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Short Communication

Lumbar Disc Herniation Comparative Study of Surgical Techniques (Standard *vs.* MIS) in Patients with BMI>35%

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Abstract

Introduction: Describe obesity as a risk factor for presenting intra and post-spinal surgery complications in degenerative disorders (Herniated Disc), structuring a protocol for patients who have degenerative disorders of the lumbar spine and who will undergo a surgical procedure such as transpedicular instrumentation.

Materials and methods: A case-control study was carried out in patients diagnosed with lumbar disc herniation, treated surgically using instrumentation in the period between 2014 to 2016 Standard Technique (30 patients) BMI>35%, and another group of 30 patients from 2017 to 2019 operated through minimally invasive surgery.

Results: Incision 12 cm *vs.* 6 cm; Surgical Time1 level 60-90 minutes *vs.* 45-60 minutes; Blood loss 300-500 CC *vs.* 30-60 CC; Fluoroscopy 1 *vs.* 10; Patient discharge 2-4 days *vs.* 1-2 days.

Conclusion: After comparing results between patients with BMI>35% operated by Conventional *vs.* MIS surgery. There are no significant differences between; Infection and discharge from the patient. There is in favor of the MIS in: Surgical incision; Blood loss during intervention; Labor Reincorporation ($p<0.05$). In favor of Standard surgery in ionic Radiation (Shots) $p<0.005$. From these results, the MIS Technique in patients with BMI>35% is the choice in our Unit.

Keywords: Obesity; Risk factor; Fusion; MIS; Lumbar spine disc

Introduction

Obesity is a risk factor for multiple diseases, including low back pain and its complications during the surgical procedures that involve it. According to the National Institute of Health (NIH), overweight is considered when the Body Mass Index (BMI) is between 25 to 29.9, obesity when it is 30 to 39.9 and morbid obesity when it is greater than 40 [1].

Low back pain is one of the reasons for consultation in our hospital and also an important cause of disability, which most of the time conservative management is not enough, requiring surgical management. In any surgical procedure there is the possibility of complications, so it is necessary to know how to select the patient, the indications and the procedure to be performed, therefore it is important to consider that being overweight or obese could be related to the presence of complications during or after surgery.

Having knowledge of some complications and sequelae, fusion continues to be used as a good resource in the treatment of instability, therefore the importance of knowing the risk factors so that this does not take place satisfactorily. There are multiple surgical techniques and treatment options, each one must be personalized to each patient, and it is important to know that a large percentage of patients who undergo spinal surgery are obese or at least overweight.

One of the complications frequently observed in spinal surgery that is well documented is pseudoarthrosis, we can define this as the lack of continuity in the trabecular and cortical bone between the graft and adjacent vertebrae, which allow local mobility. Unwanted one year after surgery and clinically presenting with pain, neurological impairment, progressive deformity, or implant rupture [2].

Materials and Methods

A comparative study was performed among patients operated between 2014-16 with the standard technique with a total of 30 patients with BMI>35%. The female sex prevailed over the male and another group of 30 other patients operated through MIS between 2017-19.

Results

The analysis of both groups allowed us to verify that the Incision in the St Group was 12 cm *vs.* 6 cm in the MIS group; The Surgical Time of 1 level with the St technique was 60-90 minutes *vs.* 45-60 minutes in the MIS group; Blood loss was 300-500 cc *vs.* MIS technique 30-60 cc. fluoroscopy; in the St technique it was 1 shot *vs.* 10 shots with the MIS technique. Patient discharge between 2-4 days with the St *vs.* Technique and one two days with the MIS technique.

Discussion

Obesity is an important risk factor for presenting multiple complications, including a high risk of developing pseudoarthrosis or failure in degenerative spine surgery. In our study, it was observed that obese patients have 5.9 (95% CI: 1.63-22.4) times more risk of developing pseudoarthrosis ($p<0.05$). So, if there are differences between the two groups to present pseudoarthrosis. It could be observed, as well as it has been mentioned in different studies, obese patients present more bleeding during surgery.

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Most of the studies carried out that talk about obesity and spinal surgery are inconclusive, firstly because they only mention complications during the procedure, such as increased bleeding, difficult surgical technique, etc., but without reporting the frequency or the strength of association between obesity and pseudoarthrosis or failure in the evolution after degenerative spine surgery.

Obesity is a preventable factor from the consultation, since from its detection it can be managed and thus avoid subsequent complications, therefore when observing patients with this factor, the risk of presenting complications to the patient must be explained and the procedure deferred until the body mass index has been reduced.

The development of clinical guidelines is suggested where obesity is specified as a risk factor, which will allow optimizing resources and, consequently, obtaining better post-surgical results.

