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Umbilical Hernia Repair under Ultrasound Guided Bilateral Rectus Sheath Block: A Case Series

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Abstract
Usually reserved for high-risk patients, ultrasound guided bilateral rectus sheath block can be a very effective alternative for primary repair of umbilical hernia thereby reducing the morbidity and mortality associated with spinal or general anesthesia and providing adequate anesthesia and analgesia.

Keywords: Bilateral Rectus Sheath Block, Ultrasound, Umbilical Hernia

Introduction

Abdominal field blocks were introduced first by Schleich in 1899 [1] as landmark guided technique. With the introduction of ultrasound, many new fascial plane blocks have been introduced including the rectus sheath block [2]. Rectus sheath blocks have been mostly used as an adjuvant or alternative to spinal or general anesthesia for surgeries involving anterior abdominal wall and pediatric surgeries like umbilical hernia [3]. It has also been used as a very good option for providing post-operative analgesia in abdominal surgeries [4, 5].

Rectus sheath block involves injecting the local anesthetic agent in the plane between the rectus abdominis muscle and posterior rectus sheath (Fig 1) which anesthetize the anterior cutaneous branches of T7-T11 spinal nerves as they pierce the posterior rectus sheath and supply the overlying skin of anterior abdominal wall [6]. It provides analgesia for anterior abdominal wall structures superficial to peritoneum and spares the visceral components [6-8].

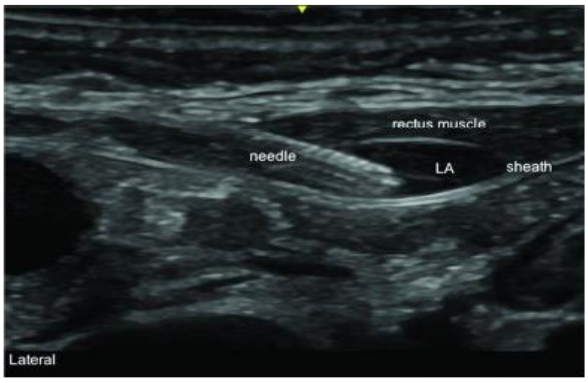

Fig 1: Ultrasound guided rectus sheath block

Use of peripheral nerve blocks like rectus sheath block has been known to avoid the complications associated with neuraxial blockade and general anesthesia too. No motor blockade with better pain control and lesser use of opioids for postoperative pain management make these blocks even more advantageous. The use of ultrasound for performing such blocks further improves the success rate thereby reducing the complications like inadvertent nerve injuries and intravascular injection [9].

We describe three cases of umbilical hernia repair performed under ultrasound guided bilateral rectus sheath block as the sole anesthesia technique.

Case 1:
30 years female presented to surgery outpatient department with complaints of abdominal pain on and off and swelling around umbilicus during straining and coughing since 3 months. No significant past medical history was noted. She had undergone laparoscopic cholecystectomy one year back. Her routine blood investigations, chest X-ray and electrocardiogram were within normal limits. Ultrasonography of abdomen revealed umbilical hernia with a defect size of 2cm and omental fat as the content. Primary repair of the defect was planned under bilateral rectus sheath block. On the day of surgery, preloading was done. After shifting to the operation theatre, baseline vitals were recorded. Under all aseptic precautions, ultrasound guided bilateral rectus sheath block was given with 25ml of 0.2 percent plain bupivacaine on each side. After confirming the adequate depth of anesthesia and analgesia, surgery was performed. (Fig 2) the intra-operative period was uneventful. Intravenous paracetamol every 6 hourly and intravenous tramadol as rescue were given for postoperative analgesia. She was discharged on the second postoperative day.

