAS), and we assessed patients functionally with Oswestry disability index (ODI). For each patient we did full preoperative lab investigations, MRI LSS, lateral dynamic x-ray LSS, full detailed informed consent has to be read and

discussed with each patient before he signed it. Intra operative, we recorded blood loss, operation time, intraoperative difficulties and complication. In group A, we made a longitudinal lower back skin incision, with back muscle separation lateral to transverse processes, insertion of pedicular screws after identification of the entry point under guide fluoroscopy, we perform full laminectomy and foramenotomy, followed by either posterolateral or interbody fusion.

In group B we do insert percutaneous screws under fluoroscopy guide, with separate small skin incision 1 cm lateral to the pedicular line for each screw, then we do small midline incision with minimal muscle separation for laminectomy, foramenotomy with insertion of PLIF.

Post-operative clinical and neurological assessment was done for each patient, with assessment of LBP and leg pain for each patient after 6, 12 and 18 months, assessment of bony fusion in addition to evaluation of patients functionally according to Oswestry disability index was done. CT LSS was obtained to review screws direction. Bone fusion was assessed after three and six months using X-ray LSS which was classified into 4 grades as follows: Grade 1: Complete fusion which is achieved with formation of bone bridge between the upper and lower vertebral bodies; Grade 2: In which Bone bridge were not formed, but there is no translucency observed around the cages with thick fusion mass formation; Grade 3: Fusion not occurred with translucency around the cages; Grade 4: Pseudarthrosis which is indicated by sinking of the cage into the vertebral body or by bone resorption around cages.

Ethical consideration:

The approval of medical ethical committee was taken from faculty of medicine Ain Shams university in 2017.

RESULTS:

The total of 40 patients was divided randomly in two groups, group A of patients underwent conventional open spine surgery approach, while group B underwent percutaneous spine fixation, each group included 20 patients, the mean age of patients in group A was 51 (Mean±SD 51.72 ± 7.71), and 47 (Mean±SD 47.35±10.91) in group B (fig1), the mean operation time was 174 minutes in group A (Mean±SD 174.00±40.83) and 168 minutes in group B (Mean±SD 168.75±36.63) (fig3), the mean amount of blood loss in group A was 443 ml (Mean±SD 443.00±161.83), while was 165 ml in group B (Mean±SD 165.00±64.85) (fig4), (p value < 0.001), the mean duration of hospital stay in group A was 2.45 days (Mean±SD 2.45±0.51), while it was 1.8 day in group B (Mean±SD 1.80±0.62) (p value <0.002)(fig5), the reduction of leg pain post operative was -73.34 % (±24.89 %) in group A while it was -57.69 % (±18.80%) in group B (fig6), leg pain reduction after 6, 12, and 18 months was -91.06 (±15.67%), -94.70(±11.94%), and -96.97(±10.04%) respectively in group A, while it was -78.17(±22.09%), -92.66(±14.74%) and -92.66(±14.74%) for group B with no statistically significant difference between the two groups . (fig6)

The reduction of back pain post-operative was -12.97 (±15.10%) in group A, while it was -10.35(±17.18%) in group B, back pain reduction after 6, 12, and 18

months was -76.41 (±16.07%), -90.89 (±10.81%), and -92.64(±9.93%) respectively in group A, While it was -72.05(±18.10%), -84.14(±17.28%) and -92.38 (±10.11%) respectively for group B, with no statistically significant difference between the two groups. (fig8)

The reduction of ODI post-operative was -31.27(±14.88%) in group A while it was -35.55(±9.44%) in group B.

ODI reduction after 6, 12, and 18 months was -83.13±14.69%, -92.90±10.82%, and -96.17±7.99% respectively in group A, while it was -81.31(±14.59%), -91.91 (±8.69%) and -95.82(±6.14%) respectively for group B, with no statistically significant difference between the two groups. (fig7)

According to assessment of interbody fusion, in group A ,grade 1 of fusion was achieved in 50% of patients after 3 months, and in 100% of patients after 6 months indicated full fusion, while in group B, grade 1 of fusion was achieved in 70% of patients after 3 months, and in 85% of patients after 6 months, with no statistically significance between the two groups in grade of fusion after 6 month of surgery.(fig10)

According to complications, two cases of group A had intraoperative dural tear which has been stitched intraoperatively with no post operative CSF leak, one other case had superficial wound infection around two stitches which resolved completely with systemic and topical antibiotics. Only one case in group B has dural tear with no post-operative CSF leak.

