



EFFICACY OF 0.5% HYPERBARIC BUPIVACAINE WITH CLONIDINE AND 0.5% HYPERBARIC BUPIVACAINE WITH FENTANYL FOR NEURAXIAL BLOCKADE IN ABDOMINAL AND VAGINAL HYSTERECTOMIES

Anaesthesiology

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ABSTRACT

Background - In the present study, practice of spinal anaesthesia, Bupivacaine is the most commonly used drug for spinal anaesthesia. To improve the quality of surgical anaesthesia and providing post operative analgesia, adjuvants like clonidine and fentanyl are used.

Objective - To evaluate the efficacy of spinal anaesthesia with Clonidine and Fentanyl added to hyperbaric Bupivacaine in abdominal and vaginal hysterectomies.

Methodology - 70 adult ASA I and ASA II patients of ages ranging between 30-60 years were included in the study who underwent elective hysterectomies.

They were divided into 2 groups

Group C - 2.5 ml (12.5 mg) of 0.5% hyperbaric Bupivacaine + 50µg clonidine intrathecally - 35 cases

Group F - 2.5 ml (12.5 mg) of 0.5% hyperbaric Bupivacaine + 25µg fentanyl intrathecally - 35 cases

Results - Intrathecal Clonidine with 0.5% hyperbaric Bupivacaine provided better quality of surgical anaesthesia and post operative analgesia without significant increase in side effects compared to intrathecal Fentanyl with 0.5% hyperbaric Bupivacaine.

Conclusion - It can be concluded by the present comparative and statistically significant results that the combination of Bupivacaine 0.5% and Clonidine 50µg better compared to Bupivacaine 0.5% and Fentanyl 25µg is better in providing surgical anaesthesia and prolonged post operative analgesia with no significant hemodynamic and respiratory side effects.

KEYWORDS

Bupivacaine, Clonidine, Fentanyl, Spinal anaesthesia

Introduction - An ideal local anaesthetic solution was proposed to have rapid onset and prolonged duration of action. In an attempt to combine the two properties there has been various studies to the effects of mixture of anaesthetic solutions. Clonidine is used with increasing frequency in surgical anaesthesia. To control the metabolic and endocrine responses to stress.

Fentanyl have anti- nociceptive effect in the spinal cord via different mechanisms and this formed the rationale of their combined use.

Aims and objectives

To study and compare the efficacy of intrathecal clonidine 50µg versus intrathecal fentanyl 25µg as an adjuvant to 0.5% bupivacaine heavy 12.5 mg for spinal anaesthesia to relieve intraoperative and postoperative pain in abdominal and vaginal hysterectomies in the age group of 30-60 years.

Methods - Seventy patients in the age group between 30 years and 60 years female patients belonging to ASA Grade-I and Grade-II posted for elective abdominal and vaginal hysterectomies without any comorbid disease were grouped randomly into two groups (n=35). Randomization was done using simple sealed envelope technique:

Group C (clonidine group): received 12.5mg of 0.5% hyperbaric bupivacaine with 50µg clonidine.

Group F (fentanyl group): received 12.5mg of 0.5% hyperbaric bupivacaine with 25µg fentanyl.

Preoperative assessment was done for each patient and written informed consent was taken. Patients were kept NPO for solids 6hrs and clear fluids 2 hrs before surgery. Patients were premedicated on the night before surgery with Tablet Ranitidine 150mg and Tablet Alprazolam 0.5mg.

Materials-

1. 23G spinal needle (Quinckes)
2. 2cc disposable syringe
3. 0.5% Hyperbaric Bupivacaine ampoule
4. 1 ml clonidine ampoule
5. 1ml Fentanyl ampoule
6. Antiseptic solution & spinal towel

Procedure-

Under aseptic precautions spinal block was performed at level of L3-L4 through a midline approach using 25G Quincke spinal needle and study drug was injected with operative table kept flat. Patients were turned to supine posture immediately and supplemental oxygen given.

