Dear Clinical trial registry Board,

I'd like to register my record titled " **(SEQ block): Single puncture combined lumbar erector spinae plane block and quadratus lumborum block for perioperative analgesia in acetabular surgeries** " in the **Clinical trial registry**

Best Regards,

Yours

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(SEQ block): Single puncture combined lumbar erector spinae plane block and quadratus lumborum block for perioperative analgesia in acetabular surgeries

Introduction: Acetabular fractures represent relatively infrequent traumatic injuries that can lead to a progressive impairment of hip articular function. Surgical treatment of these fractures may require extensive surgical dissections and frequently is associated with significant postoperative pain, delay in rehabilitation, and prolonged hospital stay. Innervation of the acetabular region is mainly provided by branches of lumbar and sacral plexuses, in addition to dorsal rami of lumbar nerve roots supplying the tissues to be dissected during posterior approach for acetabular fractures.[(1)] We suggest a novel approach for combined lumbar erector spinae plane block and PSSS quadratus lumborum block for perioperative analgesia in hip/acetabular surgeries using a single puncture technique (SEQ block).

Aim of the study: The primary aim of this study is to compare the total postoperative opioid (morphine) consumption after posterior column acetabular surgery when providing ultrasound guided SEQ block: single puncture combined lumbar erector spinae plane block and paraspinous sagittal shift (PSSS) quadratus lumborum block versus conventional intravenous morphine analgesia.

The secondary aims of this study are; sensory assessment in the block group for (dermatomal distribution), intraoperative and postoperative hemodynamics (MAP and HR), resting visual analogue scale (VAS), dynamic VAS, postoperative complications.

Methods: After obtaining approval from Alexandria university ethics committee, this study will be carried out starting from November 2020 for 1 year in El-Hadara university hospital on American Society of Anesthesiologists (ASA) physical status I-III patients scheduled for unilateral posterior wall/column acetabular fractures surgery using posterior approach. The exclusion criteria will include; BMI > 35 kg/m^2, pre-existing neurological deficit, spine deformity, pregnancy/lactation, significant renal or hepatic impairment, known contraindications to peripheral nerve block (coagulopathy or infection at the site of injection), or chronic opioid users/abusers.

Patients will be divided into 2 groups. Group SEQ; patients will receive ultrasound guided SEQ block preoperatively before the induction of general anaesthesia (GA). Group MOR; patients will receive GA and analgesia will be based on opioids mainly intravenous morphine.

Upon arrival to the operating room (OR), a multichannel monitor will be attached to patients, followed by the administration of 2 mg midazolam IV after securing an IV cannula.

SEQ block: It is a combination of paraspinous sagittal shift (PSSS) quadratus lumborum (QL) block and erector spinae plane block (ESPB). Before the induction of GA in group SEQ, patients will lay laterally on the healthy side with the fracture side independent, a curvilinear ultrasound

transducer (2–5 MHz) (Sonosite, M-turbo, Bothell, WA, USA) will be placed in a parasagittal plane 3-4 cm lateral to the lumbar spinous process of L4 (which is almost opposite to the iliac crest), producing a longitudinal scan of the lumbar paravertebral region, thus identifying the transverse processes of L3 and L4 with psoas muscle (PM) in-between and erector spinae muscle (ESM) posteriorly (superficial to transverse processes), the probe is shifted slowly to the lateral side till the transverse processes disappear and quadratus lumborum (QL) muscle is evident in its long axis attached caudally to the iliac crest with a characteristic sonographic image of three muscle layers appearing from posterior to anterior as : ESM, QL, and PM muscles respectively. Here, anterior layer of thoracolumbar fascia (ATLF) - which is considered as continuation of fascia transversalis - is seen separating PM and QL muscles.

After subcutaneous local infiltration with lidocaine 1% at the cephalic end of the probe, the block needle is advanced in a cephalo-caudal direction, through the erector spinae and QL muscles, untill it pierces the epimysium of the QL muscle. Local anaesthetic (LA) is injected anterior to the QL, observing it's spread in a caudal direction towards the iliac crest between the QL and psoas muscles.

Then the caudal end of the probe is rotated slowly medially towards lumbar spine till the hypoechoic shadow of transverse process of L4 appears in the ultrasound image. The needle is withdrawn to subcutaneous tissue, then advanced in plane towards transverse process of L4. After contacting it, LA is deposited in the plane between transverse process and overlying ESM. Total volume of LA used will be 50 ml of 0.25 % bupivacaine, 25 ml for each injection.

