Section: Anaesthesia

Original Article

ISSN (O): 2347-3398; ISSN (P): 2277-7253

Efficacy of Double Pop Blind TAP Block - Double-Blinded Randomized Controlled Study

Simon Richard[1], Sharad Goel[2], Akhilesh Mishra[3], S. Ali Imam[2], Samir El Said[4], Medhat Mahmoud Elhantery[5]

[1]Assistant Professor, Department of Anaesthesiology & Intensive Care, Saraswathi Institute of Medical Sciences (SIMS), Hapur, Uttar Pradesh, India, [2]Professor, Department of Anaesthesiology & Intensive Care, Saraswathi Institute of Medical Sciences (SIMS), Hapur, Uttar Pradesh, India, [3]Assistant Professor, Department of Anaesthesiology & Intensive Care, Saraswathi Institute of Medical Sciences (SIMS), Hapur, Uttar Pradesh, India, [4]Assistant Professor, Department of Anaesthesiology & Intensive Care, Benha University, Egypt, [5]Assisted Professor, Department of Anaesthesiology & Intensive Care, Domitta Faculty of Medicine, Alazhar University, Egypt.

Abstract

Background: The transversus abdominis plane block (TAP block) in the petit triangle is being used since 2001 for analgesia by blocking the T6 to T12 nerves, which is devoid of the sympathetic blockade and has opioid-sparing effect during and after abdominal operations. The appropriateness and efficacy of using double pop blind transversus abdominis plane block were studied in abdominal surgeries using bupivacaine with butorphanol as additive. **Subjects and Methods:** A total of 78 adult patients of ASA I and II were included, who were to undergo laparoscopic cholecystectomy under general anesthesia. The control group patients received tramadol, diclofenac, and paracetamol in the perioperative period. The study group patients received TAP block by double pop blind technique after induction of anesthesia but before surgical incision as preemptive analgesia. The p-value, the mean and the confidence interval were calculated by using Student t-test with the use of online software by graphpad.com. **Results:** Each of the two groups had 39 patients, and none met the exclusion criteria. Patients of the study (TAP) group remained pain-free for a longer time by 439 (416 – 463) minutes more than the control (IV, Intravenous) group. Rescue analgesia in the study group was required 640 minutes after the end of the surgery, but in the control group, rescue analgesia was required earlier at 200 minutes only after the surgery. **Conclusion:** Double pop blind technique for TAP block is appropriate and without complications if done with carefulness as to avoid penetration of the blunted green needle beyond the fascia between the internal oblique and the transversus abdominis muscle.

Keywords: TAP Block, Transversus Abdominis Plane, Block, Blind Pop Technique, Butorphanol, Bupivacaine, Diclofenac, Paracetamol, Tramadol

Corresponding Author: Akhilesh Mishra, Assistant Professor, Department of Anaesthesiology & Intensive Care, Saraswathi Institute of Medical Sciences (SIMS), Hapur, Uttar Pradesh, India.
E-mail: akhil61086@rediffmail.com

Received: 12 April 2020 **Revised: 22 May 2020** **Accepted: 30 May 2020** **Published: 6 July 2020**

Introduction

The transversus abdominis plane block (TAP block) which was described by Rafi et al. in 2001, is a regional anesthesia technique that requires administration of local anesthetic solution below the fascia between the transversus abdominis muscle and internal oblique muscle of the anterior abdominal wall.[1–4] The benefits of TAP block are analgesia without sympathetic blockade and the consequent hypotension or bradycardia, unlike in neuraxial block; also, opioid-induced pruritus, nausea, and vomiting are generally not observed with TAP block.[5–7] The technical difficulty with ultrasound-guided TAP block and a dearth of time, discourage to perform the block; therefore, we designed this study to ascertain the efficacy of double pop blind TAP block, which can be delivered even in a resource-poor hospital set up.

Subjects and Methods

After the Institutional ethics committee approved, the study was conducted in the Department of Anaesthesiology and Intensive Care at Saraswathi Institute of Medical Sciences (SIMS), Hapur, UP, from Dec 2017 to Nov 2019. We conducted a study on 78 adult patients undergoing laparoscopic cholecystectomy under general anesthesia.[8,9] This was a prospective double-blinded, randomized controlled trial. We randomized the patients into two groups using a computer-generated table of random numbers. The control group 1 or

group IV (Intravenous, n = 39) received Tramadol, Diclofenac, and Paracetamol. Study group 2 or group TAP (Transversus Abdominal Plane block, n = 39) received 20 ml of 0.25% Bupivacaine plain and Butorphanol 1 mg as an additive on each side of the abdomen into the Petit triangle in the midaxillary line. We used a blunted green needle to feel the double pop while passing into the transverse abdominal plane to block T6-12 nerves following negative aspiration.

