



## Case Report

# Ultrasound-Guided Quadratus Lumborum Block as a Sole Anesthetic Method for Giant Inguinal Herniorrhaphy in an Elderly Patient with High Risk

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**Abstract:** Background: Quadratus lumborum (QL) block is a fascial plane block where local anesthetic is injected adjacent to the quadratus lumborum muscle to provide effective analgesia for abdominal procedures. We presented the feasibility of using this technique as the sole anesthetic technique for giant inguinal herniorrhaphy repair by observing intraoperative and postoperative analgesic effects in patients. Case: We present an elderly patient with complex comorbidities who was hospitalized for a left inguinal hernia that fell into the scrotum and formed a huge hernial sac. Comorbidities include hypertension, atrial fibrillation, and chronic obstructive pulmonary disease. After adequate preoperative evaluation, the anesthesiologist scheduled to perform QL block as the sole anesthetic technique to complete a giant inguinal herniorrhaphy with 30 mL of ropivacaine (0.33%). Intraoperative hemodynamics was stable, the patient did not complain discomfort and pain. And no additional analgesics or local infiltration anesthesia was required. The patient was able to move 6 hours after surgery and received the first analgesia 14 hours later. He was discharged one day later, without recurrence after one year of follow-up. Conclusions: Our experience suggests that QL block with 30 mL of ropivacaine (0.33%) may be an effective intraoperative anesthesia technique suitable for elderly patients with complex complications undergoing giant inguinal hernia repair surgery, and a represents a viable alternative approach to general and neuraxial anesthesia.

**Keywords:** Quadratus Lumborum Block, Inguinal Herniorrhaphy, Anesthetic Method

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## 1. Introduction

Inguinal herniorrhaphy is one of the most common surgical procedures, and most patients are seniors with complicated comorbidities. It is better to choose the appropriate anesthetic method that has little effect on the physiological function of patients, promote early ambulation, and shorten hospital stay. Local anesthesia is widely used in inguinal herniorrhaphy, but the analgesic effect is often inadequate for giant hernias. The sensation in inguinal region is mainly innervated by the ilioinguinal nerve (IIN), iliohypogastric nerve (IHN), and genitofemoral nerves (GFN) [1]. Quadratus lumborum (QL) block is a fascial plane block that was first proposed by Blanco to provide reliable analgesia for various

abdominal operations by injecting local anesthetic adjacent to the QL muscle. QL block has been demonstrated to provide adequate dermatomal coverage from T6–7 to L1–2 [2]. Cadaver studies also suggest that all different approaches of QL block were able to anesthetize the IIN and IHN consistently [2]. Recent studies have described the use of QL blockade for postoperative analgesia in inguinal herniorrhaphy [3–6]. Based on these findings, we hypothesized that QL block could be used as an alternative approach for anesthesia in inguinal herniorrhaphy. Herein, we present an elderly patient with complex comorbidities who scheduled to undergo giant inguinal herniorrhaphy using QL block as the sole anesthetic technique.

## 2. Case Report

Written consent for publication of this report was obtained. The patient was a 75-year-old man, American Society of Anesthesiologists physical status III, scheduled to perform open tension-free inguinal herniorrhaphy. The hernia of this patient is irreducible, which cannot be fully reduction after supine. Figure 1 shows the abdominal computed tomography scan of this patient, showing a giant hernia sac containing multiple small intestines. His medical history included hypertension, atrial fibrillation, and chronic obstructive pulmonary disease. In the operating room, the patient was administered 2 L/min O<sub>2</sub> via facemask. Following routine monitorization using an electrocardiogram, peripheral oxygen saturation, and invasive arterial monitorization end-tidal CO<sub>2</sub> via face-mask, intravenous access was secured and sedation was provided with intravenous pumping of dexmedetomidine (0.4 ug/kg/h). With the puncture area and the ultrasound probe kept clean and sterile, the patient lying in the lateral position, a low-frequency convex (5 MHz) probe (Mindray Anesus ME7, China) was placed laterally between the iliac crest and costal arch. The external oblique, internal oblique, and transverse abdominis were identified. As the probe continues to slide downwards, the QL muscle attached to the transverse process could be discerned (Figure 2). 1 ml of 2% lidocaine was injected subcutaneously. Subsequently, a 21-gauge 100-mm needle (Uni-Plex Nanoline, Germany) was inserted in the tissue plane between the QL and psoas major adopting an in-plane technique. After tip positioning was confirmed by careful hydro-dissection with normal saline, 20 ml of 0.33% ropivacaine was slowly injected. Then the needle tip gradually receded, and another 5 ml of 0.33% ropivacaine was injected into the lumbar interfascial triangle, posterior border of QL muscle. Next 5 ml of 0.33% ropivacaine was injected after identifying transversus abdominis aponeurosis and the lateral border of QL muscle. We assessed the block area after 30 minutes and the sensory blockade extent was approximately T7-L1. During the operation, the gastroenterologist found that

