American Journal of
Biomedical Science & Research

www.biomedgrid.com
ISSN: 2642-1747

Mini Review

Pericapsular Nerves Block as Analgesia in Patients with Hip Fracture

Jesús Alberto Ruiz Romero[1]*, Diana María Morales Leudo[2], Néstor Fabián Sanabria Duarte[3], Oscar Fernando Castaño Almeyda[4], Karol Nathalia Cabeza Diaz[5], Andres Felipe Zafra Florez[6], Daniel Nicolás Pinilla López[7] and Jhoyner Alberto Jiménez Filigrana[8]

[1]*General Physician, Universidad Metropolitana de Barranquilla*

[2]*General Physician, Fundación Universitaria San Martín*

[3]*Intern Physician, Universidad Autónoma de Bucaramanga*

[4]*Intern Physician, Universidad Autónoma de Bucaramanga*

[5]*Intern Physician, Universidad Autónoma de Bucaramanga*

[6]*General Physician, Universidad Santiago de Cali*

[7]*General Physician, Universidad del Rosario, Bogotá*

[8]*General Physician, Universidad El Bosque, Bogotá*

***Corresponding author:** Jesús Alberto Ruiz Romero, General Physician, Universidad Metropolitana de Barranquilla.

To Cite This Article: *Jesús Alberto Ruiz Romero, Diana María Morales Leudo, Néstor Fabián Sanabria Duarte, Oscar Fernando Castaño Almeyda, Karol Nathalia Cabeza Diaz, et al., Pericapsular Nerves Block as Analgesia in Patients with Hip Fracture. Am J Biomed Sci & Res. 2021 - 15(1). AJBSR.MS.ID.002075.* DOI: 10.34297/AJBSR.2021.15.002075

Received: November 30, 2021 **Published:** December 15, 2021

Abstract

Regional analgesia techniques are very useful in medical practice; they contribute to provide better patient care, freeing them from the unpleasant effects of systemic opioid-type analgesics used in severe pain, in the specific case of hip fracture. It was given life by Girón Arango, et al. to a new pericapsular nerve block technique called PENG, which with a single echo-guided puncture deprives the femoral, obturator and accessory obturator nerves of sensory action, which oversee perceiving the sensory stimuli of the proximal femur.

Keywords: Regional blocks, Pericapsular nerve blocks, Hip fracture, Analgesia in proximal femur fracture

Introduction

Life expectancy worldwide has been growing thanks in part to the advancement of medicine, which is why the geriatric population is increasing every day, but as the population ages, various pathologies also appear with it, one of them is the hip fracture which, although it can affect the entire population, its incidence is more marked in older adults, influenced by various factors, the approach to hip fracture has always been a challenge since it confers a high degree of morbidity and mortality, patients sufferers suffer from persistent severe pain which is difficult to inhibit even with multiple classes of analgesics, not to mention that some of them when administered systemically such as opioids can generate unwanted symptoms such as nausea, vomiting, lethargy among others, which makes the patient's experience even more unpleasant, which is why more targeted analgesic mechanisms are currently being sought such as regional blocks, which are not new but have evolved in order to improve the quality of care, one of them is the pericapsular nerve block (PEGN) which has the ability to block three of the nerves that provide Sensory innervation to the proximal femur, which are the femoral nerve, the obturator nerve, and the accessory obturator.

Methodology

A narrative review was carried out in different indexed journals and others using keywords such as regional blocks, pericapsular nerve blocks, hip fracture, analgesia in proximal femur fracture, in order to obtain original and review articles without taking into account the year of publication. Initially 28 articles were obtained but then applying our inclusion and exclusion criteria, we were left with 12 of which we collected the most applicable and relevant information possible.

Results

Hip fracture or also called proximal femur fracture is an orthopedic emergency that can affect individuals of all ages, however, its prevalence is obviously higher in the geriatric and female population which is influenced by multiple factors, without a doubt it is an entity of clinical importance given that it is associated with a high rate of morbidity and mortality worldwide [1].

The experience of the patient with a proximal femur fracture is one of the most unpleasant if it is taken into account that almost 100% report severe pain and this percentage does not decrease considerably even if standard analgesic management with opioids, NSAIDs or another kind of pain is applied analgesics [2].

Various techniques have been described for pre and postoperative analgesic management, among which the femoral block, the 3-in-1 or Winnie block, the iliac fascia block, all these techniques have stood out throughout the history of targeted anesthesia with some deficiency since, as we know, the hip joint in its anterior capsule is innervated not by one, but by three nerves [3].

Mainly three nerves are distinguished, the femoral nerve which is a branch of the lumbar plexus, this nerve through the branches that innervate the hip descends through the psoas muscle and its respective tendon, this presents 92% of high sensory fibers for the joint, These originate from the height of the inguinal ligament, since this presents a difficulty when the nerve is blocked with the infrainguinal technique of the iliac fascia technique [4].

