

Spinal Anesthesia Through a Small Skin Incision in a Patient with Extensive Tattooing Throughout Dorsal Region. Case Report

Diana C De Paola¹, Lyses Villas Boas Filho², Luiz Eduardo Imbelloni^{3*}, Christiane Vigne A Abreu⁴ and Erika Mizuno Viana⁵

¹Anesthesiologist of the Hospital Copa Star, Rio de Janeiro, RJ, Brazil

²Anesthesiologist of the Hospital Casa de Saúde São José, Rio de Janeiro, RJ, Brazil

³Co-responsible for the Anesthesiology Residency Program at Tatuapé Municipal Hospital, SP, Brazil

⁴Plastic Surgeon of the Hospital Casa de Saúde São José, Rio de Janeiro, RJ, Brazil

⁵Anesthesiologist of the Hospital Prontobaby, Rio de Janeiro, RJ, Brazil

***Corresponding author:** Luiz Eduardo Imbelloni, Co-responsible for the Anesthesiology Residency Program at Tatuapé Municipal Hospital, SP, Brazil

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ABSTRACT

The prevalence of tattoos has increased significantly in both the male and female population, with the vast majority located on the back and some depicting the spine. During the administration of neuraxial anesthesia (epidural or spinal), tissue coring appears to be a common phenomenon during lumbar or thoracic puncture, potentially leading to the deposition of epithelial cells in the CSF. After local anesthesia at the planned needle insertion site, a 5-mm skin incision may minimize needle contact with pigmented skin. Allowing the pigmented skin not to be brought into the subarachnoid space, will certainly protect against the future appearance of epidermoid cancer, which is known to take 2 to 20 years to develop. In this case report, in a patient with no unpigmented area available for needle insertion, a skin incision was made with the aim of minimizing the introduction of skin tissue into the subarachnoid space.

Keywords: Neuraxial Blocks; Tattoos; Tattooing; Complications; Tissue Coring

Introduction

The introduction of any subject requires a definition to understand what is intended to be shown. Thus, the definition of tattoo means the art of engraving on the skin, using indelible colored pigments that symbolize what stimulates the tattooed person, and is relatively long-lasting [1]. In Brazil, there is no single national survey that accurately represents the incidence of patients with tattoos who will undergo anesthesia. A study conducted in four countries (Brazil,

China, Russia, and the United States) with 9,031 adults over the age of 18 using a questionnaire found that only 1,682 (18%) responded that they had one or more tattoos, with 15.97% on their torso [2]. Accessing the Brazilian Unified Health System (SUS), with the objective of knowing the number of spinal anesthetics performed in the year 2025, the response showed that there are no data available [3]. Similarly, a search was conducted on the World Federation of Societies of Anesthesiologists (WFSA), which brings together 149 societies from

156 countries, but there are no data for the number of spinal anesthetics performed annually [4]. Access to the SUS and WFSA revealed that the number of spinal anesthesia procedures is unknown, let alone the number of patients with tattoos undergoing this procedure.

The number of tattooed patients undergoing surgery has increased significantly in recent years, particularly during neuraxial anesthesia due to the possibility of the introduction of skin tissue into the subarachnoid space. Therefore, several approaches have recently been suggested for performing a puncture to administer spinal anesthesia in patients with back tattoos [5]. A recent review focusing on skin anatomy and physiology found no evidence that pigment can be transported to the central nervous system, but Fermi's paradox, "ab-

sence of evidence is not evidence of absence of effect", still holds true considering emerging evidence suggesting a possible link between tattoos and lymphoma [6]. In an editorial on spinal anesthesia and puncture position, four positions were described for accessing the subarachnoid space: sitting, lateral decubitus, prone position and, on some older orthopedic tables, under the table [7]. The three positions for performing spinal anesthesia in patients with tattoos were shown in drawings (Figures 1-3). The aim of this case report is to demonstrate that the stab incision can represent a viable technical alternative for accessing the subarachnoid space when pigment-free skin is not available, thus avoiding the introduction of pigmented skin into the subarachnoid space, and the puncture was performed with the patient in the left lateral decubitus position.

