Effect of meloxicam on postoperative pain relief after inguinal hernia repair with local anaesthesia

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ABSTRACT

AIM: To investigate the effect of the administration of a single dose of meloxicam pre-emptively on operative pain management in patients who underwent inguinal hernia repair under local anaesth

SUBJECTS AND METHOD: Fifty patients who underwent inguinal hernia repair under local anaesth the period November 2005 to May 2006 were recruited into the study prospectively. The patients w randomized to two groups regarding administration and non-administration of pre-emptive meloxicam postoperative visual analogue pain scale (VAS) values at 4, 8, 12 and 24 hours and analgesic needs
RESULTS: No difference was found between the groups in terms of age, gender, hernia localization. The VAS values of the patients regarding their pain severity were evaluated at 4, 8, 12 and 24 hours significantly lower in the group which received meloxicam pre-emptively ($p = 0.001, 0.0001, 0.003$ respectively). The need for non-steroidal anti-inflammatory drug was also found to be significantly less ($p = 0.0001$).

CONCLUSION: Postoperative pain severity and hence analgesic requirement were significantly decreased in patients who received meloxicam pre-emptively. Single dose pre-emptive meloxicam seems to be an effective analgesic therapy for patients undergoing inguinal hernia repair under local anaesthesia. It thereby improves patients comfort and should be considered for use in outpatient surgery.

RESUMEN

OBJETIVO: Investigar el efecto de la administración de una dosis de meloxicam de forma preventiva en el tratamiento del dolor postoperatorio en pacientes sometidos a una reparación quirúrgica de hernia inguinal bajo anestesia local.

SUJETOS Y MÉTODOS: Cincuenta pacientes que tuvieron una reparación de hernia inguinal bajo anestesia local durante el período de noviembre de 2005 a mayo de 2006, fueron reclutados para el estudio prospectivo. Los pacientes fueron divididos aleatoriamente en dos grupos, partiendo del criterio de la administración o no administración de meloxicam de modo preventivo. Se registraron los valores de visual-analógica (EVA) para el dolor postoperatoria a las 4, 8, 12 y 14 horas, así como las necesidad analgésicas de los pacientes.

RESULTADOS: No se hallaron diferencias entre los grupos en relación con la edad, el género, la localización del tipo de hernia. Los valores de la EVA de los pacientes con respecto a la severidad de su dolor, fueron a las 4, 8, 12 y 24 horas, y resultaron ser significativamente más bajos en el grupo que recibió meloxicam de forma preventiva ($p = 0.001, 0.0001, 0.003$ y $0.0001$ respectivamente). También se halló que la necesidad de medicamento anti-inflamatorio no esteroidal era significativamente más baja ($p = 0.0001$).

CONCLUSIÓN: La severidad del dolor postoperatorio y por lo tanto la necesidad de analgésicos, experimentaron una disminución significativa en los pacientes que recibieron meloxicam de forma preventiva. Una dosis sencilla de meloxicam de forma preventiva parece ser una terapia analgésica efectiva para pacientes que han sido sometidos a reparación quirúrgica inguinal con anestesia local. Su aplicación mejora el alivio del dolor, y debe tenerse en cuenta su uso para la cirugía ambulatoria.

INTRODUCTION

Postoperative pain is a considerable problem faced following a hernia operation (1, 2). Many studies have been performed in order to reduce postoperative pain. Pre-emptive analgesia, a concept first introduced at the beginning of the 20th century, is defined as an anti-nociceptive treatment that prevents establishment of central processing of afferent input due to injuries and starts before surgery (2-6). Postoperative pain is reduced more considerably by analgesics administered in anti-nociceptive dose before the surgical procedure compared to post-procedure analgesics (7, 8). Many drugs such as systemic opioids, non-steroidal anti-inflammatory drugs (NSAIDs) and neuroaxial blocking agents have been assessed in various studies and have significant adverse effects such as respiratory depression, nausea, vomiting, constipation and urinary retention. Both pre-operative and postoperative administration of COX-2 inhibitors seem to exert a significant opioid-sparing effect. The studies regarding the use of COX-2 inhibitors suggest that they improve patient recovery and patient satisfaction with post-operative pain management (4).
Non-steroidal anti-inflammatory drugs have been widely used, following surgical interventions, for the need for opioid (9, 10). They inhibit the activity of cyclo-oxygenases (COX). While clearly effects of NSAIDs are thought to be due to COX-1 inhibition, its analgesic and antipyretic effects are be due to COX-2 inhibition (11). These assumptions constitute the main reason for the development COX-2 inhibitors (12).

