

Intrathecal Isobaric Bupivacaine Fentanyl Mixture versus Hyperbaric Bupivacaine Fentanyl Mixture in Urological Procedures

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Abstract

Background: To compare of intrathecal isobaric bupivacaine fentanyl mixture and hyperbaric bupivacaine fentanyl mixture in urological procedures. **Subjects and Methods:** One hundred thirty patients undergoing urological procedures were divided into 2 equal groups (65). Group I patients received 3 ml of 0.5% isobaric bupivacaine with 25 µg fentanyl and group II received 3 ml of 0.5% hyperbaric bupivacaine with 25 µg fentanyl. Parameters such as systolic & diastolic blood pressure, onset and duration of motor and sensory blockade and side effects was recorded. **Results:** Group I comprised of 30 males and 35 females and group II had 32 males and 33 females. The mean onset of sensory block was 4.6 minutes in group I and 1.3 minutes in group II. The mean duration of motor block was 5.3 minutes in group I and 1.2 minutes in group II. The mean duration of sensory block was 2.2 minutes in group I and 3.4 minutes in group II. The mean duration of motor block was 2.7 minutes in group I and 3.9 minutes in group II. The mean systolic blood pressure (mm Hg) at 5 minutes was 138.2 in group I and 130.0 in group II, at 10 minutes was 132.6 and 112.2, at 20 minutes was 129.2 and 110.4, at 30 minutes was 126.0 and 118.2 and at 40 minutes was 122.8 and 116.8 respectively. A significant difference in both groups was observed ($P < 0.05$). The mean diastolic blood pressure (mm Hg) at 5 minutes was 78.2 in group I and 80.4 in group II, at 10 minutes was 77.4 and 78.0, at 20 minutes was 75.3 and 76.2, at 30 minutes was 77.1 and 72.2 and at 40 minutes was 77.0 and 74.2 respectively. A significant difference in both groups was observed ($P < 0.05$). Common adverse events recorded were nausea and vomiting seen in 1 patient in group I and 3 patients in group II, bradycardia 2 in group I and 4 in group II, hypotension 2 in group I and 5 in group II, post spinal headache was seen in 2 in group I and 3 in group II, post-operative shivering was seen in 3 in group I and 5 in group II. A significant difference was observed ($P < 0.05$). **Conclusion:** A shorter duration of both the sensory and motor blockade and greater haemodynamic stability were linked to intrathecal isobaric bupivacaine fentanyl combination.

Keywords: Bupivacaine fentanyl, Sensory blockade, urological surgery.

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Introduction

One of the most widely used procedures, subarachnoid block has the drawbacks of sympathetic and motor block leading to hypotension, bradycardia, and immobility. Local anaesthetics mixed with opioids are the best option since adding medications like opioids can result in sensory blockage with a decrease in problems. Reduced pain scores and a reduced need for analgesics in the post-operative period have been linked to the use of opioids along with local anaesthetic for spinal anaesthesia. Results from earlier research have shown that intrathecal opioids do not only speed up recovery when combined with local anaesthetics administered at subtherapeutic levels, but they also improve analgesia. Since they allow for the use of a lower dose of local anaesthetics (LA) while still providing acceptable anaesthesia and analgesia, neuraxial opioids are frequently utilised in conjunction with LA. Additionally, neuraxial opioids enable longer postoperative analgesia as well as quicker spinal anaesthesia recovery. Numerous animal investigations have

proven that LA and intrathecal opioids have an antinociceptive synergism.^[5]

The distribution of anaesthesia in the intrathecal region and, consequently, the degree of anaesthetic block, may be significantly influenced by the local anaesthetics' baricity. The duration of action and degree of motor blockage appear to vary between the two formulations of bupivacaine. However, no study could definitively demonstrate which was superior to the other.^[6] Fentanyl has been utilised with a number of local anaesthetics for a wide range of surgical operations. It is a highly lipid soluble, pure μ -agonist opioid with a rapid onset and brief duration of action.^[7] For intrathecal usage, bupivacaine is offered in isobaric and hyperbaric forms, and opioids are added to change the effects. For lower limb surgeries, the majority of earlier trials used either hyperbaric or isobaric bupivacaine.^[8] Considering this, we compared intrathecal isobaric bupivacaine fentanyl mixture and hyperbaric bupivacaine fentanyl mixture in urological procedures.

Subjects and Methods

A sum total of one hundred thirty patients undergoing urological procedures American Society of Anesthesiologists physical status 1 and 2 patients were recruited in the study. Ethical clearance was obtained from ethical review committee. All patients were informed regarding the study with their written consent was obtained.

