ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 05 | May - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

COMPARISON OF INTRATHECAL FENTANYL-BUPIVACAINE AND TRAMADOL-BUPIVACAINE COMBINATION ON POSTOPERATIVE ANALGESIA IN LOWER ABDOMINAL SURGERIES

Surgery

Dr Rakesh Singh Baghel Assistant Professor, RKDF Medical College Hospital And Research Centre.

Dr Anju Verma* Assistant Professor, RKDF Medical College Hospital And Research Centre.
*Corresponding Author.

ABSTRACT

Introduction: This prospective, randomized, double-blind study was conducted to compare the effect of intrathecal fentanyl-bupivacaine and tramadol-bupivacaine on the onset and duration of sensory and motor blockade and postoperative analgesia in lower abdominal surgeries.
Methodology: Sixty patients between the age group of 18 to 60 years of American society of anesthesiologist (ASA) grade 1 and 2 who were going lower abdominal surgery under spinal anesthesia were administered 2.5 ml of 0.5% bupivacaine heavy +0.5 ml fentanyl (group F) and 2.5 mL of 0.5% bupivacaine (heavy) +0.5 mL of tramadol (group T) intrathecally. Onset and duration of sensory and motor blockade visual analogue score, sedation score, duration of post operative analgesia, requirement of rescue analgesia and adverse drug reactions were recorded. Monitoring of vital parameters was done at predetermined interval.
Results: The duration of sensory blockade was significantly prolonged in group F (310.6±45.2 minutes) as compared to group T (260.6±25.9 minutes). Similarly, duration of motor blockade was longer in group F (260.6±40.9 minutes) compared to group T (210.6±25.6 minutes). The total duration of analgesia was significantly prolonged ($p<0.001$) in group F (410 ± 96.86 minutes) compared to group T (298±36.55 minutes).
Conclusion: The fentanyl group had a prolonged duration of sensory and motor blockade, lower pain scores, and prolonged duration of postoperative analgesia.

KEYWORDS

Fentanyl, bupivacaine, Postoperative analgesia, Tramadol, spinal anaesthesia.

INTRODUCTION

Anaesthesia is knowledge of pain relief during surgery and post operatively. The aim is to inhibit trauma induced nociceptive stimulus. Spinal anaesthesia provide effective analgesia for lower limb and abdominal surgeries. Spinal along with epidural anaesthesia uses adjuvants to prolong the effect of spinal anaesthesia. Both Opioid and non Opioid adjuvants are used for this purpose.Opioids like morphine, buprenorphine, pethidine, hydromorphone, diamorphine, fentanyl, sufentanil, and tramadol and non opioids like ketamine midazolam clonidine and neostigmine are used as adjuvants (1-13).

Opioids along with local anaesthetic solution provide excellent pain relief during intraoperative and post operative period in abdominal thoracic provided and orthopedic surgery of lower extremity. We conducted this study to compare the effect of tramadol and fentanyl as an adjuvant in spinal anaesthesia for lower abdominal surgeries.

METHODOLOGY

After taking ethical committee approval, written informed consent was taken from the subjects included in the study. This randomised double blind prospective comparative study enrolled sixty patients of either sex, who were ASA grade 1 or 2 and we're undergoing lower abdominal surgery under spinal anaesthesia. These patients were randomly allocated into two groups.

ASA grade 3 and 4 patients, those sensetive to local anesthetics solution, those with chronic medical or surgical illness and pregnant women were not included in the study.

Pre anesthetics checkup was done as per institution protocol. After taking the patient in operation theatre multipara monitor was attached and pulse rate, blood pressure and oxygen saturation was monitored.

Patients of group F were given inj fentanyl 25mcg along with 2.5 ml of inj bupivacaine 0.5% heavy and group T were given inj Tramadol 25mg along with 2.5 ml of inj bupivacaine 0.5% heavy intrathecally.

Pulse, blood pressure and oxygen saturation were recorded every 5 minute tool the end of the surgery along with sensory and motor blockade, visual analog scale (VAS) and sedation scores (Ramsay sedation scores) which were recorded after spinal, at the time of incision and at the end of surgery thereafter every 2 hours for 24 hours.

Duration of analgesia was calculated from the time of spinal anesthesia tool the onset of pain (VAS>= 4). Inj diclofenac 75 mg intramuscular was given as rescue analgesia. Total number of times rescue analgesia was needed in 24 hours was recorded. Adverse effects if any like nausea, vomiting, hypotension, bradycardia, respiratory depression, sedation, pruritus, urinary retention, and postdural puncture headache were noted. The patients were followed postoperatively till there was no residual sensory or motor blockade.

Statistical analyses was done using SPSS software . Impaired student t-test, chi square test and Mann–Whitney test were applied to study the data.

RESULT

Sixty patients were recruited into two groups of thirty each. Patients of group F were given inj fentanyl 25mcg along with 2.5 ml of inj bupivacaine 0.5% heavy and group T were given inj Tramadol 25mg along with 2.5 ml of inj bupivacaine 0.5% heavy intrathecally.

