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Recurrence and intensity of pain after inguinal repair with the Cisneros technique under local anesthesia

Recurrencia e intensidad del dolor posthernioplastía inguinal con la técnica Cisneros bajo anestesia local

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Palabras clave:
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ABSTRACT

Introduction: Recurrence of inguinal hernia has decreased with Lichtenstein and Mesh-Plug hernioplasties, although early postoperative pain continues to be a major issue. Our objective is to describe the recurrence and intensity of inguinal post herinoplasty pain with the Cisneros technique under local anesthesia. **Material and methods:** Retrospective study of a series of cases in a period of seven years with consecutive patients operated on inguinal hernia with Cisneros technique under local anesthesia. We analyzed, among other variables, the surgical time, postoperative pain intensity, postoperative complications, and recurrence of the hernia. **Results:** We operated on 204 patients with an average age of 53 ± 15 years (18-85). The surgical time was 61 ± 11 minutes for unilateral hernias and 117 ± 7 for bilateral. Average hospital discharge was 2.2 ± 0.3 hours, with mild pain in 74% of cases. There was no recurrence at 50 ± 25 months of follow-up. In addition, between obese and non-obese patients there was no significant difference in relation to the intensity of immediate postoperative pain. **Conclusions:** The Cisneros hernioplasty with local anesthesia is a technique with low recurrence and mild immediate postoperative pain.

RESUMEN

Introducción: *La recurrencia de la hernia inguinal ha disminuido con las hernioplastías de Lichtenstein y Mesh-Plug, aunque el dolor postoperatorio temprano continúa siendo un tema de importancia. Nuestro objetivo es describir la recurrencia y la intensidad del dolor posthernioplastía inguinal con la técnica Cisneros bajo anestesia local.* ***Material y métodos:*** *Estudio retrospectivo de una serie de casos en un periodo de siete años con pacientes consecutivos operados de hernia inguinal con técnica Cisneros bajo anestesia local. Se analizaron, entre otras variables, el tiempo quirúrgico, intensidad del dolor postoperatorio, complicaciones postoperatorias y recurrencia de la hernia.* ***Resultados:*** *Se operaron 204 pacientes con edad promedio de 53 ± 15 años (18-85). El tiempo quirúrgico fue 61 ± 11 minutos para hernias unilaterales y 117 ± 7 para bilaterales. El egreso hospitalario promedio fue en 2.2 ± 0.3 horas, con dolor leve en 74% de los casos. No hubo recidiva en 50 ± 25 meses de seguimiento. Además, entre pacientes obesos y no obesos no hubo diferencia significativa en relación con la intensidad del dolor postoperatorio inmediato.* ***Conclusiones:*** *La hernioplastía con técnica Cisneros bajo anestesia local tiene baja recurrencia y leve dolor postoperatorio inmediato.*

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INTRODUCTION

Inguinal hernia (IH) repair is probably the most frequently performed surgical procedure. Currently, the surgeon has several tension-free open and laparoscopic options, but recurrence continues to be one of the most important complications. Among the most frequently used open procedures, the Mesh-Plug technique has a recurrence of 0.8%,[1] while with the Lichtenstein operation it is of 0.2%.[2] Based on the combination of principles that support these two techniques, Cisneros[3] suggests a hybrid repair that, theoretically, covers all the points of failure of both procedures and prevents their recurrences.

On the other hand, although local anesthesia (LA) was first proposed for the repair of IH

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more than a century ago and it is currently considered the anesthetic method of choice for surgical treatment, its use continues to be low in specialized centers in Mexico and other countries.[4] Its advantages, compared with regional and general anesthesia, include greater patient satisfaction and safety with fewer symptoms of nausea, vomiting, urinary retention, and length of hospital stay. Also, it prolongs postoperative analgesia, facilitates the early mobilization of patients, and has a better cost-benefit ratio.[5] The object of this report is to describe the intensity of immediate postoperative pain and the frequency of recurrence of IH repair with this technique under LA and sedation. It was also determined, as additional information and as preliminary results, if there was a difference between obese and non-obese patients concerning the intensity of immediate postoperative pain.

