

## Intrathecal Fentanyl in Different Doses(10mcg,15mcg) with Hyperbaric Bupivacaine (10mg) for Caesarean Section: A Comparative Study

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**Abstract :** Caesarean section is one of the common surgical procedure in Obstetrics and subarachnoid block is a time tested anaesthetic technique for analgesia. Use of single drug and avoiding polypharmacy is the Goal. Earlier 5% Xylocaine was being used, now 0.5% Bupivacaine is the choice of medication for spinal anaesthesia. Adding Opioids like fentanyl will have faster onset, prolonged analgesia without causing much of side effects. In our study have chosen fentanyl in 2 different doses to see which is more effective and with less side effects.

**Keywords:** Bupivacaine, Caesarian Section, Fentanyl, Subarachnoid block.

### I. Introduction

In Caesarean section, Regional anaesthesia is a major factor in patient safety. Spinal anaesthesia is preferred method of anaesthesia for both elective and emergency caesarean sections. Profound blockade of spinal segments is needed in caesarean section. High doses of bupivacaine is associated with severe hypotension and delayed recovery from motor blockade post operatively. The most common side effect of spinal anaesthesia in caesarean section is maternal hypotension. Use of lipophilic opioid like fentanyl intrathecally as an adjuvant to local anaesthetic bupivacaine, reduced intrathecal dose of bupivacaine and requirement of mephenteramine doses to combat hypotension. Combination of bupivacaine with fentanyl provides good intraoperative analgesia and prolonged duration of post operative analgesia.

### II. Material And Methods

Patients admitted for both elective and emergency caesarean section, to be done under Spinal anaesthesia during the period of December 2015 to March 2016. Inclusion criteria was all elective and emergency patients belonging to age group 18-35 years with ASA grade I, II undergoing operative procedure under spinal anaesthesia. Exclusion criteria was Patients refusal; Patients suffering from cardiac (Ischaemic Heart Disease, Arrhythmias, Angina, Previous myocardial infarction, Hypertension) and Pulmonary diseases;

Patients with hemorrhagic disorders or patients who are on anticoagulant therapy; Disease and deformities of spinal cord or vertebral column; Patients with multiple gestation PIH, Eclampsia; Patients with psychiatric and neurovascular disorders.

After obtaining informed written consent, Patients were randomly divided into Two groups of each. Randomization done by computer generated table. Group A: received Bupivacaine 10mg and preservative free Fentanyl 10mcg. Group B: received Bupivacaine 10mg and preservative free Fentanyl 15mcg. All patients were examined a day before surgery and a detailed history of the patient taken. A thorough clinical examination conducted, necessary investigations sent and reviewed before surgery. Back examination for any spinal deformity was done. Airway assessment was done using Mallampatti score. Patient kept nil per oral (NPO) after 10.00pm, received Tab Ranitidine 150mg orally and Tab Alprazolam 0.25mg orally as premedication at night before surgery and at 6.00am on the day of surgery with sips of water.

In operation theatre, patients connected to monitors – electro cardiography, pulse oximetry and non-invasive blood pressure. An intravenous line secured and Ringer Lactate started. The position of OT table is kept horizontal. Under aseptic precautions patient in supine or left lateral position, at L3-L4 interspace using a tuffiers line as a bony landmark in midline 25G Quinckes spinal needle was introduced gently until it reaches sub arachnoid space. Position of needle was confirmed by free flow of CSF. The test drug was injected intrathecally, over 30secs with bevel directed cephalad.

The needle was withdrawn after injection of study drug and patient is placed in supine position immediately. Left lateral tilt was given by placing a wedge under right buttock. Oxygen supplementation at flow rate of 5L/min was done until extraction of baby. Intra operatively haemodynamic parameters were

monitored every 3 mins. Parameters observed were Time of onset of sensory blockade; The height of sensory blockade.; Motor blockade as per Bromage scale; Total duration of sensory blockade; Quality of analgesia; Two segment sensory regression time; Need for rescue analgesia when patient complains of pain. Incidence of adverse effects were noted.

Onset of sensory blockade: defined as time taken from the completion of injection of the study drug till the patient does not feel the pin prick at T10 level. Onset of motor blockade: defined as time taken for complete inability to flex both lower limbs at hip joint. Duration of sensory blockade: defined as time taken from the onset of sensory blockade till the two segment regression time. Duration of motor blockade: defined as time taken from onset of motor blockade to the time when the patient is able to lift the extended leg. Duration of effective analgesia: defined as time taken from the completion of injection of the study drug till the patient complains of pain.

