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Research Article

A CLINICAL STUDY TO ASSESS THE REQUIREMENT OF ANALGESIA POST USG GUIDED BILATERAL TRANSVERSUS ABDOMINIS PLANE BLOCK WITH 0.25% BUPIVACAINE AND 0.25% BUPIVACAINE WITH 50µG FENTANYL FOLLOWING TOTAL ABDOMINAL HYSTERECTOMY UNDER GENERAL ANESTHESIA

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ABSTRACT

Background: Different adjuvant drugs have been used to improve the quality and increase the duration of local anesthetics during various nerve block techniques. More recently ultrasound-guided TAP block has been described with promises of better localisation and deposition of the local anaesthetic with improved accuracy. The transversus abdominis plane (TAP) block is a novel approach for blocking the abdominal wall neural afferents. **Objective**: To assess the requirement of analgesia post USG guided bilateral transversus abdominis plane block with 0.25% bupivacaine and 0.25% bupivacaine with 50µg fentanyl following total abdominal hysterectomy under general anesthesia. **Methods**: This clinical study is conducted in the Department of Anaesthesiology and Critical care, Pt. J. N. M. Medical College and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur (C.G.) from 01/04/2014 to 22/09/2015. **Results**: The time to first request for analgesic came at 4th and 12th hr in group B and F respectively. The difference for the time of first request of analgesic between the two groups was statistically significant (p <0.05). Total no. of patients who used analgesic in 24 hrs duration was 19 (95%) and 15 (75%) in group B and F respectively. The difference of mean usage of i.v. paracetamol between the two groups was statistically significant (p <0.05). In group B i.v. tramadol was used once by 3 patients, twice by 14 patients whereas no analgesic supplementation was required in 16 patients. The difference in the i.v. tramadol requirement between the 2 groups was statisticaly significant (p < 0.05). **Conclusion**: Addition of small dose of fentanyl to bupivacaine for bilateral ultrasound-guided transversus abdominis plane (TAP) block improves analgesia and prolonges the time to first analgesic requirements and decreases the need for postoperative analgesics in patients undergoing total abdominal hysterectomy with no remarkable side effects. IV paracetamol and IV tramadol gave great results as analgesics.

INTRODUCTION

The aim of a TAP block is to place local anaesthetic in the plane between the internal oblique and transversus abdominis muscles targeting the spinal nerves in the plane. Sensory innervations to the skin and muscle of the abdominal wall and the parietal peritoneum will be blocked. The block can be performed by two methods including a blind technique, based on surface anatomy landmarks and an ultrasound-guided technique performed under direct vision. Total abdominal hysterectomy (TAH) is a commonly performed major abdominal surgical procedure in females of perimenopausal age group that results in substantial postoperative pain and discomfort. [1] Real-time ultrasound provides reliable imaging of the three muscular layers of the antero-lateral abdominal wall, the TAP, and the underlying peritoneal cavity. Ultrasound also provides real-time assessment of correct needle placement and local anaesthetic injection within the TAP, thus potentially increasing the success rate and safety of the TAP block compared to the landmark-based technique. This aims to improve patient satisfaction, facilitate rehabilitation and accelerated recovery from surgery that allows early discharge from hospital. Inadequately treated post-operative pain is associated with several negative effects such as cardio-respiratory complications (tachycardia, dysrrhythmias, increased systemic vascular resistance, myocardial ischaemia in susceptible patients, hypoventilation and atelectasis), CNS effects (cognitive impairment, insomnia, anxiety, feeling of helplessness), immobility leads to hypercoagulability, thromboembolic events and persistant

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gastrointestinal dysfunction which leads to prolonged hospital stay. [2] In such patients, multimodal analgesic technique reduces morbidity, cost and hospital stay. The mainstay of analgesic modalities after abdominal surgery are systematically administered opiates and central neuraxial techniques. Systemic opioids and neuraxial opioids create the need for increased action and monitoring by staff, frequently requires complicated equipment in the form of monitors and pumps and cause additional undesirable side effects like respiratory depression, drowsiness, sedation, urinary retention, constipation, ileus, pruritus, nausea and vomiting etc. [3] To avoid problems associated with systemic opioids and neuroaxial blocks, peripheral blocks have been introduced and practice to reduce pain originated from abdominal wall incision successfully. [4] Transversus abdominis plane (TAP) block was first described by Rafi in 2001. It provides analgesia to the skin, muscles of anterior abdominal wall and parietal peritoneum. It is one of the latest techniques used to block the sensory afferent nerves of the anterior abdominal wall via a single entry point through bilateral triangle of Petit, hence providing multidermatomal analgesia. [5] TAP block prolongs the time to first analgesic request, reduces postoperative analgesic consumption and reduces opioid related side effects. More recently ultrasound-guided TAP block has been described with promises of better localisation and deposition of the local anaesthetic with improved accuracy. [6]

