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COMPARISION OF INTRATHECAL FENTANYL AND INTRAVENOUS ONDANSETRON FOR PREVENTION OF PERIOPERATIVE NAUSEA AND VOMITING DURING CAESAREAN DELIVERY UNDER SPINAL ANESTHESIA

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ABSTRACT

Aim to evaluate efficacy of intrathecal fentanyl and intravenous ondansetron with intrathecal bupivacaine for prevention of perioperative nausea and vomiting. 60 patients posted for elective caesarean section belonging to ASA grade I and II were randomly allocated into two groups of 30 patients each. Group A were given Inj. Bupivacaine H(0.5%) 2ml + inj. fentanyl 12.5mcg(0.25 ml) total 2.25 ml intrathecally and inj. NS 2ml iv. Group B were given Inj. Bupivacaine H(0.5%) 2ml + inj. NS (0.25 ml) total 2.25 ml intrathecally and inj. Ondansetron 4mg(2 ml)iv. We observed any episode of nausea and vomiting, onset of sensory and motor block, duration of pain and any side effect intraoperatively and postoperatively upto 3 hours in both groups. There is a statistically significant difference in mean nausea and vomiting score during intraoperative and postoperative period. Patients in group A have very low nausea score (80% emesis free) as compared to patients in group B(50% emesis free). Intrathecal fentanyl is better modality for prevention of perioperative nausea and vomiting in parturient undergoing caesarean section in comparision to iv ondansetron.

Key words: perioperative nausea and vomiting, intrathecal fentanyl, ondansetron.

INTRODUCTION

In the world of advance anesthesia, nausea and vomiting are 'the big little problem' in caesarean delivery under spinal anesthesia [1] and produce a challenge for anaesthesiologist.

Nausea and vomiting had higher incidence (66%) during caesarean delivery under spinal anesthesia which make distressing to patient and difficult for surgeon to perform surgery. The etiology of perioperative nausea and vomiting are multifactorial (hypotension, visceral pain, motion, vagal hyperactivity, uterotonic agent and iv opioids). It can be best prevented by controlling hypotension, optimizing the use of neuraxial and intravenous opioids, improving the quality of block, minimize surgical stimuli and supplemental O_2. The common antiemetic drugs used are corticosteroids like dexamethasone, gastrointestinal prokinetics like metoclopromide and domperidone, phenothiazine agents like promethazine and selective serotonin receptor antagonists like ondansetron, granisetron etc [2].

The study was designed to compare the efficacy of intrathecal fentanyl and intravenous ondansetron on prevention of perioperative nausea and vomiting.

MATERIALS AND METHODOLOGY

After approval from ethical committee, informed written consent was taken from women of age group 20-35

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years who participated in this study. 60 patients posted for elective caesarean section belonging to ASA grade I and II were randomly allocated into two groups of 30 patients each. Any contraindication of spinal anesthesia, complicated pregnancies, pregnancy induced hypertension, placenta previa, focal prematurity, sensitivity to drug, motion sickness, hyperemesis gravidarum or antiemetic premedication in last 24 hours were excluded.

Preanesthetic checkup was done on previous day. Routine and specific investigations were noted. All patients were informed in general terms regarding the procedure of study. In operating room, iv line with 18 G iv cannula was established. All standard monitors (ECG, NIBP and SpO_2) were applied. Baseline vitals were recorded. All patients were preloaded with 500 ml ringer lactate solution. After infiltration with local anesthetic(2% lignocaine), a standard subarachnoid block performed in L_3-L_4 space in left lateral position with 23 G spinal needle with adequate aseptic and antiseptic precautions. After aspiration of CSF, mixture of drug according to group A and B was injected.

GROUP A

Inj. Bupivacaine H (0.5%) 2ml + inj. fentanyl 12.5mcg (0.25 ml) total 2.25 ml intrathecally and inj. NS 2ml iv.

GROUP B

Inj. Bupivacaine H(0.5%) 2ml + inj. NS (0.25 ml) total 2.25 ml intrathecally and inj. Ondansetron 4mg(2 ml)iv.