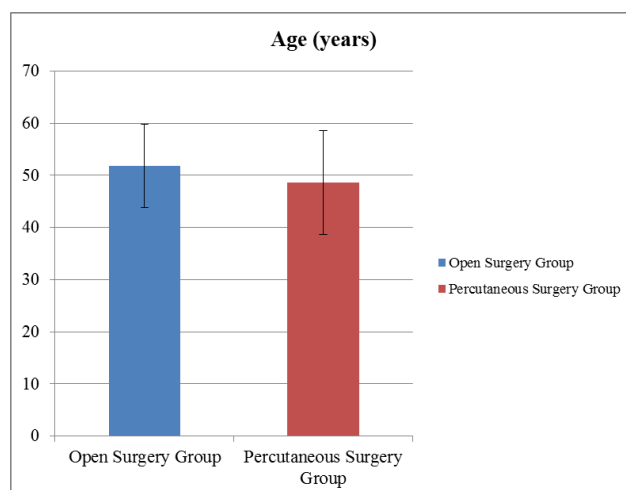


Figure (1): Comparison between open surgery group and percutaneous surgery group according to age “years”.

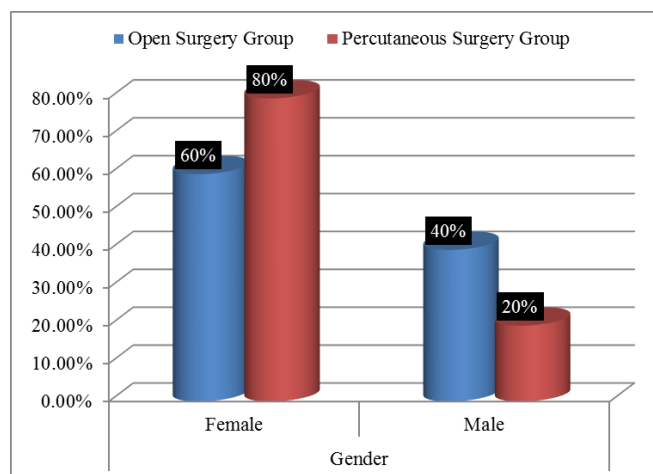


Figure (2): Comparison between open surgery group and percutaneous surgery group according to gender.

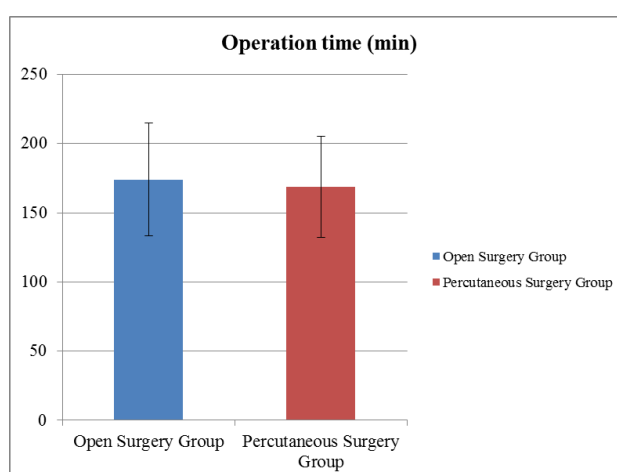


Figure (3): Comparison between open surgery group and percutaneous surgery group according to operation time “min”.

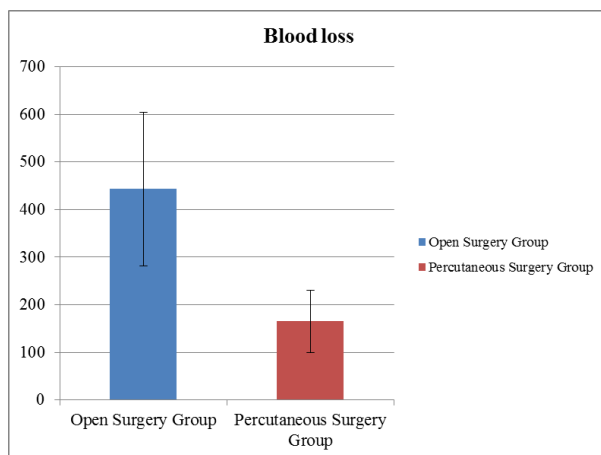


Figure (4): Comparison between open surgery group and percutaneous surgery group according to blood loss.

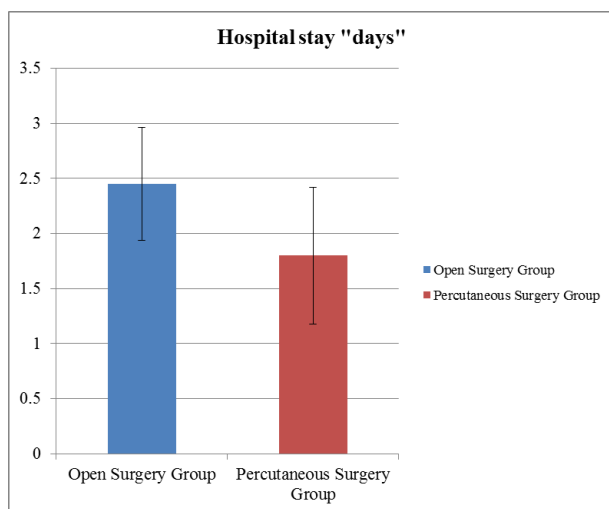


Figure (5): Comparison between open surgery group and percutaneous surgery group according to “hospital stay”.

