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Original Research Article

Effect of ilioinguinal/iliohypogastric nerve block with dexmedetomidine/ropivacaine on quality of life for elective open unilateral inguinal hernia repair in adults: a Mexican multicentric, randomized controlled trial study

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ABSTRACT

Background: Hernia surgery is one of the most frequent procedures performed worldwide, with a prevalence of postoperative groin pain above 30%. Quality of life in hernia surgery has been poorly studied. Objective was to determine the effect on the quality of life of dexmedetomidine as a local anesthetic adjuvant in elective unilateral open inguinal repair.
Methods: A multicenter, prospective, randomized, single-blind, cases and controls study was carried out that included 46 male patients between 18 and 85 years scheduled to undergo elective unilateral open inguinal repair at the north central PEMEX Hospital between November 2021 and November 2022. Sample was divided in two groups, Group A for ilioinguinal and iliohypogastric nerve block with dexmedetomidine/ropivacaine and Group B ropivacaine alone, SF-36 was measured in preoperative consult and a second measure 90 days after surgery, differences between first and second measure were analyzed, and statistical analysis was performed with the statistical software IBM® SPSS© statistics.
Results: Significant difference in pre-test/post-test shifts between groups in physical functioning (PF), role limitation due to physical health (RLPH), emotional well-being (EW-B), and health change (HC) in favor of group A.
Conclusions: The ilioinguinal and iliohypogastric nerve block with dexmedetomidine/ropivacaine improves life quality in hernia surgery patients.

Keywords: Hernia surgery, Quality of life, Regional anesthesia, Ilioinguinal and iliohypogastric nerve

INTRODUCTION

Inguinal hernia repairs are one of the most frequent surgical procedures performed. More than 20 million inguinal hernia operations are performed worldwide every year.[1] Inguinal hernia courses are symptomatic in most cases; a minority is asymptomatic, requiring surgical management in 70% of these cases within the first five years from diagnosis, accordingly surgical management is mandatory.[2] The prevalence of postoperative groin pain is 30-75% despite management strategies and 5-10% of patients with chronic pain.[3,4]

The ilioinguinal and iliohypogastric nerve block is an effective procedure that recently proved no significant complications.[5] Dexmedetomidine is a selective alpha$_2$ agonist that can be used as a local anesthetic additive that improves pain control and exerts axonal neuroprotection.[6]

Until now, no studies have been published that measure life quality after ilioinguinal and iliohypogastric nerve

block with dexmedetomidine as a local anesthetic adjuvant in open inguinal hernia repair.

Objective

The objective of this trial was to determine the effect on the quality of life of dexmedetomidine as a local anesthetic adjuvant in patients between 18 and 85 years scheduled to undergo elective unilateral open inguinal repair.

METHODS

Taskforce conducted a multicenter, prospective, randomized, single-blind, cases and controls study at the North Central PEMEX Hospital between November 2021 and November 2022.

After explaining the investigation protocol, benefits, risks, and probable complications, informed consent was obtained prior to admission. Study registration in the local clinical trial after approval from the institute's ethical committee with reference: DCAS-SSS GSM-HCN-INV-044. The study was conducted in consistent with the Declaration of Helsinki. Patient anonymity was preserved rigorously.

The study included a total of 46 male patients between 18 and 85 years scheduled to undergo elective unilateral open inguinal repair. Patients allergic to any of the study drugs, known chronic pain, and chronic use of analgesics were excluded.

Four surgical centers participated in the study. Standardized inguinal hernia repair to tension-free technique and a flat mesh ranging from 10 to 15 cm in diameter of heavy-weight polypropylene (>75 gm/m^2) were used for all repairs. Anesthetic procedure and drug doses were standardized with the cooperation of the anesthesiology department, subarachnoid single-dose for a lumbar block on L_1-L_2 level with 10 milligrams hyperbaric bupivacaine in addition to 25 micrograms fentanyl. An epidural catheter was placed for the ministration of lidocaine/epinephrine 100 milligrams single-dose and the complementary intraoperative intravenous medication were 6 milligrams dexamethasone, 8 milligrams ondansetron, 1 gram paracetamol and 100 milligrams tramadol.

Patients were randomized into two groups using OxMar® software, one group for dexmedetomidine/ropivacaine (group A) and the other for ropivacaine (group B) ilioinguinal/iliohypogastric nerve block. Patients in group A received 75 milligrams of ropivacaine 7.5 mg/ml and 25 micrograms of dexmedetomidine as an additive diluted with 10 milliliters of normal saline solution. Group B received 75 milligrams of ropivacaine 7.5 mg/ml diluted with 10 milliliters of normal saline solution. Single-blind was ensured by not allowing the patients and the surgeon who performed the operation the infiltration prepare.

Ilioinguinal/iliohypogastric nerve block was performed by identifying anatomical landmakrs and after loss of resistance to the needle.