After carefully analysing patients, all were randomly divided into two groups. Group I patients received 3 ml of 0.5% isobaric bupivacaine with 25 µg fentanyl and group II patients received 3 ml of 0.5% hyperbaric bupivacaine with 25 µg fentanyl. Each group comprised of 65 patients. Parameters such as blood pressure, onset and duration of motor and sensory blockade was recorded. Side effects were also noted. Results of the study were compiled, entered in MS excel sheet and were subjected to statistical analysis using unpaired t-test. The level of significance was significant below 0.05 and highly significant < less than 0.01.

Results

Table 1: Distribution of patients

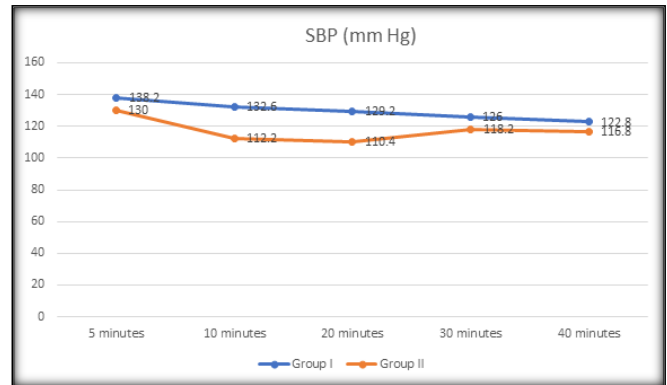
Groups	Group I	Group II
Agent	0.5% isobaric bupivacaine + 25 µg fentanyl	0.5% hyperbaric bupivacaine with 25 µg fentanyl
M:F	30:35	32:33

Group I comprised of 30 males and 35 females and group II had 32 males and 33 females [Table 1].

Table 2: Comparison of parameters in both groups

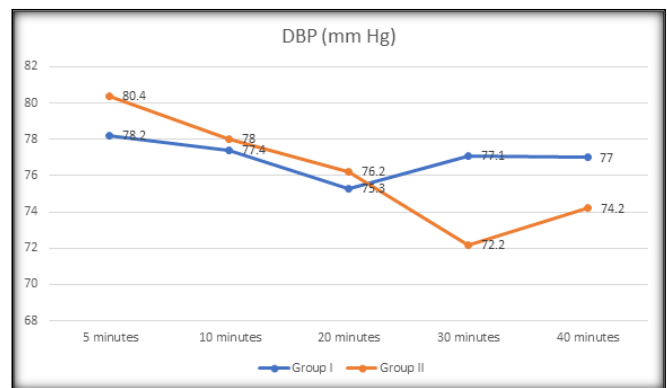
Parameters	Group I	Group II	P value
Onset of sensory block (mins)	4.6	1.3	0.02
Onset of motor block (mins)	5.3	1.2	0.01
Duration of sensory block (mins)	2.2	3.4	0.03
Duration of motor block (mins)	2.7	3.9	0.04

The mean onset of sensory block was 4.6 minutes in group I and 1.3 minutes in group II. The mean duration of motor block was 5.3 minutes in group I and 1.2 minutes in group II. The mean duration of sensory block was 2.2 minutes in group I and 3.4 minutes in group II. The mean duration of motor block was 2.7 minutes in group I and 3.9 minutes in group II [Table 2].



Graph 1 Assessment of systolic blood pressure

The mean systolic blood pressure (mm Hg) at 5 minutes was 138.2 in group I and 130.0 in group II, at 10 minutes was 132.6 and 112.2, at 20 minutes was 129.2 and 110.4, at 30 minutes was 126.0 and 118.2 and at 40 minutes was 122.8 and 116.8 respectively. A significant difference in both groups was observed ($P < 0.05$) [Graph 1].



Graph 2: Assessment of diastolic blood pressure

The mean diastolic blood pressure (mm Hg) at 5 minutes was 78.2 in group I and 80.4 in group II, at 10 minutes was 77.4 and 78.0, at 20 minutes was 75.3 and 76.2, at 30 minutes was 77.1 and 72.2 and at 40 minutes was 77.0 and 74.2 respectively. A significant difference in both groups was observed ($P < 0.05$) [Graph 2].

Table 3: Recording of adverse events

Adverse events	Group I	Group II	P value
Nausea & vomiting	1	3	0.05
Bradycardia	2	4	0.02
Hypotension	2	5	0.01
Post-spinal headache	2	3	0.12
Post-operative shivering	3	5	0.84

Common adverse events recorded were nausea and vomiting seen in 1 patient in group I and 3 patients in group II, bradycardia 2 in group I and 4 in group II, hypotension 2 in group I and 5 in group II, post spinal headache was seen in 2 in group I and 3 in group II, post-operative shivering was seen in 3 in group I and 5 in group II. A significant difference was observed ($P < 0.05$) [Table 3].

