

CASE REPORTS

The supine coronal midaxillary approach to anterior quadratus lumborum block: case report



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KEYWORDS

Quadratus lumborum;
Regional anesthesia;
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Abstract

Background: There are various approaches to perform an ultrasound guided Quadratus Lumborum Block (QLB). The lateral, posterior, anterior or trans muscular and subcostal paramedian are the various approaches described for performing a QLB. Each of these blocks are aimed to achieve a maximum spread with high volume and low concentration of local anesthetics.

Case report: In this novel approach a curvilinear ultrasound probe was used with the patient lying in supine position. The probe was placed longitudinally in the mid axillary line to visualize Quadratus Lumborum Muscle (QLM) in the coronal plane. The needle was then introduced from cranial to caudal direction and catheters were inserted in the Anterior Thoracolumbar Fascia (ATLF) up to a distance of 4–5 cm in 24 patients for an anterior approach to acetabulum fractures. The needle tip and the Local Anesthetic (LA) spread was visible in all patients. All patients except 4 had excellent perioperative pain relief considering stable hemodynamics and VAS 2–3/10 for the first 48 hours. All patients received 1 g intravenous paracetamol each 8 hours. VAS in postoperative period was 2–3/10, in 20/24 patients. In the postoperative period, 4 patients complained of persistent pain, requiring intravenous fentanyl boluses and multimodal analgesia. Mean VAS score was 2.87 from 0–12 hours, 3.14 from 12–24 hours and 3.35 from 24–48 hours. There were no block-related complications in any patient.

Conclusion: The supine midaxillary coronal approach to anterior QLB is an effective and feasible approach to QLB which can be performed in supine position.

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PALAVRAS-CHAVE
Quadrado lombar;
Anestesia regional;
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Dor pós-operatória

Abordagem supina axilar média coronal para realização de bloqueio do quadrado lombar anterior: relato de casos

Resumo

Justificativa: Existem várias abordagens para a realização do Bloqueio do Quadrado Lombar (BQL) guiado por ultrassom. Diversas abordagens são descritas para a realização do BQL: paramediana lateral, posterior, anterior ou transmuscular e subcostal, todas com o objetivo de obter a máxima dispersão da solução injetada, usando-se alto volume e baixa concentração de anestésico local.

Relato de caso: Nesta nova abordagem, a sonda de ultrassom curvilínea foi usada com o paciente em decúbito dorsal. A sonda foi posicionada longitudinalmente na linha axilar média para visualizar o Músculo Quadrado Lombar (MQL) no plano coronal. A agulha foi introduzida na direção cranial-caudal, e foram inseridos cateteres na Fáscia Toracolombar Anterior (FTLA) até uma distância de 4–5 cm, em 24 pacientes a serem submetidos à correção de fratura do acetábulo pela via anterior. O bisel da agulha e a dispersão do Anestésico Local (AL) eram visíveis em todos os pacientes. Os 24 pacientes, com exceção de quatro, apresentaram excelente analgesia perioperatória, baseando-se na estabilidade hemodinâmica e nos escores EVA de 2–3/10 nas primeiras 48 horas. Todos os pacientes receberam 1 g de paracetamol intravenoso a cada 8 horas. O escore EVA no período pós-operatório foi de 2–3/10, em 20 dos 24 pacientes. No período pós-operatório, quatro pacientes apresentaram queixa de dor persistente, necessitando de bolus de fentanil por via intravenosa e analgesia multimodal. O escore médio da EVA no pós-operatório foi 2,87 entre 0–12 horas; 3,14 entre 12–24 horas e 3,35 entre 24–48 horas pós-operatórias. Não houve complicações relacionadas ao bloqueio em nenhum paciente.

Conclusão: A abordagem supina axilar média coronal para BQL anterior é eficaz e viável para BQL, e pode ser realizada com os pacientes em decúbito dorsal.