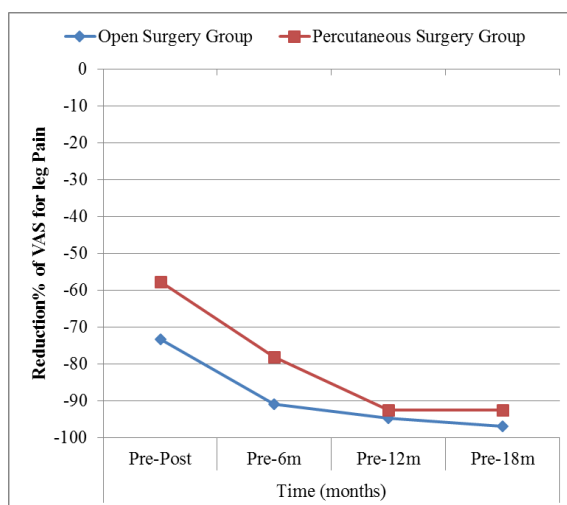


Figure (6): Comparison between open surgery group and percutaneous surgery group according to reduction% of VAS for leg Pain

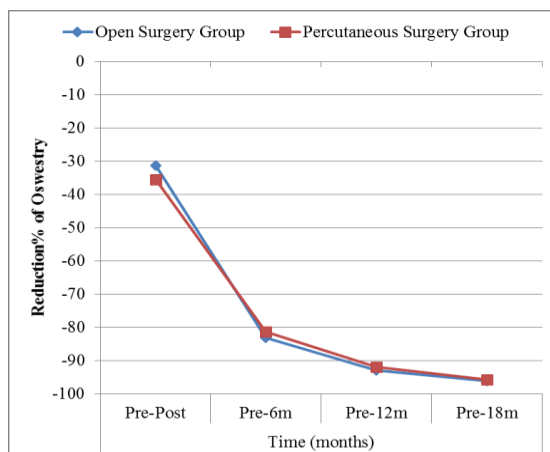


Figure (7): Comparison between open surgery group and percutaneous surgery group according to reduction of Oswestry.

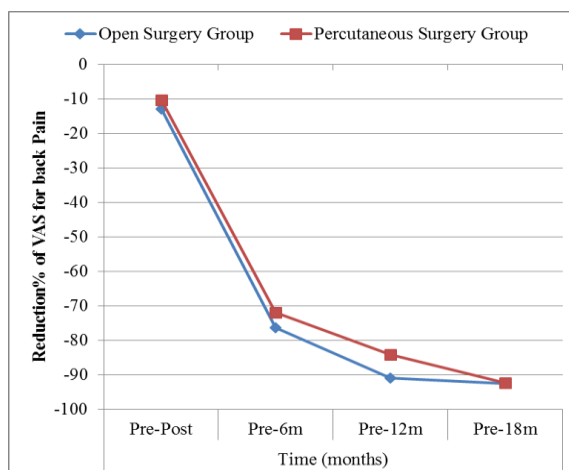


Figure (8): Comparison between open surgery group and percutaneous surgery group according to reduction of VAS for back Pain.

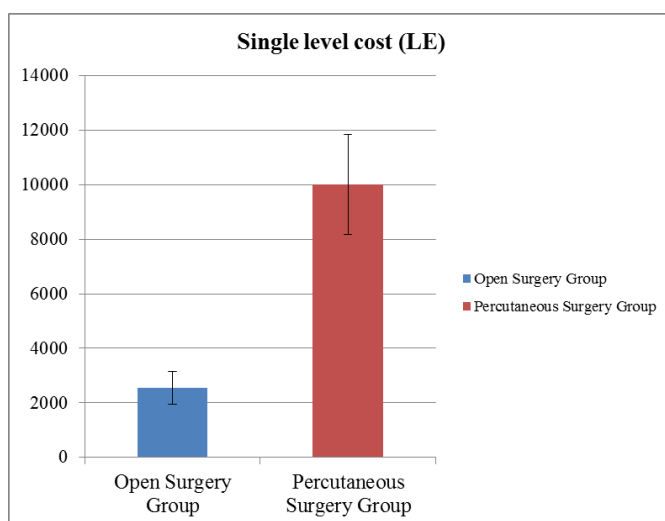


Figure (9): Comparison between open surgery group and percutaneous surgery group according to single level cost.