Fig 2: Umbilical hernia with the defect

Case 2:
45 years male with complaint of swelling around umbilicus for about 3 years presented to emergency department with sudden increase in size of the swelling and pain. Bowel and bladder habits were normal. No significant past medical or surgical history were noted. Examination revealed an irreducible swelling of about 9x9 cm^2 around the umbilicus with mild tenderness. Baseline investigations were within normal limits. Ultrasound of abdomen revealed a midline umbilical defect around 3-4cm with umbilical hernia containing omentum with intact vascularity. Emergency exploration and primary repair was planned under bilateral rectus sheath block. After shifting to the operation theater, cardiac monitors were attached and baseline vitals were recorded. Under all septic precaution, ultrasound guided bilateral rectus sheath block was given with 25 ml of 0.2 percent plain bupivacaine on each side. After confirmation of adequate depth of anesthesia, surgery was commenced. Resection of 8x7cm of omentum was done to facilitate the primary repair of the defect. (Fig 3) During the manipulation of the ometum, intravenous analgesics and sedation was given. The intra-operative period remained uneventful. Intravenous tramadol with ondansetron 8 hourly was given as postoperative analgesia. He was discharged on the second postoperative day.

Fig 3: Umbilical hernia with the sac and the omental content

Case 3:
A 23 years female with diagnosis of $G_3P_2L_1$ at 23 weeks of gestation with umbilical hernia was admitted for primary repair under bilateral rectus sheath block. She denied any significant past medical or surgical history. Ultrasound of abdomen revealed defect of 1.5cm with omental fat as the content. Obstetric scan revealed a single live intrauterine fetus with posterior placenta with fetal heart rate of 150/minute. Considering her pregnancy, she was given the options of fascial plane blocks, spinal anesthesia and general anesthesia. She chose the rectus sheath block as the option after discussion with her family members and her gynecologist. After shifting her to the operation theatre, monitors were attached. Baseline vitals along with fetal heart rate were noted. Under all aseptic precaution, ultrasound guided bilateral rectus sheath block was given with 25ml of 0.2 percent plain bupivacaine on each side. After confirming adequate depth of anesthesia, surgery was commenced. (Fig 4) The intra-operative period remained uneventful. Intravenous paracetamol was given round the clock as postoperative analgesia with intravenous tramadol as rescue analgesia. She was discharged on the first postoperative day.

Fig 4: Umbilical hernia with the small defect

Discussion
Rectus sheath block, one of the fascial blocks, involves deposition of local anesthetic agent within the posterior rectus sheath (Fig 4). It provides dense and predictable somatic anesthesia to anterior abdominal surgeries [10]. The purpose of the 9th, 10th, 11th intercostal nerves are blocked by RSB thereby providing somatic anesthesia to the anterior abdominal wall superficial to the peritoneum. For surgeries involving the peritoneum, intravenous supplementation is required along with block [11].
Spinal or general anesthesia is often associated with significant hemodynamic alterations thereby leading to

significant morbidity and mortality. These complications can be avoided with peripheral nerve blocks or fascial plane blocks like rectus sheath block with excellent analgesia. This may translate into major clinical benefits such as early ambulation thereby reducing the incidence and severity of deep vein thrombosis and pulmonary embolism, the risk of atelectasis and respiratory infection, and minimal motor blockade [12].

Conventionally performed as a landmark guided blind technique using loss of resistance as the block needle is advanced through the fascial and muscle planes, this technique has been used less due to the risks of injury to underlying structures, accuracy of needle placement and inadvertent intravascular injection of local anesthetics. Use of ultrasound for performing the block offers significant advantages like direct visualization of the needle and real time needle guidance thereby allowing observation of the local anesthetic spread into the correct plane [13]. A recent systematic review of ultrasonography-guided truncal blocks strongly recommended the use of ultrasonographic guidance for rectus sheath block in order to increase its success rate [11].

Usually reserved for high-risk patients where spinal or general anesthesia are associated with morbidity and mortality like ASA III or IV patients, patients on anticoagulants, elderly fragile patients, bleeding diathesis and multiple co-morbidities[14], we present three cases of umbilical hernias with small defect size (less than 4cm) conducted under bilateral rectus sheath block.

Conclusion

Ultrasound-guided bilateral rectus sheath block can be a very good option for umbilical hernia repair avoiding the risks of the general and spinal anesthesia and achieving an excellent postoperative analgesia, a fast recovery and hospital discharge without any complications. However, it may require sedoanalgesia if the peritoneum is involved.

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