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Introduction

The Ultrasound (US) guided Quadratus Lumborum Block (QLB) is performed by various approaches. The lateral (QL1), the posterior (QL2), the anterior (transmuscular QLB or QLB3) and the subcostal paramedian are the various approaches described for performing a QLB.^{1–3} Each of these blocks are aimed to achieve a maximum spread using high volume and low concentration of local anesthetics. Here we propose an US guided coronal approach to Quadratus Lumborum Plane (QLP) at the midaxillary line. We used this approach in 24 patients who had acetabular fractures and were scheduled to undergo an open fixation. This can be performed with the patient in supine position with the needle introduced from cranial to caudal with the help of a curvilinear US probe. From here, we mention it as Supine Coronal Approach to Quadratus Lumborum Block (SCAQLB). This approach allows a safe needle entry path, a drug deposition in the Anterior Thoracolumbar Fascia (ATLF) and a predictable caudal direction of the catheter.

The primary aim was to optimize the coronal approach to anterior QLB in the supine position. The secondary aim was to assess pain relief by monitoring Visual Analogue Scale (VAS) at various time points for 48 hours and look for complications pertaining to the block.

Case reports

After Institutional Ethics Committee approval, 24 American Society of Anesthesiologists' Physical Status (ASA-PS) I/II patients scheduled for open fixation of acetabular fractures through an anterior ilio-femoral approach for this study were recruited. The details were as follows: 9 ASA I and 15 ASA II patients, 14 males, 10 females, mean age 46.79 years. A written informed consent was obtained from all patients. Relevant investigation (hemogram, coagulation studies, electrocardiogram, renal function tests) were within normal limits. Essential monitoring was established (non-invasive blood pressure, electrocardiogram, pulse oximetry, end-tidal carbon dioxide) for all patients. General anesthesia was induced with intravenous fentanyl 50 µg, propofol 150–200 mg and cisatracurium 8–10 mg) followed by tracheal intubation with appropriate size tracheal tube. General anesthesia was maintained with oxygen: air and sevoflurane over volume-controlled ventilation mode. In supine position with a pillow beneath the pelvis, the subcostal margin and the iliac crest were identified. The mid-axillary line was drawn. A scout scan was performed with a curvilinear probe in longitudinal axis along the mid-axillary line (coronal plane). The US image was obtained and the target for needle tip was identified (Fig. 1A). ATLF