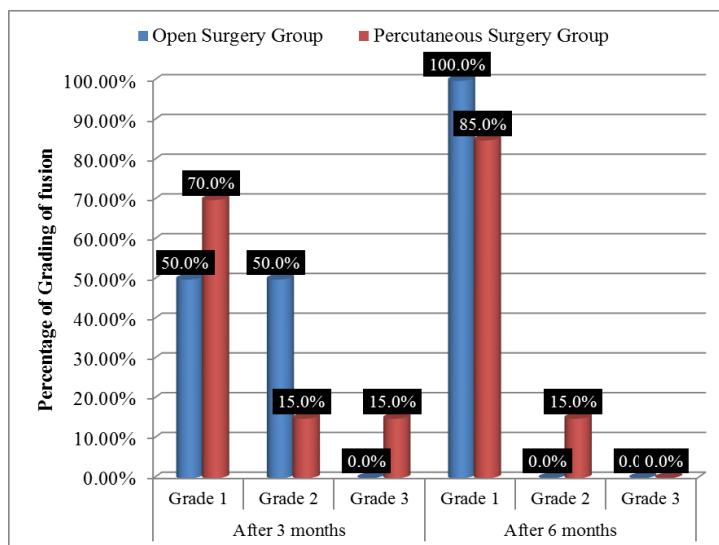


Figure (10): Comparison between open surgery group and percutaneous surgery group according to grading of fusion after 3 months.

DISCUSSION:

In recent years, there have been several case series and comparative studies on minimally invasive lumbar spine fusion.⁽⁴⁾

In conventional open surgical fixation of spine, it's necessary to provide exposure for the pedicle screw entry points, especially the most rostral screw, so it is necessary to do muscle dissection off the facet joints and transverse process, which is one important source for post operative wound pain, while the use of percutaneous pedicle screws requires minimal muscle dissection and thus avoids this morbidity⁽⁵⁾.

Also the conventional open spine fixation technique involves far lateral muscle dissection off the transvers processes to allow posterolateral fusion, which is considered an additional source of post operative wound pain, while percutaneous spine fixation procedure involves interbody fusion alone, so no lateral dissection of muscle off the transverse processes is necessary.⁽⁵⁾

This study was done to compare between percutaneous and open surgical fixation of LSS as two modalities of surgical

treatment of degenerative spondylolisthesis and to review percutaneous LSS fixation procedure and its anatomical considerations. This study was conducted on 40 patients suffering from degenerative spondylolisthesis between October 2017 to May 2022, The 40 patient was divided in a randomized manner into 2 groups, group A includes the odd numbers between 1-39 which were subjected open surgery for lumbar or lumbosacral fixation and group B which includes the even numbers between 2 and 40 which were operated for percutaneous lumbar fixation.

Kotani et al in 2011 Conducted a study on 80 patients with degenerative spondylolisthesis to compare between the midterm clinical results of minimally invasive decompression and Posterolateral fusion (MIS-PLF) with percutaneous pedicle screws versus conventional approach for degenerative spondylolisthesis with a spinal stenosis, 43 patients of them underwent MIS PLF (14 male patient and 29 female patients), and 37 cases (12 of them are male patient and 25 female patients) underwent open surgery for lumbar fixation, the mean age of surgery was 65 years, up till the date

of Kotani study at 2011, no study has demonstrate the efficacy of minimally invasive lumbar decompression and postero lateral fusion in degenerative spondylolisthesis of lumbar spine⁽⁴⁾.

Elkhatib analyzed retrospectively the clinical outcome of 17 patients (12 males and 5 females) with low grade spondylolisthesis underwent instrumented fixation of lumbar spine to compare between posterior lumbar interbody fusion augmented with pedicle screw fixation versus PLIF augmented with percutaneous pedicle screw fixation, he divided patient into 2 groups, Group A included 9 patients who underwent PLIF with conventional open surgery and Group B which included 8 patients underwent PLIF with percutaneous spine fixation system, the mean age for surgery was 43.5 years⁽⁶⁾.

Mooney et al in 2021 reviewed the data of the quality outcome database (which is a nationwide registry in USA instituted in 2012) for 11213 patients who underwent elective lumbar fusion for degenerative lumbar disease to compare between outcome of minimally invasive lumbar fusion (MIS) versus open lumbar fusion, the study included 6145 patient had degenerative spondylolisthesis, 5270 underwent open lumbar fusion and 875 underwent MIS⁽⁸⁾.