MATERIAL AND METHODS

Between January 11, 2010, and October 13, 2017, a series of case records of the Regional Hospital "Dr. Valentín Gómez Farías", ISSSTE, Zapopan, Jalisco, Mexico, from a single surgical group, was analyzed for open inguinal hernioplasty. Inclusion criteria were patients of both sexes, older than 17 years, operated electively with the hybrid tension-free Cisneros technique with local anesthesia and sedation, with unilateral or bilateral hernias. Exclusion criteria were inguinal hernias with suspected incarceration or strangulation, as well as those scheduled with some other concurrent intervention and an allergy to any medication planned to be administered. Variables analyzed were age, gender, ASA (American Society of Anesthesiologists) index, body mass index (BMI), hernia laterality, hernia type, surgical time, onset time for postoperative perambulation, the intensity of postoperative pain, intra-hospital post-anesthetic complications (nausea and/or vomiting), length of hospital stay, patient satisfaction with the procedure, early surgical complications (0-30 days), time of postoperative observation and hernia recurrence. After eliminating the five cases with bilateral inguinal hernia (all of them obese and, therefore, the reason for selection bias) from the total study population, patients were divided by their BMI to assess the intensity of immediate postoperative pain in non-obese (< 30 kg/m^2) and obese (> 30 kg/m^2) patients.[6] Pain intensity was assessed with the 11-point visual analog scale (VAS) (where 0 = no pain and 10 = maximum pain) during ambulation in the first two or three hours of the immediate postoperative period, in which 1-3 was mild pain, 4-6 moderate, and more than 7 intense.

Surgical technique

Performed by a single surgical group, the technique was standardized in all patients. Preoperative evaluation was done, including laboratory tests (total blood cell count, blood chemistry and coagulation tests) and cardiopulmonary evaluation in patients over 40 years, as well as the request to sign a letter of informed consent regarding the surgical and anesthetic act. The patients were admitted two hours before the operation with an eight-hour fasting time and were given a single dose of IV antibiotic (1 g of ceftriaxone or 500 mg of levofloxacin, depending on the availability of the drug) as prophylaxis one hour before surgery. Patients were monitored by electrocardiogram, pulse oximeter, and vital signs.

In all cases, intravenous sedation (fentanyl, midazolam, and propofol) was administered by an anesthesiologist and local anesthesia by the surgeon, with a mixture of 20 ml of lidocaine 2% with epinephrine 1:200,000 and 20 ml of ropivacaine 7.5%, diluted in 40 ml of 0.9% saline. Loco-regional block anesthesia of the ilioinguinal and iliohypogastric nerves was used,[7] as well as local infiltration of the operative field for each anatomical plane.[8] The inguinal canal was approached through a 5 cm long skin incision. In indirect hernias, the hernial sac was invaginated and a hand-made polypropylene heavy mesh cone was inserted through the internal inguinal ring, which was attached with three to four 2-0 polypropylene stitches to the surrounding muscle structures following the principles of Rutkow and Robbins.[9] Subsequently, another 7 × 15 cm mesh of the same material was placed with the Lichtenstein technique.[10] In direct hernias, the transversalis fascia was opened, surrounding the

Table 1: Preoperative and transoperative characteristics of the study population (n = 204).

Variable	
Age (years)	53 ± 15
Sex	
Male	170 (83)
Female	34 (17)
BMI (kg/m^2)	30 ± 2
Inguinal hernia	
Unilateral	199 (97)
Bilateral	5 (3)
ASA	
I	86 (42)
II	118 (58)
Nyhus classification	
II	61 (30)
IIIA	78 (38)
IIIB	65 (32)
Surgical time (minutes)	63 ± 14

Values: median ± SD and number (%).
BMI = Body Mass Index
ASA = American Society of Anesthesiologists.

