INTRODUCTION

Pain is a common human experience, a symptom frequently encountered in clinical practice, usually associated with actual or impending tissue damage. Pain is a consistent and predominant complaint of all individuals following most surgical interventions. Pain is a neuropsychological phenomenon with an unpleasant intrusive nature, is associated with the threat of actual tissue damage and disrupts normal physiological and psychological homeostasis, manifesting clinically as organ dysfunction and altered human behaviour.[1-4] A visit to most post-operative wards shows that the patients experiencing ineffective post-operative pain relief are unable to breathe adequately, cough effectively, move enough even to tend to their own daily needs or participate in their own rehabilitation and experience feelings of helplessness, fear, anxiety, low mood and loss of control.[5,6] Successful pain management from disease or surgery has long been a great challenge to the medical community. Fast and effective pain relief always gratifies the patient and the physician managing him. Pain management aims to reduce a patient's pain to tolerable with minimal or no associated suffering or distress. Recent advances in neurophysiology and neurochemistry of pain have developed selective benzodiazepine receptors acting at the spinal cord level, administered via an epidural or intrathecal route, which ensure effective, safe and prolonged post-operative analgesia.[7,8] In the present study, the effect of 0.5% bupivacaine with midazolam 2mg versus 0.5% bupivacaine administered through lumbar epidural space in patients undergoing inguinal hernia repair was
Patients were cannulated with an 18G intravenous cannula, and patients were cannulated with a 25-gauge hypodermic needle. An 18-gauge Tuohy needle with the stylet was inserted up to the interspinous ligament, and the stylet alone was removed. Air filled up to 3-4 ml in a 5 ml glass syringe was attached to the hub of the Tuohy needle, and epidural space was identified using a loss of resistance technique. With the needle tip pointing to cephalad and after negative aspiration of CSF and blood, a precalculated drug dose was injected slowly, and the patient was turned supine immediately. At the end of the surgical procedure, patients were shifted to the recovery room and monitored for 2 hours postoperatively, after which the patients were shifted to the postoperative ward. All the patients were monitored for heart rate, respiratory rate, oxygen saturation and blood pressure in the pre-operative and perioperative period for 3-4 hrs. Dermatomal sensory blockade to pinprick was evaluated – maximum level of impaired sensation noted. Duration of analgesia and motor blockade intensity (using the modified Bromage scale) were studied. The degree of pain post-operatively was evaluated by using Visual Analogue Scale. The most common form consists of a scale with a 10 cm horizontal line with two endpoints labelled ‘no pain’ and ‘worst pain ever’. The patient must place a mark on the 10 cm line at a point corresponding to the level of pain intensity the patient felt. The time of requirement of the first analgesic dose was recorded in all the cases.

Inclusion Criteria

Age group 20-50 years, ASA -I physical status, and elective cases for inguinal hernia repair were included.

Exclusion Criteria

Patients refusal, local Infection, coagulopathy, severe hypovolemia, severe spine deformity, hypersensitivity to local anaesthetics, and patients with a previous history of cardiac, respiratory, renal, neurological and hepatic disorders were excluded. Haemoglobin, blood sugar, urea, serum creatinine, serum electrolytes, bleeding time, clotting time, urine - albumin, sugar, electrocardiogram, and X-ray - chest (PA view) were assessed. All the patients taken up for the study were given premedication with an injection of glycopyrrolate 0.2mg IM 45 minutes before the anaesthetic procedure started. Pre-anaesthetic preparation includes an overnight fasting period for a minimum of 6 hours. All the patients were cannulated with an 18G intravenous cannula, and preloading was done with ringer lactate solution 15-20ml/kg body weight over 20 minutes before block induction. The procedure was re-explained to the patients on arrival at the operation theatre. The monitors connected were non-invasive blood pressure, pulse oximeter and electrocardiogram. The anaesthesia machine and resuscitation equipment were checked and kept ready. Baseline vital signs were recorded. The patient was positioned in the right or left lateral position with a table in a horizontal position. Under strict aseptic precaution, the skin over the back was thoroughly cleaned with betadine and draped. Drugs were loaded and kept ready, and L3-L4 intervertebral space was identified using the highest point of the iliac crest as the reference. Skin and subcutaneous tissues overlying the midline of the identified space were infiltrated with 2ml of 2% lignocaine using a 25-gauge hypodermic needle. An 18-gauge Tuohy needle with the stylet was inserted.

RESULTS

Sixty patients were divided into Group I (30 patients) and II (30 patients). The mean age was 38 years for group I patients and 43 years for group II patients, which was statistically significant (p<0.0001). The mean weight was 61.5 kgs for group-I patients and 58.76 kgs for group II patients, which was statistically insignificant. The mean height was 162.8 cm for group I patients and 160.8 cm for group II patients, which was statistically insignificant. The quicker onset of the sensory blockade and delay in the two-segment regression with a longer duration of action was observed in group II patients than in
In group I, seven patients had incomplete motor blockades. In comparison, 23 patients had complete motor blockade compared to 5 patients who had incomplete motor blockade, and 25 patients had a complete motor blockade in group II which was insignificant.

In group I, all 30 patients were oriented in comparison to all the 30 patients in group II, who were drowsy but responded to verbal commands, which was significant (P<0.0001) [Table 2].

