International Journal of Research in Medical Sciences
Das N et al. Int J Res Med Sci. 2018 Apr;6(4):1407-1413
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20181305

Original Research Article

Comparison of analgesic efficacy between TAP block and local site infiltration post operatively in caesarean section

Nabanita Das, Usha Shukla*, Dheer Singh, Urvashi Yadav

Department of Anaesthesiology, Uttar Pradesh University of Medical Sciences, Saifai, Uttar Pradesh, India

Received: 31 October 2017
Accepted: 30 November 2017

***Correspondence:**
Dr. Usha Shukla,
E-mail: ushashukla1970@gmail.com

ABSTRACT

Background: Patients undergoing caesarean section need to be alert, comfortable and mobile in order to take care of their babies, for which they must be pain free in post operative period. The aim of present study is to compare the analgesic efficacy of TAP block with local anaesthetic infiltration specifically in LSCS patients in reducing patient pain postoperatively, as well as to decrease the analgesic requirements.
Methods: The study population consisted of 60 patients posted for elective and emergency caesarean section. They were blindly divided into two groups of 30 patients each. Group T received 40ml 0.25% Ropivacaine in Transverses abdominis plane (TAP) block for postoperative analgesia and group I received 40ml 0.25% ropivacaine as infiltration at incision site for postoperative analgesia. Patients were observed for numeric pain score NPS, analgesic requirements, total analgesic consumption and adverse effects if any.
Results: There was highly significant difference in numeric pain scores at 2^{nd}, 6^{th}, 12^{th} and 24^{th} hours ($p<0.0001$). Both the time for first rescue analgesic and total amount of analgesic consumed are statistically significant ($p<0.0001$).
Conclusions: TAP block is an effective postoperative analgesic procedure for post caesarean section patients.

Keywords: Postoperative pain relief, Ropivacaine, TAP block

INTRODUCTION

Patients undergoing caesarean section present a unique set of challenges to the anaesthesiologist after operation. The motivated women want to be alert, comfortable and mobile in order to take care of their babies. There are several methods to combat moderate to severe postoperative pain which lasts for approx. 48 hrs in caesarean section.[1] As a part of multimodal analgesic regimen, opioids are required initially to achieve effective analgesia however, opioids are associated with dose dependent side effects including nausea, vomiting, pruritus, sedation and respiratory depression. Techniques that reduce opioids requirements may be of benefit in this population. Multiple methods have been put into use to achieve ideal pain free recovery such as local anaesthetic infilteration, epidural analgesia, peripheral nerve block and intravenous analgesia.[2-5]

Transversus abdominis plane (TAP) block has recently been described as an addition or alternative to the other analgesic regimes. TAP block technique has been shown to be safe and effective postoperative adjunct analgesia method in a variety of general, gynaecological, urological, plastic and paediatric surgeries and is suggested as part of the multimodal anaesthetic approach to enhance recovery after caesarean deliveries. Ultrasound guided approach makes it easier to identify

the transversus abdominis plane and administration of local anaesthetic in this plane.[6] Local anaesthetic infiltration is a widely performed convenient postoperative analgesia technique.[7]

The aim of present study was to compare the analgesic efficacy of TAP block with local anaesthetic infiltration specifically in LSCS patients in reducing patient pain postoperatively, as well as to decrease the analgesic requirements. This may assist recovery of patients and hopefully decrease emotional and psychological side effects of major surgeries.

Aim and objectives of the study was to do comparison of analgesic efficiency between transverses abdominis plane block and local site infiltration in postoperative caesarean section using 0.25% Ropivacaine. Also, to study time to administration of first dose of rescue analgesic. Also, to study the total amount of analgesic consumed and patient satisfaction.

METHODS

This randomised, double blinded, controlled clinical study was conducted after obtaining approval from institutional ethical committee and obtaining written informed consent from each patient after explaining the study procedure.

The sample size was calculated with the assumption of a possibility of at least of 35% difference between the two groups. Therefore 30 patients were included in each group in order to obtain an alpha error of 5% and statistical power of 80%. Preoperative assessment was done on the day before surgery and in the morning of surgery in elective patients while it was conducted just before surgery in emergency caesarean section.