Discussion

We compared intrathecal isobaric bupivacaine fentanyl mixture and hyperbaric bupivacaine fentanyl mixture in urological procedures. The quick onset, safety, and dependability of spinal anaesthesia are its benefits. A solution's baricity is determined by comparing its density to that of the cerebrospinal fluid (CSF). Isobaric spinal anaesthesia is significant because it prevents the drug's distribution from being influenced by the patient's position during injection. The baricity of an anaesthetic medication must exceed 1.0015 at 37°C in order for it to become hyperbaric.

There were 30 males and 35 females in group I and group II had 32 males and 33 females. Kumar et al.¹⁵ compared the safety and effectiveness of intrathecal bupivacaine-butorphanol with intrathecal bupivacaine-fentanyl mixtures for anaesthesia and analgesia in 80 patients. Both groups experienced sensory and motor blockade at around the same periods. When compared to the group receiving intrathecal fentanyl, the block regression to S2 level was much slower in the group receiving intrathecal butorphanol. In comparison to group B, more patients in group A requested rescue analgesia in the postoperative period.

In our study, the mean onset of sensory block was 4.6 minutes in group I and 1.3 minutes in group II. The mean duration of motor block was 5.3 minutes in group I and 1.2 minutes in group II. The mean duration of sensory block was 2.2 minutes in group I and 3.4 minutes in group II. The mean duration of motor block was 2.7 minutes in group I and 3.9 minutes in group II. Position and baricity had an impact on how intrathecal bupivacaine diffused, according to research by Hallworth et al. The patients had a combination spinal epidural procedure and received 10 mg of hyperbaric, isobaric, or hypobaric bupivacaine while seated or in the right lateral position. In contrast to sitting position, they discovered that baricity had no impact on the distribution of sensory levels in the lateral position. Hypobaric bupivacaine elicited higher sensory levels (T2) in the seated posture than hyperbaric bupivacaine. Less motor blockage was caused by increased baricity, which was visible in lateral position. The median maximal sensory level for the isobaric mixture, which was injected into the L3–4 region, was T2, while for the hyperbaric mixture, it was T3.

We found that the mean systolic blood pressure (mm Hg) at 5 minutes was 138.2 in group I and 130.0 in group II, at 10 minutes was 132.6 and 112.2, at 20 minutes was 129.2 and 110.4, at 30 minutes was 126.0 and 118.2 and at 40 minutes was 122.8 and 116.8 respectively. In the study by Upadya et al, one hundred patients underwent urological surgeries and were divided randomly into two groups. In Group 1, 3 ml of 0.5% isobaric bupivacaine with 25 g of fentanyl were administered, whereas in Group 2, 3 ml of 0.5% hyperbaric bupivacaine with 25 g of fentanyl were administered. Isobaric bupivacaine fentanyl combination (Group 1) provided higher haemodynamic stability than hyperbaric bupivacaine fentanyl mixture (Group 2). In comparison to Group 2, Group 1's mean onset times for sensory block (4 min) and motor block (5 min) were greater. When compared to the hyperbaric bupivacaine group, the isobaric bupivacaine group's sensory blockade lasted for a shorter period of time (127.8 38.64 min) and the

motor blockade for a shorter period of time (170.4 27.8 min). sixty-nine percent.

Our results revealed that the mean diastolic blood pressure (mm Hg) at 5 minutes was 78.2 in group I and 80.4 in group II, at 10 minutes was 77.4 and 78.0, at 20 minutes was 75.3 and 76.2, at 30 minutes was 77.1 and 72.2 and at 40 minutes was 77.0 and 74.2 respectively. Common adverse events recorded were nausea and vomiting seen in 1 patient in group I and 3 patients in group II, bradycardia 2 in group I and 4 in group II, hypotension 2 in group I and 5 in group II, post spinal headache was seen in 2 in group I and 3 in group II, post-operative shivering was seen in 3 in group I and 5 in group II. Erturk E et al compared ropivacaine (12 mg) and bupivacaine (8 mg) with 20 µg fentanyl and it was found that lower doses of local anaesthetics provide effective analgesia when supplemented with additives.

Conclusion

A shorter duration of both the sensory and motor blockade and greater haemodynamic stability were linked to intrathecal isobaric bupivacaine fentanyl combination.

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