Life quality was assessed using the 36-item short form survey (SF-36) questionnaire. Before surgery the SF-36 was administered by personal interview to obtain the basal measurement and 90 days after surgery SF-36 was repeated.

Statistical analysis

Statistical analysis was performed with the statistical software IBM® SPSS© Statistics. Continuous variables were compared using independent T-test or Mann-Whitney U-test. Categorical variables were compared using the Chi-square test or Fisher´s exact test. P value of less than 0.05 was considered statistically significant.

RESULTS

A total of 46 patients were included and, randomized into two groups of 23 patients each. Respecting the distribution of hospitals 17.39% (n=8) were treated in north central PEMEX Hospital, 13.04% (n=6) in Regional PEMEX Hospital Reynosa, 43.47% (n=20) in General PEMEX Hospital Veracruz and 26.08% (n=12) in General PEMEX Hospital Tula (Figure 1). A total of 46 patients were included in the study which 46 correspond to male patients (100%) between 42 and 89 years old with a median age of 65 years, 60.86% (28) left inguinal hernia, 36.95% (17) right inguinal hernia, 45.65 % (21) defects wider than 3 centimeters, 23.91% (11) smaller than 3 centimeters, and 30.43% (14) smaller than 1.5 centimeters (Table 1).

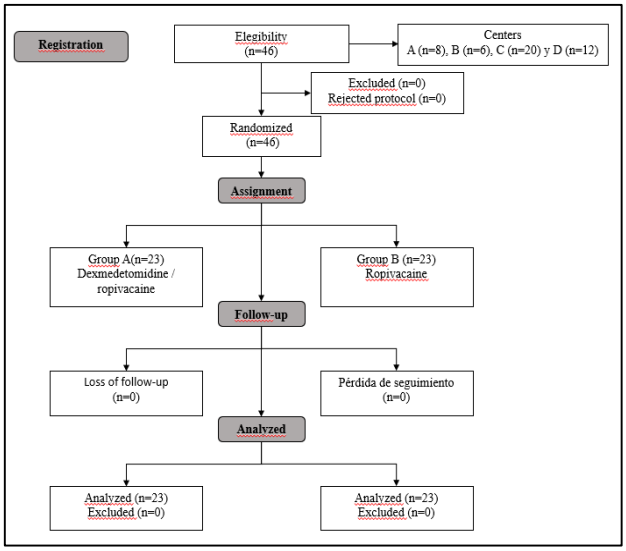

Figure 1: COSORT flow chart on randomization and allocation of patients.

Table 1: Demographics and patient characteristics.

	N=46
Age	65.63±15.071
Gender	
Male	1.0 (n=46)
Female	0.0 (n=0)
LIH	0.60 (n=28)
RIH	0.36 (n=17)
W>3	0.45 (n=21)
W<3	0.23 (n=11)
W<1.5	0.30 (n=14)

Note: LIH: Left Inguinal Hernia, RIH: RIH, W>3: defects wider than 3 centimeters, W<3: defects smaller than 3 centimeters and wider than 1.5 centimeters; W<1.5: defects smaller than 1.5 centimeters

We found no statistically significant difference between groups in the SF-36 pre-test overall (Mann-Whitney U = 0.143, p>0.05 two-tailed) (Table 2). We observed a significant difference in pre-test/post-test shifts between groups in physical functioning (PF), role limitation due to physical health (RLPH), emotional well-being (EW-B), and health change (HC) in favor of group A.; however, no difference was no proof in the overall (OA) pre-test/post-test shifts (Table 3).

Table 2: Comparison between measured variables in the SF-36 pre-test.

Variable	Group A	Group B	Student t-test	Mann-Whitney U-test
PF	0.65±0.10	0.84±0.27	p= 0.308	-
RLPH	-	-	-	p=0.143
RLEP	-	-	-	p=0.036*
E/F	-	-	-	p=0.25
EW-B	-	-	-	p=0.071
SF	-	-	-	p=0.571
P	-	-	-	p=0.25
GH	-	-	-	p=0.25
HC	0.50±0.25	0.55±0.20	p=0.77	-
OA	-	-	-	p=0.143

Note: PF: Physical functioning, RLPH: Role limitations due to physical health, RLEP: Role limitations due to emotional problems, E/F: energy/fatigue, EW-B: emotional well-being, SF: social functioning, P: pain, GH: general health, HC: health change, OA: overall. *Significant difference.

Table 3: Comparison between difference in pre-test and post-test of measured variables in the SF-36 questionnaire.