A total of 60 ASA I and II pregnant patients, over 18year's of age, who had completed 36weeks period of pregnancy and posted for caesarean section were included in the study. ASA III and IV Patients, history of hypersensitivity or allergy to the study drugs, patient refusal, BMI more than 30kg/sqm, patients presenting with cord prolapse, hand prolapse, and uterine rupture were excluded from the study. Patients were randomly allocated to two groups:

Group T: Received TAP block with Ropivacaine 0.5% 40ml (20+20ml on each side),
Group I: Received local site infiltration with Ropivacaine 0.5% 40ml (20+20ml on each side),

All patients received inj. Ranitidine 50mg and inj. Metoclopramide 10mg; 15min before surgery as a prophylaxis against aspiration.

Patients were received in operation theatre, identified and multichannel monitors which included electrocardiography, heart rate, non-invasive blood pressure and pulse oximetery, were attached and baseline values obtained. An intravenous access was established by 18G IV cannula and lactated ringer's solution (20ml/kg) was infused over 15-20min for intra-venous (IV) hydration. With the patient in right lateral position, the L3-L4 inter-vertebral space was identified and infiltrated with 1ml of 2% lidocaine. After taking full aseptic precautions, lumbar puncture was performed at L3-L4 interspace through midline approach using a disposable 25G Quincke"s spinal needle. 2.5ml of hyperbaric bupivacaine was then injected in the subarachnoid space after free flow of CSF and patient was made supine and 15^0 wedges was placed under her right hip. Surgical incision was allowed once sensory dermatomal level of T4 was achieved.

Mean arterial pressure (MAP) and heart rate (HR) were recorded at every 5min during whole operative procedure. Any fall in MAP of more than 30% of baseline was considered as hypotension and treated with 100-200ml of fluid bolus followed by inj. Mephentramine 6mg i.v. if required. Atropine was given i.v. (600mcg) if HR becomes less than 60 beats per minutes.

The sensory block was assessed by pin prick method along the midclavicular line bilaterally. The motor block was assessed according to the modified bromage scale:

- 0-no motor block,
- Inability to raise extended leg, able to move knees and feet,
- Inability to raise extended leg and move knees, able to move feet,
- Complete motor block.

Surgery was allowed only after the sensory level of anaesthesia upto T4 and bromage block of scale 2 was achieved. The time to reach T4 dematome sensory block, highest level of sensory block and Bromage 2 motor block was recorded before surgery. Intra-operative complications (nausea, vomiting, hypotension and bradycardia) and postoperative complications (nausea, vomiting, hypotension and bradycardia and headache) were recorded. At the end of surgery before administrating TAP block or local site infiltration regression of sensory block was assessed. Regression time for motor block to bromage 0 was recorded. All durations were calculated considering the time of spinal injection as time 0.

After the surgery, group T patients were administered bilateral TAP block under ultrasound guidance. 40ml (20ml+20ml bilaterally) of 0.25% of ropivacaine (Ropivacaine hydrochloride-Neon) was administered in the transverses abdominis plane using 100mm 22-G block needles. A 3mm linear array US probe (13-6MHz) was positioned in the mid axillary line in the axial plane, half way between the iliac crest and the costal margin views were considered satisfactory, if s.c. fat, external oblique muscle, internal oblique muscle, transverses

abdominis muscle, peritoneum and intra-peritoneal structures were identified. A 150mm long, 20G short bevel needle (Stimplex, B. Braun Melsungen AG, Germany) was introduced anteriorly and inserted in plane under real time US guidance to lie between the internal oblique and transverses abdominis muscle with the tip in the mid axillary line. A total of 20ml of study solution were injected on each side after aspiration to avoid intravascular placement. Successful injection produced an echo-lucent lens shaped space between the two muscles.

In group I, post-operatively a total of 40ml (20ml for each side of incision) of 0.25% (Ropivacaine hydrochloride-Neon) was used for subcutaneous wound side infiltration.

Post- operative pain was evaluated by numeric pain score (NPS), on a scale of 1-10. The patients were asked to provide the number, with 10 being most severe pain they have ever had and 0 being no sensation of pain. In group I, NPS after local anaesthetic infiltration and in group T, NPS after TAP block was considered as NPS 0 (Zero). Patients were evaluated for pain at the 2^{nd}, 6^{th}, 12^{th}, 24^{th} hr and at first mobilization by a co-investigator, who was blinded to the used method. He asked for their pain score and recorded them as NPS2, NPS6, NPS12, NPS24 and NPSfm respectively. All patients were routinely mobilised, 8 hrs after the end of the operation. If the patient suffered from pain (NPS>5) at any hour, intramuscular diclofenac sodium 5mg was administered as rescue analgesic.

