

**Conduct a Clinical Investigation into Intrathecal Ketamine Combined with Adrenaline for Lower Abdominal Surgeries**Jyoti Priya<sup>1</sup>, Himanshu Shekhar<sup>2</sup>, Mani Lal Gupta<sup>3</sup><sup>1</sup>Senior Resident, Department of Anaesthesiology, BMIMS, Pawapuri, Nalanda<sup>2</sup>Senior Resident, Department of Anaesthesiology, BMIMS, Pawapuri Nalanda<sup>3</sup>Assistant Professor & Head, Department of Anaesthesiology, BMIMS, Pawapuri, Nalanda

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Corresponding Author: Dr. Himanshu Shekhar

Conflict of interest: Nil

**Abstract:**

**Background:** This study was designed to evaluate the efficacy, onset and duration of sensory and motor blockade, occurrence of delirium reaction and other complications of Ketamine with Adrenaline given intrathecally. Lignocaine and Bupivacaine are the commonly used local anaesthetic agents for spinal anaesthesia. Lignocaine produces good motor blockade but duration of action is lesser than that of bupivacaine.

**Methods:** After informed and written consent, ASA Physical status I and II aged 18-60 years, of either sex randomly selected 100 Patients for elective lower abdominal surgeries were been enrolled after inclusion and exclusion criteria. Patients with severe systemic disease metabolic disorders, neurological, congenital or cardiovascular diseases were excluded from this study.

**Results:** In the present study the maximum level achieved ranged from T6-T10. The time taken to achieve maximum sensory blockade ranged from 2-8 minutes. There were no significant changes in mean systolic and diastolic arterial blood pressure or pulse rate. Intra-operatively, nystagmus was seen in all patients. Sedation and delirium was seen in 72 patients and 2 patients respectively.

**Conclusion:** We conclude that intra thecal ketamine with adrenaline produces a reliable anaesthesia, better operative conditions and patients comfort with minimal side effects in elective lower abdominal surgeries.

**Keywords:** Anaesthesia, Ketamine, Adrenaline, Intrathecal.

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**Introduction**

Spinal anaesthesia is used extensively for lower abdominal and lower extremity surgeries because it has distinct advantages over general anaesthesia viz, minimum physiological disturbance resulting in minimum stress response, optimal operative conditions, minimal intra operative blood loss and less chance of post-operative morbidity.

Lignocaine and Bupivacaine are the commonly used local anaesthetic agents for spinal anaesthesia. Lignocaine produces good motor blockade but duration of action is lesser than that of bupivacaine. [1] Whereas bupivacaine has been found to have less effective motor blockade but as lower onset of action. [2]

Ketamine, a phencyclidine derivative has recently been found to be effective by epidural and intrathecal routes. It possesses some definite advantages over the conventional local anaesthetic agents as it stimulates cardiovascular system and respiratory system. [3] The onset of anaesthesia (sensory block) and motor paralysis is found to be earlier than the conventional local anaesthetics. [4] Intensity of sensory block is 100% as it is described

to be due to potent analgesic effect of ketamine. [5-6]

Addition of adrenaline 0.1 mg and 5% dextrose to ketamine improves the degree of motor block and prolongs the duration of motor paralysis. [4]

**Material and Methods**

At Department of Anaesthesiology, BMIMS Pawapuri, Nalanda. After informed and written consent, ASA Physical status I and II aged 18-60 years, of either sex randomly selected 100 Patients for elective lower abdominal surgeries were been enrolled after inclusion and exclusion criteria. Patients with severe systemic disease metabolic disorders, neurological, congenital or cardiovascular diseases were excluded from this study. Study period between May 2022 to April 2024.

On the eve of surgery, all the patients were visited and a detailed examination is done along with routine investigations like CBC, Urine routine, random blood sugar ECG, chest X ray, blood grouping, blood urea and serum Creatinine whenever necessary.

Once the patient was shifted to the operating room, patient was connected to routine standard monitors and keeping ready anaesthesia trolley and machine.