In our study, the mean age of the open surgery group was 51.8, while the mean age of the percutaneous surgery group was 47.3, and no statistically significant difference between the two groups. According to gender, the open surgery group included 8 males and 12 females representing 40% and 60% of patients respectively, while the percutaneous surgery group includes 4 male patients and 16 female patients representing 20% and 80% respectively. The most affected levels in our study were L4-L5 (70% in open surgery group and 80% in percutaneous surgery group), we exclude patients below 25 years old and those above 60 years old, patients with associated painful

conditions as neoplastic, traumatic and inflammatory conditions in area of lumbar spine, patients with spine infections or previous operative intervention in lower back will be excluded, patients with true lumbar disc prolapse accompanied with radicular pain will be excluded, patients with BMI over 25 will be excluded and patients with bad general condition will be excluded.

While all patient in Kotani et al study has L4-L5 degenerative spondylolisthesis with apparent intermittent neurological claudication and/ or radicular neurological symptoms which were explained by neural compression due to spondylolisthesis with spinal stenosis, he excluded patients complaining the lower back pain alone preoperative⁽⁴⁾.

Elkhatib reported that the majority of his cases occurred at L4L5 level (11 out of 17 patients), then L5 S1 (5 out of 17 patients), He included Cases of any age, both sexes with low grade (Grade 1 and 2) degenerative and isthmic lumbar spondylolisthesis, Symptomatic patient with low back pain, radiculopathy and/or neurogenic claudication not responding to at least 3 months of conservative treatment with oral medication and physical therapy, All lumbar levels are to be included. He excluded patients with general diseases that preclude surgical management (osteoporosis and active infection), patients with Spondylolisthesis of grades higher than grade 2. Patients with morbid obesity as measured by body mass index >40, previous lumbar surgery, pregnancy, Blood coagulation disorder, and traumatic conditions⁽⁶⁾.

In our study, In group of conventional open surgery we used pedicular screws for fixation of lumbar spine followed by either posterolateral or interbody bony fusion, after good decompression of canal and bilateral foramentomy at the affected level, while in patients underwent percutaneous fixation we used a hybrid technique in which we utilized

a small mid line skin for laminectomy, foramenotomy and lumbar canal decompression with performing of interbody fusion after insertion of percutaneous lumbar screws through separate small parasagittal incisions.

Kotani et al reported that in the group of MIS PLF a small midline incision (4 cm) for neural decompression and bilateral medial facetectomy, another small parasagittal incision is done unilaterally (1.2 cm), from which he inserted percutaneous screws at L4-L5 unilaterally followed by unilateral postrolateral fusion utilizing iliac bone graft inserted in the lateral gutter from the same incision using Depuy spine expandable retractor, while patient underwent open surgery were fixated bilaterally with pedicular screws with bilateral posterlateral fusion with bone graft⁽⁴⁾.

Elkhatib reported that in patients who underwent percutaneous lumbar fixation, the surgical access for interbody fusion was obtained using tubular retraction system and done on the most symptomatic side, while patient underwent open surgery had interbody fusion with iliac crest graft after good decompression of lumbar canal and foramenotomy.⁽⁶⁾

In our study, no significant difference between the two groups in surgical time, the same result was reported by Kotani et al and by Elkhatib.

In our study the intraoperative bleeding during percutaneous fixation (which ranges between 70 and 300 ml) was significantly less than bleeding during conventional open surgery as it ranges between 200 ml and 700 ml.

Kotani reported that the average blood loss in the MIS PLF groups was 181 ml, while in open surgery group was 453 ml and so there was statistically significant difference between the two groups in intraoperative bleeding⁽⁴⁾.

In Elkhatib study, blood loss was calculated for both groups and was found to be much less for group B (300 to 500ml mean 370 ml) than group A (500 to 1100ml mean 800ml), and so blood loss during percutaneous fixation procedure was significantly less than open surgery⁽⁶⁾.

In our study, hospital stay post-operative ranges in group of open surgery from 2 to 3 days (mean 2.45), while in percutaneous group hospital stay ranges between 1 to 3 days (mean 1.8), so there is statistically significant difference between the two groups in post-operative hospital stay, with less post-operative hospital stay in after percutaneous surgery.

Kotani et al evaluated VAS for LBP preoperatively and postoperatively on the first, second and seventh days, after two weeks and then at six months and after one year. Both groups showed a rapid decrease in their low back pain on visual analogue scale, which was maintained until two weeks post operative; however, the reduction was more obvious in the MIS-PLF group. The LBP VAS on the third day postoperative in the MIS-PLF group was statistically lower than that in the open-PLF group.