The second nerve that innervates the proximal portion of the femur is the obturator nerve, which originates from the lumbar plexus specifically in the L2 to L4 branches. This takes its course through the medial region of the psoas muscle and continues posteriorly to the common iliac artery and laterally to the pelvic floor until it reaches the obturator canal where it divides into two branches; the anterior which goes to the fascia lata becoming the cutaneous branch of the obturated nerve which provides sensitivity to the medial aspect of the thigh [5].

The accessory obturator nerve occurs in 10% to 30% of patients, originates from the junction of the third and fourth lumbar nerves, runs along the posterior part of the external iliac artery which provides innervation for the joint hip [6].

Given that the regional anesthesia techniques used for this type of procedure were somewhat inefficient, it became necessary to study new blocking techniques for this type of procedure. Recently, exactly from the year 2018, a type of blockade in theory more complete and with better results began to be described, the nerve block of the pericapsular group or also called PENG, performed with the approach technique described by *Girón Arango, et al.* [7].

The block is carried out mainly in the area of the hip with the highest percentage of sensitive innervation, that is, the anterior capsule of the joint, which is given by the nerves previously described [8,9]. Apparently, the PENG block represents a better analgesia option not only in the preoperative period but also in the post-surgical period, having a greater advantage over traditional blocks since they did not block the action of the obturator nerve, this being of great importance in the Sensory innervation of the hip. The only disadvantage so far described about this blocking technique is the inability to block the lateral cutaneous femoral nerve, which provides sensitivity to the lateral aspect of the thigh, thus being through the PENG technique this lateral region is discovered of analgesic effect [9].

The effectiveness and advantages of this type of anesthesia and especially of this type of PENG block have been studied in various countries, including around the world, in both adult and pediatric populations [10]. The greatest advantage of this type of approach over a more traditional anesthesia or analgesia is the evident reduction within the painful experience of the patient, traditional analgesia methods such as the femoral nerve block or Winnie's block have shown through history a reduction of about 3.4 points on the 10 point suggestive pain scale. On the other hand, pericapsular nerve block using the technique described by *Girón, et al.* It showed a more significant reduction, reaching a reduction of around 7 points on the scale suggestive of pain [11].

In the study carried out by *Marcelo Molinelii, et al.* In 2020 in Chile, positive results were obtained in favor of PEGN blockade in this study through the application of regional anesthesia directed on the pericapsular nerves in 53 patients with diagnoses of hip fracture and the evaluation of perceived pain at 30 minutes and 10 minutes. hours after the application they found a significant response, since of 66% of patients who presented severe pain at the beginning of the procedure in the evaluation both at 30 min and 10 hours, none presented severe pain and up to 10 hours of evaluation, no patient referred more than 4 points on the pain scale, so none of them required analgesic rescue with opioids as was proposed in the study [12] (Figure 1).

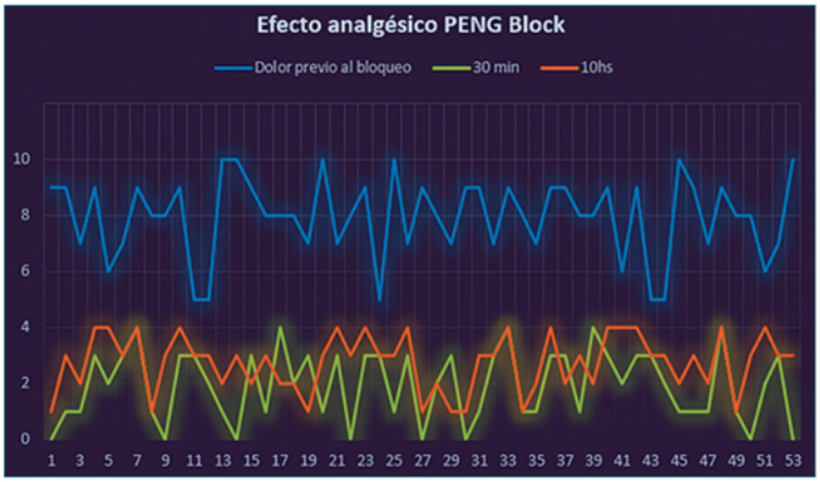

Figure 1: Evaluation of the analgesic effect through PENG block.

Discussion

Regional block anesthetic techniques are very useful and with many more advantages over general anesthesia, since they do not compromise the hemodynamic status of the patient and have much less negative effects if we compare them, for example, with systemic analgesia, the PENG-type blockade has arrived to revolutionize with many benefits in favor of providing analgesia in patients with proximal femur fracture since its appearance at the end of 2018 with the technique introduced by Girón, et al.. It has been being implemented in various fracture care centers and some of them have been willing to carry out studies that evidently support and support its analgesic effectiveness, such as two studies, the first carried out in 2020 in between the months of May. to November at the Hospital Interzonal General De Agudos "Dr. Oscar E Alende "in which analgesia was administered in a total of 53 patients with hip fracture, of which 66% had severe pain in the pre-blockade and 30 minutes after the block, none of the patients presented severe pain, continuing like this during 10 hours, none of the total patient presented manifested more than 4 points on the pain scale, which makes us think about the high rate of effectiveness provided by this analgesic mechanism as long as it is administered by trained personnel and in the most suitable way possible.