We included adult patients of ASA I and II (aged 20 to 65 years) who underwent lap cholecystectomy under general anesthesia. We excluded from the study those patients who refused to participate, had an infection at the site or hypersensitive reaction to any of the drugs.

After routine monitoring and preoxygenation, induction with 2-3 mg/kg propofol 1% and butorphanol 1mg, endotracheal intubation was achieved with vecuronium 100 ug/kg while maintaining anesthesia with nitrous oxide in oxygen (2:1) and inhalational anesthetic isoflurane through a closed circuit.

The study group received TAP block before surgical incision and immediately after induction of general anesthesia for the preemptive analgesia.[10]

The visual analog scale was used to assess the level of pain and those having VAS score >/= 30/100 mm received rescue analgesia, which included tramadol, diclofenac and paracetamol.

Student paired t-test was used for the statistical analysis to calculate the probability value (P-value), mean and confidence interval. A P-value of less than 0.05 was considered a significant difference.

Results

Laparoscopic cholecystectomy was performed in 39 patients in control Group 1 (IV, intravenous group) and 39 patients in study Group 2 (TAP, transversus abdominis plane block). Patients of Study Group 2 (TAP block) remained pain-free for a longer time by 439.90 (416.31 - 463.48) minutes than the patients of Group 1 (IV, intravenous). Mean time before requiring the rescue analgesia in Group 1 was 200.10 +/- 53.13 minutes and in Group 2 was 640.00 +/- 53.22 minutes from the end of surgery; the two-tailed P value was less than 0.0001.

The mean visual analog scale (VAS) scores in the Study Group 2 was significantly less (TAP 1.97/10 +/- 0.63) compared to the control Group 1 (IV, intravenous 2.77/10 +/- 1.16) with the two-tailed P value equal to 0.0002). The difference in the mean VAS score between the control and study group was 0.79/10 (0.40 - 1.19).

In both the groups, the patients were hemodynamically stable during intraoperative and the follow-up time of 24 hours in the post-operative period. The side effects and adverse events were comparable and similar in both the groups.

Discussion

This study was undertaken to determine the efficacy of the double pop blind technique of transversus abdominis plane block by administering on each side 20 ml of 0.25% bupivacaine with 1.0 mg butorphanol compared to the control group managed by intravenously administered analgesics, which included paracetamol, diclofenac and tramadol.[11,12]

The double-pop blind technique ensures that the second pop pierces the fascia between the internal oblique and the transversus abdominis and the right TAP site has been reached to deposit the dilute form of the large volume of local anesthetic with the opioid additive compared to the under vision block performed using ultrasound in which the drug can get deposited just above the fascia following the split of the second last opaque line resulting into failure of the block, in the ultrasound technique tenting of the fascia if occurs. The needle should be gently pushed in to pierce the fascia and abruptly stop in the plane otherwise. The needle might go into the transversus abdominis muscle or even further in.[13–15]

The properly blunted green needle (21 G) pierces the skin with a bit of resistance but the fascia piercing gives a “give” feel together with a pop sound, which even the patient can appreciate. Caution needs to be exercised in abruptly stopping immediately after the second pop otherwise, the needle tip might go intramuscular into the transversus abdominis muscle or even further into any physical structure.

Prolongation of the immediate post-operative pain-free period comforts the patient quite a great deal because this is the period when the pain is intense.[5,16–18]

Conclusion

In a resource-scarce setting, the blind double pop technique for TAP block can keep more patients pain-free in the post-operative period and it can be performed even in a recovery room and in an a ward. Also, intraoperatively the other analgesic requirement is reduced.

Acknowledgment

Sincere thanks to the Anaesthesiology postgraduate students: Drs Navdeep Sharma, Ankit Jain and Nikhil Sharma besides Operation Theatre Technicians, Surgeons and the Anaesthesia colleagues for the patient care and management during the study. Also, special thanks goes to our Anaesthesia Secretary, Mr Amit Makan for relentless assistance and to our Principal, Prof (Dr) R. C. Purohit for the great encouragement throughout.

