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ORIGINAL ARTICLE

Ultrasound-guided pericapsular nerve group block and genicular nerve alcohol neurolysis in hip and knee pain due to osteoarthritis and following total joint replacement surgery: A preliminary study

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ABSTRACT

Objectives: The aim of this study was to evaluate the efficacy of pericapsular nerve group block (PENG) and genicular neurolysis performed with ethyl alcohol in the management of pain associated with hip or knee osteoarthritis or persistent postoperative pain following arthroplasty.

Patients and methods: Between October 2023 and June 2024, a total of 89 ambulatory adult patients (70 males, 19 females; median age: 75.5 [IQR: 62.6 to 81.3] years; range: 46.7 to 92.8 years) who visited our pain clinic were retrospectively analyzed. The PENG or genicular nerve neurolysis was performed as appropriate using ethyl alcohol. Median and maximum level of pain according to patient self-report was registered before and after the interventions.

Results: A total of 33 patients presenting with hip pain and 56 patients presenting with knee pain were treated. Considering the reported median pain, the median intensity reduced from 7.5 to 3.5 for hip pain, whereas in the knee group the median intensity of pain was 7.0 before the intervention and 3.0 after the procedure. The median intensity of reported maximal pain reduced from 10 to 6.8 for the hip, and from 8.8 to 6.5 for the knee pain.

Conclusion: Alcoholic neurolysis offers a promising, cost-effective new approach for the management of pain in the absence of radiofrequency. It provides sustained pain relief until surgical arthroplasty of the hip or knee joint and is also beneficial in the management of persistent pain following surgery or for patients who are ineligible for surgical intervention.

Keywords: Ethyl alcohol, genicular, hip, knee, neurolysis, pericapsular nerve group block, PENG.

The incidence of osteoarthritis is increasing, and more than 70% of individuals over the age of 55 are affected, according to the World Health Organization.[1] The most commonly involved joints are the knee and hip, and around 65% of people with osteoarthritis live with moderate or severe pain and surgical interventions, such as total hip or knee joint replacement can often alleviate the patient's suffering, but the capacity of orthopedic surgery is limited in both time and space.[2,3] In addition to the issue of lengthy waiting lists, a significant proportion of patients are unsuitable for arthroplasty due to the presence of severe comorbidities. Conservative management, comprising physical

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therapy, medication and intra-articular therapy, can offer some benefit, particularly in the early stages of the disease. However, in the majority of cases, this approach is ineffective. Moreover, medical treatment has some adverse side effects even for cartilage repair; therefore, the use of analgesics, particularly non-steroidal anti-inflammatory drugs, should be reduced after a few weeks.[4-6] The well-known detrimental systemic consequences of chronic pain make it imperative to find solutions that is sustainable.

Denervation treatment represents an emerging therapeutic option, functioning by disrupting the transmission of pain signals.[7] This can be achieved in a number of ways. Radiofrequency treatment works by creating thermal lesions, whereas neurolysis with ethyl alcohol or phenol acts through chemical processes, each of them resulted in protein denaturation. The impact of the ethyl alcohol varies according to its concentration. At higher concentrations (50 to 100%), the chemical can cause Wallerian neuronal degeneration.[8] Burning pain during administration, reactive neuritis, neuroma, dysesthesia, hypesthesia, skin and non-target tissue lesions limit the use of alcohol.[9] Neurolysis was originally employed as a treatment for pain originating from the spinal facet, sacroiliac joint or neuropathic pain.[7] Furthermore, it represents a promising therapeutic option for the treatment of chronic osteoarthritic hip or knee pain. The target injection sites are surrounded by bone and strong connective tissue (tendons and fascia); thus, the risk of inadvertent spread is low. The small nerves concerned are purely sensory, and motor block is unlikely. Moreover, alcohol can be available even in resource-poor countries, it does not require special or expensive equipment, and procedure time is shorter. These advantages make it a valuable option for effective hip and knee pain management.

Pericapsular nerve group block (PENG) was described as a motor-sparing pain relief method for preoperative management of hip fracture in 2018.[10] As it has a high success rate, it has been used for postoperative analgesia after hip replacement surgery.[11-15] The next reasonable step was to use PENG block in chronic pain management with local anesthetics and steroids administered in a single session or repeatedly, in series.[16,17] The potential of radiofrequency treatment to alleviate pain associated with degenerative conditions of the hip joint was also explored as a potential therapeutic avenue.[18] In the literature, there are case reports on the use of chemical neurolysis of the hip joint for treatment of pain caused by fracture.[19,20]

Additionally, genicular nerve block is a motor-sparing procedure in the vicinity of the knee joint.[7,21-23] The fundamental premise is analogous to that of the PENG block: the goal is to target the minor, pure sensory articular branches of the nerves which innervate the knee joint. The original procedure of neurolysis of the genicular nerves with radiofrequency ablation was described by Choi et al.[24] A fluoroscopic guidance system was employed. The first comprehensive prospective study including 46 patients to assess the analgesic efficacy of genicular neurolysis with alcohol was conducted in 2022.[8]

Both blocks can be performed using either ultrasound or fluoroscopic guidance. Two excellent Hungarian pain specialists, Dr. Lajos Driesz and Dr. Ferenc Veres from Heténi Géza Hospital, Szolnok, Hungary have used ultrasound-guided neurolysis with ethyl alcohol for chronic hip and knee pain. Their findings have recently been the subject of publication in Hungarian.[25] In our center, we started to use this technique with their kind support after their oral presentation at the National Congress of the Hungarian Society of Anesthesiologists and Intensive Therapists in 2023. To the best of our knowledge, apart from our study, only case reports and studies with small numbers of patients have been published assessing the analgesic effect of chemical neurolysis of the hip and knee joint associated with osteoarthritis. In the present study, we aimed to evaluate the efficacy of PENG and genicular neurolysis performed with ethyl alcohol in the management of pain associated with hip or knee osteoarthritis or persistent postoperative pain following arthroplasty.