ODI was evaluated preoperatively and post operatively after two, three and six weeks and then at after one year and two years. After two weeks postoperatively, there was a dramatic reduction in ODI value in the MIS-PLF group and there was a statistical significant difference in ODI values between the two groups at two weeks postoperatively. After three months, the MIS-PLF group demonstrated further reduction in ODI to an average of 13.2; however, the average score for the open-PLF group remained 32.1, which was a statistically significant. This difference was maintained after six months, one year and after two years postoperatively.⁽⁴⁾

Elkhatib reported that the mean ODI in both groups decreased postoperatively from mean of 56 preoperatively to a mean of 23 postoperatively⁽⁶⁾.

Kotani et al reported that in his study the LBP vas shows more rapid reduction in the MIS PLF group over the initial seven days than it did with open surgery group with significant difference in the first 3 days, even though both groups demonstrated a rapid reduction in their LBP VAS, which was maintained until day 14⁽⁴⁾.

The better outcomes for postoperative LBP and reduction of ODI in the MIS-PLF group was maintained until two years, suggesting that it has a better mid-term effect on back muscle preservation⁽⁴⁾.

In Kotani study, no major complications were reported, there was no vascular or neural injury and no deep wound infections. However, in the MIS-PLF group there was some surgical difficulty in rod placement during the percutaneous rod placement procedure. In these cases, extended midline skin incisions involving lateral intramuscular exposure was done, but without conversion to a major open procedure and the rods were placed directly on heads of pedicle screws⁽⁴⁾.

Elkhatib reported that on follow-up of patients postoperatively, VAS for leg pain was reduced from a preoperative mean of 65 to a postoperative mean of 45 ($P=0.031$), as it decreased in group A from 65 to 43 while in group B from 61 to 40. VAS for back pain decreased from a preoperative mean of 52 to a postoperative mean of 40 ($P=0.003$), as it was reduced in group A from 55 to 43 while in group B from 54 to 39. As in Kotani study, Elkhatib reported that no major complications related to surgery occurred, such as, additional neurological dysfunction, wound infection or vascular injuries due to screw placement. The postoperative LBP was much less in the percutaneous group with relatively longer time for fusion. Elkhatib reported that percutaneous pedicle

screw fixation technique is minimally invasive technique and is associated with less damage to muscle and skin, less post-operative back pain, less blood loss and quicker return to normal activities. Although, percutaneous fixation technique is safe and efficacious in the management of low grade spondylolisthesis, the complex biomechanics of instrumentation, slow fusion process and high learning curve in addition to increased radiation exposure limits its application in all cases. These results seem to favor PLIF with conventional screw fixation rather than PLIF with percutaneous PSF in the treatment of low grade spondylolisthesis⁽⁶⁾.

In our study, there was no significant difference between the two groups in preoperative VAS for Leg pain, and also there was no significant difference between the two groups in VAS for leg pain immediate post-operative, though there is more improvement in VAS of leg pain in group of open surgery after 6, 12 and 18 months, the difference between the two groups was not significant.

The mean VAS of back pain preoperative in group A and B was 9 and 10 respectively, with no significant difference between the two groups, also there is no significant difference between the two groups in VAS of back pain immediate post-operative, and after 6, 12, and 18 months.

As regarding ODI, there was no significant difference between the groups in ODI preoperative, immediate post-operative, 6, 12, and 18 months.

Ai-Min Wu in 2018 conducted a study on total of 167 patients with single segmental spondylolisthesis treated by TLIF were included, 79 cases in minimally invasive TLIF (MI-TLIF) group and 88 cases in open TLIF group⁽⁷⁾.

He suggested that MI-TLIF is a safe and effective choice in the treatment of lower grade lumbar spondylolisthesis (grade II or

less), and it has advantages of less blood loss, postoperative hospital stay when compared to open TLIF.⁽⁸⁾

Ezequiel et al compared results between open and minimally invasive fusion in lumbar degenerative diseases, VAS was used to evaluate lower back pain and leg pain while ODI was used to assess patients functionally. They also compared between the two groups as regarding intraoperative blood loss, hospital stay, operative time and complications. At the end of their study they concluded that the use of a minimal invasive technique is associated with less blood loss and a shorter hospital stay in comparison to the group that underwent conventional open surgery; however, they observed longer operating times and more X-ray exposure and associated with a higher learning curve than in the conventional surgery. Both surgical techniques led to a significant reduction in radicular and back pain scores, and in the case of the minimal invasive group, the reduction in LBP pain was significantly greater. The ODI score was significantly lower in the minimal invasive group compared to the open surgery group during the 12-months follow-up. The complications like dural tear, wound infection and postoperative neurologic lesion were not related to the type of surgery used⁽⁹⁾.

Conclusions:

The percutaneous fixation of lumbosacral spine in case of degenerative lumbosacral spondylolisthesis has the advantage of being less invasive, with less intra operate bleeding, less operation time and post-operative hospital stay than the conventional open surgery fixation technique. However, both techniques have the same results of improving patients' leg and back pain on the long term but the percutaneous fixation system is much more expensive and its cost exceeds the benefit of being followed by less hospital stay duration.

