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**ORIGINAL RESEARCH**

# Comparison of Analgesic Effect of Fentanyl and Clonidine Added Intrathecally with Bupivacaine in LSCS

**Firasath[1], Abhinaya[1], Raja Shekar Reddy Motkar[1], Khaja Layeeq Ur Rahman[1]**

[1]Associate Professors, Department of Anesthesiology, Dr VRK Womens Medical College & Research centre, Hyderabad, Telangana, India.

## ABSTRACT

**Background:Hyperbaric bupivacaine 0.5% (l0mg) with fentanyl 15mcg(0.3ml) and (2) Hyperbaric bupivacaine 0.5% (10mg) with clonidine 45mcg. Objectives: The study compared the onset and duration of action of intrathecal hyperbaric bupivacaine 0.5 percent and fentanyl 15mcg (group-I) to intrathecal hyperbaric bupivacaine 0.5 percent and clonidine 45 mcg (group-II) in spinal anaesthesia in LSCS. The combination of bupivacaine with fentanyl or clonidine assists anesthesiologists in alleviating intraoperative discomfort by delivering superior analgesia to patients without extending recovery.**

**Materials and Methods: The study included 80 female patients with ASA grade I (n=40 in each group). The time of onset of sensory and motor block, duration of analgesia, 2-segment regression, intraoperative discomfort, hemodynamic stability, time to micturition, visual analogue score, and postoperative analgesic requirements were all evaluated.**

**Results: In group II, the onset of sensory and motor block was substantially later than in group I (p0.001). Hemodynamic alterations did not differ between groups (p>0.05). Intraoperatively, 1 patient reported pruritis, and 2 patients had postoperative urinary II78.506.12min and groupII-—121.284.09 min) and regression of sensory level to L2 dermatome (group-I - 142.206.73 min and group II 166.405.79 min) were significantly longer in group II (p0.001). The duration of analgesia in group II was 210.186.79 minutes, whereas in group II it was 323.5610.53 minutes, which is significant (p0.001). The VAS scores in group II were considerably lower after 3 hours (p0.05), 6 hours (p0.001), and 12hours (p0.001).**

**Conclusion: The addition of intrathecal clonidine 45 mcg to hyperbaric bupivacaine in spinal anaesthesia gives greater analgesia with less perioperative discomfort, a longer duration of analgesia, and a reduction in postoperative analgesic requirements.**

**Keywords: analgesia; bupivacaine; clonidine; fentanyl; intrathecal; regression• subarachnoid block; visual analogue score.**

**Corresponding Author:**Dr. Khaja Layeeq Ur Rahman, Associate Professors, Department of Anesthesiology, Dr VRK Womens Medical College & Research centre, Hyderabad, Telangana, India.

## INTRODUCTION

Spinal anaesthesia is caused by the injection of a local anaesthetic solution into cerebrospinal fluid, which causes a temporary disruption of nerve transmission inside the subarachnoid area. Spinal anaesthesia, which has been used routinely, safely, and successfully for than 100 years, has numerous potential advantages over general anaesthetic, particularly for surgeries

