

Subcostal TAP block as analgesic for open cholecystectomy

Raad A. Al-Khafaji*

*Branch of Surgery / college of Medicine / University of Qadisiyah

الخلاصة:

ان عمليات رفع المرارة بطريقه الفتح الجراحي يصاحبها الم شديد بعد العملية الجراحية. في هذه الدراسة نبحث كفاءه وفعالية التخدير المناطقي باستخدام السونار (تاب بلوك) في جدار البطن لتقليل الالم بعد العملية الجراحية

الغرض من الدراسة هو لمعرفة كفاءه حقن تاب باستخدام جهاز السونار لتخفيف و علاج الالم في عمليات رفع المرارة . اجريت الدراسة على ستين مريض اجريت لهم عملية رفع المرارة بطريقه الفتح الجراحي منها حالات حاده و منها حالات بارده حيث تم تقسيم المرضى الى مجموعتين . المجموعة الاولى تم حقنهم في منطقه تاب باستخدام جهاز السونار بعد اعطاء التخدير العام و مرحله انتظار خمس دقائق قبل السماح للجراح بأجراء العملية . اما المجموعة الثانية فلم يتم حقنها بالتخدير الموضعي . تم تسجيل شدة الالم بعد العملية الجراحية و كذلك امكانيه حصول اي مضاعفات لقد وجدنا في هذه الدراسة ان حقن منطقه تاب في عمليات رفع المرارة قبل إجراء العملية هو كفوء جدا في هكذا عمليات لتخفيف الالم بعد العملية ان تخفيف و علاج الالم هو حق من حقوق الانسان

Abstract

Open Cholecystectomy, is associated with high pain score post op.

TAP block provides effective post op analgesia

Aim

The aim is to evaluate the effectiveness of US guided subcostal TAP block for post op pain in open cholecystectomy

Patients were divided into two groups. Thirty patients received subcostal TAP block after commencing GA. Another thirty patients did not receive the block.

Post operative pain was recorded in both groups , so as any possible complications like nausea and vomiting .

We found that subcostal TAP block is effective , simple , and reliable as analgesia in open cholecystectomy post operatively

Patients and Methods

A total of 60 patients undergoing emergency and elective cholecystectomy were allocated into two groups : U/S guided subcostal TAP block , the A group , and the non TAP block group , the B group.

All patients received same general anaesthesia drugs and technique.The A group received subcostal TAP block 5 minutes before starting surgery , a total of 20 ml , 10 ml 1% lidocaine and 10 ml 0,25% bupivacaine

Rescue post op analgesia was in the form of I.V tramal and diclofenac.

Pain score was recorded post op , using VAS (Visual Analogue Score).

Results

Group A (30 patients) , received subcostal TAP block 5 minutes prior to starting surgery , and Group B (30 patients) did not received TAP block. Post op pain score recorded in both groups , and showed pain score 0-2 in group A , and 6-8 in group B which received rescue analgesia

Conclusion

Subcostal TAP block is effective analgesic technique with opioid –sparing effect in open cholecystectomy post operatively

Introduction

Some surgeons chose open cholecystectomy in favour of laparoscopic method in patients with previous abdominal surgeries and expected adhesions, and in high risk patients because of the more safety technique of combined regional anaesthesia and mild GA, with relatively short time surgery.

The main sources for pain after open cholecystectomy: the incision site, the peritoneal and diaphragmatic stretching and the gall bladder surgical bed in the liver after cholecystectomy.

TAP block was described as effective analgesic method in abdominal surgeries.

The description of U/S guided technique for performing TAP block advocated a single entry point, the transverse plane of the abdominal wall nerves hence providing more wide coverage.

Ultrasound (U/S) guidance allows for a greater reliability in administering local anesthetic in the correct plane and decreasing the potential for complications. Posterior TAP block will cover D10 to L2, while subcostal TAP block will cover from D7 to L1-L2, as researches show. So we chose subcostal TAP block

Anatomy

Innervation of the anterolateral abdominal wall arises from the anterior rami of spinal nerves T7 to L1. These include the intercostal nerves (T7-T11), the subcostal nerve (T12), and the iliohypogastric and ilioinguinal nerves.

The anterior divisions of T7-T11 continue from the intercostal space to enter the abdominal wall between the internal oblique and transversus abdominis muscles until they reach the rectus abdominis, which they perforate and supply, ending as anterior cutaneous branches supplying the skin of the front of the abdomen. Midway in their course they pierce the external oblique muscle giving off the lateral cutaneous branch which divides into anterior and posterior branches that supply the external oblique muscle and latissimus dorsi respectively.

The anterior branch of T12 communicates with the iliohypogastric nerve and gives a branch to the pyramidalis. Its lateral cutaneous branch perforates the internal and

external oblique muscles and descends over the iliac crest and supplies sensation to the front part of the gluteal region.

The iliohypogastric nerve (L1) divides between the internal oblique and transversus abdominis near the iliac crest into lateral and anterior cutaneous branches, the former supplying part of the skin of the gluteal region while the latter supplies the hypogastric region.

The ilioinguinal nerve (L1) communicates with the iliohypogastric nerve between the internal oblique and transversus abdominis near the anterior part of the iliac crest. It supplies the anterior part of the iliac crest and the medial part of the thigh and the genital area.

The aim of a TAP block is to deposit local anaesthetic in the plane between the internal oblique and transversus abdominis muscles targeting the spinal nerves in this plane. The innervation to abdominal skin, muscles and parietal peritoneum will be interrupted. If surgery traverses the peritoneal cavity, dull visceral pain (from spasm or inflammation following surgical insult) will still be experienced.