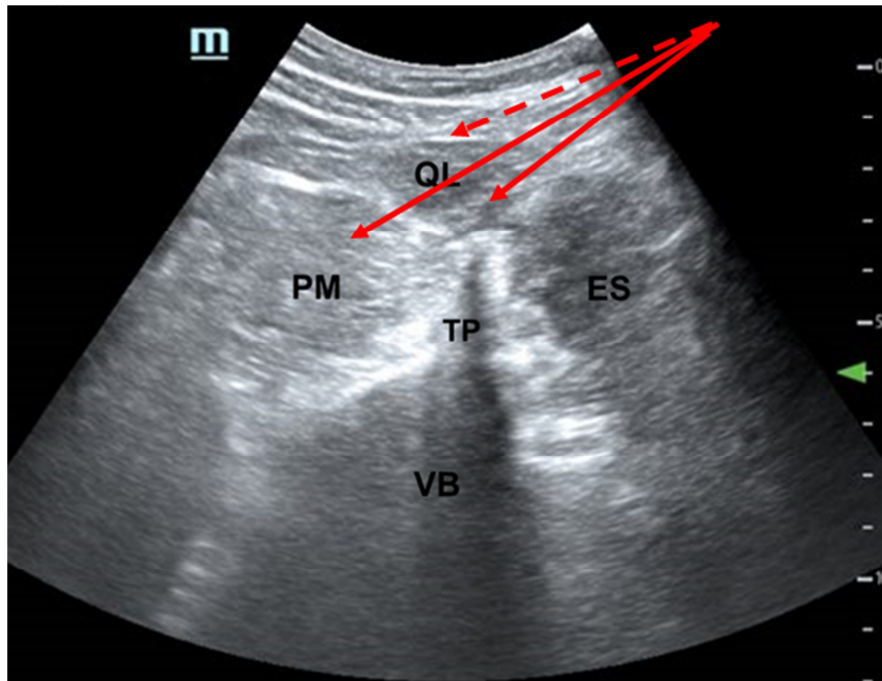
the hernia sac was 15\*10 cm in size and contained small intestine which had fallen into the scrotum. The surgical procedure progressed smoothly and lasted about 60 minutes. Intraoperative hemodynamics was stable, the patient did not complain discomfort and pain when reverting intestines and inserting the Ultrapro Hernia System mesh (Johnson&Johnson, America). And no additional analgesics or local infiltration anesthesia was required. The patient was able to pace 6 hours after surgery and received the first analgesia with 5 mg of dezocine 14 hours later. He was discharged one day later, without recurrence after one year of follow-up.