The following parameters were noted,

- Onset of sensory blockade and motor blockade.
- Maximum level of sensory blockade attained and the time taken for the same was noted.
- Maximum level of motor blockade attained and the time taken for the same was noted.
- Two segments sensory regression time was noted.
- Total duration of analgesia was noted.
- Total duration of sensory blockade and motor blockade was noted.
- Sensory blockade was tested using pinprick method with a blunt tipped 27G needle at every minute for first 5 mins and every 5 mins for next 15 mins and every 10 mins for next 30 mins and every 15 mins till the end of surgery and there after every 30 mins until sensory block is resolved.
- Quality of motor blockade was assessed by modified Bromage scale.
- Level of sedation noted.
- Total duration of surgery and if any side effects were noted.

Haemodynamic monitoring was done during the block every 5 mins for first 15 mins and every 10 mins for next 30 mins and once in 15 mins till the end of surgery and post operatively every hourly employing multi parameter monitor which displays heart rate (HR), systolic blood pressure (SBP) diastolic blood pressure (DBP), mean arterial pressure (MAP), ECG and SpO2 hourly

Hypotension- reduction of systolic blood pressure of more than 30% below baseline value and is treated with increased rate of intravenous fluids and if needed injection mephenteramine 3mg increments given.

Bradycardia - heart rate less than 60/minute and treated with injection atropine 0.6mg iv.

Adverse effects: patients will be monitored for any cardiovascular side effects like changes in blood pressure, heart rate and rhythm, central nervous system depression, respiratory depression and any hypersensitivity reactions for drugs.

Statistical Analysis:

The data obtained was coded and entered into Microsoft excel worksheet and calculated the mean and standard deviation and presented in the form of tables and graphs. Chi square test was used to obtain other possible associates.

P value of > 0.05- statistically not significant, P value of < 0.05 - statistically significant, P value of <0.01- statistically highly significant.

Observations and results-

The present comparative study was undertaken to assess the efficacy of intrathecal 0.5% Bupivacaine with clonidine 50mcg and a combination of 0.5% bupivacaine with fentanyl 25mcg for intraoperative and postoperative pains relief and to study incidence of side effects.

Table 1-Onset of sensory blockade

Sensory onset (mins)	Clonidine group	Fentanyl group	P-value
Minimum	1.0	1.5	<0.01
Maximum	2.0	3.5	
Mean	1.4	2.5	
SD	0.5	0.5	

The mean time of onset of sensory blockade in group C (clonidine group) is 1.4±0.5mins and in group F (fentanyl group) it is 2.5±0.5mins. There is a statistically significant difference when group C was compared with group F (p<0.01)

Table 2 – Mean duration of analgesia

Duration of analgesia (mins)	Clonidine group	Fentanyl group	P-value
Minimum	320.0	170.0	<0.01
Maximum	410.0	200.0	
Mean	365.1	187.4	
SD	23.9	8.3	

The mean duration of analgesia is 365.1±23.9 mins in group C (clonidine group) 187.4±8.3mins in group F (fentanyl group). There is a statistically highly significant difference between group C and between group F (p<0.01).

Table -3 –Mean duration of motor blockade

Duration of motor blockade (mins)	Clonidine group	Fentanyl group	P-value
Minimum	240.0	136.0	<0.01
Maximum	330.0	167.0	
Mean	277.7	152.5	
SD	24.1	8.1	

The mean duration of motor blockade is 277.7±24.1mins in group C (clonidine group) and 152.5±8.1mins in group F (fentanyl group).

The minimum duration of motor block is 240 mins in group C and 136 mins in group F. The maximum duration of motor block is 330 mins in group C and 167 mins in group F. There is a statistically significant difference between group C and group F (p<0.01)

Discussion:

The aim of good post operative analgesia is to produce a long lasting, continuous effective analgesia with minimum side effects.

we have undertaken this study to evaluate and compare the effect of adding clonidine versus fentanyl with hyperbaric 0.5% bupivacaine in spinal anaesthesia for elective hysterectomies.

