A STUDY TO ASSESS THE USEFULNESS OF TRANSVERSUS ABDOMINIS PLANE BLOCK AS SOLE ANAESTHETIC FOR DAY CASE BILATERAL HERNIA SURGERY ALONG WITH DEXMEDETOMIDINE INFUSION AND LOCAL INFILTRATION

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ABSTRACT

BACKGROUND
Hernia surgeries are usually done as day case without the need for admission to hospital. Several anaesthesia techniques are used like general anaesthesia, spinal anaesthesia, local infiltration, etc. Here we used combinations of TAP block and sedation to do the surgeries with good operating conditions.

Aim- To study the usefulness of TAP block as a sole anaesthetic technique for day case hernia surgery along with dexametomidine infusion.

MATERIALS AND METHODS
Settings and Design- Sree Gokulam Medical College and Research Institute, Venjaramoodu, Thiruvananthapuram, Kerala, India for a period of one year from 1st May 2015 to 31st April 2016.

45 ASA I-II patients were subjected to hernia surgery under TAP block using USG with 20 mL of Sensorcaine 0.25% along with fentanyl bolus 100 mcg and dexametomidine infusion of 0.5 mcg/kg/hour following bolus of 1 mcg/kg till the end of the surgery. USG was used to perform all the blocks. Only the blocks that were effective were included. The rest were converted to GA and excluded from the study. Patient’s vitals were monitored and pain was assessed postoperatively using VAS scale. Rescue analgesia was given when the VAS scale was >4 using paracetamol or tramadol. Patients were discharged after eight hours once they have voided.

Statistical Analysis- Statistical analysis was done using Microsoft Excel. Mean score and standard deviation were calculated. Proportion and percentages were calculated for categorical variables.

RESULTS
TAP block is useful as an anaesthetic technique for day case hernia surgery.1 Dexmedetomidine bolus and infusion helps to improve patient comfort and suppresses the visceral component of pain during herniorrhaphy.

CONCLUSION
Hernia surgeries can be safely done using TAP plane block and sedation. The advantage of long duration of analgesia gives patient the comfort of early discharge and less need for supplemental opioids. Absence of motor block is also advantageous with early mobilisation and voiding.

KEYWORDS
Transversus Abdominis, Hernia, Local Anaesthetic, Dexmedetomidine, Visual Analogue Scale, Petit Triangle.

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BACKGROUND
TAP plane block is commonly used for postoperative pain relief in lower abdominal surgeries like caesarean sections, hysterectomy and hernia, etc.1 Traditionally, it was done as a blind procedure using blunt needle and feeling for the boundaries of Petit triangle and later feeling for two pops when the fascia of external oblique and internal oblique is penetrated.2

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Rafi et al used single pop at the Petit triangle to identify the space. With the use of ultrasound in anaesthesia it is possible to deposit local anaesthetic in the TAP plane accurately making the block successful and effective in lots of abdominal surgeries even in obese patients with high success rate.2 TAP plane block is used to produce analgesia to parietal peritoneum, muscle and skin for spinal segments T10–L1 and higher depending on the volume of drug administered.

The block is considered safe as it has no major haemodynamic effects following administration. When performed with ultrasound the plane can be accurately identified. Patients with cardiac disease, COPD, aortic valve diseases, elderly, renal diseases, etc. can be given TAP block without major problems. Post-procedure complications like nausea, vomiting, urinary retention were lower when compared to spinal or general anaesthesia that are commonly given for hernia surgeries. Patients with contraindication for central neuraxial block also may be given this block due to low
complication rates associated with this block. Other advantages of TAP block are no need for hospital stay, no need for large volume of IV fluids postoperatively to prevent headache, etc.

Urinary retention, difficulty in walking, haemodynamic changes, nausea, vomiting were closely monitored and found to be rare in patients who were given TAP block. Patients who are given TAP block could be mobilised easily, with less postoperative pain medications, easily voided and discharged earlier than normal when compared with cases operated under routine spinal anaesthesia or general.