PATIENTS AND METHODS

This single-center, retrospective, observational cohort study was conducted at Uzsoki Street Teaching Hospital, Pain Clinic between October 17th, 2023 and June 20th, 2024. A total of 89 ambulatory adult patients (70 males, 19 females; median age: 75.5 [IQR: 62.6 to 81.3] years; range: 46.7 to 92.8 years) who presented with hip or knee osteoarthritic pain at our center were consecutively enrolled. The degree of joint destruction reached Grade 3-4 according to Kellgren-Lawrence classification.[26-28] Our institution is a regional orthopedic center which serves as a tertiary referral center for total hip and knee arthroplasty. Data were collected prospectively in parallel with daily practice.

The diagnosis of osteoarthritis was confirmed by radiographic imaging and corroborated by the findings of a prior orthopedic examination. The patients were experiencing pain for a minimum of three months and all of them received optimal conservative therapy before referral for neurolysis. Despite conservative treatment, maximum pain of all patients was at least moderate according to Numerical Rating Scale (NRS) >4. In cases where the patient's pain was not sufficiently pronounced to warrant neurolysis (NRS <4), this procedure was not performed. Similarly, neurolysis was not carried out within a three-month period following any intra-articular procedure or injection. Exclusion criteria included both local and systemic infections and any suspected allergic reaction to the study drugs. Prior to the procedures, medications which could affect hemostasis were withheld for an appropriate period. Written informed consent was obtained from each patient. The study protocol was approved by the Institutional Review Board Ethics Committee (Date: 02.09.2024, No: UK-IKT/1840-1/2024). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Although most of our patients were already scheduled for surgery, due to the long waiting list, neurolysis was needed. We also carried out neurolysis in those patients who were not suitable candidates for joint replacement due to their other medical conditions. In case of postoperative patients, the orthopedic surgeon was required to confirm the integrity and correct position of the implanted prosthesis and certify the absence of septic complications prior to neurolysis. All patients enrolled were free of neurological comorbidities such as hemiplegia, multiple sclerosis which could affect their response to treatment. If the same patient had hip and knee injections, each intervention was performed separately with an interval of more than four weeks.

Procedure

The ultrasound device employed was the Sonoscape X3 (SonoScape Medical Corp., 201, 202, Building 12, Shenzhen Software, Guangdong, China), which was equipped with both a curvilinear transducer (operating at frequencies between 3.8 and 4.8 MHz for the hip procedure) and a linear transducer (operating at frequencies between 9.6 and 12 MHz for the knee procedure). The spinal needle employed was the B. Braun Quincke Type Point (B. Braun, Melsungen AG, Melsungen, Germany), with a 22-gauge and a length of 88 mm.

Hip: The main pain generator in the hip joint is the anterior part of the capsule. It is innervated by the femoral, obturator and accessory obturator nerves (Figure 1).[29] The goal of PENG block is

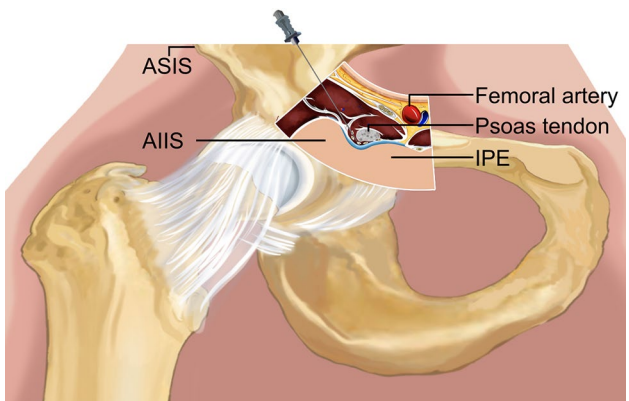

FIGURE 1. The relevant anatomy for pericapsular nerve group block.
ASIS: Anterior superior iliac spine; AIIS: Anterior inferior iliac spine; IPE: Iliopubic eminence.