If this was not sufficient to ease the patient, then 50mg tramadol was also given intravenously along with inj. ondensetron. Maximum allowable dose of diclofenac was 225mg per day and for tramadol, it was 600mg per day. Time for first analgesic administration and the total need for analgesic was recorded in each case. Patient satisfaction was determined by asking verbally to provide a number between 0-10 (0-not satisfied, 10-fully satisfied) and the number was recorded. Patient satisfaction evaluation was performed 24 hours after the block.

Recording of NPS, analgesic requirement and patient satisfaction score was done by an independent anaesthesiologist not involved in the study. Data were represented as mean ±SD. Categorical data were represented as number of patients. Physical characteristics, heart rate, mean arterial pressure, onset and duration of sensory block, onset and duration of motor block, first analgesic demand was compared using the unpaired t-test.

Although systolic blood pressure, diastolic blood pressure and mean arterial pressure were monitored during intra and postoperative period but only mean arterial pressure was considered for statistical evaluation. Categorical data was compared using chi-square test. Adverse effects profile was compared using Fischer's exact test. P value <0.05 was considered to be significant. All the statistical calculation was done by using software SPSS version 16.

RESULTS

The study population consisted of 60 patients posted for elective and emergency caesarean section. They were blindly divided into two groups of 30 patients each. Group T received 40ml 0.25% ropivacaine in transverses abdominis plane (TAP) block for postoperative analgesia, group I received 40ml 0.25% ropivacaine as infiltration at incision site for postoperative analgesia. Demographic characteristics were comparable in both the study groups (Table 1).

Table 1: Demographic characteristics.

Characteristics	Group I (n=30) mean ±SD	Group T (n=30) mean ±SD	P value
Age (years)	25±3.9	26.367±3.498	0.158
Height (cm)	151.7±6.1327	154.4±7.6411	0.1366
BMI (kg/m^2)	23.166±2.288	23.04±1.561	0.8041
Duration of surgery (min)	42.433±2.7877	42.7±2.667	0.7060
ASA (I:II)	11:19	15:15	0.297

Pre-operative and intra-operative hemodynamic parameters e.g. heart rate and mean arterial blood pressure were comparable in both the study groups during entire surgical procedure (Table 2).

Block height achieved as highest dermatomal level and level of sensory block at the end of surgery was statistically insignificant in both groups (Table 3).

Numeric pain scores at different time intervals were compared using unpaired t test. NPS at the time of giving TAP block or surgical site infiltration was 0. Analysis showed that there was highly significant difference in numeric pain scores at 2^{nd}, 6^{th}, 12^{th} and 24^{th} hours ($p<0.0001$) (Table 4).

However, there was no significant difference in scores at the time of first mobilization. Both the time for first

rescue analgesic and total amount of analgesic consumed are statistically significant (p<0.0001) (Table 4).

Table 2: Hemodynamic parameters in study groups.

Time	Heart rate (min)				Mean arterial pressure (mm Hg)			
	Group I (n=30) mean ±SD	Group T (n=30) mean ±SD	t-value (df-58)	P value	Group I (n=30) mean ±SD	Group T (n=30) mean ±SD	t-value (df-58)	P value
Pre-operative	85.367±13.57	86.8±13.19	1.35	0.237	87.97±10.11	92.8±10.614	1.5	0.11
O min	87.37±14.363	83.93±12.28	1.008	0.25	88.73±11.017	89.533±11.088	0.43	0.1703
5min	86.7±14.008	84.47±13.12	0.92	0.186	90.033±8.899	90.2±11.46	0.391	0.12
10min	89.47±15.158	85.8±10.44	0.893	0.97	90.167±8.574	93.03±12.43	0.391	0.543
15min	87.433±14.09	86.8±10.327	1.963	0.59	90.2±8.6279	94.03±11.49	1.37	0.567
20min	84.93±12.747	87.23±10.03	1.258	0.61	90.767±10.05	90.57±8.834	0.87	0.42
25min	85.43±10.672	86.87±10.64	0.8999	0.22	91.367±9.492	90.4±8.962	1.05	0.512
30min	83.77±11.245	86.167±11.099	0.918	0.278	91.57±10.874	90.067±9.017	0.887	0.111
35min	83.9±11.046	85.73±10.942	0.999	0.342	90.9±9.5569	90.4±8.8575	0.292	0.275
40min	84.4±11.545	85.533±10.28	1.925	0.175	91.03±8.9961	87.07±11.17	1.37	0.89

Table 3: Block characteristics in study group.

