

Lumbar erector spinae plane block for total hip arthroplasty analgesia.

Case report

Bloqueio do plano eretor da espinha lombar para analgesia de artroplastia total de quadril. Relato de caso

Artur Salgado de Azevedo¹, Hermann dos Santos Fernandes¹, Waldir Cunha Júnior¹, Adilson Hamaji¹, Hazem Adel Ashmawi¹

DOI 10.5935/2595-0118.20210019

ABSTRACT

BACKGROUND AND OBJECTIVES: Total hip replacement surgeries may result in intense postoperative pain. There are many analgesia techniques available in clinical practice and lumbar erector spine plane (LESP) block may be an option of an effective technique with milder adverse effects and easier execution.

CASE REPORT: Female patient, 23-year-old, allergic to morphine and tramadol, underwent a total left hip arthroplasty under mild sedation, no opioid spinal anesthesia and ultrasound guided LESP. After the surgery the patient's pain was under control, and methadone rescue analgesia was not used.

CONCLUSION: LESP block is easy to perform and may be effective for postoperative analgesia in hip surgeries, with fewer adverse effects than other techniques.

Keywords: Analgesia, Anesthesia conduction, Arthroplasty replacement hip.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Artroplastia total de quadril pode evoluir com dor pós-operatória intensa. Há várias técnicas disponíveis na prática clínica para analgesia. O bloqueio do plano eretor da espinha lombar (LESP *block*) pode ser uma opção efetiva, de fácil execução e efeitos adversos mais leves.

RELATO DO CASO: Paciente do sexo feminino, 23 anos, alérgica a morfina e tramadol, submetida à artroplastia total de quadril sob sedação leve, anestesia subaracnóidea sem opioides e

LESP *block* guiado por ultrassonografia. Evoluiu com controle de dor efetivo, sem uso de metadona de resgate.

CONCLUSÃO: LESP *block* é fácil de ser executado, pode ser efetivo para analgesia pós-operatória de cirurgias de quadril e apresenta menos efeitos adversos que outras técnicas.

Descritores: Analgesia, Anestesia regional, Artroplastia de quadril.

INTRODUCTION

Hip arthroplasty is a very common surgery and has high postoperative pain potential. There are different ways to execute postoperative analgesia and each of them has advantages and disadvantages¹. As the patients submitted to this procedure are usually older and with multiple comorbidities, analgesia options with better profile of adverse effects should be preferred. Peripheral nerve block with long-acting local anesthetics is very suitable in this situation, in comparison with systemic or neuraxial opioids.

Erector spinae plane block (ESP block) was first described for the treatment of neuropathic chest pain, in which local anesthetic is injected between the spinal erector muscle and the transverse process at T5 level. The analgesic effect is based on its spread to the anterior paravertebral space, thoracic nerve root and its branches, and even epidural space²⁻⁴. If this anatomical mechanism also exists for the lumbar region, a lumbar ESP (LESP) block local anesthetic may spread to lumbar paravertebral space and lumbar nerve roots, reaching the nerves responsible for the innervation of the hip joint lumbar plexus nerves – femoral, obturator and lateral femoral cutaneous nerves – providing analgesia for hip surgery. LESP block can be a block easier to perform than other options for hip surgery analgesia, such as posterior lumbar plexus. Some case reports, case series and small clinical trials already demonstrated this⁵⁻⁹.

This case report describes the first postoperative day evolution of a total hip replacement undergone with an associated LESP block as postoperative analgesia option in a patient allergic to morphine and tramadol.

CASE REPORT

Female patient, 23-year-old with systemic lupus erythematosus and systemic arterial hypertension, under usage of prednisone (5mg/day), weighting 63kg, allergic to morphine and tramadol, who underwent an anterior total left hip arthroplasty. The patient was monitored with electrocardiogram, non-invasive blood pressure and pulse oximeter. A spinal anesthesia was performed,

Artur Salgado de Azevedo – <https://orcid.org/0000-0002-1590-1982>;
Hermann dos Santos Fernandes – <https://orcid.org/0000-0001-9298-6118>;
Waldi Cunha Júnior – <https://orcid.org/0000-0001-7226-6631>
Adilson Hamaji – <https://orcid.org/0000-0003-0473-3511>;
Hazem Adel Ashmawi – <https://orcid.org/0000-0003-0957-971X>.