On the other hand, in Colombia, a study was carried out with thistle by *Juliana Mendoza, et al.* with equally favorable results for the PENG technique in this, the total of patients studied was 15, of which 100% presented a considerable improvement in pain 10 minutes after the block was applied, the effective algesia continued at 30 minutes and 24 hours later, as proposed in the study, also showed, thanks to the blockade analgesia, a significant decrease in opioid consumption. It should be clarified that, despite the positive results obtained in both studies, these varied in the concentration of analgesics (lidocaine, bupivacaine) administered, however, the technique was the same.

Conclusion

The PENG block technique came to show us an effective and long-lasting form of analgesia, it has shown to have advantages over the other type of traditional regional blocks, given its high potential to broadly and completely block the main 3 nerves that supply the hip (the femoral nerve, the obturator nerve and the accessory obturator nerve), mainly inhibiting its sensory function and minimally compromising its low motor action, which brings great benefits to the patient, allowing early mobilization and rapid integration into rehabilitation, while continuing to side that has a 100% effective effect to reduce severe pain, thus reducing the use of opioid-type analgesics which generated unwanted effects and unpleasant experiences in patients. However, we must bear in mind that there are studies that in addition to the positive effects of PENG blockade also report permanent nerve damage, significant vascular damage, system toxicity with the anesthetic, but studies are limited to conclude this.

References

1. Ricardo Barrantes Monge (2021) Pericapsular Nerve Group Block (PENG), Included in Electronic Magazine of PortalesMedicos.com 16(15): 795
2. Caicedo Sanguino D F, Araque Melo A E, Rojas Quintero N R, Villamizar Quintero S E (2020) Epidemiology of hip fracture in adults treated in a tertiary hospital. Home Journal Portal 7(2): 18-32.
3. C Prado Kittel, P Zumelzu Sánchez, A Palma Licandeo, G Faúndez Lillo, K Ellenberg Oyarce, et al. (2020) Continuous pericapsular nerve group blockade as analgesia for fracture of the posterior column and wall of the acetabulum; a case report and description of infusion regimen for extending analgesic effect to the distal femoral area. Rev Esp Anestesiol Reanim 67(3): 159-162.

4. Zaragoza Lemus G, Portela Ortiz JM, Díaz Guevara G (2020) Pericapsular nerve group (PENG) block for hip surgery. Mexican Journal of Anesthesiology 43 (1): 69-72.

5. Morrison C, Brown B, Lin D Y, Jaarsma R, Kroon H (2020) Analgesia and anesthesia using the pericapsular nerve group block in hip surgery and hip fracture: a scoping review. Regional Anesthesia & Pain Medicine 46(2): 169-175.

6. Akkaya T, Comert A, Kendir S, Acar HI, Gumus H, et al. (2008) Detailed anatomy of accessory obturator nerve blockade. Minerva Anesthesiol 74(4): 119-122.

7. Gallardo P, Clavel O (2020) Hip Fracture and Geriatry, A Necessary Union. Las Condes Clinical Medical Journal 31(1): 42-49.

8. Juliana M Mendoza, Pedro Nieves, Jorge H Botero, Julio E Camelo, Adriana M Cadavid, et al. Continuous Blockage of the Pericapsular Nervous Group for Analgesia of Hip Fractures. Pain Medicine Program, Hospital San Vicente Fundación, Medellín, Colombia

9. Marcelo Molinelii, Jhonathan EO Romero, Sebastián Uranga, Josefina Bartolini, Nicolás Caputo, et al. (2020) Analgesic effect of peng block (pericapsular nerve group) in patients with hip fracture. Rev Chil Anest 49: 134-138.

10. Guadalupe Zaragoza Lemus, José Manuel Portela Ortiz, Gerardina Díaz Guevara (2020) Blockade of the pericapsular nerve group (PENG) for hip surgery. Mexican Journal of Anesthesiology 43(1): 69-72.

11. Girón Arango L, Peng PWH, Chin KJ, Brull R, Perlas A (2018) Pericapsular Nerve Group (PENG) Block for Hip Fracture. Reg Anesth Pain Med 1.

12. Morrison C, Brown B, Lin D Y, Ruurd Jaarsma, Hidde Kroon (2020) Analgesia and anesthesia using the pericapsular nerve group block in hip surgery and hip fracture: a scoping review. Reg Anesth Pain Med 46(2): 169-175.