involving the lower abdomen.[1]The safe practise of spinal anaesthesia comprises selecting and preparing the patient, accessing the cerebrospinal fluid, providing appropriate anaesthetic medicines and adjuvants, treating physiologic side effects, and monitoring the patient throughout the procedure and in the early recovery phase.Spinal anaesthesia is a frequent method of preparing patients for caesarean delivery. Hyperbaric bupivacaine (in tolerable therapeutic doses) alone may not provide adequate intraoperative analgesia. As a result, it is preferable to combine intrathecal bupivacaine with an opioid or alpha2 agonist.Opioids injected in the subarachnoid space primarily decrease excitatory neuropeptide release from C-fibers by acting on receptors in the substantia gelatinosa of the dorsal horn. The spinal cord will absorb a considerable amount of lipid-soluble opioids such as fentanyl. This results in lower cerebrospinal fluid concentrations, less cephalad spread, and a lower risk of respiratory depression. Nausea, vomiting, pruritis, and respiratory depression are common side effects of intravenous opioids.Alpha2 agonists, on the other hand, do not exhibit these negative effects. Clonidine, an alpha 2 agonist, blocks pain by activating the alpha2adrenergic receptor and altering the pain pathway in the dorsal horn. Clonidine inhibits C and A-delta fibre conduction, increases potassium conductance in isolated neurons in vitro, and increases the conduction block of topical anaesthetics. Local anaesthetic, opioid, and alpha 2 agonist effects occur at three distinct locations. When opioid or Alpha 2 agonists are combined with local anaesthetics, they have a synergistic effect. When administered in large quantities, alpha 2 agonists might cause hypotension, sedation, or bradycardia.Postoperative pain in a caesarean section patient can lead to limited mobility, inadequate infant care, and decreased mother-child attachment. To avoid all of these complications, enough analgesia must be delivered following surgery. This is accomplished by incorporating opioids or alpha 2 agonists into the local anaesthetic solution during spinal anaesthesia. In our study, we investigated the relative benefits of opioid or alpha2 agonist addition on intraoperative and post-operative analgesia.

**Aims and Objectives of the Study**

The aim of the study is to compare the clinical effects of additions of fentanyl or clonidine to hyperbaric bupivacaine during spinal anaesthesia in caesarean section patients.

The objectives of the study are to compare perioperative and postoperative analgesic effects in the following two groups i.e.

1. Hyperbaric bupivacaine 0.5%(10 mgs) with fentanyl 15mcg (0.3ml).
2. Hyperbaric bupivacaine 0.5%(10 mgs) with clonidine 45mcg (0.3ml) in spinal anaesthesia. The study of (l) the effect of addition of such adjuvant drugs like fentanyl and clonidine on the quality of neuraxial blockade during spinal anaesthesia. (2) The level of sensory block and quality of perioperative and postoperative analgesia.
3. The quality of muscle relaxation with Bromage scale.
4. Hemodynamic changes during spinal anaesthesia in both groups.

**MATERIALS & METHODS**

This prospective, randomised, placebo-controlled, single-blind trial was conducted in 60 pregnant women scheduled for elective caesarean sections during an 18-month period. All patients were ASA I with one pregnancy. Patients with ASA grades other than I were excluded. This study included patients 5 feet to 5 feet 2 inches tall. Others were excluded if they didn't fit. Patients over 75 kg were also eliminated. These 80 patients were split into two groups at random. Tenmg hyperbaric bupivacaine Plus 0.3ml (15cg) fentanyl, and 0.3ml (45cg) clonidine, were given to groups I and II, respectively.An 18G cannula was placed after

a preoperative visit. We preloaded properly before spinal anaesthesia. Both groups received intravenous rantidine and ondensetron prior to surgery. For spinal anaesthesia, all patients were positioned left lateral. A 25G quincke needle was used at the L3-L4 interspace. 10mg hyperbaricbupivacaine plus 0.3ml fentanyl or clonidine over 30 seconds. Each group has a total volume of 2.3ml. Patients were turned supine immediately following spinals, allowing the surgeon to scrub and drape them. Hudson mask delivered six litres of oxygen every minute until delivery and then four litres until operation ended. Monitoring followed ASA guidelines. Pinprick along the mid-axillary line to assess sensory block.