sac with electrocautery so that the mesh cone remained in the preperitoneal space and was fixed with multiple separate 2-0 polypropylene points to the margins of the defect and the surrounding healthy tissue (transversalis fascia). Finally, the flat mesh was placed on the inguinal floor as previously described with indirect hernias. The Nyhus classification for hernia types was used.[11] Patients were discharged home directly from the recovery room two to three hours after the procedure if they had no side effects attributable to LA and with normal perambulation, vital signs, and urination. Patients were interviewed at the end of the procedure to subjectively assess their degree of satisfaction with the operation under LA (unsatisfactory, satisfactory and very satisfactory). Oral analgesia was prescribed for three to five days (paracetamol + NSAIDs) and they were allowed to return to their usual activities five to seven days after the intervention. Controls were done seven days postoperatively for the removal of stitches, as well as at 30, 60, 120, and 180 days, and then every year until completing a five-year follow-up. Those patients who did not attend their hospital appointment were contacted by telephone to find out about any complications.

For statistical analysis, data are described as numbers, proportions (%), and means ± standard deviation (SD). Categorical variables were analyzed with Pearson's χ^2 test and, when appropriate, with Fisher's exact test. For the comparison of means and normally distributed data, the Student's t-test was applied for independent samples, or the Welch test when applicable. Two-tailed tests with a statistical significance of $p \leq 0.05$ and 95% confidence intervals (CI) were applied in all cases. For the analysis, a statistical package for the Social Sciences (SPSS® 19.0; SPSS, Chicago, IL, USA) for Windows™ was used.

RESULTS

During the seven-year study period, 204 patients who met the inclusion criteria were reviewed. Three patients with inguinal hernias were excluded from the final analysis due to strangled small intestine loops. The average age of the 204 patients was 53 ± 15 years (range: 18-85), 170

Table 2: Postoperative characteristics of the study population (n = 204).

Variable	
Time to perambulation (hours)	2.2 ± 0.3
Intensity of pain (AVS)*	
Mild	151 (74)
Moderate	50 (24)
Severe	3 (2)
Postoperative satisfaction	
Not satisfactory	0 (0)
Satisfactory	33 (16)
Highly satisfactory	171 (84)
Follow-up time (months)	50 ± 25

Values: median ± SD and number (%).
AVS = Analogous Visual Scale
* Evaluated in the 12 hours before hospital discharge.

Table 3: Obese and non-obese unilateral inguinal hernia patients.

Variable	Non-obese group (n = 79)	Obese group (n = 120)	p	CI 95%
Age (years)	52 ± 20	52 ± 11	0.845	-8.5
Surgical time (minutes)	58 ± 12	64 ± 9	0.001	-5.8
Time to perambulation (hours)	2.1 ± 0.4	2.2 ± 0.4	0.871	-14.2
Intensity of pain (AVS)*				
Mild	64 (81)	84 (70)	0.123	
Moderate	15 (19)	33 (28)		
Severe	0 (0)	3 (2)		

Statistical significance, $p \leq 0.5$.
CI = Confidence interval
Values: median ± SD and number (%).

(83%) were men, and 34 (17%) women, with a BMI of 30 ± 2 kg/m^2 (range, 24-34). IH was unilateral in 199 (97%) and bilateral in 5 (3%) cases, indirect hernias in 126 (62%), and direct hernias in 78 (38%) patients. In 86 patients (42%) the ASA physical state was I, and in 118 (58%) it was II. Ceftriaxone as antibiotic prophylaxis was administered in 192 patients (94%) and levofloxacin in 12 (6%). The mean injected volume of LA was 45 ± 18 ml (range: 30-60 ml) in the case of unilateral IH and a maximum total of 80 ml in bilateral IH. In no case was there a need to convert the anesthetic technique to general or regional, due to failure in LA. The surgical time was 63 ± 14 minutes (range: 40-125), 61 ± 11 minutes (range: 40-90) for unilateral hernias, and 117 ± 7 minutes (range: 110-125) for bilateral hernias *(Table 1)*. Post-anesthesia nausea and/or vomiting occurred in 20 patients (10%) within the first six hours after surgery, they responded satisfactorily to ondansetron. The start of the postoperative perambulation was on average 2.2 ± 0.3 hours, with a mild intensity of pain at the surgical site in 151 (74%), moderate in 50 (24%), and intense pain in three cases (2%). 84% of the patients reported feeling highly satisfied. Two surgical complications occurred within the first postoperative 30 days, a hematoma and a seroma (1% of the studied population), which resolved completely before the second week after surgery. During the average follow-up time of 50 ± 25 months (range: 4-92) *(Table 2)*, there were no hernia recurrences. *Table 3* shows no significant difference between groups of obese and non-obese patients for age, postoperative walking time, and postoperative pain intensity ($p = 0.845$, $p = 0.871$, and $p = 0.123$, respectively).