Inguinal hernia operations are performed under local anaesthesia in many clinics and most of these discharged home within a few hours postoperatively. Reduction or prevention of postoperative pain for patient comfort and to allow early discharge. In this study, the effect of pre-emptive meloxicam postoperative pain and analgesic need was investigated in patients who underwent inguinal hernia repair under local anaesthesia.

**SUBJECTS AND METHODS**

This prospective and randomized study included 50 patients who underwent inguinal hernia repair under local anaesthesia between November 2005 and May 2006. The study was approved by Gazi University Ethical Committee. Age, hernia type, hernia localization (left/right) and gender of each patient were recorded. Types were classified according to Gilberts classification (Table 1). Lichtenstein tension free inguinal repair was performed in all patients. Patients were divided into two groups in terms of pre-operative meloxicam usage. Patients in group I received no pre-emptive analgesia while those in group II received meloxicam (15 mg orally) 30 minutes before the operation. All patients were sedated with intravenous midazolam at the beginning of the procedure and received another 2 mg as needed. The local anaesthetic infiltrated was 4 mls of 1% lidocaine, 1 ml of lidocaine containing 1:200 000 epinephrine and 5 mls of 0.5% bupivacaine. General anaesthesia was not required for any patient. All the patients hospitalized for 24 hours following the operation in order to determine their postoperative pain level analgesic needs. Postoperative pain of each patient was evaluated at 4, 8, 12 and 24 hours following procedure.

**Table 1:** Modified Gilberts’ Classification by Rutkow and Robbins (34)

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>Indirect inguinal hernia, tight internal ring through which passes a peritoneal sac of any size</td>
</tr>
<tr>
<td>Type 2</td>
<td>Indirect inguinal hernia, moderately enlarged internal ring that measures no more than 4 cm</td>
</tr>
<tr>
<td>Type 3</td>
<td>Indirect inguinal hernia, patulous internal ring of more than 4 cm</td>
</tr>
<tr>
<td>Type 4</td>
<td>Direct inguinal hernia, essentially the entire floor of the inguinal canal is defective</td>
</tr>
<tr>
<td>Type 5</td>
<td>Direct inguinal hernia, diverticular defect of no more than 1 cm or 2 cm in diameter</td>
</tr>
<tr>
<td>Type 6</td>
<td>Both indirect and direct inguinal hernia (Pantaloons hemias)</td>
</tr>
<tr>
<td>Type 7</td>
<td>Femoral hernia</td>
</tr>
</tbody>
</table>
Pain scores were evaluated using the visual analogue pain scale (VAS). Patients were asked to score with a number between 0 and 10 (0 for no pain and 10 for extremely severe pain). A single dose of selective NSAID (Diclofenac sodium 75 mg) was administered intra-venously to patients whose VAS the postoperative period. Patients whose VAS remained above 3 in spite of the single dose of non-selective NSAID, received parenteral (IM) meperidine HCl at 0.5 mg/kg.

The data were evaluated by Chi-square and Mann Whitney test using SPSS 11.0 version; \( p < 0.05 \) was significant.

RESULTS

The distribution of patients in terms of age, hernia localization and hernia types is given in Table 2. Patients were male. No difference was found between the groups. However, when the postoperative were evaluated, a significant difference was found in terms of VAS values at 4, 8, 12 and 24 hours between the groups (Table 3). The VAS values in Group I at 4, 8, 12 and 24 hours were 2.3, 2.6, 2.0 and 1.0 respectively. The values found in Group II were 0.8, 0.7, 0.9 and 0.3 respectively. However, the values of VAS at group I and that at 12 hours in group II were higher than other VAS values. These were the times at which patients required analgesia. The need for analgesia was observed to be lower in the patients in group I who received meloxicam. In Group I, 22 patients (88%) were given NSAID postoperatively while only 9 (40%) patients in Group II received NSAID and the difference was statistically significant (\( p = 0.001 \)) (Table 4). Meperidine was not needed in any of the patients in group II, while 10 (40%) of those in group I received it (\( p = 0.0001 \)) (Table 4). Early post-operative complications such as haematoma, seroma and superficial infection were not seen in any of the patients included in this study. No side effects such as nausea, gastric intolerance were observed.