Objective
Objective of the study is to assess the usefulness of TAP plane block and dexmedetomidine infusion as sole anaesthesia for day-case hernia surgeries.

MATERIALS AND METHODS
An observational study was conducted among patients undergoing inguinal hernia surgery using TAP block at Sree Gokulam Medical College during 1st May 2015 to 31st April 2016. The study was approved by the ethical committee of Sree Gokulam Medical College prior to commencement. Informed consent was obtained from patients. Only ASA I and II patients were included in the study.

Inclusion Criteria
• ASA PS I or II.
• Age 40-60.
• Male sex.
• No history of allergy to local anaesthetics or any of the drugs used.
• No infection at the point of injection.
• Patients willing to undergo procedure under TAP block.

Exclusion Criteria
• Patient’s refusal.
• Psychiatric patient.
• Major Coagulation abnormalities.
• Major systemic diseases like heart disease, lung disease.
• Very large hernia.
• Complicated hernia.

RESULTS
The mean age of the study participants was 51.83 ± 5.45 years. The mean weight of the participants was 63.4 ± 7.80 Kg.

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Number of Patients</th>
<th>Percentage of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-50</td>
<td>21</td>
<td>46.7</td>
</tr>
<tr>
<td>51-60</td>
<td>24</td>
<td>53.3</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1. Age Distribution of Patients

<table>
<thead>
<tr>
<th>Weight in Kg</th>
<th>Number of Patients</th>
<th>% of Patients in each Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td>50-60</td>
<td>15</td>
<td>30%</td>
</tr>
<tr>
<td>61-70</td>
<td>25</td>
<td>56.7%</td>
</tr>
<tr>
<td>&gt;70</td>
<td>1</td>
<td>3.3%</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2. Weight Distribution of Patients

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Yes</th>
<th>No</th>
<th>Percentage of Patients with comorbidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>3</td>
<td>42</td>
<td>2.2</td>
</tr>
<tr>
<td>Diabetes</td>
<td>1</td>
<td>44</td>
<td>2.2</td>
</tr>
<tr>
<td>Bronchial asthma</td>
<td>13</td>
<td>32</td>
<td>28.8</td>
</tr>
</tbody>
</table>

Table 3. Comorbidity within the Group

<table>
<thead>
<tr>
<th>ASA Physical Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA PS I</td>
<td>23</td>
<td>51.1</td>
</tr>
<tr>
<td>ASA PS II</td>
<td>22</td>
<td>48.9</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. ASA Physical Status of Patients
operative anaesthesia using USG traditionally done as a blind procedure in the Petit triangle, internal oblique and managed surgical pain by injecting local anaesthetic in between the need for postoperative morphine was less and error of 17.625, no major complication period. The average duration of postoperative analgesia was a went uneventful, with analgesia lasting in the postoperative 45 patients were subjected to hernia surgeries with TAP block commenced after 30 landmarks, USG and under vision by both lower abdominal and upper abdominal surgery by abdominal field block done for postoperative pain relief for TAP block or and patients required less morphine post-operatively. observed that TAP block was useful as multimodal analgesia of the iliac crests as reported by Shibitay et al for hernia surgeries in 26 patients using ultrasound guidance and they reported a sensory block up to T7 to L1 dermatomes, when local was injected in cephalic to caudal direction in the posterior TAP plane. Similar spread was described by Hibbard Shihbata and colleagues in gynaecological laparoscopic surgeries in 26 patients using ultrasound guidance and they suggested lower abdominal surgery as the main use for TAP block. In contrast, a study by McDonnell and colleagues reported a sensory block up to T7 to L1 in volunteers when landmark technique was used and TAP block was done through Petit triangle using 25G blunt needle. In another randomised trial, TAP block was used successfully for large bowel surgery with midline incision with reduction in morphine requirement postoperatively.