Table 1: Patient characteristics between the groups

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>38.93 ± 3.11</td>
<td>43.96 ± 3.63</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Weight (Kgs)</td>
<td>61.53 ± 7.23</td>
<td>58.76 ± 5.69</td>
<td>0.105</td>
</tr>
<tr>
<td>Height (Cms)</td>
<td>162.8 ± 4.4</td>
<td>160.8 ± 5.03</td>
<td>0.107</td>
</tr>
<tr>
<td>Onset of sensory block (min)</td>
<td>10.63 ± 2.55</td>
<td>7.46 ± 1.13</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Level of sensory block (Dermatome level)</td>
<td>8.93 ± 1.01</td>
<td>8.93 ± 1.01</td>
<td>1.000</td>
</tr>
<tr>
<td>Two-segment regression time (min)</td>
<td>112.5 ± 10.64</td>
<td>147 ± 10.38</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Duration of post-operative analgesia</td>
<td>167.16 ± 8.57</td>
<td>212.83 ± 19.98</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table 2: Motor block and sedation between groups

<table>
<thead>
<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor block</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B2</td>
<td>7 (23.3%)</td>
<td>5 (16.7%)</td>
<td>0.519</td>
</tr>
<tr>
<td>B3</td>
<td>23 (76.7%)</td>
<td>25 (83.3%)</td>
<td></td>
</tr>
<tr>
<td>Sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conscious and oriented (Score 2)</td>
<td>30 (100%)</td>
<td>0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Response to verbal commands (Score 3)</td>
<td>0</td>
<td>30 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

No significant deviation in mean arterial blood pressure between groups [Figure 2].

Both groups' mean respiratory rates at various intervals were similar and insignificant [Figure 3].

The mean of SpO2 at various intervals in both groups was similar and insignificant [Figure 4].

**DISCUSSION**

Pain management has become one of the principal missions of the anaesthesiologist. Establishing and
organising acute pain management services are essential for high-quality pain management, but it isn't very easy. From the early 1980s, the practice of epidural analgesia for post-operative pain relief had set in. Earlier, it was routinely used for orthopaedic surgeries, later it was used routinely for surgical and obstetric procedures, and at present, it is practised for thoracotomies too.[9,10] Using benzodiazepines epidurally and intrathecally has opened up a new avenue in post-operative analgesia. Benzodiazepine receptors, including the spinal cord, are in the central nervous system.[11,12] Several experimental investigations were carried out to study the effects of epidural midazolam. It produced amnesia, sedation, and analgesia without any adverse effects. In children, adding midazolam with local anaesthetics to the caudal epidural space for post-operative pain relief has proved effective without side effects.[13-16] Our clinical study aimed to compare the effects of 0.5% bupivacaine with midazolam 2mg through lumbar epidural for cases of inguinal hernia repair. The mean time of onset of sensory block was 10.5 minutes in group I compared to 7.5 minutes in group II patients, which was significant (P<0.001). The mean dermatomal level of sensory blockade was T9 in both groups. The mean of the two-segment regression time was 113 minutes in group I compared to 146 minutes in group II which was significant (P<0.0001). There was no significant difference in the dermatomal level of sensory block and motor block in both groups. Using Ramsay's sedation score, both groups of patients were evaluated. In group I, all the patients were cooperative and orientated (score- 2) for up to 150 minutes. In group II, all the patients scored three up to 180 minutes, and only three patients were sedated for 4 hrs in a group. All these results are similar to the studies done by Nishiyama et al.[17] and Sharma et al.[18] They concluded that a combination of bupivacaine and midazolam induced significantly better analgesia, with significant amnesia, slight sedation and more stable haemodynamic and respiratory condition. In our study, the mean duration of post-operative analgesia was 169 minutes in group I compared to 212 minutes in group II patients, which was significant (P<0.0001). This result is similar to the studies done by Naguib et al.[19] In our study, both groups' duration of surgery varied from 60-90 minutes. Post-operatively pain was evaluated by a visual analogue scale, which was 5-6 up to 150 minutes in group I and up to 180 minutes in group II. The first dose of systemic analgesia was given when the visual analogue score reached 3-4. Here we evaluated the post-operative pain status with a visual analogue scale at various time intervals and time of first demand analgesia in all the cases. The study showed no significant change in both groups during the first 150 minutes as per the visual analogue scale. From the 150 minutes onwards, there was a significant change in the visual analogue scale reading. In group II, 5 demanded analgesia after 180 minutes, 2 demanded analgesia after 190 minutes, 2 demanded analgesia after 195 minutes, three required analgesia after 200 minutes, one demanded analgesia after 205 minutes, four demanded analgesia after 210 minutes, and 2 demanded analgesia after 215 minutes. Six patients didn't require any analgesia, and post-operative analgesia lasted 230-240 minutes. In group I, one patient demanded analgesia after 155 minutes, 6 demanded analgesia after 160 minutes, 5 demanded analgesia after 165 minutes, 5 demanded analgesia after 170 minutes, 3 demanded analgesia after 175 minutes, and five required analgesia after 180 minutes. The pulse rate, mean arterial blood pressure, respiratory rate and oxygen saturation were maintained within the normal range in both groups. No significant side effects were observed in this study in both groups.

CONCLUSION

Midazolam, combined with bupivacaine administered epidurally, has better advantages over bupivacaine alone in increasing the duration of post-operative analgesia without producing any respiratory depression or haemodynamic changes. In clinical practice, epidurally can be used as a safe adjuvant and bupivacaine to increase post-operative analgesia with sedation for cases undergoing inguinal hernia repair.

REFERENCES

2. Linton SJ. Understanding pain for better clinical practice: a psychological perspective.