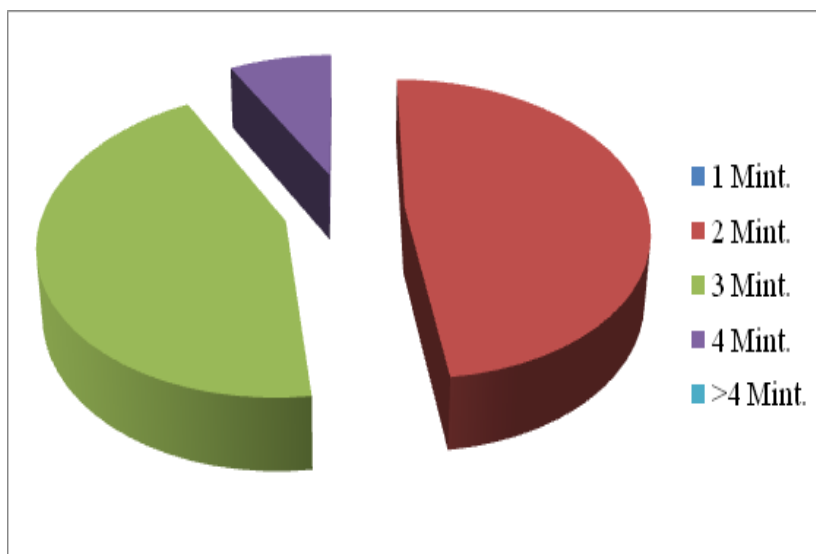
After securing wide bore intravenous access all patients were premedicated with injection Ranitidine

50 mg, injection Ondansetron, 4 mg, injection Midazolam 2 mg intravenously. Baseline haemodynamics were noted and under aseptic precaution in left lateral position by midline approach spinal anaesthesia is performed using disposable Quincke spinal needle (23-25G) between L3-L4 intervertebral space and injected 75 mg of Ketamine with 100

microgram of adrenaline after clear free flow of CSF. Continuous monitoring of pulse rate and blood pressure were recorded at 0, 5, 10, 20, 30, 45, 60, 90 and 120 minutes along with assessment of sensory and motor blockade by pinprick and Bromage scale.

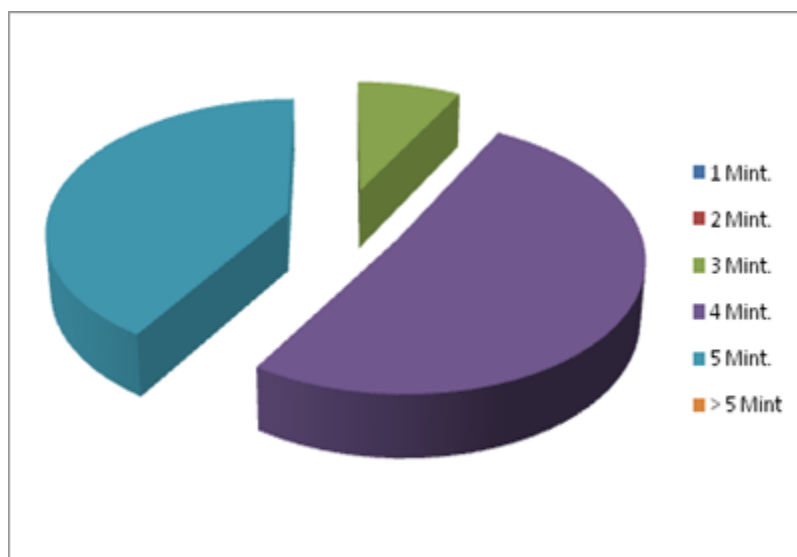
**Results**

In the present study, the 62% patients were male and 38% patients were female. The mean age of patients were 31.28±12.34 Years.



**Onset of sensory Blockade (minutes)**

In the present study, the onset of analgesia ranged from 2- 4 minutes.



**Onset of motor Blockade (minutes)**

In the present study, the onset of motor blockade ranged from 2- 5 minutes.

**Table 1: Duration of Sensory Blockade (Minutes)**

| Duration of Sensory Blockade (Minutes) | No. of patients | Percentage |
|--|-----------------|------------|
| 40-60                                  | 5               | 5.00       |
| 61-80                                  | 32              | 32.00      |
| 81-100                                 | 60              | 60.00      |
| 101-120                                | 3               | 3.00       |
| >120                                   | 0               | 0.00       |
| Total                                  | 100             | 100.00     |

In the present study, the duration of sensory blockade ranged from 61-100 minutes.