Demographics data was insignificant in both the groups. Sensory block onset in fentanyl group was 1.37 minutes and in Tramadol group was 1.47 minutes. Motor blockade onset in fentanyl group was 2.47 minutes and in Tramadol group was 2.6 minutes. Duration of sensory and motor blockade in fentanyl group was 314.66 minutes and 263.66 minutes and in Tramadol group was 261.66 minutes and 214.66 minutes respectively. The difference in the onset and duration of sensory and motor blockade was statistically significant ($p<0.05$).

Fentanyl group required rescue analgesia at a later stage as compared to tramadol group and was statistically significant ($p<0.05$). The VAS was low in fentanyl group and so was the requirement of rescue analgesia over 24 hours. Vital parameters were comparable and statistically insignificant.

DISCUSSION

Autonomic and somatic response to pain is blunted by use of analgesic techniques thereby inhibiting nociceptive stimulus induced by pain and tissue trauma. Post operative analgesia enables faster recovery.

Sub arachnoid block is a commonly used technique of regional anaesthesia for lower limb and lower abdominal surgeries for short duration. Thus came the need of longer duration of analgesia. Use of systemic drug was warranted which included opioid and non opioid drugs which when used were associated with complications like nausea, vomiting, itching, urinary retention and respiratory depression. Various intrathecal adjuvants have been tried to increase the duration of analgesia of sub arachnoid block which include opioids

like morphine buprenorphine, fentanyl, sufentanyl, pethidine, hydromorphone, diamorphine and tramadol and non opioids like clonidine, ketamine, neostigmine and midazolam (2-13).

Opioids inhibit the ascending transmission of nociceptive impulse from the dorsal horn of the spinal cord. They also activate the pain control circuit that descend from the midbrain to the dorsal horn via rostral ventromedial medulla.

In our study demographic data, duration and type of surgery were comparable in both the groups. The effect of fentanyl and tramadol intrathecally were analysed in onset and duration of sensory and motor blockade. Sensory block started at the same time in fentanyl and tramadol group (2.3±0.5 and 2.4±0.5) but the peak effect of sensory blockade was seen earlier in fentanyl group (3.5±0.64 vs 4.96±0.68 minutes) and it was statistically significant. The duration of sensory blockade was also more in fentanyl group 310.6±45.2 vs 260.6±±25.9 minutes in Tramadol group and was statistically significant. Biswa et al and Be David et al also conducted similar study and found that the duration of sensory blockade was more when fentanyl was used as adjuvant along with bupivacaine(14,15).

In our study we found out that time of onset of motor blockade at time to reach motor blockade was less in fentanyl group but was statistically insignificant. However, duration of motor blockade was high in fentanyl group (260.6±40.9 vs 210.6±25.6minutes) and was statistically significant.

The duration of post operative analgesia was found to buy longer in fentanyl group (410 ± 96.86 minutes vs 298±36.55 minutes) and was same as the conclusion drawn by Biswas et al, Ben David et al and Dahlgren et al(14-16). Parthasarthy and Ravishankar conducted study in lignocaine with Tramadol and found that adding tramadol increases the duration of analgesia(17).

Adding any kind of adjuvant to any kind of local anaesthetic solution in any kind of regional block can increase the duration of analgesia. Dewesh et al found that adding fentanyl or dexmedetomidine to ropivacaine can increase duration of analgesia in epidural block also.(18)

Opioids and local anaesthetic solution show synergistic interaction with seperate mechanism of actions. (20-24). Opioids act by A-delta and C fibres by inhibiting calcium influx thereby inhibiting transmitter release. They also have direct post synaptic hyperpolarization effect this reducing neuronal activity. Local anaesthetic solution block voltage gates sodium channel at the axon membrane and cause presynaptic inhibition of calcium channel.(19-24).

The VAS score for fentanyl group was significantly lower that Tramadol group especially from 3.5-4.5 hours. 10 patients required single dose of rescue analgesia, 20 patients needed 2 doses in fentanyl group. All patients in Tramadol group required more than one dose of rescue analgesia. 20 patients required 2 doses and 10 patients to 3 doses.

CONCLUSION

Adding fentanyl to bupivacaine in spinal anesthesia provide longer duration of sensory and motor blockade when compared with tramadol. There is no difference in the onset time.

Table 1:Demographic data

Parameter	Group F	Group T
Age	35.46±9.5	33.4±9.34
Sex ratio	21:9	21:9
Weight	60.2±5.8	59.2±6.7
Duration of surgery	90.56±18.64	88.24±20.66

Table 2:Comparison of onset and duration of sensory and motor blockade

	Group F	Group T	P value
Onset of sensory blockade	2.3±0.5	2.4±0.5	0.5
Duration of sensory blockade	310.6±45.2	260.6±±25.9	<0.05
Onset of motor blockade	2.4±0.7	2.6±0.6	0.5
Duration of motor blockade	260.6±40.9	210.6±25.6	<0.05

Table 3: Total number of analgesics in 24 hours

Number of analgesic in 24 hours	Group F		Group T	
1	10	33.33%	00	00%
2	20	66.66%	20	66.66%
3	00	00%	10	33.33%