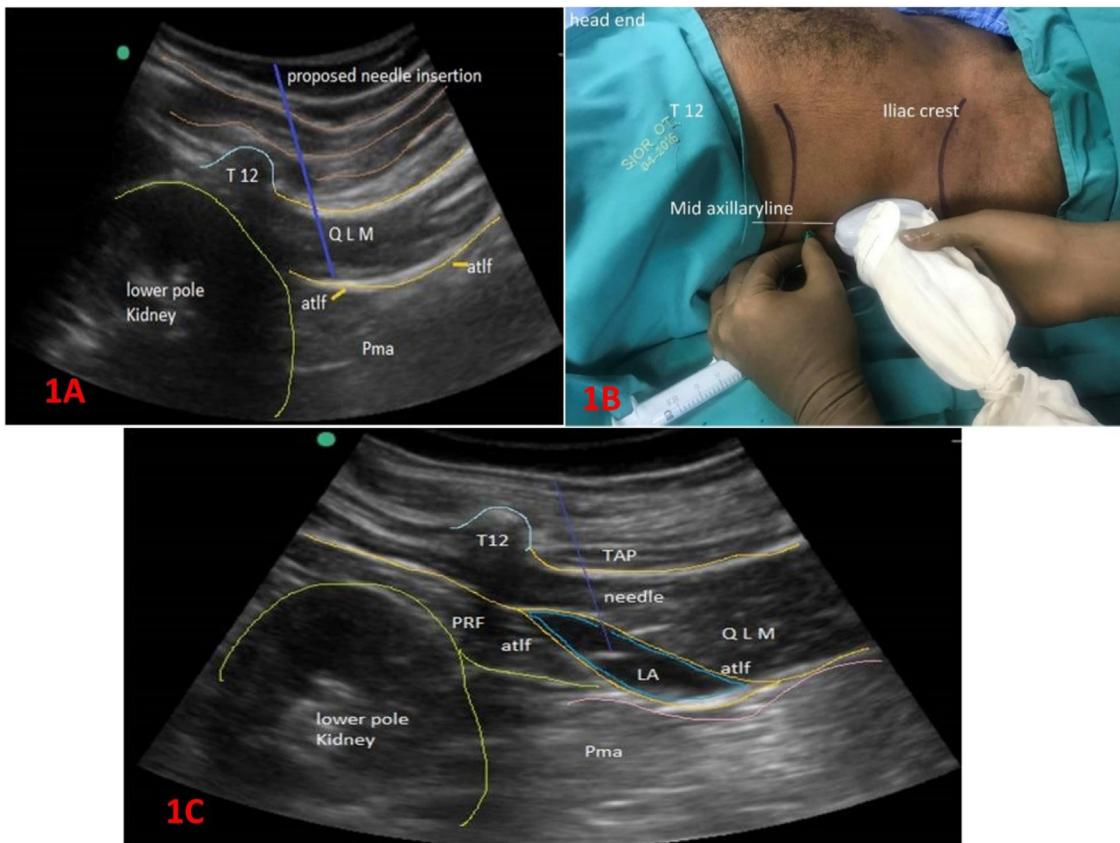


Figure 1 A, Right supine longitudinal scout scan along the mid axillary line – Coronal plane. Right panoramic view of Supine Coronal Approach to Quadratus Lumborum Block (SCAQLB) – proposed needle insertion and target area (dark blue line). QL, Quadratus Lumborum muscle (orange); K, Kidney (light green); PMa, Psoas Major; atlf, Anterior thoracolumbar fascia (orange line). B, Representative figure of right SCAQLB. Needle insertion in supine position in the proximal part of the mid axillary line joining the Iliac Crest (IC) and subcostal (T12). C, Right SAQLB. The SCAQLB needle insertion: (dark blue line); Needle tip visualized as hyperechoic structure at the distal end of blue line in the hypoechoic LA distribution; PRF, Prerenal Fascia; QL, Quadratus Lumborum Muscle (orange); K, Kidney (light green); PMa, Psoas Major; ATLF, Anterior Thoracolumbar Fascia (orange) surrounding the LA (blue).

is the anterior part of thoracolumbar fascia engulfing the Quadratus Lumborum Muscle (QLM).

Aseptic skin preparation was done using 2% w/v chlorhexidine. The curvilinear probe was wrapped in sterile Tegaderm biofilm (3M™ Tegaderm™) and deployed in coronal plane. An 18G Tuohy needle (Braun Medical Inc.) was inserted distal to subcostal margin and advanced under curvilinear probe (Fig. 1B). The needle was advanced through external oblique aponeurosis, internal oblique and transversus abdominis muscles. The tip could be visualized penetrating the posterior epimysium of QLM and entering ATLF. On injection of 5 mL 0.9% normal saline in ATLF, there was an elliptical swelling with spread from cephalad to caudal (Fig. 1C). Thereafter 30mL of 0.375% ropivacaine with 12.5 µg of dexmedetomidine was injected followed by insertion of 20G multi-hole catheter (Braun Medical Inc.) up to 4–5 cm in the ATLF. Postoperatively all patients received continuous infusion of 0.1% ropivacaine at 8mL/h and 1 g IV paracetamol each 8 hours. IV tramadol 100 mg was prescribed if the VAS (Visual Analogue Scale) more than 4. IV fentanyl bolus 1 µg/kg followed with an infusion of

0.5 µg/kg/h was infused if VAS score was above 4. VAS was assessed every 2 hours until the next day.

In coronal plane, QLM was screened and adequately visualized in all patients along with the thoracolumbar fascia in its path from origin at the iliac crest to its insertion close to the 12th rib. The needle tip was identified in all 24 patients in the mid part of ATLF in coronal plane. The anterior spread was 4–5 cm beyond mid-axillary line and a similar spread was observed along the posterior aspect of QLM. Fig. 2 demonstrates a drawing demonstrating structures of importance in a coronal cross-section.

In two out of 24 patients, the LA spread was observed below ATLF between QLM and PMa possibly due to needle tip penetrating ATLF. The catheters seemed to be obstructed at ATLF either coiling or curling on itself in two cases. In 2/24 patients the VAS was persistently above 4. These patients were treated with IV fentanyl infusion at 0.5 µg/kg/h along with IV paracetamol. At the end of 48 hours VAS score revealed a mean of 2.87 from 0–12 hours, 3.14 from 12–24 and 3.35 from 24–48 hours. There were no block-related complications.