Seventy patients of ASA Grade-I and Grade-II posted for elective hysterectomies were selected randomly into 2 groups (n=35).

Demographic data comparing age, height, weight shows no statistical difference among the groups.

In our study the mean time taken for onset of sensory block is 1.4±0.5mins in the clonidine group and 2.5±0.5mins in the fentanyl group. There is a statistically highly significant early onset of sensory blockade in clonidine group compared to fentanyl group.

The mean duration of analgesia in the present study is 365.1±23.9mins in the clonidine group and 187.4±8.3 mins in the fentanyl group. There

is a statistically significant increase in the duration of analgesia in clonidine group compared to the fentanyl group.

Our study concurs with the study conducted by Krishnakumar Srinivasagam et al., where authors observed the mean duration of analgesia of 353.19±7.69mins in the clonidine(50µg) group and 195.83±7.30mins in the fentanyl(25µg) group.

In our study the mean duration of motor blockade is 277±24.1 mins in the clonidine group and 152.5±8.1mins in the fentanyl group. There is a statistically highly significant increase in the duration of motor blockade in clonidine group compared to the fentanyl group.

This compares with the study conducted by Krishnakumar Srinivasagam et al. where the mean duration of motor blockade is 254.64±72.05 in the clonidine (50mcg) and 151.27±12.02 in the fentanyl group (25µg).

In the clonidine group we observed a maximum fall in MAP of 12.48 mmHg from basal MAP at 30th min, in the fentanyl group we observed a maximum fall in MAP of 17.06 mmHg from basal MAP at 60th min. There was no statistically significant difference in any of the two groups regarding fall in MAP. Seven patients in clonidine group and two patients in fentanyl group developed hypotension and were easily managed with intravenous fluids and vasopressor.

In the clonidine group we observed a maximum decrease in the mean heart rate of 8.06 bpm from basal value at 30th min, in the fentanyl group it is 19.63 bpm at 40th min. There was no statistically significant difference in any of the two groups regarding decrease in the mean heart rate.

In our study, in the clonidine group 8.6% of patients had grade 2 sedation, 31.4% had grade 1 sedation and remaining 60.0% had grade 0 sedation, compared to fentanyl group 17.1% of patients had grade 2 sedation, 28.6% had grade 1 sedation and remaining 54.3% had grade 0 sedation. There is no statistical significance in mean sedation scores.

In our study we did not observe any evidence of respiratory depression, episodes of nausea, vomiting, shivering in any of the groups. None of the patients came back to us with backache, buttock pain or leg pain or any neurological deficit. This is comparable with most of the studies.

CONCLUSION:

From the present study it can be concluded that compared to intrathecal fentanyl in the dose of 25µg administration of clonidine in the dose of 50µg along with 2.5 ml bupivacaine, 0.5% heavy, in patients undergoing elective hysterectomy,

- Decreases the onset time for sensory blockade and motor blockade
- Produces higher level of sensory blockade
- Produces prolonged postoperative analgesia
- Produces prolonged sensory blockade
- Produces prolonged motor blockade
- Produces sedation in which patients were asleep and easily arousable
- Produces haemodynamic changes which could be easily managed.

It was not associated with cardiovascular side effects like change in rate and rhythm, respiratory depression and hence can be an attractive alternative for prolonging spinal analgesia.

Since clonidine and fentanyl when used intrathecally along with Bupivacaine significantly prolonged the duration of analgesia and there was also clinically significant difference between clonidine and fentanyl on spinal block characteristics, intrathecal clonidine was proved to be better than fentanyl with regards to onset and duration of both sensory and motor blockade as well as duration of analgesia. Hence clonidine is a better neuraxial adjuvant compared to fentanyl for providing early onset of sensory and motor blockade, adequate sedation and prolonged post operative analgesia.

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