DISCUSSION

According to the guidelines of the European Hernia Society, LA should be considered for open elective hernioplasty in adult patients with primary, unilateral and reducible IH, including obese, elderly, and patients with ASA III/IV. However, this may not be possible in anxious young patients, those with morbid obesity or incarcerated hernias.[12] Cisneros et al.[13] repaired 854 IH with their technique under epidural anesthesia, 822 (96.2%) primary hernias, of which 85 were bilateral. Their average surgical time was 40 minutes, but they did not distinguish whether hernias were unilateral or bilateral. Their average hospital-stay length was four hours in 98.5%. Postoperative pain at 72 hours was 1 to 4 on the VAS, without recurrence at 69.8 months (range: 1-110) of follow-up. In contrast, the mean surgical time in our series was longer, 61 ± 11 minutes for unilateral hernias, which we attribute to the time required by the surgeon to apply LA throughout the procedure, but which is similar to the 56 minutes reported in the medical literature for inguinal hernioplasties

with other techniques under LA.[14] As expected, the operative time was longer (117 ± 7 minutes) for bilateral hernias, but it was shown that Cisneros' operation can be performed with LA in this type of hernia as it is done with other surgical techniques.[15] The hospital discharge of our patients was almost half the time reported by Cisneros et al. (2.2 vs. 4 hours, respectively) which, we think, is a clear result of the anesthetic procedure used. Postoperative pain in IH surgery can prolong the length of hospital stay, lead to unplanned hospital re-admissions, and delay return to daily activities. Callesen et al.[16] reported moderate to severe pain in 60% of patients on the first day after repair. In this series we obtained better results, since postoperative pain at the beginning of ambulation was of slight intensity (EVA 1-3) in 74%, and moderate (EVA 4-6) in 24% of the patients, which may be related to the postoperative analgesia of almost 24 hours' after LA.[17] This facilitated the discharge of our patients practically without pain, as described by other authors.[18] No statistically significant difference was observed over time baseline for ambulation and intensity of postoperative pain in patients with and without obesity ($p = 0.871$ and $p = 0.123$, respectively). The severe pain that occurred in the early postoperative period in three cases (2%) was attributed to inadequate infiltration of the local anesthetic by planes or to genetic factors inherent to these patients. However, our results were inferior to those of Vázquez-Mellado et al.,[4] since these authors reported "mild to moderate" pain intensity in 98% of their patients operated with LA, but did not describe the pain measurement scale used. Ten percent of the patients had nausea and/or vomiting, less than the 30-50% reported with general or regional anesthesia.[19] Finally, as in the series by Cisneros et al., there was no hernia recurrence in our patients during a similar average observation time (69.8 months with range 1-110 vs 50 months with range 4-92, respectively). Knowledge and the correct execution of open tension-free surgical techniques for the repair of IH are essential to provide optimal treatment, to obtain the best results in the rate of recurrences, and to reduce the postoperative time of incapacity for work.[3] We consider that for the repair of IH, the tension-free hybrid technique of "Cisneros" with LA is most appropriate. Despite this, the use of LA continues to be rare in our country for hernia repairs of any kind. Additional studies are required to reaffirm or invalidate these findings.

CONCLUSIONS

In our study, there was no recurrence of the inguinal hernia with the hybrid "Cisneros" technique under LA and sedation. In most cases, the intensity of immediate postoperative pain was mild to moderate. We consider that this inguinal repair technique is feasible in outpatient surgical centers, hospitals of any level, and/or with limited material resources.

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