	Group I (n=30)	Group T (n=30)	P- value
Highest dermatome level achieved			
T3	3	5	X2 =degree of freedom=3 Two tailed value (Exact value) Non- significant
T4	20	18	
T5	4	4	
T6	3	3	
Level of sensory block at the end of surgery mean (range)	T6 (T6-T8)	T6 (T6-T8)	

Table: 4 Numeric pain score (NPS), analgesic requirement and satisfaction scores in study groups.

Time (in hrs)/ parameter	Group I (n=30) mean ±SD	Group T (n=30) mean ±SD	t-value (df-58)	P- value
NPS0	0.00±0.00	0.00±0.00	-	-
NPS2	5.967±0.994	3.83±1.167	10.616	<0.0001*HS
NPS6	4.9±0.662	3.9±0.6074	8.4767	<0.0001* HS
NPSfm	4.0±0.4549	3.966±0.6149	0.331	0.7408
NPS12	5.0±0.5872	2±0.3714	32.8835	<0.0001*HS
NPS24	4.133±0.5074	1.967±0.4901	23.3867	<0.0001*HS
First demand of analgesic	2.537±1.149	5.99±1.514	13.8361	<0.0001*HS
Total diclofenac (in mg) consumed in first 24hrs	162.5±34.585	107.5±37.800	8.1755	<0.001
Patient satisfaction score	7.667±0.661	7.9±1.029	1.45	0.689

*=p value<0.0001 Highly significant(HS), NPS= Numeric pain score

Table: 5 comparisons of adverse effects between two groups.

Adverse effect	Group I (n=30) mean ±SD	Group T (n=30) mean ±SD	P- value
Intraop hypotension	7	5	0.075
Intraop bradycardia	2	3	0.431
Shivering	2	3	0.921
PONV	4	3	0.082

Patient satisfaction score was evaluated at the end of 24 hours. Patients were asked to give a score between 1 and 10 depending on level of satisfaction achieved in pain relief and were evaluated using unpaired t- test. Level of satisfaction was more in TAP block group, but the

difference was not significant (p>0.05) (Table 4). Adverse effects profile was not significant in both the study groups (Table 5).

DISCUSSION

Effective post-operative pain control is an essential component of the care of the surgical patient. Inadequate pain control may result in increased morbidity and mortality.[1,2] Regarding a special postoperative condition like in postoperative caesarean section, during the planning of postoperative analgesic regimen, along with the mother, we need to consider the breast feed dependent new born also. It may result in respiratory, dietary intake and ambulation impairment which consequently leads to complications.[8] Another concern in these patients is that as they breast feed the new born, opioids must be avoided in these patients due to secretion in breast milk. Keeping these in mind, we chose to study the TAP block and LIA using 0.25% ropivacaine in post caesarean pain relief.

Pain assessment at 2 hours

Authors found that NPS in both the groups at the time of intervention was 0 and level of sensory block was at the level of T6 at the end of surgery and before application of TAP block or LIA. It was due to the fact that at that time patient were under the effect of spinal anaesthesia. MT Ayodogmus et al studied the analgesic efficacy between TAP block and LIA using levo-bupivacaine 0.25% and NPS at the time of intervention was 0.[9]

In present study 27 (n=30) patients in group I in the 2nd hour (NPS2) needed supplemental analgesia in the form of intramuscular diclofenac injection, whereas in the TAP group only 3 patients required rescue analgesia. This difference was statistically significant, thus proving the analgesic efficacy of TAP block in comparison to LIA (mean ±SD: 5.967±0.994: LIA Vs 3.83±1.167: TAP). MT Ayodogmus et al also found TAP block to be significantly superior over LIA in NPS at 2nd postoperative hour (p=0.005).[9]

In a study, Charles F Bellows and David H Berger found local site infiltration in laparoscopic ventral hernia repair, using 0.25% Bupivacaine with epinephrine efficacious than control group.[10] But at 2nd hour, VAS score was only 3.1±0.9 in contrast to our study, where Authors found NPS score 3.83±1.167 at 2nd hour. This difference can be explained by demographic profile of patients and type of the surgery.