REFERENCES

1. Brown DL. Spinal, epidural and caudal anesthesia. In: Miller RD, editor. Miller's anesthesia. 7th ed. Vol. 2. Philadelphia (PA): Churchill Livingstone; 2010. p. 1611-1638.
2. Wang JK, Nauss LA, Thomas JE. Pain relief by intrathecally applied morphine in man. Anesthesiology 1979 Feb;50(2):149-151.
3. Dixit S. Postoperative analgesia after caesarean section: an experience with intrathecal buprenorphine. Indian J Anaesth 2007;51(6):515-518.
4. Pandya ST. Labour analgesia: recent advances. Indian J Anaesth 2010 Sep-Oct:54(5):400-408.
5. Tejswani GA, Rattan AK. The role of spinal opioid receptors in antinociceptive effects produced by intrathecal administration of hydromorphone and buprenorphine in the rat. Anesth Analg 2002 Jun;94(6):1542-1546.
6. Cowan CM, Kendall. JB, Barclay PM, Wilkes RG. Comparison of intrathecal fentanyl and diamorphine in addition to bupivacaine for caesarean section under spinal anaesthesia. Br J Anaesth 2002 Sep;89(3):452-458.
7. Fournier R, Gessel EV, Weber A, Gamulin Z. A comparison of intrathecal analgesia with fentanyl or sufentanil after total hip replacement. Anesth Analg 2000 Apr;90(4):918-922.
8. Chakraborty S, Chakrabarti J, Bhattacharya D. Intrathecal tramadol added to bupivacaine as spinal anesthetic increases analgesic effect of the spinal blockade after major gynecological surgeries. Indian J Pharmacol 2008 Aug;40(4):180-182.
9. Cann CC, editor. Principles of anesthesiology: general and regional anesthesia. 3rd ed. Pennsylvania (PA): Lea and Febiger; 1993. p. 1445-1554.
10. Chaturvedi S, Chaturvedi A. Postoperative pain and its management. Indian J Crit Care Med 2007;11(4):204-211.
11. Bhattacharya D, Banerjee A. A comparative study of clinical effects of intrathecal hyperbaric bupivacaine and ketamine in hyperbaric solution. Indian J Anaesth 2004;48(2):116-120.
12. Klamt JG, Slullitel A, Garcia IV, Prado WA. Postoperative effect of intrathecal neostigmine and its influence on spinal anaesthesia. Anaesthesia 1997 Jun;52(6):547-551.
13. Batra YK, Jain K. Addition of intrathecal midazolam to bupivacaine produces better postoperative analgesia without prolonging recovery. Int J Clin Pharmacol Ther 1999 Oct;37(10):519-527.
14. Biswas BN, Rudra A, Bose BK, Nath S, Chakrabarty S, Bhattacharjee S. Intrathecal fentanyl with hyperbaric bupivacaine improves analgesia during caesarean delivery and in early postoperative period. Indian J Anaesth 2002;46(6):469-472.
15. Ben-David B, Solomon E, Levin H, Admoni H, Goldik Z. Intrathecal fentanyl with small-dose dilute bupivacaine: better anesthesia without prolonging recovery. Anesth Analg 1997 Sep;85(3):560-565.
16. Dahlgren G, Hultstrand C, Jakobsson J, Norman M, Eriksson EW, Martin H. Intrathecal sufentanil, fentanyl or placebo added to bupivacaine for caesarean section. Anesth Analg 1997 Dec;85(6):1288-1293.
17. Parthasarathy S, Ravishankar M. Single dose intrathecal tramadol in the management of postappendicectomy pain. J Anaesth Clin Pharmacol 2002;18(4):419-422.
18. Gill RS, Acharya G, Rana A, Arora KK, Kumar D, Sonkaria LK. Comparative evaluation of addition of fentanyl and dexmedetomidine to ropivacaine for epidural anaesthesia and analgesia in lower abdominal and lower limb orthopedic surgeries. EJPMR. 2016;3:200–5.
19. Maves TJ, Gebhart GF. Antinociceptive synergy between intrathecal morphine and lidocaine during visceral and somatic nociception in the rat. Anesthesiology 1992 Jan;76(1):91-99.
20. Tejwani GA, Rattan AK, McDonald JS. Role of spinal opioid receptors in the antinociceptive interactions between intrathecal morphine and bupivacaine. Anesth Analg 1992 May;74(5):726-734.
21. Akerman B, Arwestrom E, Post C. Local anesthetics potentiate spinal morphine antinociception. Anesth Analg 1988 Oct;67(10):943-948.
22. Wang C, Chakrabarti MK, Whitman JG. Specific enhancement by fentanyl of the effects of intrathecal bupivacaine on nociceptive afferent but not on sympathetic efferent pathways in dogs. Anesthesiology 1993 Oct;79(4):766-773.
23. Penning JP, Yaksh TL. Interaction of intrathecal morphine with bupivacaine and lidocaine in the rat. Anesthesiology 1992 Dec;77(6):1186-2000.
24. Butterworth JF, Strichartz GR. Molecular mechanisms of local anesthesia: a review. Anesthesiology 1990 Apr;72(4):711-734.