The path of ilioinguinal nerve is subjected to variability in position, it penetrates the transversus abdominis muscle and enters the TAP plane in different places in relation to the anterior iliac crest. In 24 out of 244 specimens dissected, the ilioinguinal nerve joined the TAP only at the anterior 20% part of the iliac crests as reported by Shibitay et al in a review. The analgesic efficacy of transversus abdominis plane block after caesarean section in an RCT, done by McDonnell JG et al observed that TAP block was useful as multimodal analgesia and produced superior analgesia than placebo up to 48 hrs. and patients required less morphine post-operative. In another study done by EL-Dawlatly AA et al., patients were randomised to receive either TAP block of 15 mL of bupivacaine on each side or placebo, pain was substantially reduced and requirement for morphine postoperatively in TAP group. Rafi et al in 2012 described that variable results were due to failure in technique in administering the local in correct plane, he described a single pop of technique at the apex of the triangle with feel for one pop as described by Rafi et al and later by feeling for two pops one of external oblique and another for internal oblique before it is deposited in the plane between transversus abdominis and internal oblique as described by McDonnell and his colleagues. They demonstrated its utility in retropubic prostatectomy. Usually 20-25 mL of local anaesthetic is deposited. Commonly used preparations are Ropivacaine 0.2%, Bupivacaine 0.25%, and 0.375% Ropivacaine, and 0.5% Ropivacaine by different authors. The actual spread of local anaesthetic is not clear yet. Studies in cadaver and human volunteers suggests that 20 mL of local anaesthetic spread from costal margin to iliac crest exerts a complete sensory block of abdominal wall. Some authors have shown only limited spread of local anaesthesia to segments T10 level.

Rosen WM et al in a review redefining the course of the thoracolumbar nerves in 2008 has described the innervation of the anterior abdominal wall. The TAP is a fascial plane between internal oblique and transversus abdominis, it exists as a continuous plane at any point in the abdomen where the two innermost muscle layers exist. The nerves running in the TAP originates strictly from T9–L1 nerve segment. USG was first described by Hebbard P et al, Tran TMN et al in review in 2009 on the spread of local anaesthetic in TAP block in cadaver using dye found the spread limited to T10-L1 dermatomes, when local was injected in cephalic to caudal direction in the posterior TAP plane. Similar spread was described by Hibbard Shibata and colleagues in gynaecological laparoscopic surgeries in 26 patients using ultrasound guidance and they suggested lower abdominal surgery as the main use for TAP block. In contrast, a study by McDonnell and colleagues reported a sensory block up to T7 to L1 in volunteers when landmark technique was used and TAP block was done through Petit triangle using 25G blunt needle. In another randomised trial, TAP block was used successfully for large bowel surgery with midline incision with reduction in morphine requirement postoperatively.

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Venkataraman R et al used 0.2% ropivacaine 20 mL and normal saline in 60 patients and observed no difference in VAS scores at 0, 2 and 24 hours between the two groups, but there was a reduction in pain at 4, 6, 12 hours with reduction in VAS scores.\(^4\) Sudhynanti Kerai et al reported two cases of laparotomy and hernia surgery done for high risk patients with TAP block and IV Dexmedetomidine. Some authors describe the low success of the block due to the wrong plane of deposition with blind technique and only 23.6% were spared in AK. Bupivacaine in transversus abdominis plane block was more effective and better evaluated. Reg Anesth Pain Med 2017;32(5):399-404.

Usefulness of TAP block in paediatric patients are also reported. Incidence of any major complications are rare but rare reports of visceral injuries have been reported.\(^28\)

CONCLUSION

TAP block with supplemental IV sedation and incision site infiltration is an effective anaesthetic technique for bilateral hernia surgeries.\(^{29}\) Use of ultrasound and better understanding of correct plane of deposition makes the block more useful. Though widely used many more research studies and clear understanding may make the block more successful in future. Supplementation with dexmedetomidine would take care of the visceral component of pain that is spared in TAP block.

REFERENCES


