Research Article

Abdominal truncal blocks in Children Undergoing Laparoscopic Surgery

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Abstract
Objectives: Truncal blocks have a place within multimodal analgesia techniques in abdominal surgery. The quadratus lumborum block is an abdominal truncal block used for somatic analgesia of both the upper and lower abdomen. In this prospective, double blind, randomized study, we aimed to compare quadratus lumborum block and transversus abdominis plane block in pediatric patients undergoing laparoscopic lower abdominal surgery. **Patient and methods:** A total of 60 pediatric patients of both sex, ASA I and II, aged between 1 to 7 years, scheduled for laparoscopic lower abdominal surgery, under general anesthesia were included in the study. Patients were randomly allocated into 2 equal groups each containing 30 patient. Group (QLB) received bilateral ultrasound guided Quadratus Lumborum Block and group (TAPB) received bilateral ultrasound guided transversus abdominis plane block. Pain levels were assessed. **Results:** the patients who received quadratus lumborum block showed lower post-operative pain score and receive less rescue analgesia than TAP block group. Parent satisfaction scores were higher in the quadratus lumborum block group ($P < 0.05$). **Conclusions:** The results of this study showed that in pediatric patients undergoing elective laparoscopic lower abdominal surgeries the quadratus lumborum block provided longer and more effective postoperative analgesia compared with the transversus abdominis plane block.
Key words: quadratus lumborun block, TAP block, laparoscopic abdominal surgeries, regional anathesia

Introduction
In recent years an increasing number of pediatric surgical cases are being managed successfully by laparoscopic technique (Gupta et al., 2013). Although abdominal laparoscopic surgery, a widely performed surgery, is known for less pain compared to that of laparotomy, many patients actually still complain of considerable postoperative pain (Barczynski &Herman, 2003 and Wills & Hunt, 2000). The benefits of adequate analgesia include a reduction in the stress response of surgery, reduction in the perioperative morbidity and reduction in certain types of surgery improved surgical outcome. Effective pain control can also facilitate rehabilitation and accelerate recovery from surgery (Kehlet, 1989 and Capdevilla, 1999).

Regional anesthesia techniques are commonly advocated for pain control in pediatric surgical practice as they decrease parenteral opioid requirements and improve the quality of postoperative pain control as well as patient-parent satisfaction (Kehlet & Holte, 2001).

Abdominal field blocks have been used in anesthesia for surgery involving the anterior abdominal wall for several decades. Many blocks in this area are either difficult or high risk when performed blind, but ultrasound renders them very accessible and safe to perform (Hebbard et al., 2007).

The Transversus Abdominis plane (TAP) block was first described in 2004 by McDonnell et al., and ultrasound-guided technique was sub-sequently popularized by Hebbard et al., 2007 TAP block is a regional anesthetic technique that blocks neural afferents of the anterolateral abdominal wall. Using anatomical landmark guidance or with the aid of ultrasound (US), local anesthetic is injected into the transversus abdominis fascial plane, where the nerves from T6 to L1 are located (McDonnell et al., 2004).

Ultrasound-guided quadratus lumborum (QL) block is considered now as one of the novel truncal abdominal blocks, as it is effective in preventing somatic pain associated with upper and lower abdominal surgeries (Kadam, 2013).

Aim of the study

The aim of the present study is to evaluate and compare the analgesic effect of ultrasound-guided Quadratus Lumborum Block with ultrasound-guided Transversus Abdominis plane block in pediatric Laparoscopic lower abdominal surgeries.

Patients and methods

After getting approval by institutional ethics committee of El-Minia university hospital (no 271:7/2019) and written consent will be given from parent of guardian of 60 male and female patients aged from 1 to 7 years old from ASA class I to II undergoing elective laparoscopic lower abdominal surgery. This study was conducted between May 2019 to May2020.

Patient's groups:

patients will be allocated randomly into two equal groups , 30 patients in each as the following :-

Group TAP **"TAP group"** will receive bilateral TAP block using (0.5ml/kg bupivacaine 0.25%) in each side + regular analgesics.

Group QL"quadratus lumborum group" will receive bilateral quadratus lumborum block using (0.5 ml/ kg bupivacaine 0.25%) in each side + regular analgesics

TAP block procedure

With the patient in the supine position, . The TAP block will be performed laterally behind the midaxillary line between the iliac crest and the most inferior extent of the ribs. The plane between the internal oblique and transversus abdominis muscle located around the midaxillary line with the probe transverse to the abdomen. Anteriorly, the needle passes to come perpendicular to the ultrasound beam and placed between transversus and internal oblique posterior to the midaxillary line. Then, the local anesthetic will be injected**.** Other side was also injected in similar manner.