1. University of São Paulo School of Medicine, Teaching Hospital, Division of Anesthesia, São Paulo, SP, Brazil.

Submitted on December 28, 2020

Accepted for publication on February 08, 2021.

Conflict of interests: none – Sponsoring sources: none.

Correspondence to:

Hermann dos Santos Fernandes
Av. Dr. Enéas Carvalho de Aguiar, 155 – Cerqueira César
05403-000 São Paulo, SP, Brasil.
E-mail: hermannfernandes@yahoo.com.br; hermannfernandes@alumni.usp.br

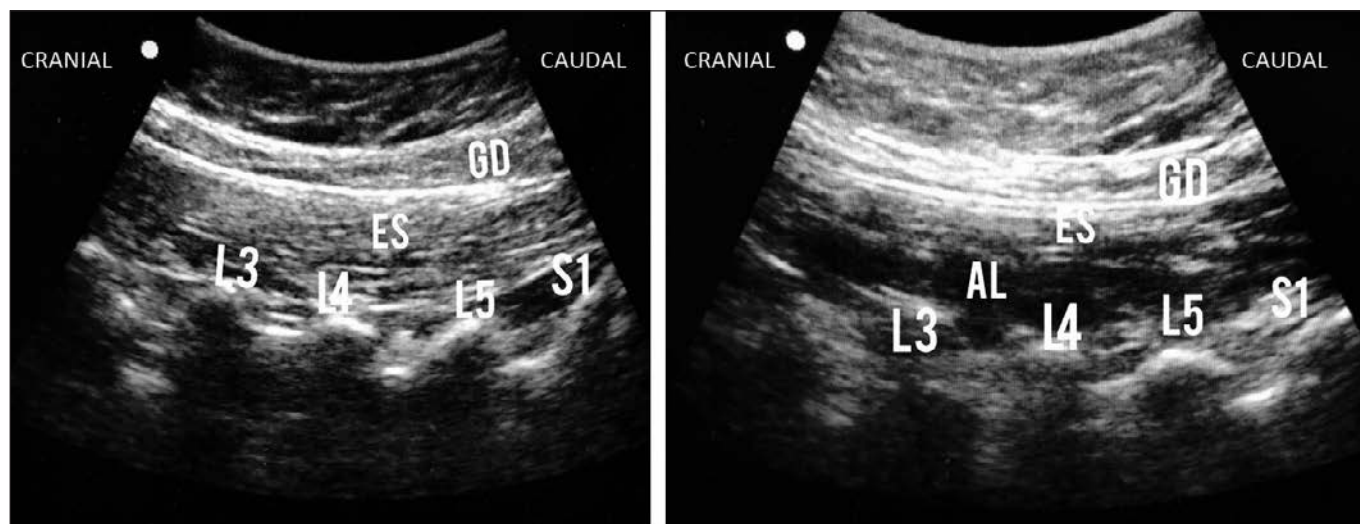


Figure 1. Lumbar ultrasound anatomy

GD = Latissimus Dorsi muscle; ES = erector spinae muscles, L3, L4 and L5: 3rd, 4th and 5th lumbar vertebrae transverse process, respectively; S1 = sacrum; LA = local anesthetic.

in sitting position, with a 27G needle, puncture level L3-L4, with 20mg of 0.5% isobaric bupivacaine, without spinal opioid, under mild intravenous sedation with midazolam (2mg) and fentanyl (50µg). Sedation during the procedure was maintained with propofol of 1% TCI mode, adjusted between 1.2 and 1.6µg/mL. Because the patient had history of allergy to morphine and tramadol, her postoperative (PO) analgesia would be very limited in terms of systemic agents. So, at the end of the procedure, an ultrasound guided LESP block was performed with the patient positioned in right lateral decubitus, identification of L4 left transverse process with longitudinal positioned curvilinear probe (5-2 MHz), followed by in-plane insertion of 100mm 20G needle, from cephalad to caudal direction, and injection of 30mL of 0.5% ropivacaine after negative aspiration at the plane between L4 transverse process and erector spinae muscle (Figure 1).