Onset of sensory block was assessed by pin prick method and onset of motor block was assessed and graded using Bromage criteria. Maximum level of sensory block achieved (T_4/T_6 level).

Patients were monitored at every 5 minutes till 30 minutes, every 15 minutes afterwards upto 3 hours postoperatively for any emetic episode, change in pulse, NIBP, ECG, SpO_2, pain and urine output.

Study variable was assessed according to Belville's score for nausea and vomiting.

Belville's score

0-No nausea , 1- nausea , 2- retching , 3- vomiting

Episode of perioperative hypotension (systolic BP<80 mm Hg) was treated with fast infusion of intravenous fluids and inj. Mephentermine 6 mg iv in incremental dose. Bradycardia (HR<60/ min) was treated with inj atropine 0.6 mg iv. Desaturation (SpO_2< 90%) were recorded. Sedation and respiratory depression were recorded. Pruritis was treated with inj. Diphenhydramine 25 mg iv. Analysis of data were prepared using student 't' test and as applicable significance was defined as p<0.05.

OBSERVATIONS AND RESULTS

Table 1. Demographic data

Parameter	Group A(Mean ± SD)	Group B (Mean ± SD)
Age (yrs)	24.3± 3.91	24.9± 3.91
Height (cm)	154.37± 4.22	152.93± 9.46
Weight (kg)	53± 5.4	51.7± 6.66

Age, height and weight are comparable in both groups.

Table 2. Belville score (nausea & vomiting score)

Time (min)	Group A Mean ± SD	Group B Mean ± SD	P Value
Pre-op	0	0	p>0.05
30	0.03± 0.18	0± 0.36	P<0.05
60	0.167± 0.648	0.033± 0.182	p>0.05
90	0.033± 0.0183	0.17± 0.65	p>0.05
150	0.1± 0.548	0.066± 0.182	p>0.05
240	0	0	p>0.05
Total	**0.33± 0.76**	**1.13± 1.3**	**P<0.01**

Statistically significant difference in mean nausea and vomiting score between two groups was observed which indicate better control of emetic episode with fentanyl.

Table 3. Belville score (no. of patients)

PONV Score	Group A	Group B
0	24(80%)	15(50%)
1	3(10%)	4(12.3%)
2	2(7%)	3(10%)
3	1(3%)	8(27%)

Score 0 means no nausea or vomiting. In group A, 80% patients are emesis free while in group B 50% patients which indicates fentanyl decreases PONV better than ondansetron.

Table 4. Rescue Antiemetics

	Group A	Group B
No. of patients requiring rescue antiemetics	6(20%)	15(50%)

Table indicates that fentanyl decreases requirement of rescue antiemetic significantly in caesarean section.