Conflict of interest:

We declare that there are no conflicts of interest for this paper.

REFERENCES:

1. **Leonid Kalichman & David J. Hunter (2008).** Diagnosis and conservative management of degenerative lumbar spondylolisthesis, *Eur Spine J*: 17:327–335 DOI 10.1007/s00586-007-0543-3 348.
2. **Guigui P., Ferrero E (2017).** Surgical treatment of degenerative spondylolisthesis *Orthopaedics & Traumatology: Surgery & Re-349 search 103: S11–S20* 350.
3. **Charles A. Reitman (2013).** Surgery for Degenerative Spondylolisthesis: Open Versus Minimally Invasive Surgery *Clin Orthop Relat Res* 471:3082–3087 / DOI 10.1007/s11999-013-3171-8 352.
4. **Kotani Y, Abumi K, Ito M, Sudo H, Abe Y, Minami A (2012).** Mid-term clinical results of minimally invasive decompression and 353 posterolateral fusion with percutaneous pedicle screws versus conventional approach for degenerative spondylolisthesis with 354 spinal stenosis. *Eur Spine J*; 21(6):1171-7. doi: 10.1007/s00586-011-2114-x. Epub 2011 Dec 16. PMID: 22173610; PMCID: 355 PMC3366131 356
5. **Mobbs RJ, Sivabalan P, Li J, Wilson P, Rao PJ (2013).** Hybrid technique for posterior lumbar interbody fusion: a combination of open 357 decompression and percutaneous pedicle screw fixation. *Orthop Surg*; 5(2):135-41. doi: 10.1111/os.12042. PMID: 358 23658050; PMCID: PMC6583178.
6. **Elkhatib E (2013).** Posterior Lumbar Interbody Fusion (PLIF) augmented with Pedicle Screw Fixation Versus PLIF augmented with Percutaneous Pedicle Screw Fixation in Low Grade Lumbar Spondylolisthesis, *Egy Spine; J* 6:11-17.
7. **Wu AM, Hu ZC, Li XB, Feng ZH, Chen D, Xu H, Huang QS, Lin Y, Wang XY, Zhang K, Zhao J, Ni WF (2018).**

- Comparison of minimally invasive and open transforaminal lumbar interbody fusion in the treatment of single segmental lumbar spondylolisthesis: minimum two-year follow up. *Ann Transl Med.*; 6(6):105. doi: 10.21037/atm. 2018.02.11. PMID: 29707554; PMCID: PMC5900072.
8. **Mooney, J., Michalopoulos, G. D., Alvi, M. A., Zeitouni, D., Chan, A. K., Mummaneni, P. V., Bisson, E. F., Sherrod, B. A., Haid, R. W., Knightly, J. J., Devin, C. J., Pennicooke, B., Asher, A. L., & Bydon, M. (2022).** Minimally invasive versus open lumbar spinal fusion: a matched study investigating patient-reported and surgical outcomes, *Journal of Neurosurgery: Spine*, 36(5), 753-766. Retrieved Mar 26, 2023, from <https://doi.org/10.3171/2021.10.SPINE211128>
 9. **Ezequiel Gimenez, Montaña Marcelo and Santivañez Raul et al. (2019).** Comparative results between open and minimally invasive fusion in lumbar degenerative disease. *Coluna/Columna.* Vol. 18(4):301-307. DOI: 10.1590/s1808-185120191804222785.

تثبيت الفقرات القطنية العجزية عن طريق الجلد في مقابل فتح اسفل الظهر في حالات التزحزح الفقاري التنكسي

محمد جلال محمد ومحمد عبد الله الورداني وشفيق تحسين الملا و أحمد رشدي فرغلي و عمر الفاروق احمد

قسم جراحة المخ والأعصاب كلية الطب جامعة عين شمس

يعد التزحزح الفقاري التنكسي ما بين الفقرات القطنية والفقرات العجزية من أكثر الاسباب شيوعا لالام اسفل الظهر والام الساقين وفي حالة فشل الاساليب العلاجية التحفظية في الحصول على نتائج مرضية للمريض يصبح التدخل الجراحي في صورة تثبيت الفقرات القطنية العجزية أكثر طرق العلاج فعالية في تخفيف الام الظهر والساقين يتضمن التدخل الجراحي المعتاد في تثبيت الفقرات القطنية العجزية اجراء جرح طولي بمنتصف اسفل الظهر مع فصل واسع للعضلات تحت السمحاق المغلف للفقرات القطنية و العجزية و هو ما تم استخدامه لعقود كتقنية لتثبيت الفقرات القطنية العجزية ،و بالرغم من النتائج الجيدة التي يحققها في تخفيف الام الظهر و الساقين و التحام الفقرات الا انه كان يرتبط بالام حاده باسفل الظهر بعد اجراء الجراحة بالاضافة الى فقد كمية كبيرة من الدم اثناء الجراحة و كذلك يتطلب ضرورة اقامة المريض بالمستشفى لفترة طويلة بعد اجراء الجراحة