METHODOLOGY

Method: This clinical study is conducted in the Department of Anaesthesiology and Critical care, Pt. J. N. M. Medical College and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur (C.G.) from 01/04/2014 to 22/09/2015. 40 females aged 40-60 yrs undergoing elective total abdominal hysterectomy (TAH) under general anaesthesia were included in this study, after approval from institutional ethics committee, written and informed consent was obtained and use of ultrasound-guided TAP block for postoperative pain relief as well as the use of Visual analogue scale (VAS) graded from 0 cm (no pain) to 10 cm (maximum pain) was explained to all the patients.

All patients were assessed preoperatively the day before surgery including complete history, clinical examination and recording of vital parameters along with routine investigations. All patients were randomly distributed into two groups B (bupivacaine group) and F (fentanyl group) by sealed envelope technique with 20 patients in each group. Patients of group B (bupivacaine group) received 0.25% bupivacaine 20 ml on each side and group F (fentanyl group) received 0.25% bupivacaine 20 ml and 50µg inj. fentanyl on each side.

RESULTS

This comparative clinical study is conducted in the Department of Anaesthesiology and Critical care, Pt. J. N. M. Medical College and Dr. Bhim Rao Ambedkar Memorial Hospital, Raipur (C.G.) from 01/04/2014 to 22/09/2015. The results are as follows:

Table 1 Personal characteristics of study subjects.

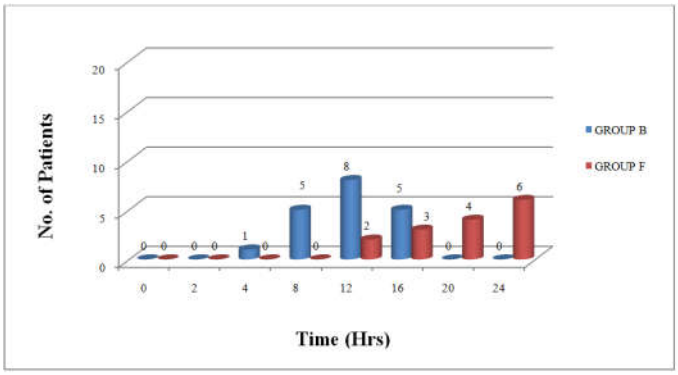
Variables	Group B	Group F
Weight (in kg)	56.9 ± 1.138	57.35 ± 1.173
Height (in cm)	145.6 ± 3.84	144.7 ± 4.32
BMI (kg/m^2)	26.81 ± 1.655	27.31 ± 1.656

The mean (± sd) value of the weight of the patients. Mean weight of the patients in group B was 56.9 ± 1.138 kg and in group F it was 57.35 ± 1.173 kg. These values showed that patients in both the groups were comparable with respect to weight. ($p > 0.05$). The mean (± sd) height of patients. Mean height of the patients in group B was 145.6 ± 3.84 cms and in group F it was 144.7 ± 4.32 cms. These values showed that patients in both the groups were comparable with respect to height. ($p = 0.4905$). The mean (± sd) values of the BMI of the patients in group B (26.81 ± 1.655) and F (27.31 ± 1.656). These values show that the patients in both the groups were comparable with respect to BMI ($p > 0.05$).

Table 2 Time for First Request of Analgesic

Time (hrs)	Group B		Group F		*p* - value
	n	%	n	%	
0	0	0	0	0	< 0.05
2	0	0	0	0	
4	1	5	0	0	
8	5	25	0	0	
12	8	40	2	10	
16	5	25	3	15	
20	0	0	4	20	
24	0	0	6	30	
Total	19	95%	15	75%	

Table-2 shows the distribution of patients according to the time to first request for analgesic. The time to first request for analgesic came at 4th and 12th hr in group B and F respectively. Maximum request came at 12th hr (8 patients, 40%) and at 24th hr (6 patients, 30%) in group B and F respectively. The difference for the time of first request of analgesic between the two groups was statistically significant (p <0.05). Total no. of patients who used analgesic in 24 hrs duration was 19 (95%) and 15 (75%) in group B and F respectively.