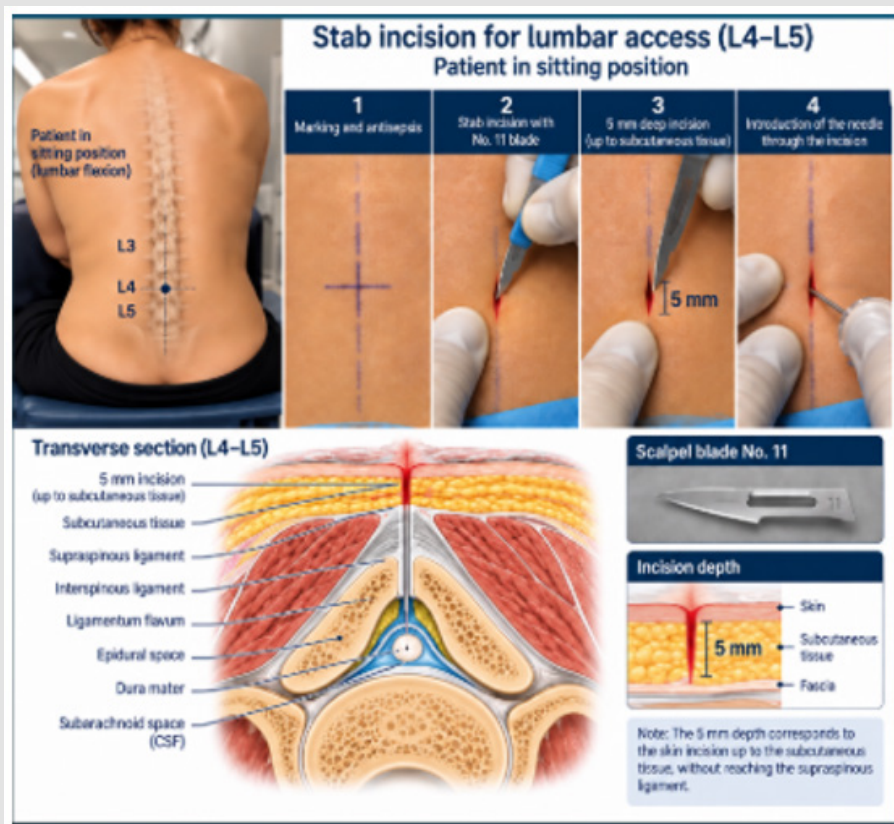


Figure 1: Spinal anesthesia puncture in the sitting position, with the help of AI.

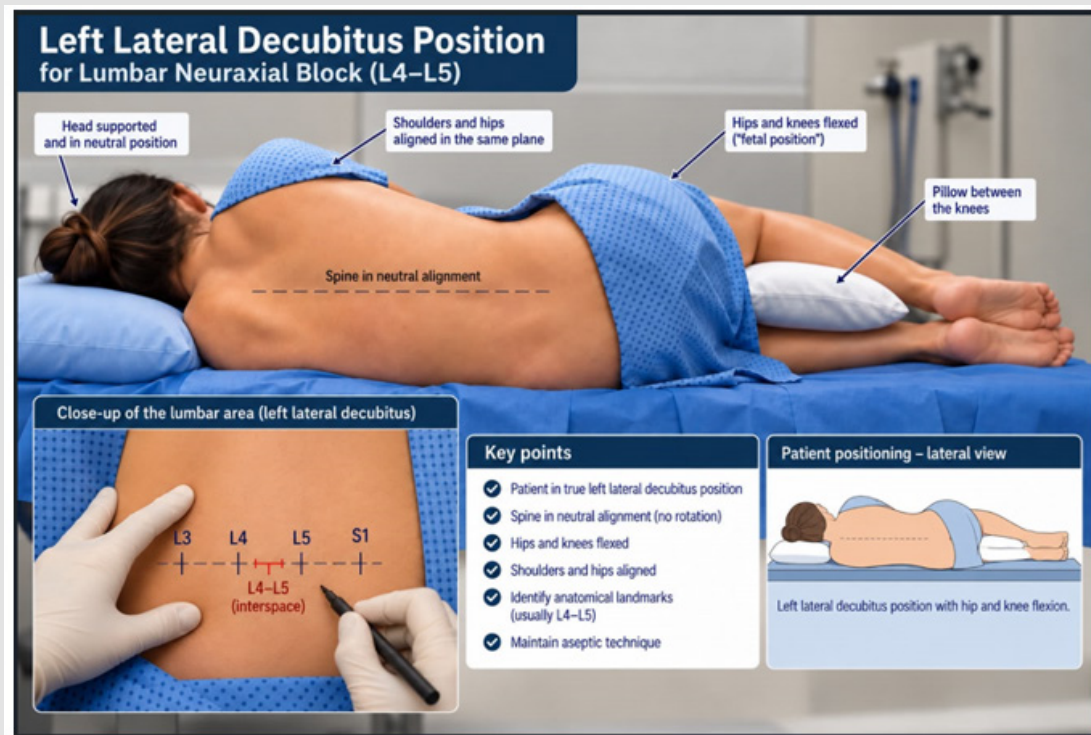


Figure 2: Spinal anesthesia puncture in the left lateral decubitus position, with the help of AI.