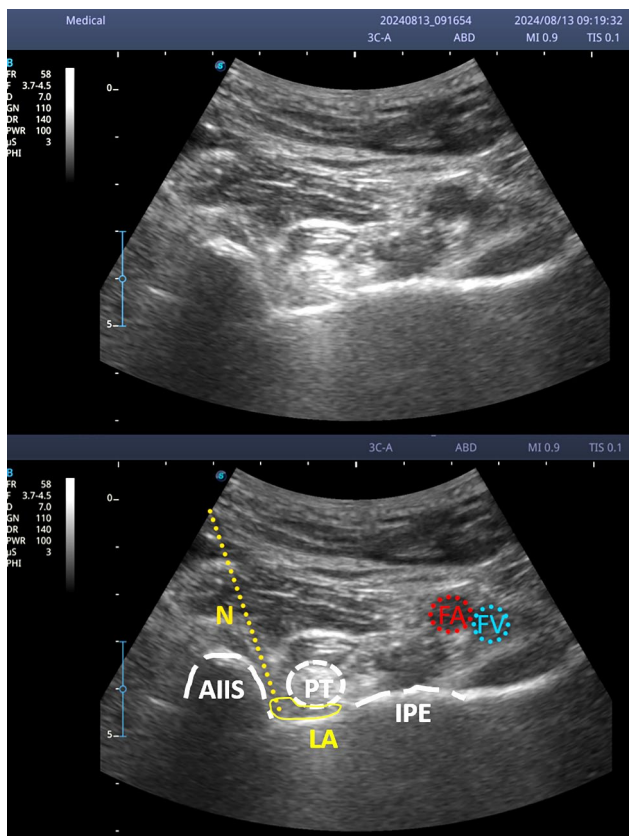

FIGURE 2. Ultrasound guided PENG block.
AIIS: Anterior inferior iliac spine; FA: Femoral artery; FV: Femoral vein; IPE: Iliopubic eminence; LA: Local anesthetic patch; N: Needle; PT: Psoas tendon; PENG: Pericapsular nerve group block.

to block small branches of the femoral and the accessory obturator nerves between the anterior inferior iliac spine and the iliopubic eminence of the superior ramus of the pubic bone, under the tendon of the psoas muscle. Care should be taken not to get too close to the large femoral vessels and femoral nerve.

No premedication or sedation was administered. The patient was positioned supine with the hip in a neutral, resting position. The skin was prepared and draped appropriately. The ultrasound probe was covered with a sterile plastic cover. Bony anatomical landmarks were identified using ultrasound guidance.

The spinal needle was inserted in a lateral to medial direction using an in-plane technique. Once bony contact was achieved, 5 mL of 1% lidocaine was injected as a diagnostic block (Figure 2). Care was taken to ensure that the bony contour was continuous, and the injected volume was localized below the psoas tendon but above the periosteum. If the patient reported a notable reduction in pain (or the presence of analogous clinical signs) within a brief period, 5 mL of 60% alcohol was administered at the same site in rapid succession. After a short observation period (maximum 20 to 30 min), the patient was discharged.

Knee: The sensory innervation of knee joint is predominantly supplied by the superomedial, superolateral, inferomedial and inferolateral genicular nerves (Figure 3). Each nerve, excluding the inferolateral, was targeted in the same patient, aiming to achieve as complete analgesia as possible.

No premedication or sedation was administered. To achieve the optimal position, the knee was flexed at 30° to 40°. The target areas are in the middle of the supracondylar widening part of the femoral shaft both medially and laterally (long axis view of the femur) at half of the anteroposterior diameter of the bone. In the majority of cases, the arterial pulsation in the neurovascular bundle could be visualized. Under aseptic conditions, a 22-gauge spinal needle was inserted using an in-plane technique.

The inferomedial genicular nerve was blocked using an out-of-plane technique. The target area is located in the mid-portion of the infracondylar widening region of the tibial shaft, situated medially (long axis view of the tibia) at a point that is approximately half the anteroposterior diameter of the bone.