**Assessment of Sensory Blockade:**
The pin-prick approach was used. The medication was injected into the subarachnoid space and the pin-prick feeling was lost. The time from drug injection to cessation of pin-prick sensation at highest dermatomal level was measured. Two dermatomal segments sensory level regression time was noted. The period from commencement to return of pin-prick sensation to L2 dermatomal region was recorded. Analgesics or opioids were avoided post-operatively until the patient requested them. In all cases, surgery began 5 minutes after spinal anaesthesia. BP, HR, and Spo2 were recorded at 0, 5, 10, 20, 30, 60, and 120 minutes. In all patients, 1500ml of ringer lactate and dextrose in normal saline were given IV over 15 minutes. As needed, vasopressor and atropine were given. The newborn's Apgar scores were tested at 1 and 5 minutes.
Oxytocin 10 units IV infusion after delivery, extra oxytocin if surgeon requested it. Analgesics were given after delivery if the patient had substantial discomfort during operation. Both groups had similar surgical manipulation and bleeding.
Intraoperative sedation was classified as follows: awake, sleepy, sedated but awake, and highly sedated but not awake. 4 degrees of intraoperative analgesia Pain levels range from superb (no pain at all) to light, moderate, and severe (needing analgesics). The surgeon was asked to grade abdominal muscle relaxation. 1 poor, 2 average, 3 good, 4 excellent.

**Assessment of Motor Blockade:**
This was assessed by Bromage scale*. The time interval between injections of drug into subarachnoid space, to the patients' inability to lift the straight extended leg was taken as onset time. The time to achieve maximum motor blockade was noted from time of injection of the drug to maximum degree of motor block. Duration of motor block was recorded from onset time to time when the patient was able to lift the extended leg.

***Bromage Scale:**
0- Full flexion of knees and feet
1- Just able to flex knees, full flexion of feet.
2- Unable to flex knees, but some flexion of feet possible. 3 - Unable to move legs or feet.
In the post-operative ward, patients were closely watched by an anaesthesiologist who was unaware of their group affiliation. The obstetrician gave patients 75mg Diclofenac sodium IM, B.D. Postoperative sedation was tracked. To first over 24 hours under 4 grades 1 alert, 2 drowsy, 3 sedated but awake, 4 completely sedated and unable to complain of discomfort.
The Visual Analogue Scale was taught to all patients (VAS).Nausea, vomiting, pruritis, shivering, arterial oxygen desaturation (SpO2 90%), respiratory depression (respiration rate 10/min), sleepiness, hypotension, euphoria, sedation, bradycardia and urine retention were described as side effects of intrathecal fentanyl.In the post- operative ward, patients were closely watched by an anaesthesiologist who was unaware of their group affiliation. The

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## RESULTS

The effect of injecting hyperbaric bupivacaine 10mg 0.5% with 0.3ml(45mcg) clonidine (n—40) or hyperbaric bupivacaine 10mg 0.5% with 0.3ml(25mcg) fentanyl (n—40) in the subarachnoid space was compared in 80 patients belonging to ASA grade I, posted for elective lower abdominal surgery.

**Table 1:Age distribution in both the groups**

| Age (Yrs) | Group-I(Bupivacaine with Fentanyl) | Group-II (Bupivacaine with Clonidine) |
|---|---|---|
| | F | F |
| 18-21 | 16 | 15 |
| 22-25 | 16 | 17 |
| 26-28 | 08 | 09 |
| Total | 40 | 40 |

**Table 2: Distribution of height of the patients in both the groups**

| Height (Feet & Inches) | Group-I | Group-II | Total |
|---|---|---|---|
| | F | F | |
| 5’0’’ | 06 | 09 | 15 |
| 5’1’’ | 18 | 12 | 30 |
| 5’2’’ | 16 | 19 | 35 |

**Table 3: Weight wise distribution of the patients scheduled for the study**

| Weight (Kgs) | Group-I | Group-II | Total |
|---|---|---|---|
| | F | F | |
| 46-50 | 06 | 05 | 11 |
| 51-55 | 07 | 08 | 15 |
| 56-60 | 10 | 12 | 22 |
| 61-65 | 11 | 12 | 23 |
| 66-70 | 06 | 03 | 09 |
| 71-75 | 00 | 00 | 00 |