<table>
<thead>
<tr>
<th>Table 2: Demographic characteristics of the patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>[\text{Group I} \quad \text{Group II} \quad \text{p-value}]</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Left : Right</td>
</tr>
</tbody>
</table>
| Gilbert’s classification | \[\begin{array}{c|c|c|}
| & \text{Group I} & \text{Group II} \\
| 1 & - & - \\
| 2 & - & - \\
| 3 & 1 & - \\
| 4 & 5 & 7 \\
| 5 & 4 & 2 \\
| 6 & 15 & 16 \\
| \end{array}\] | NS |

NS: Not significant
DISCUSSION

Many inflammatory mediators including prostanoids are released as a result of the surgical trauma. Mediators display their effects on pain development by either changing the firing threshold or by dir stimulation of the nociceptors (13). Non-steroidal anti-inflammatory drugs block the prostaglandin synthesis especially PGE by inhibiting cyclo-oxygenase enzyme which decreases the production of mediator occurring as a response to an acute injury. Many studies have shown that NSAIDs reduce pain and the firing threshold of the nociceptors (14–16). Non-steroidal anti-inflammatory drugs inhibit both COX-1 and COX-2. Unwanted side effects which arise due to COX-1 inhibition occur along with the anti-inflammatory pyretic activity (11, 12). Preferential COX-2 inhibitor drugs are used as non-opioid agents for pain control and postoperative usage of preferential COX-2 inhibitor drugs decrease the side effects of the post-operative period for surgical patients (4, 17). Meloxicam is one of which preferentially inhibits the COX-2 enzyme (18–20). The relative ratio of COX-1:COX-2 inhibition by meloxicam on humans was shown to be 1:10–13 (20, 21). Since the half life of meloxicam is approximately 22 hours, it can be administered as a single dose therapy per day. Therefore, meloxicam was chosen as a pre-emptive agent in this study. The recommended daily adult dose is 7.5–15 mg (22). Pre-operative meloxicam usage was shown to be efficient and safe for postoperative pain management in studies in animals (23).

COX-2 inhibitors were found to cause less gastric erosion in patients with osteoarthritis and rheuma osteoarthritis as compared to the non-selective NSAIDs (24, 25). Gastrointestinal side effects arising from chronic use of meloxicam were investigated and it was found to cause less gastrointestinal side effects in patients with osteoarthritis as compared to the non-selective NSAIDs (26). Because meloxicam causes less inhibib
gastric mucosal PGE synthesis, gastric mucosa is minimally disturbed and gastric tolerance towards very high (27, 28). Several studies have shown that meloxicam does not impair platelet function or tromboxane levels (29, 30). In the present study, no early complications, such as seroma or haema wound site, that would indicate thromboocyte disturbance, had occurred. Also, none of the patients gastrointestine side effects such as epigastric pain, nausea and vomiting.

Studies which focussed on the effectiveness of non-selective NSAIDs on postoperative pain showed these agents reduced postoperative pain and hence the need for opioids. Nevertheless, this effect varied according to the chosen drug, dosage and the type of surgical procedure (31, 32). In one study, the morphine dose required for analgesia was reduced in subjects treated with a pre-emptive analgesic (32). In a study using Rofecoxib, less pain and decreased opioid needs were observed in the patient received pre-emptive analgesia as compared to those who did not (33). In another study, VAS value morphine usage were found to be decreased by pre-operative meloxicam administration in patients underwent abdominal hysterectomy (32). That study also showed significantly lower VAS scores in postoperative period in patients who received pre-emptive meloxicam as compared to those who did not.

Group I, 22 patients (88%) required NSAID postoperatively, while in Group II it was 9 (36%, p = 0.0001). Pre-emptive analgesia was shown to reduce post-operative pain following hernia repair performed under local anaesthesia and increased patient comfort in the post-operative period.

This study confirms that pre-emptive analgesia with a single dose of 15 mg meloxicam reduces post pain and increases patients comfort following Lichtenstein tension free hernia repair under local anaesthesia.

**REFERENCES**


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