Effect of Use of Ropivacaine as Preemptive Local Anesthesia in Laparoscopic Cholecystectomy

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ABSTRACT

Background: Postoperative pain of laparoscopic cholecystectomy is a dilemma. Ropivacaine is reported to have significant control over pain after laparoscopic cholecystectomy.

Aim: To get local evidence as if ropivacaine found to be effective in reducing postoperative pain and less analgesia consumption, then in future we can implement the use of ropivacaine as preemptive local anesthesia

Methods: This randomized controlled trial was done at Ghurki Teaching Trust hospital, Lahore for 6 months. Sample size of 60 patients was included through consecutive sampling. Then patients were randomly divided in two groups. In group R, 30 patients will be given Ropivacaine. In group NS, normal saline was given. After surgery patients were shifted to post-surgical wards and were followed-up there for 24 hours. During 24 hours, pain score and analgesia consumption was noted. Data was analyzed in SPSS 21.

Results: In group R, the mean age of patient was 41.33±10.58 years and in group NS, the mean age of patient was 39.99±12.04 years. In group R, there were 19 (63.3%) males and 11 (36.7%) females. In group NS, there were 21 (70%) males and 9 (30%) females. After 24 hours, the mean pain score was 4.73±1.08 in R group while 5.47±1.17 in NS group (p<0.01) and mean analgesia consumption was 4.0±0.91mg in R group while 5.90±0.76mg in NS group. The difference was highly significant on (p<0.01).

Conclusion: Ropivacaine as preemptive local anaesthesia in laparoscopic cholecystectomy is effective in reducing pain and analgesia consumption.

Key words: ropivacaine, normal saline, preemptive local anaesthesia, laparoscopic cholecystectomy, pain score, analgesia consumption

INTRODUCTION

Laparoscopic cholecystectomy has replaced open cholecystectomy as the gold standard surgical procedure for majority of patients with gallstone disease. Conventional laparoscopic cholecystectomy is done using four ports. With an effort to minimise the number of ports, single-incision laparoscopic surgery has come into practice1, 2.

Laparoscopic cholecystectomy is considered as the treatment of choice for symptomatic cholelithiasis3. Laparoscopic surgery has displayed advantages over open surgery, including less post-operative pain, smaller incisions, shorter postoperative ileus, reduced blood loss, reduced length of hospital stay, faster recovery, as well as earlier return to preoperative activity and work4-6.

Immediate postoperative pain and analgesia requirements in the post-anaesthesia care unit varies according to type of surgery, patient characteristics, and the timing and amount of intraoperative analgesia6. Laparoscopic cholecystectomy is a surgical procedure that frequently results in significant immediate postoperative pain and the need for rescue analgesia in the post-anaesthesia care unit7, 8.

Various local anesthetics such as lignocaine, bupivacaine, ropivacaine, and levo-bupivacaine have been evaluated in many trials9-10. Barczynskiet al. evaluated the optimal timing of bupivacaine peritoneal instillation and concluded that peritoneal instillation was much more effective for pain relief if used before creation of pneumoperitoneum11. Kucukiet al. have found that intraperitoneal instillation of 150 mg of ropivacaine was significantly more effective than either 100 mg bupivacaine or 100 mg ropivacaine for preventing postoperative pain12.

So, we planned to conduct this study as to get local evidence in this regard. As if ropivacaine found to be effective in reducing postoperative pain and less analgesia consumption, then in future we can implement the use of ropivacaine as preemptive local anaesthesia.