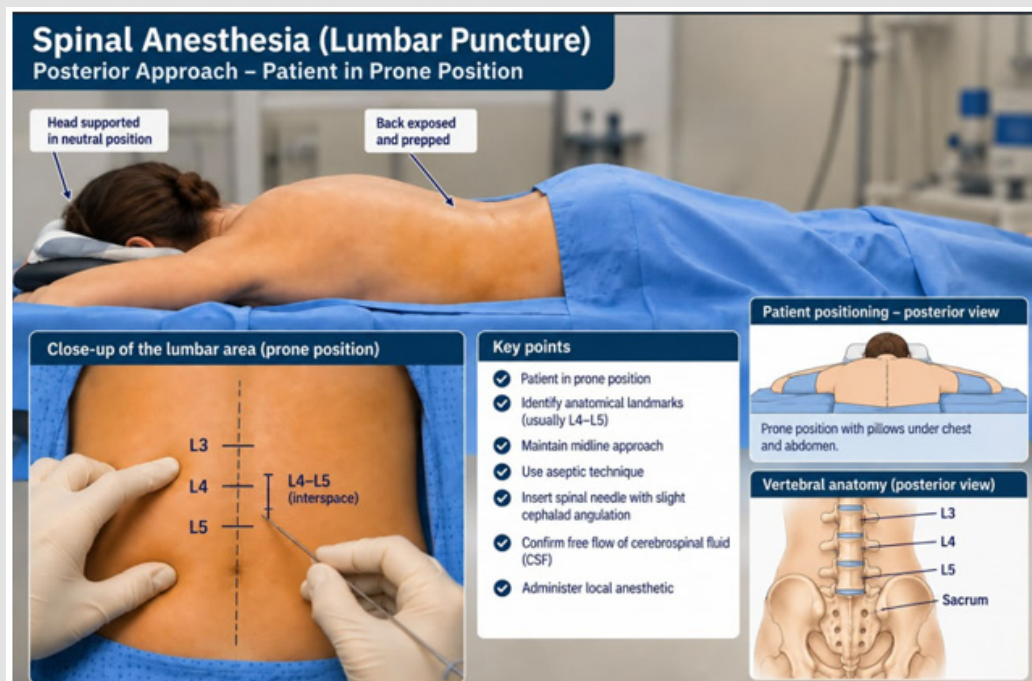


Figure 3: Spinal anesthesia puncture in the prone position, with the help of AI.

Case Report

This case report was registered on Plataforma Brasil and approved by the CEP/CONEP of the Hospital Barra Plástica, and the Free and Informed Consent Form was signed by the patient after the explanation of the entire anesthetic procedure to be performed and authorized for publication in an indexed medical journal. A 51-year-old female patient, weighing 82 kg and measuring 168 cm in height, with a BMI of 29.1 kg/m², classified as ASA II, underwent surgery for bilateral removal of industrial silicone from the gluteal region combined with reconstruction by gluteal lift. She reported industrial silicone injections into both buttocks in 2021 and presented with inflammatory signs and skin discoloration in the affected regions at the time of evaluation. She denied other relevant comorbidities, regular medication use, and drug allergies. During the preoperative evaluation, laborato-

ry tests showed a hemoglobin level of 13.9 g/dL, hematocrit of 40.3%, platelet count of 293.000/mm³, prothrombin time of 12.4 seconds, activated partial thromboplastin time of 31 seconds, and INR of 1.02. Serum creatinine was 1.0 mg/dL. Examination of the patient's dorsal region from C7 to the sacral region revealed an extensive, continuous tattoo with no area of unpigmented skin available for neuraxial puncture (Figure 4). The tattoo was fully healed, with no local signs of infection, inflammation, or other skin abnormalities. After monitoring with continuous electrocardiography, noninvasive blood pressure measurement, and pulse oximetry was initiated, peripheral venous access was obtained using a 20G catheter in the left upper limb. The patient was placed in the left lateral decubitus position, and antisepsis of the lumbar region was performed. The puncture site was identified at the L4–L5 intervertebral space using a paramedian approach.



Figure 4: Extensive tattoo covering virtually the entire back area with no unpigmented zones.

After local infiltration with 7 mL of 1% lidocaine, an approximately 5-mm skin incision (stab incision) was made with a cold-blade scalpel, extending through the epidermis and dermis to the subcutaneous tissue. Through this opening, a 25G Quincke spinal needle, without an introducer, was advanced via a paramedian approach at L4–L5. The subarachnoid space was reached on the second attempt, with free flow of cerebrospinal fluid. After confirmation of needle placement, 17 mg of hyperbaric bupivacaine and 75 µg of clonidine were administered intrathecally. The patient was then immediately placed in the prone position. The operating table was tilted to an approximately 30° Trendelenburg position, maintained for 30 minutes, and subsequently returned to the horizontal position. Sensory blockade up to the T10 dermatome and complete motor block (grade 3) were confirmed. During the procedure, supplemental sedation was provided with midazolam 5 mg, fentanyl 50 µg, ketamine 10 mg, and propofol 30 mg. The total duration of surgery was 115 minutes, and the procedure was performed entirely in the prone position. The patient remained hemodynamically stable throughout the procedure, with no anesthetic complications and no need for conversion to general anesthesia. In the immediate postoperative period, the patient experienced no pain, nausea, post-dural puncture headache, neurological deficits, or persistent sensory changes. No signs of infection or other skin changes were observed at the incision site. Lower-limb movement recovered approximately four hours after the block. Because of the surgical procedure performed in the gluteal region, she was instructed to avoid the supine and sitting positions during the first two postoperative weeks. Follow-up continued for 45 days, with no neurological symptoms during this period.