**Table 4: Perioperative systolic blood pressure of the patients at different time-intervals**

| Time in Min. | Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|---|
| | Mean ± S.D. | Mean ± S.D. | | |
| 00 | 113.36±9.64 | 118.41±8.41 | 0.02 | P>0.05 |
| 05 | 130.84±18.01 | 116.05±7.56 | 1.47 | P>0.05 |
| 10 | 113.12± 8.12 | 115.26±6.02 | 1.27 | P>0.05 |
| 20 | 116.24±8.43 | 112.22 ±7.02 | 0.96 | P>0.05 |

| | | | | |
|---|---|---|---|---|
| 30 | 114.23±7.45 | 111.18±14.02 | 1.43 | P>0.05 |
| 60 | 119.28±5.91 | 114.02 ±5.24 | 1.34 | P>0.05 |
| 120 | 113.04±4.07 | 115.73±5.21 | 1.21 | P>0.05 |
| 180 | 117.89±5.21 | 116.06±5.02 | 1.81 | P>0.05 |

The difference between the groups at different time-intervals studied statistically insignificant(P>0.05).

**Table 5: Perioperative diastolic blood pressure at different time intervals**

| Time in Min. | Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|---|
| | Mean ± S.D. | Mean ± S.D. | | |
| 00 | 77.32±5.32 | 78.02±5.08 | 0.34 | P>0.05 |
| 05 | 76.55±4.78 | 76.18±5.02 | 0.18 | P>0.05 |
| 10 | 73.10±4.34 | 74.14±4.90 | 1.13 | P>0.05 |
| 20 | 73.40±4.56 | 73.28±5.08 | 0.27 | P>0.05 |
| 30 | 73.21±4.91 | 73.96±3.92 | 0.82 | P>0.05 |
| 60 | 73.09±3.02 | 73.21±3.41 | 1.05 | P>0.05 |
| 120 | 73.64±2.32 | 73.88±3.02 | 0.43 | P>0.05 |
| 180 | 74.11 ±2.54 | 74.08±3.02 | 0.21 | P>0.05 |

The difference between the groups was statistically insignificant (P>0.05).

**Table 6: Heart rate of the patients' perioperatively in both the groups**

| Time in Min. | Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|---|
| | Mean ± S.D. | Mean ± S.D. | | |
| 00 | 79.70±10.21 | 79.88±10.73 | 0.29 | P>0.05 |
| 05 | 81.84±9.12 | 81.64±9.91 | 0.57 | P>0.05 |
| 10 | 83.34±10.4 | 81.32±8.58 | 1.19 | P>0.05 |
| 20 | 80.06±7.15 | 78.82±8.12 | 1.91 | P>0.05 |
| 30 | 77.26±6.65 | 75.82±7.45 | 1.58 | P>0.05 |
| 60 | 77.65±7.43 | 77.62±6.67 | 0.62 | P>0.05 |
| 120 | 76.26±7.35 | 76.34±7.17 | 0.35 | P>0.05 |
| 180 | 77.21±7.65 | 78.14±8.54 | 0.49 | P>0.05 |

The difference between the groups was statistically insignificant (P>0.05).

**Table 7: Onset of sensory blockade (seconds) in either group**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 152.32±11.15 | 171.32±10.26 | 13.31 | P<0.001 |

The difference between the groups was statistically highly significant (P<0.001).

**Table 8: Onset of motor blockade (seconds)**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 217.70±10.85 | 254.31±9.66 | 21.09 | P<0.001 |

The difference between the groups was statistically highly significant (P<0.001).

**Table 9: Two dermatomal segments regression of sensory level (minutes)**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 78.50±6.12 | 121.28±4.09 | 31.32 | P<0.001 |

The difference between either groups was highly significant (P<0.001).

**Table 10: Regression of sensory level to L2 dermatome (minutes)**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 142.20±6.73 | 166.40±5.79 | 19.12 | P<0.001 |

The difference between either groups was highly significant (P<0.001).

**Table 11: Time (in minutes) for complete motor recovery**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 183.60±8.33 | 217.320±5.324 | 2.34 | P<0.05 |

The difference between the groups was statistically significant (P<0.05).

**Table-12: Time (in minutes) for first request of analgesics by the patients in either groups**

| Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|
| Mean ± S.D. | Mean ± S.D. | | |
| 210.18±6.79 | 323.56±10.53 | 86.06 | P<0.001 |

The difference between the groups was statistically highly significant (P<0.001).