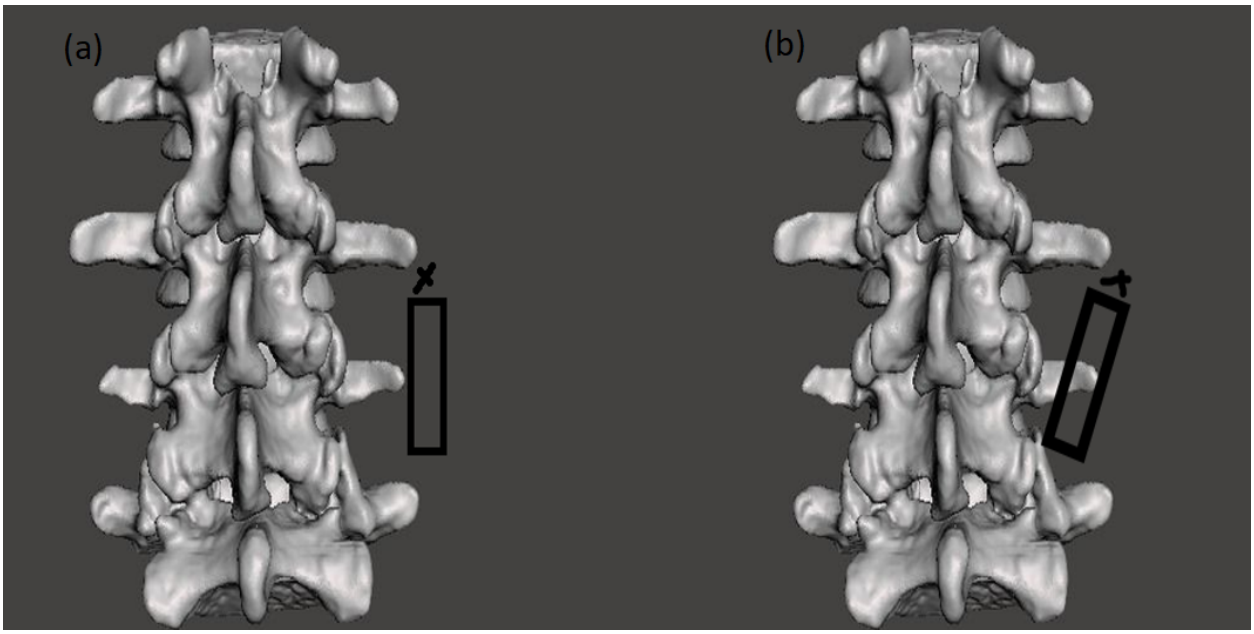

Figure 1. (a) Diagrammatic representation of probe position during SEQ block technique. (a) probe is in para-sagittal plane about 4 cm lateral to lumbar vertebrae spinous processes with needle entry point at cephalad end of the probe, (b) caudal end of the probe is rotated medially towards lumbar spine till the hypoechoic shadow of transverse process of L4 appears in the ultrasound image.

Thirty minutes after block performance, sensory assessment will be performed using a pin prick test for dermatomal distribution, followed by the induction of GA. While, in group M; no block will be given.

Anaesthesia will be induced with propofol 2 mg/kg, atracurium 0.5 mg/kg, and fentanyl 1µg/kg, followed by endotracheal intubation, anaesthesia will be maintained by isoflurane 1 MAC in 100% oxygen. Multimodal analgesia protocol will be provided including intravenous dexamethasone 8 mg, paracetamol 1 gm, and ketorolac 60 mg. Increments of 0.5 µg/kg of fentanyl will be given intraoperatively if there is an increase in HR/MAP above 20% of the basal value.

Postoperatively, multimodal analgesia regimen will be continued in the form of paracetamol 1 g /8 hours and ketorolac 30 mg /8 hours intravenously for 48 hours. Intravenous morphine in a dose of 0.05 mg/kg will be given as a rescue analgesic when the VAS ≥4.

Measurements:

1. HR and MAP will be recorded preoperatively (baseline), every 30 minutes during the surgery, and every hour postoperatively for the first 4 hours, then every 4 hours for the remaining 24 hour postoperative follow up.
2. Resting VAS every hour for the first 4 hours, then every 4 hours for the remaining 24 hour postoperative follow up.
3. Dynamic VAS every hour for the first 4 hours, then every 4 hours for the remaining 24 hour postoperative follow up.
4. Total analgesic requirement (intraoperative fentanyl and postoperative morphine).
5. Postoperative complications (block or opioid related complications).

References:

1. Chelly JE, Casati A, Al-Samsam T, Coupe K, Criswell A, Tucker J. Continuous lumbar plexus block for acute postoperative pain management after open reduction and internal fixation of acetabular fractures. Journal of orthopaedic trauma. 2003;17(5):362-7