Performing the ultrasound-guided block

Requirements

- Ultrasound machine with a high frequency probe (5-10 MHz)
- Antiseptic for skin disinfection
- Sterile ultrasound gel
- Needle: 50 mm or 80 mm needle
- 20ml needle and injection tubing
- 20 local anaesthetic

Technique

In a small cadaveric study, T11, T12 and L1 were most consistently present in the transversus abdominis plane, while T10 was present in 50% of the cases. Subcostal injection will help attain a higher block up to T7. The subcostal TAP is a modification of the

original technique in which the ultrasound probe is placed just beneath the costal margin and parallel to it. The needle is then introduced from the lateral side of the rectus muscle in plane of the ultrasound beam and 20 ml of local injected into the transversus abdominis plane . The needle is introduced in plane of the ultrasound probe directly under the probe and advanced until it reaches the plane between the internal oblique and transversus abdominis muscles.

Upon reaching the plane, 20 ml of local anaesthetic solution is injected. The transversus abdominis plane is visualized expanding with the injection .

Patients and methods

This study was conducted in Al-Diwaniya Teaching Hospital, Iraq.. 60 ASA physical status I and II patients of both sexes undergoing open cholecystectomy were included in this study . Exclusion criteria were allergy to amide local anesthetic, and history of psychiatric disease.

Patients were allocated randomly by a computer-generated list into two groups: the U/S-guided modified TAP block group (A) and the non group group (B). All patients received the same general anesthetic technique. No premedication was used. General anesthesia was induced with intravenous ketamine (2 mg/kg) and propofol (2.0-2.5 mg/kg). Tracheal intubation was facilitated by cisatracurium (0.15 mg/kg). Anesthesia was maintained with oxygen and isoflurane. All patients were mechanically ventilated with pressure-controlled mode with targeted EtCO₂ (30-35 mmHg). All patients received 4 mg dexamethasone Intravenously (IV) during surgery. Standard monitoring maintained throughout the procedure included ECG, noninvasive arterial pressure, arterial oxygen saturation, and capnometry.

The severity of pain was measured by visual analogue score (VAS) in the recovery room and at 2-4, 6-8, 10-12, and 18-24 hours after operation and was recorded.

Postoperative nausea and vomiting together with the amount of antiemetic medications received during the first 24 h were recorded. Any adverse events including hematoma , related to the technique used were also recorded in both groups.

Results

A total of 60 patients were included in this study.

There were no reported cases of swelling, or bruising , while haematoma accounted for 1% at the injection site in group A.

All patients in group B had a high pain score (6-8-VAS) post op that they required rescue analgesia in the form of tramadol and diclofenac. 50% of group B had nausea and vomiting following tramal use.

Discussion

Some surgeons chose open cholecystectomy in certain patients. Early postoperative pain after the procedures is a frequent complaint. Subcostal Transversus abdominis plane (TAP) block relies on guiding the needle with U/S to the plane between the transversus abdominis and internal oblique muscles, to block the anterior rami of the lower six thoracic nerves (T7-T12) and the first lumbar nerve L1. Injection of local anesthetic within the TAP can provide unilateral analgesia to the skin, muscles, and parietal peritoneum of the anterior abdominal wall from T7 to L1 . While posterior TAP block can provide analgesia from T10-L1. So we chosed Subcostal TAP block . The results of this study showed that modified U/S-guided TAP block is an effective technique as part of multimodal analgesia for the management of postoperative pain in patients undergoing open cholecystectomy In this study, the pain score was high (6-8 VAS) in group B that they required rescue analgesia, and low (0-2 VAS) in group A during the early postoperative period up to 24 hours.

U/S-guided TAP block wasperformed by in-plane technique. In this study, there were no

reported cases of hematoma, swelling, or bruising at the injection site.

Conclusion

U/S-guided subcostal TAP block is an effective analgesic technique with longer duration of action and opioid-sparing effect and less sedation during the postoperative period in patients undergoing open cholecystectomy.

References

1. Journal of NYSORA (New York Regional Anesthesia)
2. Gray H. Anatomy of human the body. 12th edition. New York. Bartleby.com; 2000: 211-12
3. Rafi A. Abdominal field block: a new approach via the lumbar triangle. *Anaesthesia* 2001; 56: 1024-26.
4. Hebbard P, Fujiwara Y, Shibata Y, Royse C. Ultrasound-guided transversus abdominis plane (TAP) block. *Anaesthesia and Intensive Care* 2007; 35: 616-7.
5. Carney J, McDonnell JG, Ochana A, *et al.* The transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. *Anesth Analg* 2008; 107:2056-60
6. O'Donnell BD, McDonnell JG, McShane AJ. The transversus abdominis plane (TAP) block in open retropubic prostatectomy. *Reg Anesth Pain Med* 2006 ; 31:91
7. McDonnell J, Laffey J. Transversus Abdominis Plane Block. *Anesthesia and Analgesia* 2007; 105: 883.
8. Shibata Y, Sato Y, Fujiwara Y, Komatsu T. Transversus Abdominis Plane Block. *Anesthesia and Analgesia* 2007; 105: 883.
9. Tran TMN, Ivanusic JJ, Hebbard P, *et al.* Determination of spread of injectate after ultrasound-guided transversus abdominis plane block: a cadaveric study. *Br J Anaesth* 2009; 102(1): 123-7
10. Hebbard P. Transversus abdominis plane (TAP) block. 2007; Website: [www.heartweb.com.au/downloads TAPblock.pdf](http://www.heartweb.com.au/downloads/TAPblock.pdf)
11. Farooq M, Carey M. A Case of Liver Trauma With a Blunt Regional Anesthesia Needle While Performing Transversus Abdominis Plane Block *Regional Anesthesia and Pain Medicine* 2008; 33: 274-5.