**Table 2: Duration of Motor Blockade (Minutes)**

| Duration of Motor Blockade (Minutes) | No. of patients | Percentage |
|--------------------------------------|-----------------|------------|
| 80-90                                | 10              | 10.00      |
| 91-100                               | 14              | 14.00      |
| 101-110                              | 29              | 29.00      |
| 111-120                              | 25              | 25.00      |
| 121-130                              | 22              | 22.00      |
| >130                                 | 0.00            | 0.00       |
| Total                                | 100             | 100.00     |

In the present study, the duration of motor blockade ranged from 80-130 minutes.

**Table 3: Maximum Level Achieved**

| Maximum Level Achieved | No. of patients | Percentage |
|------------------------|-----------------|------------|
| T6                     | 3               | 3.00       |
| T8                     | 18              | 18.00      |
| T10                    | 79              | 79.00      |
| >T10                   | 0               | 0.00       |
| Total                  | 100             | 100.00     |

In the present study the maximum level achieved ranged from T6-T10.

**Table 4: Complication**

| Complication | No of patients | Percentage |
|--------------|----------------|------------|
| Nausea       | 0              | 0.00       |
| Vomiting     | 0              | 0.00       |
| Hypotension  | 0              | 0.00       |
| Delirium     | 2              | 2.00       |
| Neurological | 0              | 0.00       |
| Sedation     | 72             | 72.00      |
| Nystagmus    | 100            | 100.00     |
| Dizziness    | 0              | 0.00       |
| Total        | 100            | 100.00     |

In the present study, the most common complication was nystagmus, which was present in all patients, followed by sedation, which occurred in 72 patients. There was no significant variation in heart rate, mean systolic and diastolic blood pressure.

### Discussion

Spinal anaesthesia is a time honoured procedure for producing surgical analgesia and its importance is increasing day by day as it possesses certain advantages over general anaesthesia.

Though a number of drugs have been used for inducing spinal anaesthesia their use has been usually associated with the occurrence of undesirable side effects such as hypotension and bradycardia in lower abdominal surgeries.

Therefore, there is a need for find out a safer, effective and reliable spinal anaesthetic, which has rapid onset of action, excellent analgesia, and satisfactory muscle relaxation with a wide margin of safety.

Ketamine a phencyclidine derivative is a potent analgesic and its sympathomimetic effects may be useful in trauma and emergency cases. The present study is to evaluate the efficacy of Ketamine given intrathecally as spinal anaesthesia agent and to study its onset of sensory blockade, duration of sensory blockade, motor blockade and the occurrence of delirium reaction and other complications if any and whether Ketamine can be safely recommended for lower abdominal surgeries.

In the present study the onset of sensory blockade

ranged from 2-4 minutes. In the study conducted by Dipasri Bhattacharya et al [7], it was reported that onset of sensory blockade ranged from 1-2 minutes with a mean of  $1.38 \pm 0.05$  (SE). In the present study duration of sensory blockade ranged from 60-100 minutes. In the study conducted by Dipasri Bhattacharya et al [7], it was reported that duration of sensory blockade ranged from 90-140 minutes with a mean of  $122 \pm 3.34$ .

In the present study, the maximum level achieved ranged from T6-T10. In majority of the male and females, the maximum level achieved was T10. In the study conducted by Bion JF et al.[8], they reported that the maximum level achieved ranged from T10-T12 in majority of them the maximum level achieved was T0. The present study was in accordance with their study.

In the present study, the onset of motor blockade ranged from 2-5 minutes. In the study conducted by Dipasri Bhattacharya et al [7], the onset of motor blockade ranged from 2-4 minutes with a mean of  $2.35 \pm 0.07$ .

In the present study, the duration of motor blockade ranged from 80-130 minutes. In the study conducted by Dipasri Bhattacharya et al [7], it was reported that the duration of motor blockade ranged from 90 to 140 minutes with a mean of  $127 \pm 1.79$ . [8]

In the present study the most common complication was nystagmus, which occurred in all the patients. Sedation was seen in 72 patients and delirium reaction was seen in 2 patients.

In the study conducted by Chris Hawksworth et al [9], nystagmus occurred in six out of ten patients, four patients developed psychomimetic disturbance. One complained of simply feeling strange and three patients had frank hallucination.

### Conclusion

We conclude that intra thecal ketamine with

adrenaline produces a reliable anaesthesia, better operative conditions and patients comfort with minimal side effects in elective lower abdominal surgeries.

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