Spinal surgery to try to improve low back pain has been shown to have a high failure rate in patients who have a BMI of 40 or higher. Among the complications we have a greater possibility of infection of the surgical wound, pneumonia, deep vein thrombosis and reoperations for events such as recurrent herniated disc. Patel et al found a correlation between a high BMI and the frequency of complications in arthrodesis of the lumbar spine [5]. On the other hand, there are series of spinal surgery in obese patients in whom no increase in complications has been observed and the reports are more favorable [6].

The efficacy of surgery in the lumbar spine in patients with high BMI seems to vary according to the type of surgery (decompression or fixation) and the indication (radiculopathy or low back pain located in the midline). The most consistent peri-operative complication is the presence of impaired wound healing. Preliminary experience of Minimally Invasive Surgery (MIS) in patients with elevated BMI is promising regarding its efficacy and complications. Park et al. [7] demonstrated that there was no difference in complications related to BMI in a series of 77 patients who underwent discectomy, laminectomy, and fixation using MIS. The decrease in complications related to MIS in obese patients appears to be related to minimal soft tissue aggression and small but precisely guided trajectories (Figures 1-3).

Advances in radiological technology have facilitated obtaining adequate images of the spine in the MIS, in patients with morbid obesity. With the MIS, it has been possible to increase the chances of success, especially in fixations, which may be related to the early postsurgical mobilization and the least degree of postoperative pain.

Figure 1: MRI lumbar Disc herniation in patients of Group MIS.

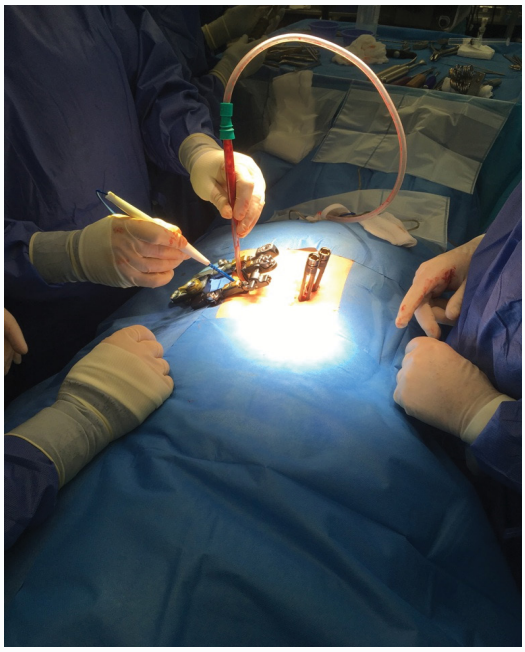

Figure 2: *In vivo* MIS surgery.

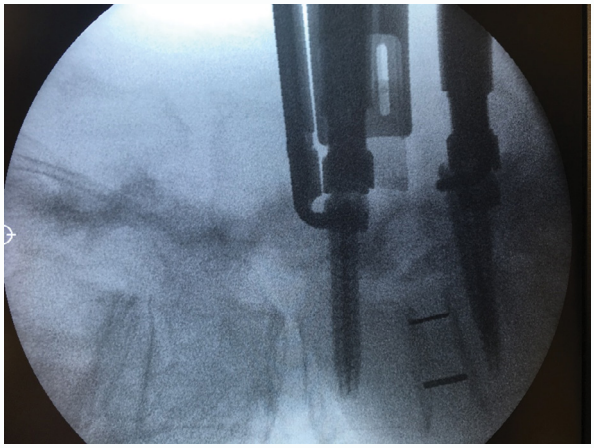

Figure 3: RX of MIS Arthrodesis.

In relation to ionizing radiation; Annual exposure to 5 REM (5,000 mREM) is currently allowed. Such a 1-level MIS intervention offers an exposure between 10 and 40 mREM.

Exposure to radiation can be decreased if the Rx Emitter is under the table. Use memory devices (since the shooting time is reduced by half 24 "against 59" or if used: Leaded apron, Thyroid protection, Protective glasses<90%, Anti-radiation glove<40%.

Conclusion

After the study carried out, it can be concluded that; using the MIS technique: Better cosmetic results thanks to small incisions that heal better. Less blood loss during surgery less muscle injury, making recovery faster and less need for rehabilitation. Lower risk of infection, because there is much less tissue exposed during the intervention. Less postoperative pain derived from minimal t6issue injury. Less need for pain relievers and rehabilitation in the weeks after the intervention.

In addition, a statistically significant result was obtained in favor of standard surgery in the number of shots with the image intensifier and in favor of MIS: Surgical incision; Blood loss during intervention; Labor Reincorporation ($p<0.05$). After these results, it is the choice to operate on obese patients with Lumbar disc herniation with BMI>35%.

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