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Bilateral rectus sheath block for post-operative analgesia for laparoscopic appendicectomy: A randomized controlled trial

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Abstract
Since its first description and practice in 1899, bilateral rectus sheath block has provided a better and more convenient way of conducting surgical procedures which involve the walls of the anterior section of the abdomen. Pediatric application has also gained prominence, especially in repair of hernia and related surgical procedures. Local anesthesia is often infused into the patients caudal for analgesic purposes. In this study, a bilateral rectus sheath block was performed thirty patients of between twenty-five and sixty years, and who were seeking laparoscopic appendicectomy. A section of these patients was given lignocaine with adrenaline. For the control experiment, no anesthesia was administered. However, fentanyl would be applied upon demand. Several variables, such as the recovery period and pain score, were recorded.

Keywords: bilateral rectus sheath block, anesthesia, postoperative pain, multimodal approach to pain management, cephalocaudally, ultrasonography, sonoanatomy visualization

Introduction
Schleich first described the rectus sheath block in 1899, where it was identified as a potential means of facilitating surgical processes in adults, especially when the anterior abdominal wall is involved. According to Schleich (1899) [9], this process involves ventricular innervation of the anterior wall of the abdomen at the center thereby exposing the roots of five spinal nerves between T7 and T11 (Quek, & Phua, 2014) [8]. The ventral nerves in this position lie between the posterior section of the rectus sheath and the rectus abdominus muscles, and they connect to the rectus muscle close to the midline (Quek, & Phua, 2014) [8]. An anesthetic injection capable of spreading cephalocaudally in the section is administered at the intersectional point of the posterior region of the rectus sheath and rectus muscle. Since it was introduced in medical surgery, bilateral sheath block has been used as post-operative analgesia for various surgical processes (Quek, & Phua, 2014) [8]. In this case, a study was conducted to examine the effect of bilateral rectus sheath block on postoperative pain following a laparoscopic appendectomy.

Background
Surgical doctors often use the bilateral rectus sheath block to provide postoperative analgesia. This practice is particularly common for a multimodal approach to pain management to patients undergoing surgical operations in their abdominal sections (Shokri, 2017) [11]. Although this process was developed for the treatment of adults, it has gained popularity even in pediatric patients, whereby it is commonly used for hernia repair and other abdominal gynecological therapies. In these procedures, bilateral rectus sheath block is mainly used in patients with poor physiological and cardiovascular reserves for its anesthetic properties (Elbahrawy & El-Deeb, 2016) [5]. Moreover, it is used to reduce postoperative pain for patients undergoing surgical operations of different kinds at the anterior abdomen.
Initially, a blind mechanism which depended on resistance loss experienced by the patient when the physician drove a blunt needle through the muscle and fascial planes of the ventricular spinal joint was used to perform rectus sheath block. However, the accuracy with which the needle penetrated the body cannot be guaranteed (Singh & Gulyam Kuruba, 2011) [12]. Thus, most modern operations often consider alternative mechanisms of ensuring that the needles penetrability is more precise. More recently, ultrasonography has often been used to guide the performance of rectus sheath blocks. Under this process, physicians use ultrasound to provide real-time guidance to the needle as it penetrates the rectus sheath.
According to Awad and Chan (2005) [1], ultrasonographic guidance increases the success rate of rectus sheath block treatment. Real-time sonoanatomy visualization, especially in the in-plane positions, reduces the chances of entry of the needle into the blood vessels, the peritoneum, or the bowels. Also, this visualization increases the rates at which the nerves get blocked successfully (Seidel *et al*. 2017) [10]. Following the invention of ultrasonography and sonoanatomy visualization of the needle movement, the bilateral rectus sheath block has continually gotten anesthetic and postoperative analgesic advantages in periumbilical surgery and laparoscopic appendectomy (Crosbie *et al*. 2012) [3, 4]. This process is primarily adopted when handling patients who exhibit high risks of blockage of the central neuroaxis with general anesthesia.

Methodology
In this study, a sample of thirty patients aged between twenty-five years and sixty years underwent laparoscopic

appendectomy in a randomized controlled trial. The patients were divided into two groups A and B. For group A patient, lignocaine with adrenaline was injected into the fascial-muscle plane during bilateral rectus sheath block. For the control group (group B), the patients were administered saline. The lignocaine with adrenaline was prepared by adding 2.0% lignocaine hydrochloride with 0.00227% adrenaline acid tartrate. 0.1% chlorocresol and 0.1% sodium metabisulphite were also added to the mixture.

The patients were carefully observed during their recovery period. For each patient, the study outcomes which were recorded included pain score, analgesic use, and period of stay at the hospital. A blinded observer used the Verbal Numerical Rating Scale (VNRS) to measure pain scores. This was done by the observer coughing periodically at 0, 6, and 48 hours following admission into the post anesthesia care unit (PACU). For cases where there was a rescue demand, the patients were administered an intravenous injection of fentanyl analgesia.

Results

A considerably lower pain score was recorded for patients of group A (who were given lignocaine with adrenaline). The median pain scores when the patients were at rest and when coughing were recorded as indicated in the table.

Table 1

Time	Group A		Group B	
	Rest	Coughing	Rest	Coughing
0	4.5	6	5	7
6	3	5	27.7	53.3
48	2.5	2.5	3.9	3.9

It was also noted that after six hours, the patients in the control group needed more fentanyl than patients in group A. The recovery duration for group A patients was shorter than that of group B patients. By the second day, most group A patients were fit for discharge.