MATERIAL AND METHODS

This randomized controlled trial was done at Ghurki Teaching trust hospital, Lahore for 6 months (from Aug 2018 to Feb 2019). The study was approved by the Institutional Ethical Board. Sample size of 60 patients was calculated with 95% confidence level, 80% power of study and taking magnitude of mean pain score i.e., 0.38±0.66 with ropivacaine and 2.56±0.07 with normal saline. The patients were recruited through wards with complaint of cholelithiasis (on ultrasound). Patients with previous treatment of malignant disease, acute pancreatitis, pregnancy, prolonged administration of NSAIDS or other analgesics, liver disease, abnormal bleeding profile, history of peritonitis, carcinoma gall bladder, splenomegaly, were excluded. Informed consent was obtained and demographics were noted. Then patients were randomly divided in two groups by using lottery method. In group R,
30 patients will be given 0.5% of 3mg/kg Ropivacaine diluted in 100ml saline. In group NS, 100ml normal saline was given. Instillation was done at intraperitoneal space before creation of pneumoperitoneum. After, surgery patients were shifted to post-surgical wards and were followed-up there for 24 hours. During 24 hours, pain score was noted hourly. Pain score was assessed by using visual analogue scale. Paracetamol 1g was given in cases with pain score >4 and total dose was observed during 4 hours. Data was entered & analyzed in SPSS 21.

RESULTS

In group R, the mean age of patient was 41.33±10.58 years and in group NS, the mean age of patient was 39.99±12.04 years. In group R, there were 19 (63.3%) males and 11 (36.7%) females. In group NS, there were 21 (70%) males and 9 (30%) females. The mean duration since diagnosis of choleolithiasis was 5.64±1.28 years in group R and 6.69±3.67 years in group NS. The mean BMI of patients was 29.58±11.32 kg/m² in R group while 28.91±10.22 kg/m² in NS group. The mean duration of surgery was 53.75±6.29 min in R group while 55.89±7.11 min in NS group. Table 1 depicts these.

At baseline (0 hours after surgery), the mean pain score was 0.12±0.08 in R group while 1.01±0.13 in NS group. After 6 hours of surgery, the mean pain score was 0.97±0.81 in R group while 2.10±0.88 in NS group. After 12 hours of surgery, the mean pain score was 1.93±0.93 in R group while 2.87±0.82 in NS group. After 18 hours of surgery, the mean pain score was 4.43±1.17 in R group while 5.40±1.00 in NS group. After 24 hours of surgery, the mean pain score was 4.73±1.08 in R group while 5.47±1.17 in NS group. The difference was highly significant on all points (p<0.01). Table 2

At baseline (0 hours after surgery), the mean analgesia consumption was 0 in R group while 0 in NS group. After 6 hours of surgery, the mean analgesia consumption was 0 in R group while 1.50±0.51mg in NS group. After 12 hours of surgery, the mean analgesia consumption was 1.97±0.89mg in R group while 3.53±0.51mg in NS group. After 18 hours of surgery, the mean analgesia consumption was 2.23±0.77mg in R group while 4.13±0.82mg in NS group. After 24 hours of surgery, the mean analgesia consumption was 4.00±0.91mg in R group while 5.90±0.76mg in NS group. The difference was highly significant on all points (p<0.01), except at baseline. Table 3

Table 1: Demographic details of patient

<table>
<thead>
<tr>
<th>Group</th>
<th>R</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Age (years)</td>
<td>41.33±10.58</td>
<td>39.99±12.04</td>
</tr>
<tr>
<td>Gender (M / F)</td>
<td>19 / 11</td>
<td>21 / 9</td>
</tr>
<tr>
<td>Duration of choleolithiasis (years)</td>
<td>5.64±1.28</td>
<td>6.69±3.67</td>
</tr>
<tr>
<td>BMI</td>
<td>29.58±11.32</td>
<td>28.91±10.22</td>
</tr>
<tr>
<td>Duration of surgery</td>
<td>53.75±6.29</td>
<td>55.89±7.11</td>
</tr>
<tr>
<td>ASA I / II</td>
<td>20 / 10</td>
<td>25 / 5</td>
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</tbody>
</table>