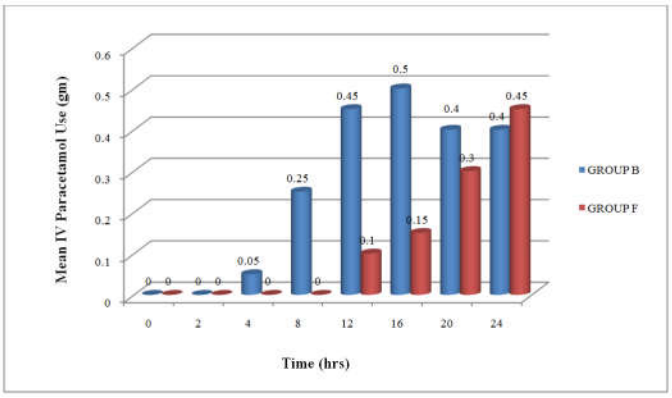
Graph 1 Time for First Request of Analgesic

Table 3 Mean 24 hr IV paracetamol requirement (gm)

Time (hrs)	IV Paracetamol Requirement (gm)				*p* - value
	Group B		Group F		
	Mean	SD	Mean	SD	
0	0	0	0	0	0
2	0	0	0	0	0
4	0.05	0.22	0	0	0
8	0.25	0.44	0	0	0.0162
12	0.45	0.51	0.10	0.31	0.0124
16	0.50	0.51	0.15	0.37	0.0176
20	0.40	0.50	0.30	0.47	0.5197
24	0.40	0.50	0.45	0.51	0.7566
Total	2.05	0.45	1	0.42	<0.05

Table- 3 shows the mean (± sd) i.v. paracetamol requirement in 24 hr duration. At 8, 12 and 16 hrs the difference of mean usage of i.v. paracetamol between the two groups was statistically significant (p <0.05). At 24 hr i.v. paracetamol use was more in group F (0.45 ± 0.51 gm) as compared to group B

(0.40 ± 0.50 gm) but it was statistically not significant.(p >0.05)

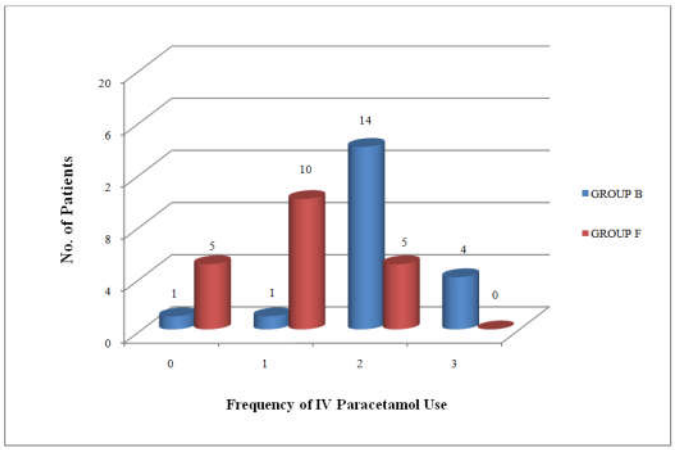


Graph 2 Mean 24 hr IV paracetamol requirement (gm)

Table 4 Frequency of IV Paracetamol use

Frequency of i.v. Paracetamol use	No. of patients		p - value
	Group B	Group F	
0	1	5	< 0.05
1	1	10	
2	14	5	
3	4	0	

Table- 4 shows the frequency of i.v. paracetamol use in 24 hrs postoperatively. In group B i.v. paracetamol was used twice by 14 patients, thrice by 4 patients and only once in 1 patient whereas no analgesic supplementation was required in 1 patient. In group F i.v. paracetamol was needed twice in 5 patients, once in 10 patients and 5 patients did not need any analgesic supplementation. The difference in the i.v. paracetamol requirement between the 2 groups was statisticaly significant. (p < 0.05)