Rescue analgesia is defined as time taken from the completion of injection of the study drug till the patient complains of pain and need for analgesic drugs. The level of sensory blockade assessed by PIN PRICK TEST until it reached the T8-T6 level and surgical incision was allowed.

### 1.1 The degree of motor blockade was assessed by using BROMAGE scale.

**Grade 0** - No Motor block

**Grade 1** - inability to raise extended leg

**Grade 2** - inability to flex knee, able to flex ankle

**Grade 3** - inability to flex ankle.

### 1.2 Quality of analgesia was assessed by visual analogue scale.

**Visual analogue scale for pain:**

0 No pain

1-3 Mild pain

4-6 Moderate pain

7-10 Severe pain

### 1.3 Assessment Of Sedation Was Done By Ramsay Sedation Score

1 - anxious, agitated

2 - co operative, tranquil, oriented

3 - drowsy but responsive to verbal commands

4 - asleep , brisk response to light glabellar tap or loud auditory stimulus

5 - asleep , sluggish response to light glabellar tap or loud auditory stimulus

6 - no response.

### 1.4 Assessment of shivering was done by 4 POINT SCALE

**0 – none** : no shivering noted on palpation of the masseter , neck or chest wall.

**1 – mild** : shivering localised to the neck and / or thorax only

**2 – moderate** : shivering involves gross movement of the upper extremities (in addition to neck and thorax)

**3 – severe** : shivering involves gross movements of the trunk , upper and lower extremities.

Delivery time of the baby was noted and 15 IU of syntocin added to i.v drip and oxygen discontinued . Assessment of newborn was done using Apgar score at 1min and 5 mins .The birth weight was noted. Side effects such as hypotension , bradycardia , nausea ,vomiting ,shivering and pruritus were recorded during surgery. Time of first request of analgesics was recorded in post operative ward.

**Statistical analysis:** Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of Frequencies and proportions. Continuous data was represented as mean and standard deviation. Independent t test was used as test of significance to identify the mean difference between two groups. p value <0.05 was considered as statistically significant.

## III. Results

**Table 1:** Age distribution of subjects between two groups

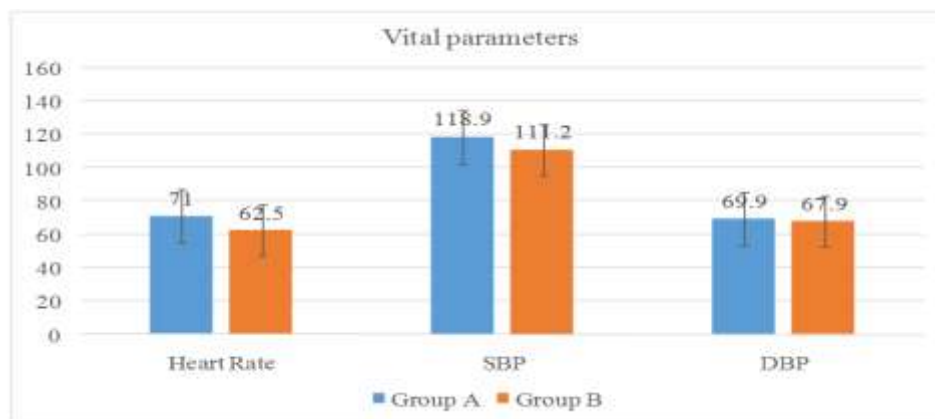
	Group				P value
	Group A		Group B		
	Mean	SD	Mean	SD	
Age	23.3	2.6	24.0	3.5	0.428

There was no significant difference in mean age between two groups.

**Table 2:** Vital parameters among subjects between two groups

	Group				P value
	Group A		Group B		
	Mean	SD	Mean	SD	
Heart Rate	71.0	4.0	62.5	4.3	<0.001*
SBP	118.9	5.1	111.2	4.9	<0.001*
DBP	69.9	3.3	67.9	3.4	0.029*

In the study Mean HR, SBP and DBP was lower in group B than in Group A. This difference in mean values between two groups was statistically significant.