## 3. Discussion

As the aging of the population, the incidence of inguinal hernia increases year by year. Anesthesiologists also face the challenge from elderly patients with complicated comorbidities. While local anesthesia is widely used as the main anesthetic method in open tension-free inguinal herniorrhaphy, its analgesic effect is often insufficient for giant hernias. This is because local anesthesia cannot alleviate the visceral pain associated with the reduction of giant hernia, and it cannot adequately relax the abdominal wall muscles to meet the surgical requirements [7]. Although general or neuraxial anesthesia could address these issues, the significant risks of motor blockade and urinary retention are limitations and may delay postoperative recovery and even lead to extreme hemodynamic fluctuations during perioperative anesthesia. These fluctuations could lead to serious cardiovascular side effects [8]. Furthermore, with a combination of IIN and IHN blocks, patients often experience discomfort and pain while stretching the intestines and peritoneum, due to the inability to block the visceral sympathetic nerve [9, 10]. Similarly, since transversus abdominis plane block can only control abdominal incision pain, it is also not the optimal choice for intraoperative analgesia [11].



**Figure 1.** The abdominal computed tomography scan of this patient. The scanned images indicated that the left inguinal hernia, which had fallen into the scrotum, contained small intestine and its mesentery, with no obvious signs of intestinal obstruction. White arrow: the giant hernia sac.



**Figure 2.** Needle trajectory indicated QL block process. Long arrow indicates the path of the needle pierces through QL to the tissue plane between QL and PM. Short arrow indicates the needle tip is placed on the posterior border of the QL, between the QL and ES muscles. Dotted arrow indicates the path to the lateral border of QL after the tip penetrates the transversus abdominis aponeurosis. QL: quadratus lumborum muscle; PM: psoas major; ES: erector spinae; TP: transverse process; VB: vertebral body.

Recent anatomy of the human abdominal wall revealed that the IIN and IHN pass through the anterior surface of QL muscle, while GFN runs on the psoas major muscle [12]. Previous research into the anatomical and potential mechanisms has also discovered that QL block gives continuous anesthesia for IIN and IHN [2]. Moreover, QL block may alleviate the discomfort of sac traction since it could inhibit visceral pain by local anesthetic diffusing into the paravertebral space to block the sympathetic fibers [13]. QL blocker can enter the paravertebral space, stain the somatic nerves and thoracic sympathetic trunk, and disseminate over several segments [14, 15]. Favaro et al. also observed that QL block could be an effective option for laparoscopic inguinal herniorrhaphy. Compared with general anesthesia, QL block can reduce early postoperative pain, briefer hospital stay, and decrease anesthesia and hospital costs [16]. Therefore, we chose QL block as the anesthetic method for this patient. This concept was inspired by the relevant anatomy, potential drug distribution mechanisms. The patient did not feel pain during hernia sac traction, and no additional analgesics or local anesthesia was needed. The hemodynamics of the patient were stable during the operation. The QL block provided excellent surgical anesthesia for giant inguinal herniorrhaphy. Moreover, chronic pain caused by inguinal hernia repair is a significant concern that may impact the patient's quality of life and result in high social costs [17]. The question of how local anesthesia and regional nerve block affect chronic pain after inguinal hernia surgery is worth investigating.

In summary, our limited evidence suggests that QL block could present a viable alternative approach to general and neuraxial anesthesia for giant inguinal herniorrhaphy. We

believe that it has theoretical advantages, including simplicity, patient comfort, relatively safety, and a less likely chance of complications compared to general and neuraxial anesthesia. This technology could have some limitations, such as potential differences in paravertebral diffusion, drug dose among patients of different ages, and average analgesic duration. Having a lot of experience manipulating ultrasound may be necessary for the operators. Future clinical studies are necessary to investigate the application of QL block for inguinal herniorrhaphy and to compare this approach with the other techniques for IIN, IHN, and GFN blocks and local anesthesia.

## 4. Conclusion

QL block with 30 mL of ropivacaine (0.33%) is a safe and effective option for patients with complex complications undergoing giant inguinal herniorrhaphy repair surgery, and a represents a viable alternative approach to general and neuraxial anesthesia.

## Abbreviations

QL: Quadratus Lumborum  
 IIN: Ilioinguinal Nerve  
 IHN: Iliohypogastric Nerve  
 GFN: Genitofemoral Nerves  
 PM: Psoas Major  
 ES: Erector Spinae  
 TP: Transverse Process  
 VB: Vertebral Body

## Conflicts of Interest

The authors declare that there is no conflict of interest.

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