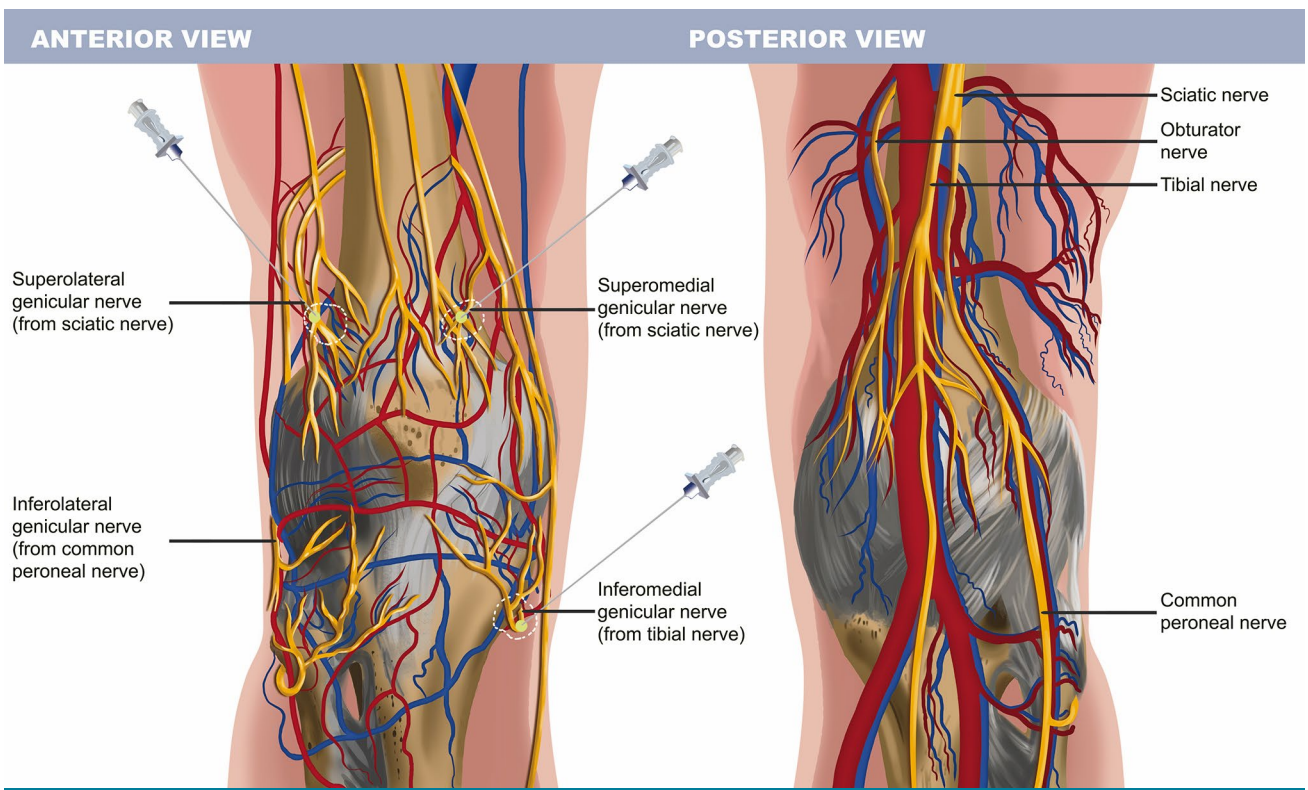

FIGURE 3. Innervation of the knee joint. White dashed circles: the spread of injected volume.

Once bony contact was felt, a test dose of 1.5 mL of 1% lidocaine was administered to all three nerves (Figure 4). Care was taken to localize the injected volume below the soft tissue but above the periosteum. Following a notable reduction in patient-reported pain (or analogous clinical signs) within a brief period, a 2-mL dose of 60% alcohol was injected at each site in rapid succession. The patient was observed for a short period (not exceeding 20 to 30 min) and discharged.

Outcome measures

Baseline demographic information was collected. Patients were asked to provide feedback by telephone or email after two weeks. Median and maximum pain scores were recorded before and after the interventions. The intensity of pain was quantified using the NRS, with scores ranging from 0 to 10. A score of 0-3 was classified as mild, 4-6 as moderate, 7-8 as severe, and 9-10 as unbearable.[30]

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 27.0 software (IBM Corp., Armonk, NY, USA). The data followed a normal distribution tested by Shapiro-Wilk or Kolmogorov-Smirnov test as appropriate.[31] Descriptive data were presented in median and interquartile range (IQR) or in number and frequency, where appropriate. Median values between the score values before and after the procedure were compared using the Mann-Whitney U test and incidence rates were compared using the Kendall's Tau test. Confidence intervals (95%) were calculated using the Hosmer-Lemeshow formula. In consideration of the retrospective nature of this study, a sample size was not calculated; rather, all qualifying patients within the stipulated timeframe were included. The effect size was represented by values of Cohen's d, which were 3.2266 and 2.9619, respectively, in case of comparing the median and maximal hip pain, and 2.6379 and 2.8462, respectively, in case of comparing the median and maximal knee pain before and after the interventions. A p value <0.05 was considered statistically significant.

RESULTS

Of a total of 89 patients, 33 presented with hip pain and 56 with knee pain. Baseline demographics are shown in Table I. The median age ranged from 62.6 to 81.3 years in the group of hip pain and 66.2 to 79.9 in the group of knee pain.

The efficacy of neurolysis is illustrated in Tables II and III. Considering the reported average pain, the median intensity reduced from 7.5 to 3.5 for hip pain, whereas in the knee group the median intensity of pain was 7.0 before the intervention and 3.0 after the procedure. The median intensity of reported maximal pain reduced from 10 to 6.8 for the hip, and from 8.8 to 6.5 for the knee pain. Patients report that hip pain was more debilitating and that the median pain level was reduced to a lesser extent in these cases. The proportion of