**Figure 1:** Bar diagram showing vital parameters among subjects between two groups

**Table 3: Onset of sensory and Motor Blockade**

	Group				P value
	Group A		Group B		
	Mean	SD	Mean	SD	
Onset of Sensory Blockade	2.1	0.3	1.5	0.1	<0.001*
Onset of Motor Blockade	4.1	0.4	3.1	0.1	<0.001*

Mean Onset of Sensory and Motor blockade was lower in Group B than in Group A. Onset was earlier in Group B. This difference was statistically significant.

**Table 4: 2 segment regression and Duration of Post Op Analgesia**

	Group				P value
	Group A		Group B		
	Mean	SD	Mean	SD	
2 Segment Regression	148.1	4.3	165.8	3.7	<0.001*
Duration of Post Op Analgesia	151.7	3.6	169.6	3.7	<0.001*

In the study Mean 2 segment regression and Duration of post Op analgesia was higher in Group B than in Group A. This difference was statistically significant. Group B had longer duration of Post op analgesia.

#### IV. Discussion

In obstetrics, caesarean section is one that is commonly encountered by anaesthesiologists. The most commonly preferred mode of administration of anaesthesia is spinal anaesthesia [1]. Sub arachnoid block is most often preferred as it is easy to administer, economical and there is immediate onset of motor and sensory blockade [2]. Sub arachnoid block inhibits the stress response to surgery, blunts the autonomic and somatic responses to pain, and facilitate breathing, coughing, sighing and early ambulation. It also has efferent sympathetic blockade action which results in increased blood flow to the blocked area resulting in better wound healing. It reduces the risk of deep vein thrombosis and thromboembolism.

On the other hand it also has certain demerits that the duration of anaesthesia and height of blockade is not under control. Moreover, post dural puncture headache<sup>6</sup> and hypotension are the complications that are commonly encountered [3]. Hypotension is one complication that leads to lot of other untoward effects like fetoplacental insufficiency, maternal morbidity, nausea<sup>3</sup> and vomiting [4]. This relation between the extent of blockade and hypotension has led to the wide discussion on the dosage of local anaesthetics and the role of

adjuvants being added to it [5]. Adjuvants added to intrathecal local anaesthetics improves quality and duration of spinal blockade and prolongs postoperative analgesia. Adjuvants also reduce dose of local anaesthetics<sup>7</sup> and total amount of systemic postoperative analgesics [6].

There have been a lot of studies on the dosage of local anaesthetics and adjuvants used for spinal anaesthesia in caesarean section. In a clinical study of effect of spinal fentanyl on subarachnoid block in parturients they have used 12.5mcg fentanyl with 10mg of bupivacaine [1]. They have found that with fentanyl there is better haemodynamic stability. Also in a randomized controlled prospective study comparing a low dose bupivacaine and fentanyl mixture to a conventional dose of hyperbaric bupivacaine for caesarean section, they have come to a conclusion that when fentanyl 25mcg was added to 7.5mg of bupivacaine, there was better haemodynamic stability and prolonged duration of analgesia [4]. In a study, the effect of height and weight adjusted dose of intrathecal hyperbaric bupivacaine for elective caesarean section, they have found that less bupivacaine led to lesser segments being blocked and thereby lesser sympathetic blockade [7].

In our study we compared 10mcg and 15mcg of fentanyl with 10 mg bupivacaine. There was no significant difference in mean age between two groups. In the study Mean HR, SBP and DBP was lower in group B than in Group A, and also Mean Onset of Sensory and Motor blockade was lower in Group B than in Group A. That is, onset was earlier in Group B. This difference was statistically significant. Moreover, in the study mean 2 segment regression and duration of post Op analgesia was higher in Group B than in Group A. This difference was statistically significant. Group B had longer duration of Post op analgesia.

In our study, there was faster onset of sensory blockade, better haemodynamic stability and prolonged post operative analgesia in patients administered with 15mcg of fentanyl and 10mg of bupivacaine, than with patients administered with 10mcg of fentanyl and 10mg of bupivacaine.

#### **V. conclusion**

In our study there was faster onset of sensory blockade, better haemodynamic stability and prolonged post operative analgesia in patients administered with 15mcg of fentanyl and 10mg of bupivacaine compared with patients administered with 10mcg of fentanyl and 10mg of bupivacaine.

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