Variable	Group A	Group B	Student t-test	Mann-Whitney U-test
PF	0.18±0.10	-0.82±0.04	p=0.002*	-
RLPH	-	-	-	p=0.036*
RLEP	0.50±0.44	-0.16±0.06	p=0.11	-
E/F	0.00±0.00	-0.10±0.09	p=0.97	-
EW-B	0.24±0.16	-0.16±0.66	p=0.002*	-
SF	0.00±0.00	-0.11±0.11	p=0.97	-
P	0.00±0.00	0.04±0.25	p=0.80	-
GH	0.23±0.23	-0.01±0.06	p=0.19	-
HC	0.50±0.25	0.08±0.13	p=0.019*	-
OA	-	-	-	p=1.000

Note: PF: physical functioning, RLDPH: role limitations due to physical health, RLDEP: role limitations due to emotional problems, E: energy, EW-B: emotional well-being, SF: social functioning, P: pain, GH: general health, HC: health change, OA: overall. *Significant difference.

DISCUSSION

Studies focused on postoperative pain proved improvement quality of life after hernia surgery.[7] The quest for better pain control leads to a variety of sinews. The ilioinguinal and iliohypogastric nerve block proved to be as effective as caudal epidural, which permits better postoperative pain control.[8] Dexmedetomidine proved to be secure and effective for local applications.[9]

Increased odds of bradycardia and hypotension with 50-60 micrograms of dexmedetomidine, in contrast, 25 micrograms dosages coursed with no bradycardia nor hypotension during the immediate postoperative period, such as 30 micrograms dosages.[10,11] Today, the surgical correction of disease is no longer the only objective for achieving successful surgical treatment. New targets in surgical outcomes appear. Hence, the interest is around evaluating, measuring, and reaching improvement in quality of life after surgical intervention. Significant improvement results in physical functioning, role limitations due to physical health, emotional well-being, and health change coursed group A, such as observed in studies focused on pain control.

The principal limitation of this study is the sample size, results may not be generalized and further research is needed.

CONCLUSION

Local dexmedetomidine as an adjuvant to low-dose local anesthetic is a safe and efficient measure to improve the postoperative evaluation of patients undergoing hernia surgery with benefits on quality of life in the psychological and biological spheres. At present, it is necessary to extend research efforts to improve the quality of life of surgical patients, not only from the resolution of the surgical disease but also from the impact and consequences of the surgical procedure a posteriori. This study represents one of the first steps in that search.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Kingsnorth A, LeBlanc K. Hernias: inguinal and incisional. Lancet. 2003;362(9395):1561-71.
2. Fitzgibbons RJ Jr, Ramanan B, Arya S, Turner SA, Li X, Gibbs JO, et al. Long-term results of a randomized controlled trial of a nonoperative strategy (watchful waiting) for men with minimally symptomatic inguinal hernias. Ann Surg. 2013;258(3):508-15.
3. Toivonen J, Permi J, Rosenberg PH. Analgesia and discharge following preincisional ilioinguinal and iliohypogastric nerve block combined with general or spinal anaesthesia for inguinal herniorrhaphy. Acta Anaesthesiol Scand. 2004;48(4):480-5.
4. Aasvang E, Kehlet H. Chronic postoperative pain: the case of inguinal herniorrhaphy. Br J Anaesth. 2005;95(1):69-76.
5. Urits I, Virgen CG, Alattar H, Jung JW, Berger AA, Kassem H, et al. A comprehensive review and update of the use of dexmedetomidine for regional blocks. Psychopharmacol Bull. 2020;50(4 Suppl 1):121-41.
6. Kaye AD, Chernobylsky DJ, Thakur P, Siddaiah H, Kaye RJ, Eng LK, et al. Dexmedetomidine in enhanced recovery after surgery (ERAS) protocols for postoperative pain. Curr Pain Headache Rep. 2020;24(5):21.
7. Iftikhar N, Kerawala A. Quality of life after inguinal hernia repair. Pol Przegl Chir. 2021;93(3):1-5.
8. Varsha R, Desai SN, Mudakanagoudar MS, Annigeri VM. Comparison between caudal epidural and ultrasound-guided ilioinguinal-iliohypogastric block with bupivacaine and dexmedetomidine for postoperative analgesia following pediatric inguinal hernia surgeries: A prospective randomized, double-blind study. J Anaesthesiol Clin Pharmacol. 2021;37(3):389-94.
9. Bao N, Shi K, Wu Y, He Y, Chen Z, Gao Y, et al. Dexmedetomidine prolongs the duration of local anesthetics when used as an adjuvant through both perineural and systemic mechanisms: a prospective randomized double-blinded trial. BMC Anesthesiol. 2022;22(1):176.
10. Vorobeichik L, Brull R, Abdallah FW. Evidence basis for using perineural dexmedetomidine to enhance the quality of brachial plexus nerve blocks: a systematic review and meta-analysis of randomized controlled trials. Br J Anaesth. 2017;118(2):167-81.
11. Liu W, Guo J, Zheng J, Zheng B, Ruan X. Addition of dexmedetomidine to ropivacaine-induced supraclavicular block (ADRIB) investigator. Low-dose dexmedetomidine as a perineural adjuvant for postoperative analgesia: a randomized controlled trial. BMC Anesthesiol. 2022;22(1):249.

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