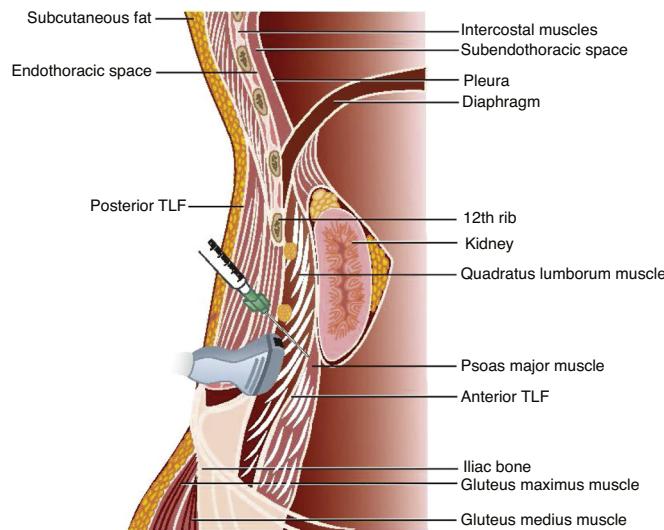


Figure 2 Coronal Approach to Anterior Quadratus Lumborum. The curved linear probe is placed parallel to the quadratus lumborum muscle. The needle is inserted below the 12thrib close to the probe. The needle is inserted through the TAP muscle plane, posterior sheath of QLM, QLM into the anterior TLF. TLF, Thoracolumbar Fascia; QLM, Quadratus Lumborum Muscle.

Discussion

The concept of QLB was introduced by Blanco. Elsharkawy et al. described US-guided subcostal paramedian approach for QLB. This block performed either in prone or lateral position involving injection of LA anterior to the QLM at the level of the 12thrib, with the needle dangerously close to the renal tissue to achieve a paravertebral spread and covers T6-7 to L1-2. The TMQLB described by Borglum et al. is performed with Shamrock method in the lateral position. Catheters inserted with this technique could coil or penetrate the ATLF.⁴ Krohg et al. described the anterior QLB in supine position with the Shamrock (transverse view).⁵ However, in the Shamrock method the QLM and the ATLF are identified in the transverse plane with a small acoustic window.

Herein we describe the midaxillary longitudinal approach in supine position with a pillow beneath the corresponding iliac crest or lateral positions. The advancing needle skirts over the 12thrib laterally, penetrates the transversus abdominis plane and lands in the ATLF in front of the QLM. The kidney could be visualized in real time during the placement of the block, and the needle was safely placed beyond the lower pole of the kidney. Our coronal view obtained with curvilinear probe placed in the mid axillary line in the supine position offers a panoramic view of the QL and the ATLF (Fig. 1) by rocking the curvilinear probe cephalad to caudad. The LA spread could be visualized from cephalad to caudad and in the anterior to posterior plane. As opposed to the Shamrock method the lower pole of the kidney could be well demarcated throughout the procedure and the needle tip positioning is easier and safer.

A slight elevation below the corresponding pelvis is necessary. Our modified method has several advantages. The QLM is visualized in its entire length stretched across from the iliac crest to the 12thrib. The lower pole of kidney is

distinctly recognized. The needle tip can be observed entering from the cephalad portion of the mid-axillary line. The tip traverses the lateral aspect of the abdominal muscles (external oblique, internal oblique, transversus abdominis), penetrates through the QLM to lie in the ATLF. The spread of LA is visualized in all planes, for instance, cranial to caudal and in the anterior to posterior plane. Catheters were easily inserted as the bevel was parallel to the QLM fibers. The primary (2/24) and the secondary failure (2/24) of blocks were due to penetration of ATLF and difficulty in catheter insertion, respectively. To overcome the failures, we recommend LA injection into the TAP plane as needle is withdrawn from the ATLF plane of QLM. Alternatively, the catheters can be inserted from caudal to cephalad.

We propose an alternative coronal approach to anterior QLB in the supine position and would further recommend a comparison between the transverse and the coronal approaches to anterior QLB. Initially it takes some time to get oriented to QLM and ATLF in supine position in a coronal plane. Obesity may impose a limitation to the proposed technique as the needle might not reach the ATLF in these patients. We recommend conventional approaches to QLB in such patients.

Conflicts of interest

The authors declare no conflicts of interest.

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