Postoperative analgesic prescription was: IV dipyron 2g QID, PO ibuprofen 600mg BID, IV methadone 3mg PRN in case of pain, maximum of four times a day. Patient had no pain for the first nine hours after the blockade. Numerical verbal scale (NVS) for most intense pain was referred as 6/10 at that moment, although the patient asked for no rescue analgesics. After 24 hours of blockade, the patient had no pain at rest and had mild pain (NVS=3/10) when making movements. No methadone request.

DISCUSSION

Since 1960 total hip arthroplasty has become one of the most frequent surgeries in the world, improving quality of life of patients with osteoarthritis, rheumatoid arthritis and proximal femur fractures. However, it is a surgery with high postoperative pain potential. Patients undergoing this type of surgery are usually older, with multiple comorbidities^{10, 11}, more sensitive to adverse effects of systemic analgesic drugs and, because pain

may lead to decreased mobility, the risk of thromboembolic complications is increased. In this scenario, analgesic alternatives with good efficacy and milder adverse effects are a benefit.

There are many options for postoperative analgesia for total hip arthroplasty, such as spinal morphine; femoral, obturator and lateral femoral cutaneous nerve block; lumbar plexus block; continuous epidural block; and fascia iliaca block. Intrathecal morphine has some adverse effects: pruritus, urinary retention, nausea and vomiting. The fascia iliaca block may be accompanied by partial failure. Blockade of femoral, obturator, and lateral femoral cutaneous nerves requires 3 injections and a larger volume of local anesthetic. The epidural technique allows the use of epidural catheter with or without a patient-controlled analgesia (PCA), but it may lead to hypotension in fragile patients, and may be limited by concomitant use of anticoagulant medications. Lumbar plexus block is a deep block, with greater risk of complications such as retroperitoneal hematoma, deep bleeding, of greater technical difficulty, and erratic local anesthetic spread^{1,10-13}.

The LESP block emerged based on the same principle as the thoracic ESP block. Some case reports, case series and small clinical trials already demonstrated its application in hip surgery⁵⁻⁹.

Although some studies demonstrated a clinical effect of LESP block, and some of them showed the possible mechanism of action of the anterior spread reaching the anterior rami of lumbar nerve roots through imaging exams, this data must be reinforced by cadaveric anatomical studies and larger clinical trials.

LESP *block* has potential advantages: facility to perform, low risk of nerve damage and safety in patients with coagulopathies or on anticoagulants. In 2019 study¹⁴ evaluated retrospectively 308 patients submitted to LESP block. Only one patient experienced motor weakness. A total of 4 patients had suspicious minor neurological findings related to local anesthesia toxicity. No major neurological or minor/major cardiological findings

were observed. No complications such as nerve damage or organ damage were observed. A complete epidural block below the T12 level was determined in a patient with a history of spinal surgery after unilateral LESP block. Priapism following LESP block, lower extremity motor weakness following lower thoracic ESP block, and total motor block after lumbar procedures have also been reported.

A study reinforced the efficacy of LESP block as the main anesthetic technique used for hemioarthroplasty or intramedullary nailing-long surgeries in high-risk patients who suffered of hip fracture. All patients had their surgeries completed with no need of local anesthesia infiltration, spinal or general anesthesia⁵.

It's necessary to highlight the limitations of this study. This is a case report, a single patient description of the outcome, with no comparative patient or group. Conclusions cannot be made based on a single case description. Although strong opioids were not used for postoperative pain management in this case, the patient received analgesic agents in postoperative pain. It's not possible to conclude that the performed block had any analgesic effect, however, it is of common knowledge that this type of surgery may be accompanied by moderate to severe pain when no long-acting regional block or neuraxial opioid is used. That fact corroborates the published studies in this subject: it raises the hypothesis that LESP block may offer effective postoperative analgesia for hip surgeries. However, larger anatomic studies are needed in order to reach an explanation on how LESP block may work, as well as randomized clinical trials, in order to assess its clinical effect.

CONCLUSION

In this case report, after 24 hours of blockade, the patient had no pain at rest and had mild pain during movements, without methadone request. Considering that LESP block is easy to perform and may be effective for postoperative analgesia in hip surgeries, with fewer adverse effects than other techniques, it's feasible to use it in specific cases.