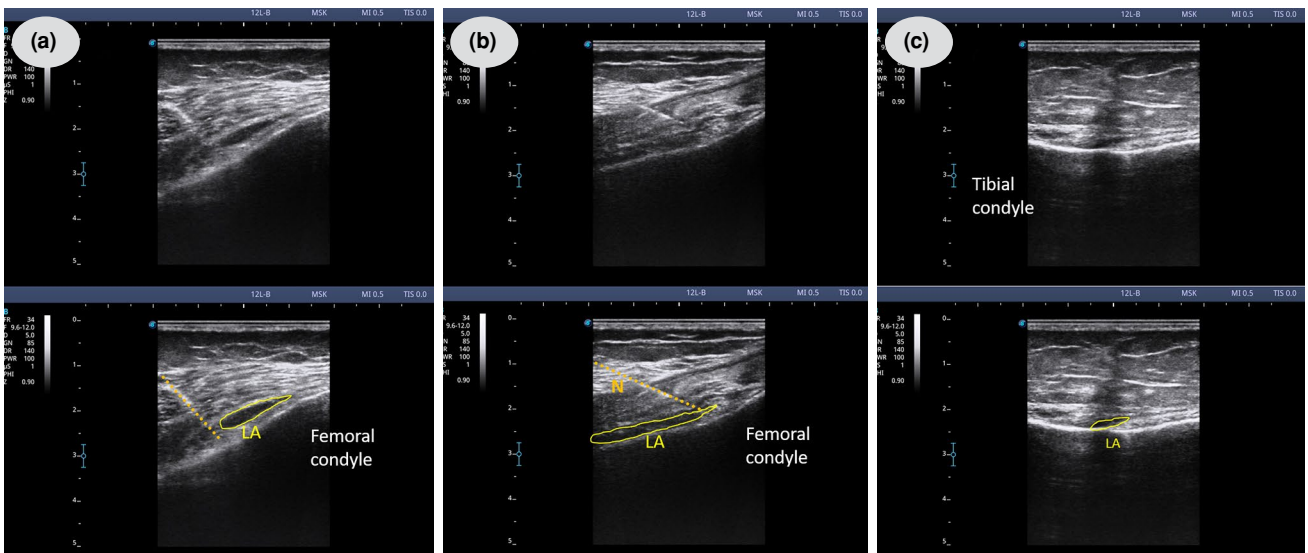

FIGURE 4. Ultrasound guided genicular block. **(a)** Superomedial block; **(b)** superolateral block; **(c)** inferomedial block.
LA: Local anesthetic patch; N: Needle.

TABLE I
Demographic data

	Hip pain (n=33)				Knee pain (n=56)			
	n	%	Median	Min-Max	n	%	Median	Min-Max
Age (year)			69.5	62.6-81.3			74.4	66.2-79.9
Sex								
Male	23	69.7			47	83.9		
Surgery								
Pre	29	87.9			43	76.8		
Post	1	3.0			5	8.9		
Impossible due to comorbidities	3	9.1			3	5.4		
Data not available	0	0			5	8.9		

TABLE II
The intensity of pain experienced prior to and following the administration of neurolysis with alcohol

		Hip pain			Knee pain		
		Before (n=33)	After (n=33)	*p*	Before (n=56)	After (n=56)	*p*
Average pain	Intensity of pain (NRS)*	7.5 (6.3-8.0)	3.5 (1.0-8.0)	<0.001	7.0 (5.5-8.0)	3.0 (0-5.0)	<0.001
	Number of patients, n (%)			<0.001			<0.001
	Mild	1 (3.0%)	16 (48.5%)		1 (1.8%)	31 (55.4%)	
	Moderate	7 (21.2%)	4 (12.1%)		18 (32.1%)	20 (35.7%)	
	Severe	19 (57.6%)	10 (30.3%)		26 (46.4%)	4 (7.1%)	
	Unbearable	6 (18.2%)	3 (9.1%)		11 (19.6%)	1 (1.8%)	
	Non-available	0	0		0	0	
Maximal pain	Intensity of pain (NRS)*	10 (9.0-10.0)	6.8(4.0-8.3)	<0.001	8.8 (8.0-10.0)	6.5 (4.5-8.0)	<0.001
	Number of patients, n (%)			<0.001			<0.001
	Mild	0 (0%)	6 (18.2%)		0 (0%)	11 (19.6%)	
	Moderate	1 (3.0%)	9 (27.3%)		2 (3.6%)	17 (30.4%)	
	Severe	4 (12.1%)	10 (30.3%)		19 (33.9%)	19 (33.9%)	
	Unbearable	28 (84.8%)	8 (24.2%)		35 (62.5%)	9 (16.1%)	
	Non-available	0	0		0	0	

NRS: Numeric rating score; * Median (Min-Max).

TABLE III
The reduction of pain and insufficiency rate

	Hip pain (total: n=61; feedback from n=34)				Knee pain (total: n=103; feedback from n=56)			
	n	%	Median	Min-Max	n	%	Median	Min-Max
Reduction of average pain			3.8 50%	0.4-5.5 8.3%-84.6%			4.5 61.3%	2.0-5.9 26.4%-100%
Reduction of maximal pain			2.3 26.4%	0.0-5.0 0.0%-56.1%			2.0 25.0%	0.5-4.4 5.9-50.0%
Number of repeated interventions	13	21.3			24	23.1		
Interval before second intervention (day)			49	38.5-59.5			49	42-82.3