**Table 13: Visual analogue scores at different time intervals**

| Time | Group-I | Group-II | Z-Value | Significance |
|---|---|---|---|---|
| | Mean ± S.D. | Mean ± S.D. | | |
| 3 Hrs | 0.675±1.50 | 0.04±0.23 | 2.62 | P<0.05 |
| 6Hrs | 3.67±0.96 | 1.42±0.56 | 17.23 | P<0.001 |
| 12Hrs | 4.52±1.18 | 1.12±0.78 | 15.34 | P<0.001 |

The difference between the groups was statistically significant at all the three time intervals recorded (At 3 Hours P <0.05, At 6 Hours P<0.001, At 12 Hours P<0.001).

**Table 14: Adverse effects**

| Adverse effects | Group-II | Group-I |
|---|---|---|
| Nausea/vomiting | Nil | Nil |
| Pruritis | Nil | 1 |
| Shivering | Nil | Nil |

| | | |
|---|---|---|
| Arterial $O_2$ desaturation($SpO_2$<90%) | Nil | Nil |
| Respiratory depression (RR< 10/min) | Nil | Nil |
| Drowsiness | Nil | Nil |
| Hypotension | 8 | 5 |
| Chesttightness | Nil | Nil |
| Urinaryretention | Nil | 1 |

Hypotension was noted in 6 patients in group II and 5 patients in group I.One patient complained of itching (pruritis) over the neck and shoulders in group I and none in group II.

**DISCUSSION**

Spinal anaesthesia has the advantage of being simple to perform and requiring a modest amount of medication, making systemic absorption unnecessary. Airway reflexes are preserved, and cerebral and myocardial depressions are avoided. Abdominal muscular relaxation and a constricted stomach make operational conditions more comfortable and desirable.Spinal anaesthesia is especially crucial in developing nations such as India, where infrastructural and economic conditions are not conducive to patient-controlled analgesia, particularly in remote areas.

The use of neuraxial opioids in conjunction with local anaesthesia improves operational circumstances and extends the duration of analgesia supplied by local anaesthesia. Clonidine and fentanyl improve the quality of spinal block created by hyperbaric bupivacaine because they synergistically affect the sensory, motor, or sympathetic block produced by hyperbaric bupivacaine intraoperatively, resulting in better post-operative analgesia. When adjuvant medications were used,intraoperative circumstances appeared to improve.The addition of fentanyl and clonidine to intrathecal hyperbaric bupivacaine is a simple and successful method of providing post-operative analgesia in patients undergoing caesarean section. There have been numerous clinical studies involving intrathecal fentanyl and clonidine use in caesarean section patients, all of which have demonstrated the benefit of adding adjuvant to intrathecal bupivacaine. Fentanyl has a shorter duration of action and hence provides less analgesia after surgery.Clonidine, on the other hand, has a longer half-life and offers post-operative analgesia for a longer period of time. During our trial with clonidine, we saw no complications associated with intrathecal opioids such as pruritis, hypotension, nausea, vomiting, respiratory depression, or severe drowsiness.Clonidine operates on an alpha2 receptor in the dorsal horn of the spinal cord. It is an alpha2 receptor agonist that modulates pain transmission in C and A- delta fibres. Many studies with intrathecal clonidine were conducted, and all showed clonidine's efficacy in improving post-operative analgesia.The purpose of this study was to compare the effect of adding 15 mcg Fentanyl or 45 mcg clonidine to 0.5 percent hyperbaric bupivacaine in subarachnoid block on the quality of neuraxial blockade on the onset of sensory and motor block, duration of block, intra-operative discomfort, and post-operative analgesic requirements.All of the patients were ASA grade I with a single pregnancy. Patients with ASA grades other than I were barred from participating in the trial. This study included individuals ranging in height from 5 feet to 5 feet 2 inches and aged 18-28 years. Patients who fell outside of this range were eliminated. Patients weighing more than 75 kg were also barred from participating. The volume of medication to be injected into the subarachnoid space is 2.3ml, with bupivacaine 10mg(2ml)+ fentanyl 0.3ml(15mcg) or clonidine 0.3ml being used (45mcg). This was done to ensure that the overall volume of medication in both groups was the same. When the total volume of medicine is raised, the drug ascends and causes a greater block.