References

1. D M, S S, S S, TK S, Faisal. Anesthetic techniques: focus on transversus abdominis plane (TAP) blocks. Local Reg Anesth. 2019;12:81–88. Available from: https://doi.org/10.2147/LRA.S138537.
2. Rafi AN. Abdominal field block: a new approach via the lumbar triangle. Anaesthesia. 2001;56(10):1024–1026. Available from: https://dx.doi.org/10.1046/j.1365-2044.2001.02279-40.x.
3. Hebbard P. TAP block nomenclature. Anaesthesia. 2015;70(1):112–113. Available from: https://dx.doi.org/10.1111/anae.12970.
4. Holmes R, Smith SR, Carroll R, Holz P, Mehrotra R, Pockney P. Randomized clinical trial to assess the ideal mode of delivery for local anaesthetic abdominal wall blocks. ANZ J Surg. 2018;88(7-8):786–791. Available from: https://dx.doi.org/10.1111/ans.14317.
5. Singh T, Gupta A, Saxsena A, Jagar K, Gupta M, Srivastava U, et al. Efficacy of trans abdominis plane block for post cesarean delivery analgesia: A double-blind, randomized trial. Saudi J Anaesth. 2015;9(3):298–302. Available from: https://dx.doi.org/10.4103/1658-354x.154732.
6. Saxena A, Bansal R, Mittal A, Shrivastava U, Sharma P, chand T. Evaluation of postoperative analgesic efficacy of transversus abdominis plane block after abdominal surgery: A comparative study. J Nat Sci Biol Med. 2013;4(1):177–181. Available from: https://dx.doi.org/10.4103/0976-9668.107286.
7. Charlton S, Cyna AM, Middleton P, Griffiths JD. Perioperative transversus abdominis plane (TAP) blocks for analgesia after abdominal surgery. . Cochrane Database Syst Rev. 2010;p. 7705–7705. Available from: https://www.cochrane.org/CD007705/SYMPT_tap-blocks-nerve-blocks-for-analgesia-after-abdominal-surgery.
8. Oliveira GSD, Castro-Alves LJ, Nader A, Kendall MC, McCarthy RJ. Transversus Abdominis Plane Block to Ameliorate Postoperative Pain Outcomes After Laparoscopic Surgery. Anesth Analg. 2014;118(2):454–463. Available from: https://dx.doi.org/10.1213/ane.0000000000000066.
9. Zhao X, Tong Y, Ren H, Ding X, Wang X, Zong JY. Transversus abdominis plane block for post-operative analgesia after laparoscopic surgery: a systematic review and meta-analysis. Int J Clin Exp Med. 2014;7(9):2966–2975.
10. Bhattacharjee S, Ray M, Ghose T, Maitra S, Layek A. Analgesic efficacy of transversus abdominis plane block in providing effective perioperative analgesia in patients undergoing total abdominal hysterectomy: A randomized controlled trial. J Anaesthesiol Clin Pharmacol. 2014;30(3):391–396. Available from: https://dx.doi.org/10.4103/0970-9185.137274.
11. El-Dawlatly AA, Turkistani A, Kettner SC, Machata AM, Delvi MB, Thallaj A, et al. Ultrasound-guided transversus abdominis plane block: description of a new technique and comparison with conventional systemic analgesia during laparoscopic cholecystectomy †. Br J Anaesth. 2009;102(6):763–767. Available from: https://dx.doi.org/10.1093/bja/aep067.
12. Sharma N, Mehta N, Sharma S. An evaluation of (0.25%) Bupivacaine Vs (0.5%) Ropivacaine for post-operative analgesia using ultrasound guided transversus abdominis plane block for abdominal surgeries: A comparative study. Indian J Clin Anaesth. 2016;3(4):635–639. Available from: https://dx.doi.org/10.18231/2394-4994.2016.0028.
13. Rozen WM, Tran TMN, Ashton MW, Barrington MJ, Ivanusic JJ, Taylor GI. Refining the course of the thoracolumbar nerves: A new understanding of the innervation of the anterior abdominal wall. Clin Anat. 2008;21(4):325–333. Available from: https://dx.doi.org/10.1002/ca.20621.
14. Shibata Y, Sato Y, Fujiwara Y. Ultrasound-guided transversus abdominis plane (TAP) block. Anaesth Intensive Care. 2007;35(4):616–7.
15. Jankovic Z, Ahmad N, Ravishankar N, Archer F. Transversus Abdominis Plane Block: How Safe is it? Anesth Analg. 2008;107(5):1758–1759. Available from: https://dx.doi.org/10.1213/ane.0b013e3181853619.
16. Chen, Zhang, Zhang, Huang, Zhang, Xie, et al. Identification of Long Non-Coding RNA-Associated Competing Endogenous RNA Network in the Differentiation of Chicken Preadipocytes. Genes. 2019;10:795–800. Available from: https://dx.doi.org/10.3390/genes10100795.
17. Vadivelu N, Mitra S, Narayan D. Recent Advances in Postoperative Pain Management. Yale J Biol Med. 2010;83(1):11–25. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2844689/.
18. Rafi AN. Abdominal field block via the lumbar triangle revisited. Anaesthesia. 2012;67(12):1399–1401. Available from: https://dx.doi.org/10.1111/anae.12077.

How to cite this article: Richard S, Goel S, Mishra A, Imam SA, Said SE, Elhantery MM. Efficacy of Double Pop Blind TAP Block – Double-Blinded Randomized Controlled Study. Asian J. Med. Res. 2020;9(2):1-3.

DOI: dx.doi.org/10.47009/ajmr.2020.9.2.AN1

Source of Support: Nil, **Conflict of Interest:** None declared.