Discussion

Laparoscopic Appendectomy is a surgical procedure which is conducted on patients suffering from conditions which lead to the inflammation of the appendix (Long *et al*. 2007). This condition, also called appendicitis, is caused by several factors including a blockage of the appendix either by stool or foreign bodies. The appendix responds to such discomforts by swelling and developing painful sensations. Appropriate surgery is needed to remove this inflammation (Swank *et al*. 2011) [12]. Otherwise; the appendix may swell and burst, thus cause fatal infections. Often, appropriate anesthesia is used during this process. Laparoscopic appendectomy is the most commonly used mechanism of handling patients with appendicitis. However, this operation is delicate and can cause significant discomfort to the patient; thus, a bilateral rectus sheath block is used as postoperative analgesia (Smink *et al*. 2012) [14]. For analgesic care during and after the operations, patients are often administered injections of lignocaine with adrenaline. However, fentanyl is used when the patient situation gets worse.

For this study, Lignocaine with adrenaline was given to a section of the patients while the control group did not get any post-operative analgesia. The group A patients recorded lower pain scores as compared to the control group (Elbahrawy & El-Deeb, 2016) [5]. This because lignocaine with adrenaline prevent the pain signals from the operating section from reaching the brain thereby numbing the region; thus the patient does not feel the pain during the operation (Bharati *et al*. 2011) [2]. For postoperative care, lignocaine with adrenaline works, in the same way, to provide the patient with analgesic care. The effects of lignocaine in the body last up to eight hours, thus keeping the patient of the pain for several hours after the operation. Adrenaline is added to lignocaine to relieve stress and to keep the patient active. The rate of demand of fentanyl for rescue purposes was higher for the control patients. This is because they were nod administered any postoperative analgesia; thus, they recorded more intense pain levels.

During midline laparotomy, patients experience a lot of pain, and this is not good as it may prolong the recovery period. Thus, a catheter is often used to infuse local anesthetic drugs into the posterior section of the patient's rectus sheath. This anesthesia also provides postoperative analgesia to the patient, thus reducing the need for opioids. This explains why patients in group A had a shorter and less painful recovery process (Skinner & Lauder, 2007) [13]. Patients in group B (the control group) endured prolonged recovery duration associated with severe pain. Nearly all group B patients required fentanyl infusion to help reduce the pain and boost the recovery process. Chlorocresol preservative and sodium metabisulphite antioxidant ensured that there were no infections to the wounds which would otherwise affect the recovery process and duration (Jorkjend & Skoglund, 2001) [6].

Conclusion

From this study, it was established that infusion of lignocaine with adrenaline through bilateral rectus sheath block reduced pain and anxiety in the patients, thus reducing the pain levels during and after the laparoscopic appendectomy. Therefore, the bilateral rectus sheath block can be used to provide patients with postoperative analgesia after a surgical process.

References

1 Awad IT, Chan V. Ultrasound imaging of peripheral nerves: a need for a new trend. Regional anesthesia and pain medicine. 2005; 30(4):321.

2 Bharati S, Singh DK, Shukla VK. Two-port laparoscopic-assisted appendicectomy under local anesthesia in adults: A pilot study. Journal of surgical technique and case report. 2011; 3:2.

3 Crosbie EJ, Massiah NS, Achiampong JY, Dolling S, Slade RJ. The surgical rectus sheath block for post-operative analgesia: a modern approach to an established technique. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2012; 160(2):196-200.

4 Crosbie EJ, Massiah NS, Achiampong JY, Dolling S, Slade RJ. The surgical rectus sheath block for post-operative analgesia: a modern approach to an established technique. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2012; 160(2):196-200.

5 Elbahrawy K, El-Deeb A. Rectus sheath block for postoperative analgesia in patients with mesenteric

vascular occlusion undergoing laparotomy: A randomized single-blinded study. Anesthesia, essays and researches. 2016; 10(3):516.
6 Jorkjend L, Skoglund LA. A dose–response study of adrenaline combined with lignocaine 2%: effect on acute postoperative pain after oral soft tissue surgery. British journal of clinical pharmacology. 2001; 51(4):335-341.
7 Long KH, Bannon MP, Zietlow SP, Helgeson ER, Harmsen WS, Smith CD, *et al*. A prospective randomized comparison of laparoscopic appendectomy with open appendectomy: clinical and economic analyses. Surgery. 2001; 129(4):390-400.
8 Quek KHY, Phua DSK. Bilateral rectus sheath block as the single anaesthetic technique for an open infraumbilical hernia repair. Singapore medical journal. 2014; 55(3):e39.
9 Schleich DL. 4th ed. Berlin: Springer Verlag. Schmerzlose Operationen, 1899, 240-58.
10 Seidel R, Wree A, Schulze M. Does the approach influence the success rate for ultrasound-guided rectus sheath blocks? An anatomical case series. Local and regional anesthesia. 2017; 10:61.
11 Shokri H. The efficacy of rectus sheath block for pain management following laparoscopic orchiopexy surgery. Ain-Shams Journal of Anaesthesiology. 2017; 10(1):219.
12 Singh SK, Gulyam Kuruba SM. The loss of resistance nerve blocks. ISRN Anesthesiology, 2011.
13 Skinner AV, Lauder GR. Rectus sheath block: successful use in the chronic pain management of pediatric abdominal wall pain. Pediatric Anesthesia. 2007; 17(12):1203-1211.
14 Smink DS, Peyre SE, Soybel DI, Tavakkolizadeh A, Vernon AH, Anastakis DJ. Utilization of a cognitive task analysis for laparoscopic appendectomy to identify differentiated intraoperative teaching objectives. The American Journal of Surgery. 2012; 203(4):540-545.
15 Swank HA, Eshuis EJ, van Berge Henegouwen MI, Bemelman WA. Short-and long-term results of open versus laparoscopic appendectomy. World journal of surgery. 2011; 35(6):1221.