ومع تطور اساليب التدخل الجراحي المحدود في تثبيت الفقرات القطنية و العجزية، اتاح نظام تثبيت الفقرات عن طريق الجلد فرصة جديدة للتقليل من تدمير الانسجة اثناء الجراحة بالاضافة الى تقليل فترة التعافي بعد الجراحة و ايضا الى تحسين مدى الرضا لدى المرضى

وفي هذا المجال، اقيمت العديد من الدراسات العلمية للمقارنة بين تثبيت الفقرات باستخدام طريقة الفتح الجراحي المعتاد لاسفل الظهر وبين تثبيت الفقرات باستخدام نظام تثبيت الفقرات عن طريق الجلد في حالات الاصابات و الامراض التنكسية هذه الدراسة، نقوم بالمقارنة بين هاتين الطريقتين فيما يتعلق بالتقنية المستخدمة اثناء الجراحة، وكذلك مقارنة المضاعفات والصعوبات اثناء الجراحة، بالاضافة الى المقارنة بين نتائج ما بعد الجراحة في الطريقتين ومدى رضا المرضى عن النتائج بعد الجراحة

في هذه الدراسة، نقوم بالمقارنة بين هاتين الطريقتين فيما يتعلق بالتقنية المستخدمة اثناء الجراحة، وكذلك مقارنة المضاعفات والصعوبات اثناء الجراحة، بالاضافة الى المقارنة بين نتائج ما بعد الجراحة في الطريقتين ومدى رضا المرضى عن النتائج بعد الجراحة

يتميز تثبيت الفقرات القطنية عن طريق الجلد انه اقل توغلا في الانسجة، كما انه يقلل من فقد الدم اثناء الجراحة بالاضافة الى قصر مدة الجراحة مقارنة بالتدخل الجراحي التقليدي وكذلك يقلل من فترة الحجز بالمستشفى بعد اجراء الجراحة

مع ذلك فان الطبيعة التنكسية لمرض التزحزح الفقاري التنكسي والتي ينتج عنها ضيق بالقناة العصبية القطنية نتيجة لتضخم الاربطة والمفاصل ما بين الفقرات بالاضافة لتزحزح احدى الفقرات القطنية فوق الاخرى والذي ينتج عنه ضيق بمخارج الاعصاب القطنية مما يتطلب اجراء تدخل جراحي محدود لتوسيع القناة العصبية القطنية وتوسيع مخارج الاعصاب القطنية وكذلك تحفيز التحام اجسام الفقرات القطنية ببعضها باستخدام قفص كربوني يوضع بين الفقرات المتأثرة بعد تثبيتها باستخدام المسامير عن طريق الجلد مما يضيف الى زمن الجراحة و يزيد من التوغل في الانسجة و و بالتالي يستدعي القيام بهذا الاسلوب الجراحي المزيد من التدريب للقيام بهذا التدخل للمحدود بالكفاءة المطلوبة و هو ما يستلزم منحى تعليمي اعلى من التدخل الجراحي التقليدي

ومن خلال متابعة المرضى في المجموعتين ما بعد اجراء الجراحة في الشهر السادس والثاني عشر والثامن عشر، ابدى المرضى في كلا المجموعتين استجابة جيدة للتدخل الجراحي من حيث التحسن في الام اسفل الظهر والام الساق وكذلك استعادة القدرة على المستخدم لتقييم (ODI) القيام بالانشطة اليومية المعتاده، ولم يظهر فرق مؤثر احصائيا بين المجموعتين وفقا لمقياس الالم المستخدم لقياس شدة الالم في الظهر والساق قبل الجراحة وبعدها (VAS) المرضى وظيفيا قبل الجراحة وبعدها وكذلك مقياس

وفقا لهذه الدراسة، فإن كلا النهجين الجراحيين فعالان في علاج التزحزح الفقاري التنكسي، إلا أن تقنية تثبيت الفقرات القطنية عن طريق الجلد تعد أكثر تكلفة وتتطلب منحى تعليميًا أعلى مع الحاجة إلى اجراء تدخل جراحي اضافي محدود لإزالة الضغط عن الأنسجة العصبية وإدخال القفص القطني من أجل مزيد من الالتحام للعمود الفقري، مما يجعل تقنية الجراحة المفتوحة التقليدية تقنية جيدة وفعالة لعلاج الانزلاق الفقاري التنكسي