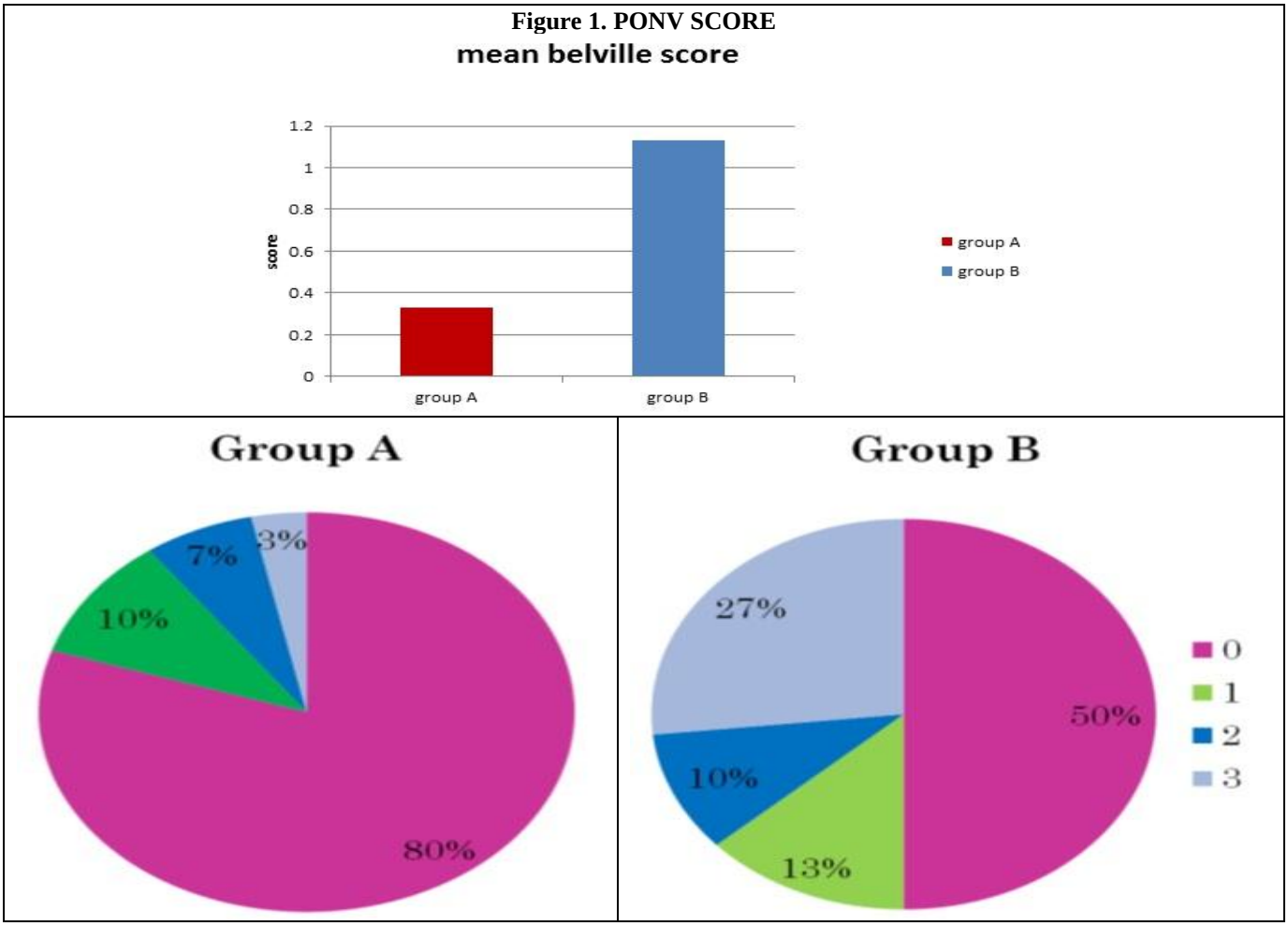
Table 5. Mean onset time of sensory and motor block

Onset time (min)	Group A (Mean ± SD)	Group B (Mean ± SD)	P value
Sensory level T6/T4	5.33 ± 1.06	6.46 ± 1.05	P<0.01
Motor block (Bromage score III)	7.67 ± 1.18	6 ± 0.9	P<0.01

Table 6. Perioperative complications

SIDE EFFECT	GROUP A	GROUP B
1. Bradycardia (HR<60)	2(7%)	2(7%)
2. Hypotension (SBP<80)	4(13%)	5(16%)
3. Pruritis	2(7%)	0(0%)
4. Sedation	6(20%)	0(0%)
5. Others	0(0%)	0(0%)

Figure 1. PONV SCORE



DISCUSSION

Pregnancy produces profound physiological changes that alter usual response to anaesthesia. We have to take extra precaution for mother as well as for baby.

Among all anaesthetic technique spinal anaesthesia is best suited to mother for caesarean delivery because it is easier, rapid, predictable onset more intense

and complete block, economical, less dose and less chances of aspiration pneumonia.

MF Wtcha et al [3] had stated that the perioperative nausea and vomiting has multifactorial etiology including (hypotension, vagal hyperactivity, visceral pain, uterotonic agent and motion) . It is prevented by prophylactic antiemetic, controlling hypotension, neuraxial and IV opioids, improving quality of block.