QL block prcedure

Bilateral ultrasound guided transmuscular quadrates lumborum (TQL) block was given In lateral position, the side to be blocked was kept up and probe was placed in the midaxillary line in the transverse plane immediately above the iliac crest and then it was slided dorsally till the Shamrock sign was clearly identified. In "Shamrock sign" The quadratus lumborum (QL) muscle is seen as a superior leaf of the Shamrock at the apex of the transverse process (TP) of L4, erector spinae (ES) muscles make up the posterior leaf, psoas major (PM) muscle makes the anterior leaf and the transverse process (TP) represents the stem connecting the 3leaves. The spinal needle was inserted from the posterior end of the probe and directed for the fascial plane between the QL and PM muscles through the QL muscle. Once needle was confirmed at correct location the drug was injected. Other side was also injected in similar manner.

Pain levels were assessed using a FLACC (Face, Legs,Activity,Cry, Consolability) scale.

Results

The 2 groups were comparable with respect to age, gender, weight and ASA grade with no clinical significance between the 2 groups. There was a state of hemodynamic stability in the two groups throughout the study period although there were some statistical significant differences inside or in-between the groups observed in some times that didn't affect clinical stability and didn't need any interference.

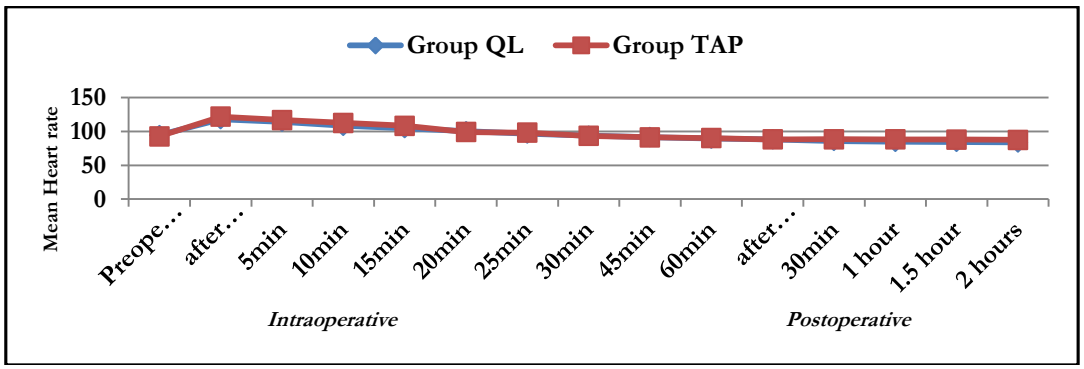

Figure: (1) heart rate changes (beat/min.) in the two groups

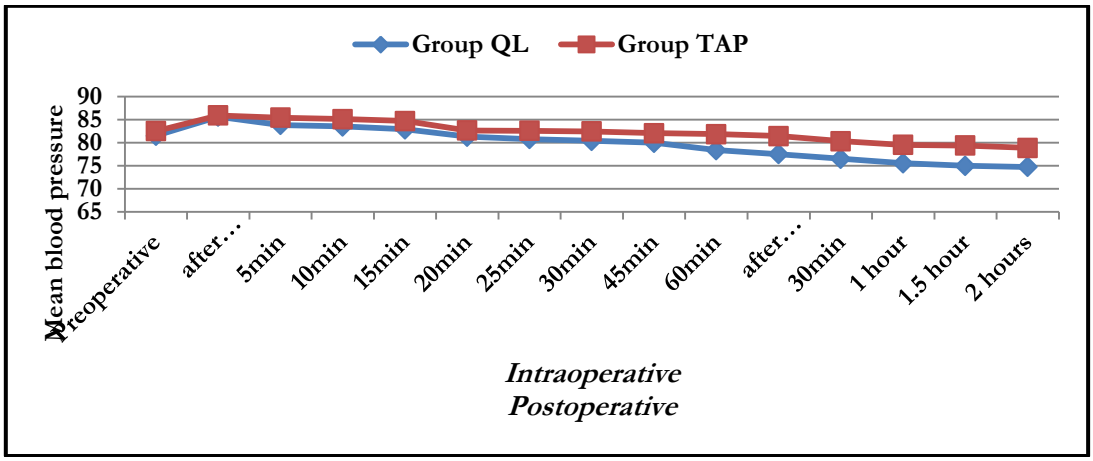

Figure: (2) Mean blood pressure changes (mmHg) in the two groups

The median values of pain score(FLACC) among the studied groups were significant .QL group Showed a better pain score values postoperatively except at 18 hour when FLACC was >4 with a mean values of (5(4-4)). TAP group Showed good pain score values postoperatively except at 8 hour and 20 hour when FLACC was > 4 with a median values of (5(4-5)) and (5(3-5)) respectively.