These 80 patients were divided into two study groups at random. Group I was given 10 mg of hyperbaric bupivacaine plus 0.3ml (15mcg) of fentanyl, while Group II was given 10 mg of hyperbaric bupivacaine plus 0.3ml (45mcg) of clonidine.Following a regular preoperative checkup, an IV was placed and an intravenous infusion of ringer lactate was started at a rate that would have resulted in around 250ml of fluid by the time spinal anaesthesia was established. Before surgery, patients in two groups were routinely premedicated with intravenous ranitidine and ondensetron. Before spinal anaesthesia was delivered, the surgical table was turned horizontal. For spinal anaesthesia, all patients were placed in the left lateral position. Lumbar puncture was conducted with a 25G quincke needle with the bevel pointed cephalad at the L3-L4 interspace. 10mg of hyperbaric bupivacaine was delivered slowly over 30 seconds, along with 0.3ml of fentanyl or clonidine. Each group's total volume was ensured to be 2.3ml.

Patients were turned supine immediately after receiving a spinal, and the surgeon was allowed to clean and drape the patient. The Hudson mask delivered six litres of oxygen per minute till delivery and then four litres of oxygen until the completion of the surgery. The patient was hooked up to an NIBP and a pulse oximetery monitor. A pinprick along the midaxillary line was used to measure the level of sensory obstruction.In all cases, surgery began roughly 5 minutes after spinal. Blood pressure, pulse rate, and Spo2 levels were measured every 0,5,10,20,30,60,120 minutes. IV fluids were administered at a rate of 500ml every 15 minutes, for a total of 1500ml of ringer lactate and dextrose in normal saline.Vasopressor and atropine were administered as needed.The newborn's Apgar scores were measured at 1 and 5 minutes after birth. After delivery, 10 units of oxytocin were added to the IV drip;extra oxytocin was given if the surgeon wanted it. If the patient had substantial pain during surgery, analgesics were administered after the kid was delivered. The surgical manipulation and bleeding were nearly same in both groups.Intraoperative sedation was categorised as follows: alert, 2 sleepy, 3 sedated but aroused, and 4 severely sedated and cannot be aroused. Intraoperative analgesia was graded on a four-point scale: 1 for no pain at all, 2 for light discomfort, 3 for moderate pain requiring analgesics, and 4 for severe pain necessitating conversion to general anaesthesia. The surgeon's comments on abdominal muscular relaxation were graded on a 4-point scale. At the end of the surgery, the score was 1 terrible, 2 average, 3 good, and 4 excellent. After surgery, the patients were transferred to the post-operative ward and were intensively followed by anaesthesiologists who were unaware of the patients' group membership. The obstetrician routinely administered Inj Diclofenac sodium 75mg 1M, B.D. to patients. The level of sedation after surgery was assessed. The time in hours to the first 24 hours following surgery was recorded in four grades: 1 awake, 2 drowsy, 3 sedated but can be aroused, and 4 severely sedated and cannot be aroused.The Visual Analogue Scale was taught to all of the patients (VAS). A visual analogue scale comprised of ten beads strung together and categorised as no pain (1-bead) to greatest agony (10-bead) (10 beads). The degree of the discomfort gradually increases from the first to the tenth bead. The patients were instructed to mark the level of their pain on the scale.In the clonidine group (group II), the beginning of sensory blockade was delayed by about 30 seconds, while the onset of motor block was delayed by around 40-45 seconds. In group II, the period for two segment sensory regression was extended, extending the duration of analgesia.Five participants in group I and six individuals in group II of the trial had hypotension. Mephenteramine 6 mg IV increments were administered to the patients, as well as IV fluids to treat hypotension. All patients, however, were hemodynamically stable at the completion of surgery and in the post-operativeperiod.Pruritis (1 patient) and urine retention (2 patients) were observed in group I of the research. There were no issues and the adverse