As we know that the intensity of pain sensation depends on the sex of the patient, females being more sensitive, and our study exclusively consisted of female subjects, while in their study major bulk was of male patients. Also, in their study, surgical procedure was minimally invasive while in this study, surgery was more invasive. They used local vasoconstrictor in the form of epinephrine, which was not usedIn this study.

Pain assessment at 6th, 12th, 24th hour

Authors found that pain scores in this study in group T at 6th, 12th, 24th hour were lower as compared to group I (NPS6:LIA 4.9±0.662 vs TAP 3.9±0.6074) (p<0.0001) (NPS12: LIA5.0±0.5872 Vs TAP: 3.9667±0.6149) (p<0.001) (NPS 24: LIA 4.133±0.5074 vs TAP 1.9667±0.4901) (p<0.001). this was quite similar to the study done by MT Ayodogmus et al who demonstrated a significant lower NPS at 6th, 12th, 24th hour (NPS6: p= 0.003, NPS12 P=0.0001, NPS 24: p=0.0001).[9] A single shot TAP block can produce effective analgesia for up to 2 days. This prolonged duration of analgesia is due to relatively poor vascularisation of transverses abdominis plane.

Pain assessment at first mobilisation

There was no significant difference in first mobilisation NPS (NPSfm). In present study, only 3 patients out of 30 in group T, experienced NPS >5 after first mobilisation. In group I, 3 patients out of 30 experienced NPS >5 (NPSfm: LIA4.0±0; 4549 vs TAP 3.9667±0.6149) (p=0.7408). This finding is similar to the study done by MT Ayodogmus et al, who did not find any statistically significant difference in terms of NPS between the two group after first mobilisation (NPSfm, p=0.123) which was further supported by the observations of the study done by Michel Chandon et al where they compared the US guided TAP block with the continuous wound infusion in post caesarean section patients.[9,11]

They found that though the pain during mobilisation was higher in intensity but similar in both the groups (p>0.9). Post-operative pain arises mainly from somatic and visceral component. Both TAP block and LIA act on somatic component, not on visceral component. During mobilisation, pain mainly arises from visceral component which is not under the effect of TAP or LIA. Hence during the mobilisation, both the groups demonstrate similar NPS score.

Time for first rescue analgesia

In the present study, in group I, 28 patients (n=30) showed NPS >5 within 2-3 hours of the LIA whereas in group T 22 patients (n=30) sustained their analgesic effects up to 6 hours after that they showed NPS >5 and were treated by parental analgesic (LIA 2.5±1.149 vs TAP 5.99±1.514) (p<0.0001). MT Ayodogmus et al also demonstrated a statistically significant difference in first analgesic application time (LIA 2.63±1.83 vs TAP 6.11±6.2) (p=0.003).[9] Vijaylaxmi Sivapurapu et al compared bilateral TAP block with LIA using 0.25% bupivacaine and noted the time for first request of analgesia as well as visual analogue scale at that time (VAS T- rescue).[12] They used morphine 0.1mg/kg IV as rescue analgesic. TAP proved its superiority in their study (p=0.001) as well.

Total analgesic consumption

In this study, cumulative total diclofenac consumption was found lower in group T in comparison to LIA (LIA 162.5±34.585 vs TAP: 107.5±37.800) (p<0.001). Telenes A et al in their study, compared TAP block with LIA in caesarean section using bupivacaine 0.25% with adrenaline 5mcg/ml.[13] Their study also demonstrated decreased cumulative analgesic consumption in terms of morphine consumption (TAP41±34mg vs LIA 38±27mg). Vijaylaxmi sivapurapu et al also demonstrated a statistically significant decreased consumption of analgesic in 24 hours in TAP group (TAP22.15±4.14 vs LIA 29.15±3.93 p=0.001).[12] Their finding further supported TAP block as a more effective analgesic procedure than LIA.

Tan TT et al (2012) did a study to evaluate the analgesic efficacy of US guided TAP block in caesarean delivery under general anaesthesia.[14] They postulated that the advantage of TAP block might be even more obvious after general anaesthesia. They found that the TAP block group used significantly less analgesic than those who did not receive any block (12.3mg (2.6) 4 vs 31.4mg (3.1), p<0.001).