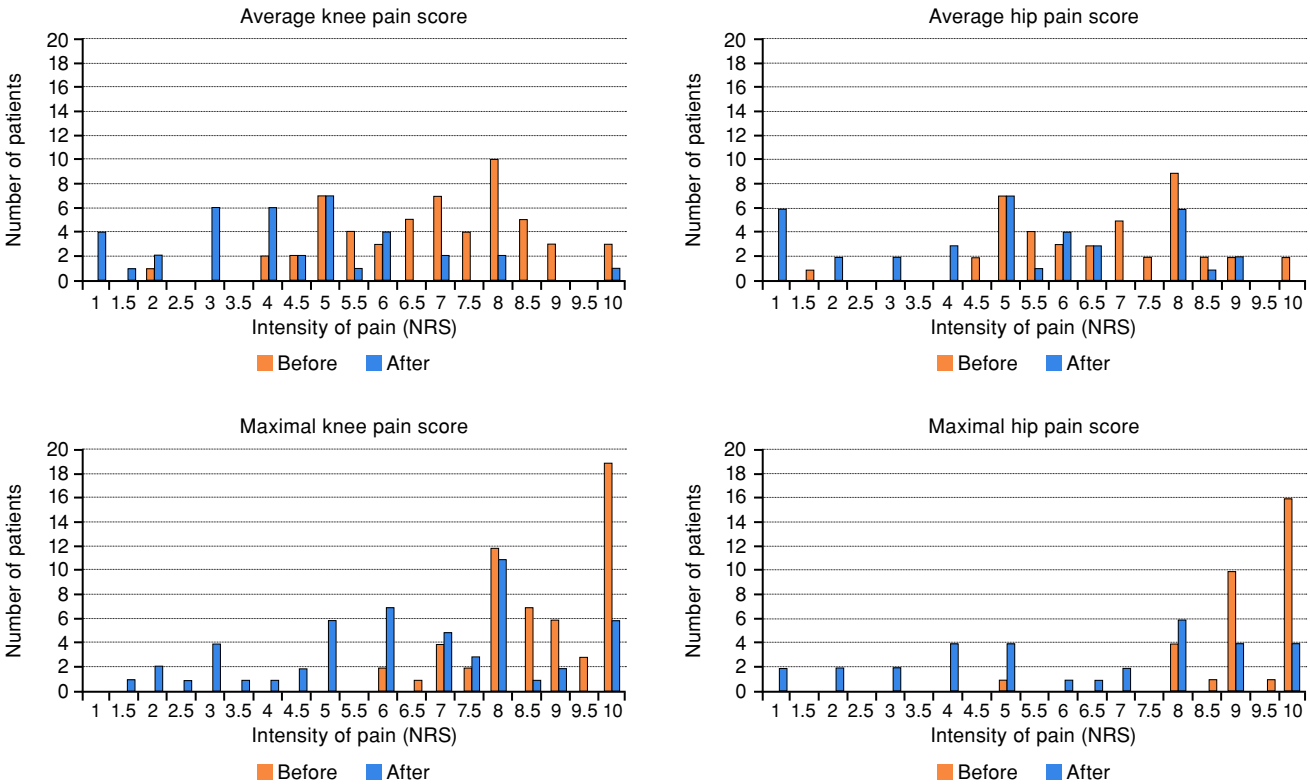

FIGURE 5. Pain scores before and two weeks after the neurolysis.
NRS: Numeric rating scale.

patients experiencing severe or unbearable pain as a worse pain was reduced from 32 (94%) and 54 (96%) to 18 (53%) and 28 (50%) for hip and knee pain, respectively. There was a significant shift in the NRS spectrum toward the lower scores ($p<0.001$ for both hip and knee pain for both median and maximum pain) (Figure 5).

Figure 6 illustrates the individual success rate. Pain was reduced in at least 90% of patients, except for median hip pain, which was reduced in only 78% of patients. Almost complete pain relief was seen in some patients.

The number of postoperative patients was insufficient for the application of separated statistical analysis; thus, these results are included in the analysis of the total group.

The median postoperative pain was 8/10 on the NRS in one patient with hip pain and in three of five patients with knee pain. Hip pain decreased to zero in two weeks after the interventions, while knee pain decreased by 1-3 scores at that time. Unfortunately, one patient had unbearable knee pain after neurolysis.

In three patients, the procedure was performed on both hips a few weeks apart. In two patients, both hip and knee pain were treated at consecutive sessions. In four patients, the procedure was performed on both knees in a row.

No motor block or other complications (hematoma, soft tissue lesion, infection etc.) were observed after PENG neurolysis. In only one case of genicular block (<1%), necrosis reached the skin and a lesion of 3 cm in diameter occurred at infragenicular injection site. The skin lesion healed without long-term sequelae. No motor block was found after genicular neurolysis. On rare occasions (n=4), a persistent but non-inflammatory nodule has become a residual consequence of interventions.

DISCUSSION

The anterior capsule of the hip joint is innervated by articular branches that originate from the femoral nerve, the obturator nerve, and the accessory obturator nerve.[19,32,33] The posterior capsule is innervated by nerve to the quadratus femoris muscle, the sciatic nerve and the superior gluteal nerve. The relative contribution of these