Discussion

The prevalence of extensive tattoos in the population has increased among both males and females in most countries. The 16% prevalence of tattoos on the back in four countries surveyed may make it difficult to perform anesthesia in the neuraxial region (spinal and epidural) [2]. In a recent short communication, a total of 17 steps were proposed that must be followed exactly when performing the puncture through the back of tattoo patients [5]. In the preoperative assessment, extensive tattooing was observed covering the entire dorsal region of the thorax to the sacral region, with no area of skin free of pigmentation. Given this situation, a 5-mm cold-blade stab incision was made through which a 25G cutting-tip needle was introduced on a second attempt. This avoided introducing pigmented skin into the subarachnoid space. This case report demonstrated the possibility of avoiding the introduction of pigmented skin into the subarachnoid space with a small incision shown in all three spinal anesthesia puncture positions (sitting, lateral decubitus, and prone position), thereby avoiding a potential complication. With the aim of evaluating the presence of epithelial cells that reflux from Cerebrospinal Fluid (CSF) after subarachnoid puncture with a 25G cutting-tip needle in the 1st and 3rd drops, squamous epithelial cells were identified

in 35 (89.7%) of the samples from the 1st drop, in 34 (87.2%) from the 3rd drop and in 24 (61.5%) [8]. Thirty-six young adult male rabbits were divided into 3 groups: GI, spinal puncture through tattooed skin; GII, spinal puncture through tattooed skin and saline injection; and GIII, spinal puncture through untattooed skin and saline injection [9].

The results showed that intrathecal injection of saline solution through a needle inserted into tattooed skin was able to produce histological changes in the meninges of rabbits, and ink fragments remained trapped inside the spinal needles, despite the presence of a stylet. An epidermoid tumor is a benign lesion of embryonic origin formed by the inclusion of epidermal cells in locations where they should not be. Iatrogenic spinal epidermoid tumors may result from implantation of raised epidermal tissue into the spinal canal during lumbar punctures without needles mandrel, with inadequate or poorly adapted mandrel [10]. In 1962, a review of 90 cases of spinal epidermoid tumors reported that 41% of tumors had iatrogenic origin for distinct reasons [11]. To corroborate the possibility of clinical features of squamous cell carcinoma of the lumbar spine, two children were described, both of whom underwent lumbar punctures six years before the onset of symptoms [12].

Most anesthesiologists worldwide prefer the sitting position to access the subarachnoid space. However, there are two other positions (lateral decubitus and prone position) for accessing the subarachnoid space [7]. In this case, the puncture was performed in the left lateral decubitus position, but as this is a case report, the suggested procedure involving a 5-mm incision and needle insertion was illustrated in all three puncture positions. Therefore, the 5 mm skin incision through which the spinal needle would be inserted should avoid introducing skin and pigmented tissue into the subarachnoid space. Spinal epidermoid cysts are a rare, potentially delayed complication of lumbar puncture and neuraxial procedures. Their incidence following spinal anesthesia remains unknown, as the available evidence is predominantly based on case reports and retrospective literature reviews [13,14]. These tumors are well tolerated by patients for extended periods of time, ranging from 2 to 10 years [10]. As we do not have a single medical record system in Brazil, it would be difficult to monitor children undergoing spinal anesthesia for the development of squamous cell carcinomas after spinal anesthesia.

Conclusion

The presence of extensive tattooing in the lumbosacral region should not be considered an absolute contraindication to neuraxial anesthesia, both in the lumbar and thoracic regions. There is a pigment book, which should be used preferentially for punching. Meanwhile, in patients with complete coverage throughout the dorsal region, performing a superficial stab incision prior to needle introduction may represent a technical alternative intended to avoid needle passage through pigmented dermal bedded hairs. This procedure was used in this case, and after local anesthesia for the incision with

a scalpel, the spinal needle was introduced without the risk of introducing skin into the subarachnoid space. In a study evaluating tissue regurgitation up to the 3rd drop of CSF, it is essential to make a skin incision to avoid this problem.

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Luiz Eduardo Imbelloni . Biomed J Sci & Tech Res



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