ACKNOWLEDGMENTS

The authors would like to thank the Orthopedics team for accepting this option for postoperative analgesia in such a specific case.

AUTHORS' CONTRIBUTIONS

Artur Salgado de Azevedo

Data Collection, Project Management, Writing - Preparation of the original

Hermann dos Santos Fernandes

Project Management, Writing - Preparation of the original, Writing - Review and Editing, Supervision

Waldir Cunha-Júnior

Supervision

Adilson Hamaji

Supervision

Hazem Adel Ashmawi

Supervision

REFERENCES

- Liang C, Wei J, Cai X, Lin W, Fan Y, Yang F. Efficacy and safety of 3 different anesthesia techniques used in total hip arthroplasty. *Med Sci Monit.* 2017;23:3752-9.
- Adhikary SD, Pruet A, Forero M, Thiruvankatarajan V. Erector spinae plane block as an alternative to epidural analgesia for post-operative analgesia following video-assisted thoracoscopic surgery: a case study and a literature review on the spread of local anaesthetic in the erector spinae plane. *Indian J Anaesth.* 2018;62(1):75-8.
- Forero M, Adhikary SD, Lopez H, Tsui C, Chin KJ. The erector spinae plane block: a novel analgesic technique in thoracic neuropathic pain. *Reg Anesth Pain Med.* 2016;41(5):621-7.
- Vidal E, Gimenez H, Forero M, Fajardo M. Erector spinae plane block: a cadaver study to determine its mechanism of action. *Rev Esp Anestesiol Reanim.* 2018;65(9):514-9.
- Ahiskalioglu A, Tulgar S, Celik M, Ozer Z, Alici HA, Aydin ME. Lumbar erector spinae plane block as a main anesthetic method for hip surgery in high risk elderly patients: initial experience with a magnetic resonance imaging. *Eurasian J Med* 2020;52(1):16-20.
- Santonastaso DP, De Chiara A, Kraus E, Bagaphou TC, Tognu A, Agnoletti V. Ultrasound guided erector spinae plane block: an alternative technique for providing analgesia after total hip arthroplasty surgery? *Minerva Anestesiol* 2019;85(7):801-2
- Tulgar S, Kose HC, Selvi O, Senturk O, Thomas DT, Ermis MN, et al. Comparison of ultrasound-guided lumbar erector spinae plane block and transmuscular quadratus lumborum block for postoperative analgesia in hip and proximal femur surgery: a prospective randomized feasibility study. *Anesth Essays Res* 2018;12(4):825-31.
- Tulgar S, Selvi O, Senturk O, Ermis MN, Cubuk R, Ozer Z. Clinical experiences of ultrasound-guided lumbar erector spinae plane block for hip joint and proximal femur surgeries. *J Clin Anesth.* 2018;47(1):5-6
- Tulgar S, Senturk O. Ultrasound guided erector spinae plane block at L-4 transverse process level provides effective postoperative analgesia for total hip arthroplasty. *J Clin Anesth.* 2018;44:68
- Foss NB, Kristensen MT, Palm H, Kehlet H. Postoperative pain after hip fracture is procedure specific. *Br J Anaesth.* 2009;102(1):111-6
- Ibrahim MS, Twajj H, Giebaly DE, Nizam I, Haddad FS. Enhanced recovery in total hip replacement: a clinical review. *Bone Joint J.* 2013;95-B(12):1587-94.
- Kang H, Ha YC, Kim JY, Woo YC, Lee JS, Jang EC. Effectiveness of multimodal pain management after bipolar hemiarthroplasty for hip fracture: a randomized, controlled study. *J Bone Joint Surg Am.* 2013;95(4):291-6.
- Kearns RJ, Macfarlane AJ, Anderson KJ, Kinsella J. Intrathecal opioid versus ultrasound guided fascia iliaca plane block for analgesia after primary hip arthroplasty: study protocol for a randomised, blinded, noninferiority controlled trial. *Trials.* 2011;12:51.
- Tulgar S, Aydin ME, Ahiskalioglu A, De Cassai A, Gurkan Y. Anesthetic techniques: focus on lumbar erector spinae plane block. *Local Reg Anesth* 2020;13:121-33.