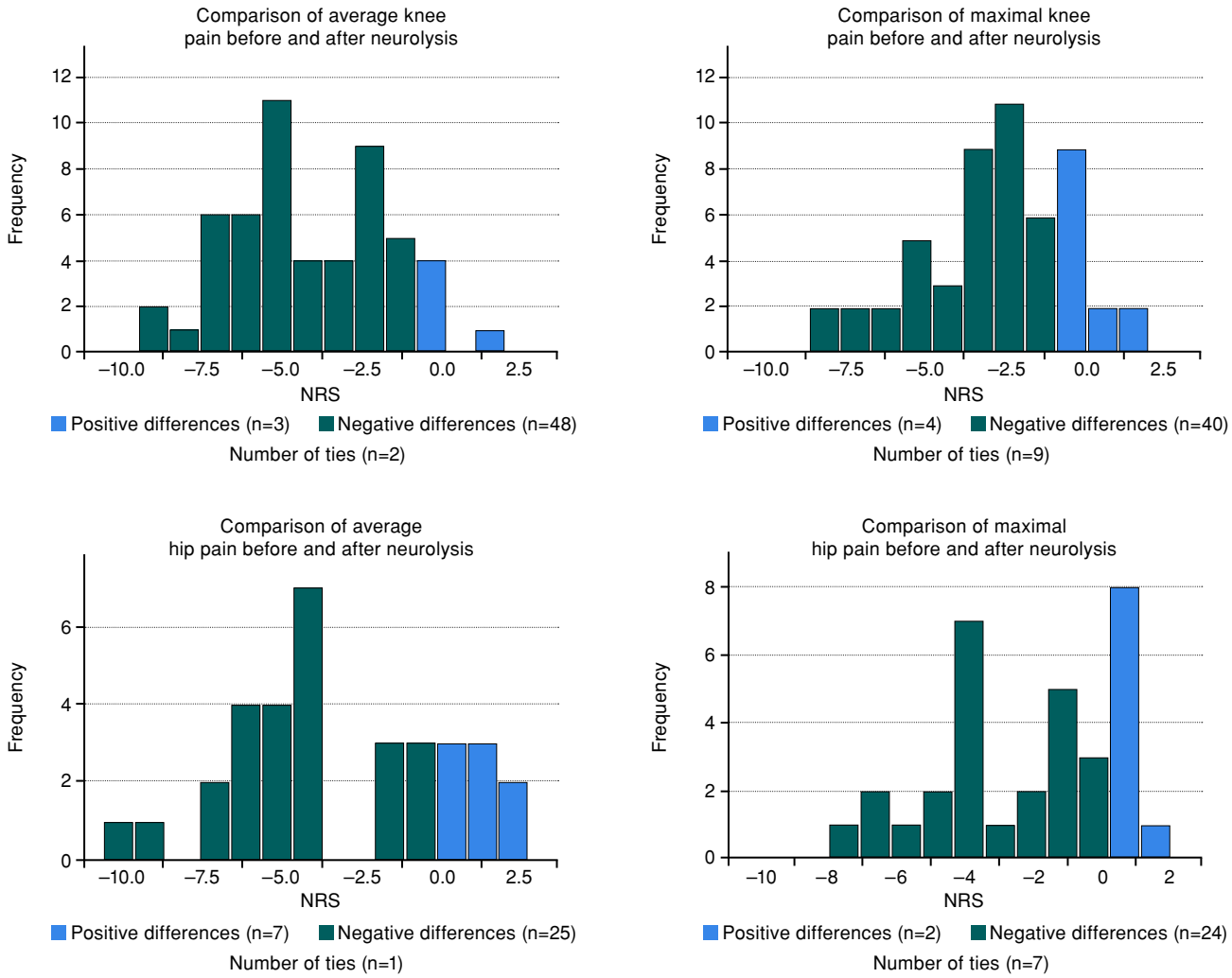

FIGURE 6. The success of neurolytic block by individual. The green columns represent patients, whose pain was improved, the blue columns represent patients with maintained or worsened pain.
NRS: Numeric rating scale.

nerves can vary between individuals, but it seems to be evident that the source of hip pain can be found in the anterior capsule.[32] As posited by Short et al.,[29] the femoral and obturator nerves play a pivotal role in the innervation of the region. Additionally, the accessory obturator nerve is found to have a more pronounced influence than previously assumed. A cadaveric study was conducted to examine the trajectory of these nerves and identify the bony landmarks which can be readily observed with ultrasound. These are the so-called teardrop (inferomedial acetabulum) for the obturator nerve, and the surface of the pubis between AIIS and iliopubic eminence for the femoral and accessory obturator nerves.[29]

The PENG block was initially announced as a preoperative opioid-free alternative for the management of hip fractures, performed with local anesthetics and steroid.[10,34] Expanding its use for postoperative analgesia was a reasonable course of action.[35]

Many publications exist focusing on the management of chronic pain. In a recent publication, Sato et al.[17] presented findings from a study on the repetitive administration of PENG block using local anesthetics for the management of chronic osteoarthritic pain. Karaoğlan et al.[16] examined different groups of patients with chronic hip pain. Administration of local anesthetics resulted in temporary effect.

Bhatia et al.[18] assembled a corpus of 14 publications pertaining to the efficacy of radiofrequency treatment for hip joint pain,

predominantly caused by osteoarthritis. It is notable that none of the studies were randomized-controlled trials. The majority of the studies focused on the obturator and femoral nerves. While some patients reported a reduction in pain intensity, the reported success rates varied considerably, from 20 to 80%. The follow-up periods spanned a considerable range, with the longest observation period reaching 36 months.

Given the limited availability of radiofrequency, the concept of chemical neurolysis also emerged as a potential alternative. In a pioneering case series, Kwun-Tung et al.[19] examined the alcohol neurolysis of the small nerves supplying the hip joint in patients with inoperable hip fractures. The articular branches of the femoral, obturator and accessory obturator nerves were denervated under ultrasound guidance. The results were encouraging, demonstrating a significant reduction in pain, a considerable increase in maximal tolerable hip flexion, and the ability to sit within days after the procedure in half of the patients.

The knee joint is innervated by 12 to 13 nerves, resulting in its significant anatomic variability.[36] The branches are originated from the tibial, common peroneal, femoral, saphenous and obturator nerves. The current techniques are unable to treat all nerves, particularly if the objective is avoidance of affecting motor function of the peroneal nerve. It should be noted, however, that not all nerves are intended to be targeted; rather, the aim is to selectively denervate those that are responsible for transmitting pain signals. In a comprehensive review of the literature, Tan et al.[21] identified the superomedial, superolateral, and inferomedial genicular nerves as the most important targets. The authors assert the procedure's safety, although a sole modest case study was incorporated into the study, which employed the use of alcohol.