Crystal et al stated that nausea and vomiting during pregnancy is a common experience, affecting 50% to 90% of all women. The possible causes are endocrine disturbances, elevated serum human chorionic gonadotropin levels and progesterone produce smooth muscle relaxation in oesophagus, stomach and impaired small bowel motility which prolong gastric emptying and precipitate nausea and vomiting.

After discovery of opiate receptors by Synder SH in 1973, intrathecal opioids introduced in clinical practice in 1979 by Wang et al. Fentanyl is highly lipophillic and high affinity for opiate receptors.

Low dose fentanyl (12.5 mcg) being highly lipophilic do not remain free long enough in the CSF to reach the CTZ in sufficient concentration to directly cause nausea. But the same low dose sufficiently augment local anesthetic mediated block to decrease nociceptive stimulation during maneuvers like peritoneal traction and uterus exteriorization and indirectly reduce nausea and vomiting. It provides effective analgesia with no motor block, no sympatholysis and decrease in PONV, improve antinociceptive action effect of bupivacaine.

Ondansetron is serotonin 5HT3 receptor antagonist in CTZ and peripherally on vagal nerve terminal. It reduces activity of vagal nerve which activate vomiting centre in medulla and routinely use as antiemetic in clinical practice

In our study group A (bupivacaine 0.5%H + Fentanyl 12.5microgram) required significant less time 5.33 $\pm$ 1.06 (Mean$\pm$SD) than group B (bupivacaine 0.5% + IV ondansetron 4 mg) 6.46+1.05 (Mean + SD) ($p<0.01$) it indicates fentanyl produce faster onset of sensory block. We found that maximum level of sensory blockade was significantly higher in fentanyl group.

In our study group A (bupivacaine 0.5% H + Fentanyl 12.5 microgram) 203.83 $\pm$ 15.84 min (Mean $\pm$ SD) and group B (bupivacaine 0.5 % + IV ondansetron 4 mg) 105.83 $\pm$ 13.33min (Mean $\pm$ SD). This is highly significant ($p<0.01$)indicates fentanyl prolong the duration of analgesia up to 2 hour post-operative and decrease requirement of analgesia in early post-operative period.

According to David et al (1990) [4], Gunnar Dhlgren et al (1997) [5], Mustafa Karakean et al (1999) [6], Jain et al (2004) [7], Siveski et al (2006) [8], Bano F et al [9] fentanyl produces prolong post-operative analgesia and complete and effective analgesia. It produces good surgical anaesthesia by preventive pain of uterine exterioration and surgical exploration.

Gannar Dahlgren et al [5] studied that the need for intraoperative antiemetic medication was reduced in fentanyl group.

Theodore et al [10] found that intraoperative nausea was decreased in intrathecal fentanyl group compared with the IV ondansetron group.

In our study there is a statiscally significant change in mean nausea and vomiting score during intra operative period group A (bupivacaine 0.5H+Fentanyl 12.5microgram) 0.33$\pm$0.76 (MEAN$\pm$SD) while group B (bupivacaine 0.5%+IV ondansetron 4mg) 1.13$\pm$1.30(MEAN$\pm$SD) ($P<0.01$)which indicate better control of emetic episodes with fentanyl.

In our study bradycardia occur in 2 patients in each group and hypotension in 4 patients in group A(bupivacaine 0.5%H+fentanyl 12.5microgram)and 5 patients in group B(bupivacaine 0.5%+IV ondansetron 4 mg)which is comparable. No patient had respiratory depression and all patients in fentanyl group were calm and quite pruritus occurs in 2 patients in fentanyl group .According to Jaishri Boghra et al [11] Gunnar et al [5] Mustafa Karakan et al [6] pruritus is most common side effect in fentanyl group however it is mild and not cause discomfort to patient.

SUMMARY AND CONCLUSION

To conclude the study, we have observed that intrathecal fentanyl leads to better prevention of perioperative nausea and vomiting and decrease requirement of rescue antiemetic without affecting neonate. Thus intrathecal fentanyl is better modality for prevention of perioperative nausea and vomiting in parturient undergoing caesarean delivery in comparison to intravenous ondansetron.

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