Table 2: Comparison of pain score in both groups

<table>
<thead>
<tr>
<th>Postoperative pain score</th>
<th>Group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 hour</td>
<td>R</td>
<td>0.12±0.08</td>
</tr>
<tr>
<td>NS</td>
<td>1.01±0.13</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>6 hour</td>
<td>R</td>
<td>0.97±0.81</td>
</tr>
<tr>
<td>NS</td>
<td>2.10±0.88</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>12 hour</td>
<td>R</td>
<td>1.93±0.93</td>
</tr>
<tr>
<td>NS</td>
<td>2.87±0.82</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>18 hour</td>
<td>R</td>
<td>4.43±1.17</td>
</tr>
<tr>
<td>NS</td>
<td>5.40±1.00</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>24 hour</td>
<td>R</td>
<td>4.73±1.08</td>
</tr>
<tr>
<td>NS</td>
<td>5.47±1.17</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

DISCUSSION

Laparoscopic cholecystectomy is the preferred surgical technique for cholelithiasis. Severity of postoperative pain and opioid consumption is less with better pulmonary function in laparoscopic procedures compared with open cholecystectomy. Although post-operative pain is less intense as compared to open procedure, patients often complain of considerable pain in the first 24 hours. Postoperative nausea, vomiting and pain are two of common complications seen after ambulatory laparoscopic cholecystectomy.

The time to first rescue analgesic was significantly longer with ropivacaine (7.84±1.34h) as compared to NS (1.72±0.67h), p<0.001. Mean tramadol consumption for 24hrs was significantly lower with ropivacaine as compared to NS (202±33.78mg) as compared to NS (298±22.73mg) p<0.001. Postoperative pain scores were also significantly less with ropivacaine as compared to NS during first 6 hours, p<0.05. Rescue analgesic requirement showed a 32.21% reduction with ropivacaine.

Bindra et al., found that mean pain was 2.88±0.82 with ropivacaine and 3.80±1.86 with NS (p=0.001) after 6 hours, 2.28±1.17 with ropivacaine and 3.16±1.99 with NS (p=0.001) after 12 hours, 1.46±1.59 with ropivacaine and 3.64±1.97 with NS (p=0.001) after 18 hours and 0.38±0.66 with ropivacaine and 0.56±0.97 with NS (p=0.001). The number of rescue analgesic requested was significantly lower with ropivacaine as compared to NS and the difference was highly significant (p values<0.001). The mean paracetamol consumption for 24hrs was 1.3409±0.52gm with ropivacaine and 4.7000±0.97416 gm with NS which was also significantly lower with ropivacaine than with NS (p value<0.001).

While in another trial, Bindra et al., found that mean pain was 2.88±0.82 with ropivacaine and 3.80±1.86 with NS (p=0.001) after 6hours, 2.28±1.17 with ropivacaine and 3.16±1.99 with NS (p=0.001) after 12 hours, 1.46±1.59 with ropivacaine and 1.64±1.67 with NS (p=0.601) after 18 hours and 0.38±0.66 with ropivacaine and 0.56±0.97 with NS (p=0.464) and mean total analgesic was 1340±52.28gram with ropivacaine and 2400±97.42gram with NS (p=0.00012).
The total analgesic requirement was also significantly less in patients who received intraperitoneal instillation of drug before creation of pneumoperitoneum (1.34±0.52g paracetamol) than patients who received after completion of surgery (2.4±0.97g paracetamol). Maestroni et al. also observed a significantly lower total pain intensity and total analgesic requirement during initial 8 h postoperatively in patients who received ropivacaine preemptively. Kim et al. also concluded intraperitoneal instillation of ropivacaine at the beginning of laparoscopic cholecystectomy combined with NS infusion is an effective method for reducing pain after laparoscopic cholecystectomy.

CONCLUSION

Ropivacaine as preemptive local anesthesia in laparoscopic cholecystectomy is effective in reducing pain and analgesia consumption. Now in future, we will recommend to add ropivacaine in anesthesia to decrease the post-operative complications.

REFERENCES