It can be reported that the genicular nerves are purely sensory in function. They are situated in close proximity to bone surfaces, accompanied by small arteries. Given the abundance of sensory innervation of the joint, denervation of these nerves does not result in difficulties with proprioception. Untreated branches can compensate for the function of the treated ones.[8]

The original procedure of radiofrequency neurolysis of genicular nerves was first described in 2011 by Choi et al.[24] The study cohort comprised 38 patients. Following a positive diagnostic blockade, half of the patients underwent radiofrequency denervation of the genicular nerves under fluoroscopic guidance. A significant reduction in pain was observed at the 12-week follow-up. This was the inaugural randomized study to demonstrate the efficacy of radiofrequency neurolysis in the treatment of chronic knee osteoarthritis.

Radiofrequency lesioning permits a more exact and targeted ablation, although the probability of affecting nerve fibers traversing atypical pathways is diminished.

A meta-analysis of six studies revealed that radiofrequency-based denervation of the genicular nerves resulted in a significant reduction in pain intensity for a period of six months following the procedure.[7] With regard to the long-term outcome, the efficacy of this approach remains a topic of contention, with a dearth of studies employing longer follow-up periods. Similarly, Li et al.[37] reached the same conclusion.

Chemical neurolysis with ethyl alcohol or phenol represents an alternative to radiofrequency-based denervation. There are case reports which attest the efficacy of neurolysis of genicular nerves with alcohol in alleviating pain for periods ranging from 5 to 12 months.[38] The denervation process utilizing alcohol does not necessitate the same degree of precision as that employed with radiofrequency. This is due to the fact that even a relatively small quantity of injected fluid (1 mL) has the potential to extend beyond the area covered by radiofrequency, encompassing a significantly larger region.[39]

Ahmed and Arora[40] presented a case series comprising four patients.[40] Elashmawy et al.[8] conducted a comparative analysis of genicular nerve block versus neurolysis with alcohol. Findings indicated that neurolysis with alcohol could alleviate pain and enhance quality of life for longer period of time.

The aforementioned methods and studies employed for neurolysis include radiofrequency lesioning or the administration of ethanol or phenol. As radiofrequency and phenol were not available for us, the only remaining option for sustained pain relief was the administration of alcohol. Both of the hip and knee joint neurolysis can be performed under the guidance of fluoroscopy or ultrasound, as well. The advantages of the latter method are the lack of radiation, easy accessibility and direct visualization of the accompanying vessels. All of

our treatments were carried out with the use of ultrasound.

One of the most significant disadvantages of alcohol administration is the occurrence of a sharp, transient (lasting approximately one to two minutes) pain sensation during the injection procedure. The prior administration of lidocaine serves two purposes: firstly, to ascertain the likelihood of sustained pain relief at the site in question (serves as diagnostic blockade), and secondly, to prevent the occurrence of procedural pain. In our experience, these goals can only be achieved to a limited extent.

Another notable adverse effect is the occurrence of transient worsening of the pain after the procedure, which typically persists for two to three days. This can be effectively managed with oral paracetamol and tramadol. Our results showed an improvement at two weeks after the procedure.

The role of the diagnostic blockade is controversial. Some authors do not perform diagnostic blockade, while some uses lower volume of local anesthetic. The volume and the timing are questionable as well, because administering large volume of local anesthetic just prior to the procedure can dilute the concentration of the alcohol significantly. Following our protocols, lidocaine reduces the ethanol concentration to 30% (hip dose) and 35% (knee dose), respectively. Further research is required to ascertain whether increasing the concentrations can enhance the efficacy of the procedure. Given that a higher number of nerves are involved in the innervation of the joints, it can be postulated that the treatment of a greater number of nerves may result in a more efficacious reduction of pain.

Nevertheless, the patients can benefit from alcoholic neurolysis. It is more affordable than radiofrequency lesioning due to its far lower costs and shorter procedural time.[22] Moreover, it does not require special equipment and has easier access even with limited resources. As mentioned above, it can cover a broader area than radiofrequency ablation allowing for better targeting of the affected nerves leading to a more efficient reduction of pain.

The opportunity is offered to enhance muscular length and strength, optimize the length and tension of tendons, give a chance for intentional body weight loss and thereby potentially facilitate more efficacious rehabilitation outcomes. This patient population presents with a number of comorbidities, which are exacerbated by an increased sympathetic tone resulting from pain. The overall condition of patients is improved, thereby increasing the success rate of surgical procedures.

One of the main limitations to this study is the short follow-up period of time. In some cases, beyond two weeks after the procedure further improvement could also be noticed due to the fact that alcohol needed at least 10 to 14 days to make an effect. Thus, longer follow-up presumably could lead to better outcomes. Another limitation is the small number of postoperative patients which does not allow the separated statistical analysis of this group.

In conclusion, alcoholic neurolysis represents a novel and promising approach of pain management, offering a viable alternative as a bridging therapy until surgical arthroplasty of the hip or knee joint and for the treatment of persistent pain following surgery. Ultrasound guidance is safe and effective, allowing a radiation-free modality and making the procedure more widely available. The low volume used provides satisfactory pain relief without motor blockade, thereby enabling the procedure to be performed in an outpatient setting. Furthermore, it offers a potential solution for patients who are not eligible for surgical intervention. Further research and longer follow up are required to enhance the efficacy and sustainability of this method.

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