Patient satisfaction

There was no significant difference between the two groups (LIA 7.667±0.661 vs TAP: 7.9±1.029) (p=0.689). This outcome is further supported by MT Ayodogmus et al, where they also did not find any difference between the two procedures in terms of patient satisfaction score (LIA 8.54±0.82 vs TAP: 8.89±0.63) (p=0.081)[9]

CONCLUSION

From these observations and analysis, it can be inferred that

- TAP block provides better analgesia in comparison to local anaesthetic infiltration.
- TAP block also prolongs the time interval for first rescue analgesic.
- TAP block decreases the total analgesic consumption.

It can be concluded that the TAP block is an effective postoperative analgesic procedure for post caesarean section patients.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bonnet MP, Mignon A, Mazoit JX, Marret E. Analgesic effect and adverse effects of epidural morphine compared to parental opioids after elective caesarean section. A systematic review. Eur J pain. 2010;14:894-9.
2. Gupta A. Local anaesthesia for pain relief after laparoscopic cholecystectomy: a systematic review. Best Pract Res Clin Anaesthesiol. 2005;19(2):275-92.
3. Ventham NT, Hughes M, O'neill S, Johns N, Brady RR, Wigmore SJ. Systematic review and meta-analysis of continuous local anaesthetic wound infiltration versus epidural analgesia for postoperative pain following abdominal surgery. Brit J Surg. 2013;100(10):1280-9..
4. Fowler SJ, Christelis N. High volume local infiltration analgesia compared to peripheral nerve block for hip and knee arthroplasty- what is the evidence? Anaesth Intensive Care. 2013;41(4):458-62.
5. Gousheh SM, Nesioonpour S. Intravenous paracetamol for postoperative analgesia in laparoscopic cholecystectomy. Anesthesiol Pain Med. 2013;3(1):214-8.
6. Huang D, Ma X, Zhou D. Effects of postoperative analgesia of ultrasound-guided transversus abdominis plane block in hemicolectomy patients. Zhonghua yi xue za zhi. 2014;94(21):1623-6.
7. Coughlin SM, Karanicolas PJ, Emmerton- Coughlin HM, Kanbur B, Kanbur S, Colquhoun PH. Better late than never? Impact of local analgesia timing on post-operative pain in laparoscopic surgery: a systematic review and meta-analysis. Surg Endo. 2010;24(12):3167-76.
8. Atim A, Biligin F, Kilickya O, purtuogulu T, Alanbay I, Orhan ME. The efficacy of ultra sound-guided transverses abdominis plane block in patients undergoing hysterectomy. Anaesth Intensive Care. 2011;39(4):630-34.
9. Aydogmus MT, Sinikoglu SN, Naki MM, Ocak NB, Sanlı N, Alagol A. Comparison of analgesic efficiency between wound site infiltration and ultra-sound-guided transversus abdominis plane block after cesarean delivery under spinal anaesthesia. Hippokratia. 2014;18(1):28.
10. Bellows CF, Berger DH. Infiltration of suture sites with local anesthesia for management of pain following laparoscopic ventral hernia repairs: a prospective randomized trial. JSLS. 2006;10(3):345-50.
11. Chandon M, Bonnet A, Burg Y, Barnichon C, DesMesnards-Smaja V, Sitbon B, et al. Ultrasound-guided transversus abdominis plane block versus continuous wound infusion for post-caesarean analgesia: a randomized trial. PloS one. 2014;9(8):e103971.
12. Akkaya A, Yildiz I, Tekelioglu UY, Demirhan A, Bayir H, Ozlu T, et al. Dexamethasone added to levobupivacaine in ultrasound-guided tranversus abdominis plain block increased the duration of postoperative analgesia after caesarean section: a

randomized, double blind, controlled trial. Eur Rev Med Pharmacol Sci. 2014;18(5):717-22.
13. Telnes A, Skogvoll E, Lonnee H. Transverses abdominis plane block versus wound infilteration in caesarean section: A randomized controlled trial. Acta Anaesthesiol Scand. 2015;59(4):496-504.
14. Tan TT, Teoh WH, Woo DC, Ocampo CE, Shah MK, Sia AT. Randomized trial of the analgesic efficacy of ultrasound guided transverses abdominis plane block after caesarean delivery under general anaesthesia. Eur J Anaesthesiol. 2012;29(2):88-94.

Cite this article as: Das N, Shukla U, Singh D, Yadav U. Comparison of analgesic efficacy between TAP block and local site infiltration post operatively in caesarean section. Int J Res Med Sci 2018;6:1407-13.