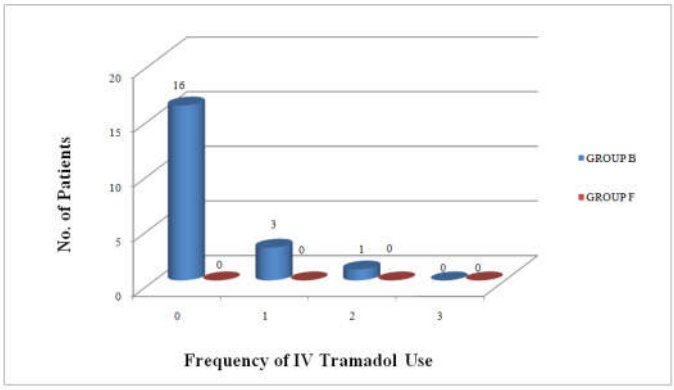


Graph 3

Table 5 Frequency of IV Tramadol use

Frequency of i.v. Tramadol use	No. of Patients		p- value
	Group B	Group F	
0	16	20	< 0.05
1	3	0	
2	1	0	
3	0	0	

Table-5 shows the frequency of i.v. tramadol use in 24 hrs postoperatively. In group B i.v. tramadol was used once by 3 patients, twice by 14 patients whereas no analgesic supplementation was required in 16 patients. Patients in group F did not need any analgesic supplementation. The difference in the i.v. tramadol requirement between the 2 groups was statisticaly significant (p < 0.05).



Graph 4 Frequency of IV Tramadol use

Table 6 Analgesic Requirements

	Group B	Group F	p - value
Time to first request for i.v. paracetamol (hr)	4th	12th	
Mean (± sd) time to first request for i.v. paracetamol (hrs)	11.58 ± 3.50	19.73 ± 4.40	
Total i.v. paracetamol use in 24 hrs (gm)	41	20	< 0.05
Mean (± sd) i.v. paracetamol use in 24 hrs (gm)	2.05 ± 0.45	1.0 ± 0.41	
Total i.v. tramadol use in 24 hrs (mg)	500	0	

Table- 6 shows the analgesic requirement in both the groups. Time to first request of i.v. paracetamol came at 4th and 12th hr in patients of group B and F respectively. Mean (± sd) time of first request of i.v. paracetamol was 11.58 ± 3.50 hr for group B and 19.73 ± 4.40 hr for group F. Total i.v. paracetamol usage in 24 hrs duration postoperatively was 41 gms and 20 gms in group B and F respectively. Mean (± sd) i.v. paracetamol use in 24 hrs was 2.05 ± 0.45 gm and 1.0 ± 0.41 gm in group B and F respectively. Beside that i.v. tramadol use in 24 hr postoperatively was 500 mg in group B whereas the patients in group F did not require it. The difference was statistically significant (p <0.05) for all sets of observations.

DISCUSSION

Our study subjects were all females undergoing elective total abdominal hysterectomy under general anaesthesia. We chose 40- 60 yrs age group patients. Maximum number of patients, 21 were in the age group of 40-50 yrs (11 in group B; 10 in group F) and 19 patients were in the age group of 50-60 yrs (9 in group B; 10 in group F). The difference was not statistically significant between the two groups with respect to the age of the patients (p > 0.05).

Nishikawa K. et al (2000) [7] in their study they found that the addition of small-dose fentanyl to lidocaine solution in axillary brachial plexus block can increase the success rate and prolong the duration of analgesia, but it delays the onset time of sensory blockade as compared with the same dose of lidocaine although this may be accounted by the decreased pH caused by fentanyl. Moharari R.S. et al (2010) [8] showed in their study that addition of fentanyl to lidocaine solution shorten the onset times of sensory and motor blocks during the interscalene brachial plexus block without any increase in side effects. McDonnell J.G. et al (2007) [9] concluded in their study that the TAP block provided highly effective postoperative analgesia in the first 24 hours after major abdominal surgery. Carney J. et al (2008) [10] studied the TAP block and stated that it provides effective postoperative analgesia in patients undergoing TAH. They concluded that the TAP block as a component of a multimodal analgesic regimen provided superior analgesia as compared to placebo block up to 48

hours postoperatively. Baaj J.M. et al (2010) [11] designed a double blind, placebo controlled, randomized study to evaluate the efficacy of ultrasound-guided TAP block for post caesarean section delivery analgesia. They concluded that the analgesic efficacy of ultrasound-guided TAP block after caesarean delivery reduced the postoperative pain score, total morphine consumption, antiemetic drugs and improved patient's satisfaction, and quality of pain relief.

CONCLUSION

Addition of small dose of fentanyl to bupivacaine for bilateral ultrasound-guided transversus abdominis plane (TAP) block improves analgesia and prolonges the time to first analgesic requirements and decreases the need for postoperative analgesics in patients undergoing total abdominal hysterectomy with no remarkable side effects. IV paracetamol and IV tramadol gave great results as analgesics.

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