

Combined lumbar plexus sciatic nerve block for hip fracture: a case series with 442 patients

Abstract

Introduction: Hip fractures are a global health problem in the elderly population. The mortality and morbidity after anesthesia are high in the elderly population with hip fractures due to numerous comorbidities. In recent years, the combined lumbar sciatic block (CLSB) method is safely applied in high-risk hip fracture surgeries. This study aims to examine 442 cases of hip fracture surgery in our clinic.

Method: 442 high-risk patients operated in Istanbul University Cerrahpasa, Cerrahpasa Faculty of Medicine, Department of Orthopedics and Traumatology between 2004 and 2016 are included in this retrospective study. Neurostimulation technique combined with lumbar plexus and sciatic nerve block applied in all cases. The Lumbar plexus block consists of bupivacaine 15 cc 0.5 % and prilocaine 15 cc 2%. Sciatic nerve block consists of bupivacaine 10 cc 0.5 % and prilocaine 10 cc 2%. Cases are evaluated for anesthesia quality and complication rate.

Results: There was no need for any sedation or analgesia in 199 cases. Sedation was required in 147 cases. In 82 cases, the need for sedation combined with analgesia occurred. The conversion to general anesthesia was required in 14 cases. Complication wise, the epidural spread was observed in 5 cases and 3 cases got convulsions.

Conclusion: It is concluded that CLSB is a safe alternative technique to use in high-risk hip fracture surgery.

Keywords: Hip fracture surgery, Lumbar plexus block, Sciatic block

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Introduction

Hip fracture is a global public health problem with an incidence of more than 1.6 million cases worldwide each year.¹ Due to the increase of the global elderly population aging over 65 years, the total number of hip fracture cases is expected to surpass 6 million by 2050.² Elderly patients suffering from hip fracture have multiple comorbidities in most cases that which puts these patients at high risk of morbidity and mortality after anesthesia.^{3,4}

Method

442 high-risk patients having been operated in Istanbul University Cerrahpasa Faculty of Medicine, Department of Orthopedics and Traumatology between 2004-2016 are included in this retrospective case series study. Neurostimulation technique combined with lumbar plexus and sciatic nerve block (CLSB) were applied in all cases. Lumbar plexus block consists of administration of bupivacaine 15 cc/0.5% and prilocaine 15 cc/2%. Sciatic nerve block consists of administration of bupivacaine 10 cc/0.5% and prilocaine 10 cc/2%. Cases are evaluated for anesthesia quality and complication rate.

Lumbar plexus block : The determination of the site of needle insertion is identified by following steps: A line is drawn connecting the iliac crests (intercristal line). The spinous processes are marked and posterior superior iliac spines are located by palpation. A line through the posterior superior iliac spine is drawn parallel to the line joining the spinal processes. The site of needle insertion should be at the lateral third and medial two-thirds of a line between the spinal processes and the posterior superior iliac spines (see Figure 1). Insertion of the needle is perpendicular to all planes. A 100 mm stimulating needle is inserted and connected to a nerve stimulator with a starting output of 1.5 mA and 2 Hz. The needle is advanced into

deeper tissues until quadriceps twitches are visible or contact with bone tissue (presumed to be the transverse process of L4) is made. If bone tissue is encountered, the needle should be withdrawn and redirected caudally under the transverse process and advanced 15–20 mm at most, until twitches of the quadriceps muscles are seen with currents between 0.3 and 0.5 mA. After a safety check by negative aspiration, the mixture of bupivacaine 15 cc/0.5 % and prilocaine 15 cc/2% of local anesthetic solution is injected incrementally over 3–5 min with regular aspiration for blood or cerebrospinal fluid.

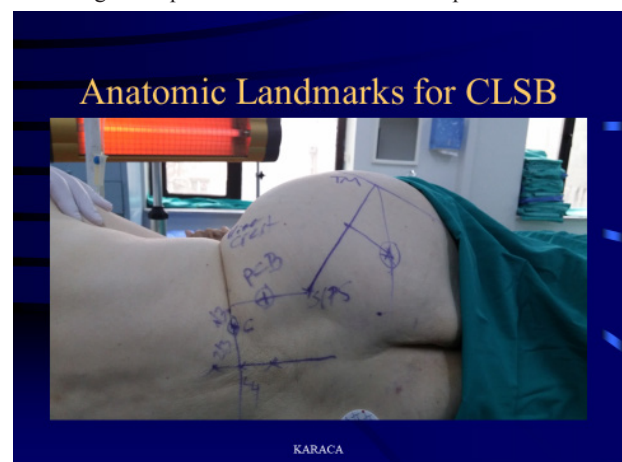


Figure 1

Posterior sciatic block: Posterior approach to sciatic block can be easily achieved by clear landmarks identifiable in most patients. Proper deep palpation is of utmost importance because the thick adipose tissue over the gluteal area may obscure bone structures. The greater trochanter, and posterior superior iliac spine are marked

after palpation. The needle insertion site should be 4 cm distal to the midpoint between the two marked points (see Figure 1). Insertion of the needle is perpendicular to the skin, and the palpating hand firmly pressed to decrease the skin–nerve distance and stabilize the anatomy is strongly recommended. A 100 mm stimulating needle is inserted and connected to a nerve stimulator with a starting output of 1.5 mA and 2 Hz, until the twitching movement of plantar flexion or dorsal flexion are visible with currents between 0.3 and 0.5 mA. Bupivacaine 10 cc 0.5 % and prilocaine 10 cc 2% are injected incrementally over 3–5 min with regular negative aspiration for blood.