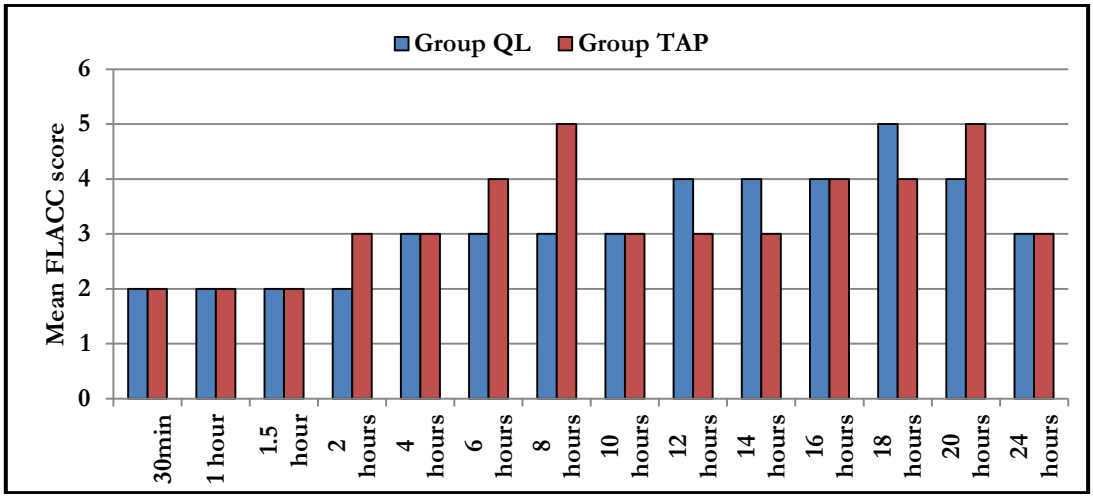

Figure (3): FLACC pain scale in the studied groups

As the time to first analgesic requirement was significant among the studied groups with p value (<0.001). It was longer in QL group with a mean value of (18±1.36 hour).TAP group showed shorter time in comparison with QL group with a mean value of (8±1.28hour).

The total paracetamol (mg/kg) in the studied groups was significantly different where p value (<0.001). QL group showed lower paracetamol consumption in comparison with TAP group with a mean value of (184±91.78mg/kg), (387±115.81mg/kg).

Discussion

Quadratus lumborum block (QLB) under ultrasound has been one of the interfascial plane blocks being popularized in regional anesthesia over the last few years given the vast number of indications in a variety of abdomino-pelvic surgeries in pediatrics and adults. (Mieszkowski et al., 2018).

In agreement with our results, Öksüz et al., 2017 studied the analgesic efficacy of

Quadratus Lumborum Block Versus Transversus Abdominis Plane Block in Children Undergoing Low Abdominal Surgery, Fifty-three children aged 1 to 7 years undergoing unilateral inguinal hernia repair or orchiopexy surgery were randomized into 2 groups: transversus abdominis plane block and quadratus lumborum block (0.5 mL/kg 0.2% bupivacaine). All blocks were performed under general anesthesia before surgery. Pain levels were assessed using an FLACC (face, legs, activity, cry, consolability) scale.they found that the number of patientswho required analgesia in the first 24 hours postoperatively was significantly lower in the quadratus lumborum block group ($P < 0.05$). In the quadratus lumborum block group, the postoperative 30-minute and 1-, 2-, 4-, 6-, 12-, and 24-hour FLACC scores were lower compared with those of the transversus abdominis plane block group ($P < 0.05$). Parent satisfaction scores were higher in the quadratus lumborum block group ($P < 0.05$).they concluded that in pediatric patients nundergoing unilateral inguinal hernia repair or orchiopexy the quadratus lumborum block provided longer and more effective postoperative analgesia compared with the transversus abdominis plane block.

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