effects were modest.Clonidine significantly increased analgesia duration (210 min in group I and 360 min in group II), lowering the need for analgesics in the early post-operative period.Up to 12 hours of spinal anaesthesia, the VAS values in the clonidine group were also low. With this study, we can conclude that intrathecal clonidine potentiates bupivacaine spinal anaesthesia more than fentanyl, resulting in better perioperative conditions, prolonged duration of analgesia, delayed postoperative pain, and thus reduced post- operative analgesic requirements with minimal side effects.

Hunt C.O et al,[7] studied to evaluate the potential of fentanyl administration in subarachnoid space to improve intraoperative and early postoperative period analgesia. They concluded that the addition of more than 6.25mcg fentanyl to hyperbaric bupivacaine for spinal anaesthesia in parturients undergoing cesarean section improved intraoperative as well as immediate postoperative analgesia with no adverse effect on mother and neonate. We found that 15mcg of fentanyl produce similar result as mentioned above.

Harbhej Singh et a1,[8] studied the effect of intrathecal fentanyl 25mcg on the onset and duration of sensory bupivacaine block. They concluded that fentanyl prolonged the duration of bupivacaine induced sensory blockade and reduced the analgesic requirements in the early postoperative period. We found similar results with 15mcg fentanyl as mention above.

Belzarena et a1,[2] in 1992 conducted a study, to determine whether single dose of subarachnoid fentanyl 0.25mcg/kg added to hyperbaric bupivacaine provides analgesia of good quality and duration in dose dependent manner in caesarean section patients. They concluded that fentanyl produced many of its clinical effects very early after intrathecal administration and in intraoperative period. It enhanced surgical analgesia and prolonged duration of block. We found that 15mcg of fentanyl produced similar results.

Chu CC and Shu SSet a1,[9] in 1996 studied the effect of intrathecal bupivacaine combined with fentanyl in parturients undergoing caesarean section.They concluded that the combination of bupivacaine with a dose fentanyl as low as 7.5 mcg did not produce actual clinical effects. As the dose of fentanyl was increased to 12.5 microgram or 15 mcg, the quality of surgical analgesia was better and the postoperative analgesia lasted longer. We found that 15mcg of fentanyl produces similar result.

Santos E et al,[10] studied the effectiveness of 3 mg isobaric 0.5% bupivacaine with 20 mcg of fentanyl or 15mcg of clonidine as adjuvant drugs to promote good surgical conditions for anorectal surgeries.

They concluded even a very low intrathecal dose of 15 mcg of clonidine was able to increase motor block duration. We found that addition of45mcg of clonidine produce similar results with the above study.

Michael J Paechand,[11] and colleagues found that addition of clonidine to intrathecal hyperbaric bupivacaine would prolong the analgesia but will not alter VAS scores In our study addition of clonidine not only prolonged pain free period after surgery but also decreased VAS score significantly.

In our study though addition of Fentanyl improved post-operative pain relief, at the dose of 15 mcg it was less effective than clonidine at the dose of 45 mcg. With a higher dose of fentanyl equal analgesia effect without the side effects associated with a opioids may be achieved.

Both intrathecal opioids and alpha 2 agonists along with local anaesthetics provide the patients significant benefits over patient-controlled analgesia.

## CONCLUSION

When compared to the addition of 15 micrograms of fentanyl to bupivacaine for spinal anaesthesia, intrathecal administration of 45 micrograms of clonidine produces superior intraoperative and postoperative analgesia with fewer complications. This is achieved without causing gross hemodynamic disturbances, intraoperative discomfort, or neonatal compromise. It provides a cost-efficient post-operative care by increasing the amount of time that analgesia is effective for and decreasing the amount of postoperative analgesic that is required.

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