Results

There was no need for any sedation or analgesia in 199 cases. Sedation was required in 147 cases. In 82 cases, the need for sedation combined with analgesia occurred. The conversion to general anesthesia was required in 14 cases. Complication wise, the epidural spread was observed in 5 cases and 3 cases got convulsions.

Discussion

Age is definitely an important factor affecting the outcome of every anesthesiologic procedure, CLSB included. The ages of patients in this series are ranging from a minimum of 46 to a maximum value of 99. Overall, a mean value of age is 78.8±9.4 and the median age is 80. Out of 442 patients 292, 66% were female and 150, 33% were male. This complies with the previously published findings in the literature. The female sex is a relative risk factor for hip fractures in elderly years.⁵ The female subgroup has the mean age value of 79.4±8.9 and median age of 81. On the other hand, the male subgroup has a mean age value of 77.5±10.2 and median age of 79. 397, 89% of the patient population of this study falls within the elderly age group of over 65 years old, meanwhile 101, 22% of the patient population lies within “senility” and possible frailty range of over 85 years old (see Figure 2). Old age patients have numerous comorbidities and lengthy medical history which causes majority of cases to fall under high ASA (American Society of Anesthesiologists) physical status classification (see Table 1).

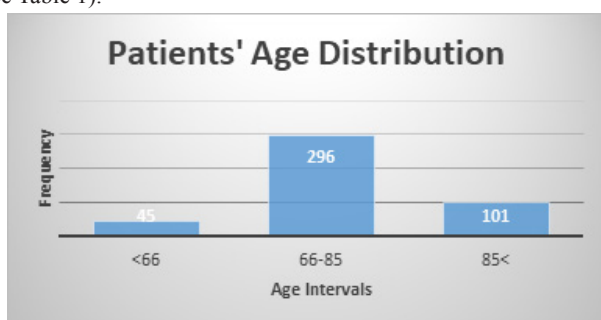


Figure 2

Table 1

ASA Classification	ASA I	ASA II	ASA III	ASA IV	ASA V
No. of Patients	11	88	312	29	2

Body mass index (BMI) is another important indicator of possible challenges during the application of CLSB, considering the amount of adipose tissue and fat deposits in the gluteal region the needle needs to pass in high BMI patients to apply the anesthetic solution in desired locations. Overall, the mean BMI of the study group is 25.3±5.0 and the median is 24.9. It can be said that 84% of the patient population being under the limit of obesity (see Figure 3) had led the procedures to a more successful outcome. It has been published that

regional anesthesia is a favorable method to utilize in obese patients undergoing various types of surgery but an abundance of fat tissue in the application area could prove challenging and cause technical difficulties for anesthesiologists.⁶

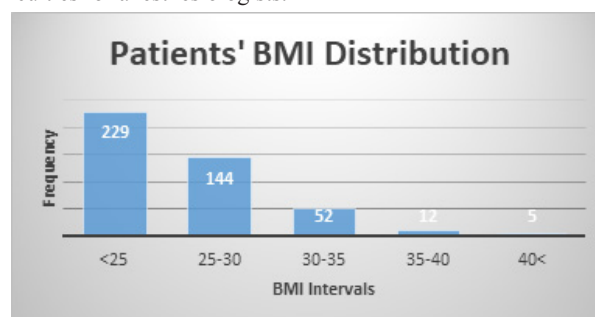


Figure 3

In general, a measure of success regarding anesthesia technique mainly focuses on comparisons between neuraxial anesthesia and general anesthesia.^{7,8} Compared with neuraxial anesthesia, CLSB is associated with less sympathetic block and better cardiovascular function stability. A previous small sample-size retrospective study⁹ compared the effect of general anesthesia, neuraxial anesthesia and CLSB on the prognosis of patients with hip fracture. The results show that both neuraxial anesthesia and CLSB could reduce the total mortality also there was no significant difference between neuraxial anesthesia and CLSB. Although the fact remains, the number of elderly and high-ASA-grade patients in the CLSB group was significantly greater than that in the neuraxial anesthesia group, therefore it can be derived that when comparing the effect of these two anesthetic methods in similar conditions CLSB might have more advantages.

Conclusion

In conclusion, considering in only 14 cases out of a total of 442 (3%) conversion to general anesthesia was required, and only in 8 cases out of these 442 (2%) serious complications were recorded. It can be said that combined lumbar plexus sciatic nerve block is a safe alternative technique to use in high-risk hip fracture surgeries.

Acknowledgments

None.

Conflicts of Interest

None.

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