

Analgesic Effects of Naproxen Suppository and Local Marcaine Injection on Inguinal Hernia Surgery

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Background: Nonsteroidal anti-inflammatory drugs (NSAIDs) are routinely used after surgery, especially after minor procedures such as inguinal herniorrhaphy. Local anesthetics such as marcaine are also used in many minor procedures.

Objectives: The aim of this study was to examine the efficacy and safety of a commonly used NSAID, naproxen, versus wound infiltration by marcaine, on inguinal herniorrhaphy. We hypothesized that naproxen would reduce postoperative pain following inguinal hernia repair surgery more effectively than local marcaine injection, but the possible complications may be the same or less.

Patients and Methods: In this double-blind controlled clinical trial, 150 patients undergoing inguinal herniorrhaphy were divided into three groups: A (marcaine infiltration in the wound + sup-placebo), B (two sup-naproxen suppositories) and C (sup-placebo). Standard analgesic and antiemetic were available to all the patients. Primary endpoints were postoperative pain, measured at the beginning of the operation, 22 O'clock at night, and the tomorrow morning, using visual analogue scale (VAS) score and the dosage of morphine that the patients needed.

Results: Baseline characteristics were equivalent between the three groups. In group B with naproxen, after the operation, decreased pain by 65 ± 23% at the beginning, decreased pain by 34 ± 16% at the 22 O'clock at night and decreased pain by 19 ± 12% at the tomorrow morning were observed. In this group, the patients received 4.4 ± 2 mg less morphine (A), versus the marcaine (B) and the placebo groups (P < 0.001). No side effects or complications were observed following naproxen administration.

Conclusions: Naproxen is an effective and low-cost adjunct for pain control after inguinal herniorrhaphy surgery. It is also better than wound infiltration with marcaine because of lower incidence of complications and morphine consumption.

Keywords: Herniorrhaphy; Marcaine; Naproxen; Local Anesthesia

1. Background

Postoperative pain after inguinal hernia repair (IHR) is a prevalent setback in day-case and out-patient settings (1). This is due to autonomic stimulation and catecholamine release, which can cause not only patients dissatisfaction, but also serious undesirable phenomena such as mutability, increased myocardial oxygen demand, immobility, and atelectasis (2). Various strategies and drugs with different routes of administration have been evaluated in acute pain after herniorrhaphy such as many local anesthetics (LA), sedatives, and some nonsteroidal anti-inflammatory drugs (NSAIDs) such as naproxen in company with morphine (1-7). These strategies have different levels of effects on lowering the morphine dose and subsequently its complications such as respiratory depression, pruritus, etc., as well as improving pain and patients' satisfaction degree. NSAIDs such as naproxen have been previously evaluated and widely used for postoperative pain after minor surgeries (8), but rarely compared with local anesthetics after inguinal hernia repair. Naproxen is available in oral and sup-

pository forms, but the latent is applicable for unconscious patients.

2. Objectives

In this study, we decided to compare the effects of naproxen and wound injection with marcaine on pain as well as the complications after inguinal herniorrhaphy.

3. Patients and Methods

In this double-blind randomized controlled clinical trial, 150 patients undergoing inguinal herniorrhaphy were divided equally into three groups: group A received marcaine injection in wound plus suppository placebo, group B received naproxen suppository, and group C received only placebo supplements. The dosing protocol was for 2 mg of 0.125% marcaine solution and naproxen was administered as 500 mg by two separate doses, the first one an hour after the surgery and the second one at 22 O'clock at night. All operations were performed in

Table 1. Comparison of Group-Related Factors and Significance Using Student Tests ^{a,b}

	A (Marcaine)	B (Naproxen)	C (Placebo)	P Value
Pain-free period, h	5.5	5.48	5.3	NS
VAS, starting pain	83.2	65.6	90	< 0.001
VAS, night	36	34.6	58.8	< 0.03
VAS, next morning	19.8	19.6	27.4	0.02
Morphine dosage, mg	5.88	4.4	7.78	< 0.001

^a Abbreviations: VAS, visual analogue scale; NS, not significant.

^b T-test and Mann-Whitney test due to type of distribution.

the morning in our hospital. Besides this protocol, standard morphine (0.5-4 mg) and antiemetic were available to all the patients, if needed. Primary endpoints were the postoperative pain, measured using visual analogue scale (VAS) score at the beginning of the operation, 22 O'clock at night, and the tomorrow morning. The dosage of morphine the patients received and all the possible complications as well as adverse drug effects such as gastrointestinal (GI) bleeding and azotemia were recorded. All the patients in need for inguinal hernia repair were included. Exclusion criteria were a history of peptic ulcer disease, renal failure, cardiac arrhythmia, steroid usage, NSAIDs usage except ASA, opium addiction, and finally the patient's dissatisfaction.

3.1. Statistical Analysis

Data obtained using questionnaires were analyzed by SPSS 14. Every P value was calculated with 95% confidence interval. Descriptive statistics were reported as mean \pm SD. Since the pain scores obtained in both groups at different times were not normally distributed, they were compared using the nonparametric analogue with student T-test and Mann-Whitney test results.

4. Results

In this study, 72 patients underwent Lichtenstein operation and 25 and 41 patients were treated with Bassini and drain-assistance surgery, respectively. Among all 150 patients, there were no differences among pre- and intra-operative factors such as age, duration and types of surgery and hemorrhage extent, except for not injecting marcaine placebo in groups A and B. The mean age \pm SD was 51 \pm 19.22 and all the patients were male; 127 patients had mild severity and 16 and 7 had moderate and severe operations. Scrotal hernia was absent in 122 patients and 10 cases were facing recurrent hernia. Hemovac drain was used for six patients, four of which were naproxen and two were marcaine receivers. All the hemovac cases were discharged the next day with no gross hemorrhage. Scrotal seroma was observed in four patients with equal distributions, only in groups A and C.

4.1. Pain Assessment

The pain-free period in surgery methods was statisti-

cally different from T-test (six hours with mesh insertion, 5.45 hours with drain assistance, and 5.15 hours in Bassini group). For all 150 patients, severity of starting pain was significantly lower in groups A and B compared to the control group ($P < 0.001$). With regards to the type of surgery, three groups were compared for pain degree. In patients undergoing treatment with mesh insertion, significant differences were found between groups A and B for severity of the starting pain, with lower severity in group B (A = 83%, B = 65%, C = 90%, and P Value = 0.03); however, the morphine dosage was not different in these groups. Both groups A and B showed better pain improvements at night and the morning after as well as the morphine dosage in comparison with group C with more prominent improvement in naproxen receivers. Similar findings were observed in patients undergoing surgeries with drain preparation methodology. In the Bassini repair group, a significant difference was found for both A and B groups in comparison with the control group for severity of the starting, nocturnal and the morning after pains as well as the morphine dosage. However, when it came to the two case groups themselves, only the starting pains were different with lower severity in group B. Table 1 Shows VAS scores for different groups.

4.2. Side Effects and Complications

Hematoma, orchitis, palpitations, arrhythmia and emesis were not observed in any of the patients. Urinary retention occurred in four patients, none of which were in the naproxen group. Headache and dizziness occurred in two patients. GI bleeding, epigastric pain, wound infection and increased creatinine levels were also absent in all the patients.

5. Discussion

Effective pain management in the postoperative period, caused by the stress coming from the surgery (9, 10), is very critical to enhance patients' satisfaction, manage the in-patient period, and reduce the costs of surgeries (11, 12), especially in very prevalent ones such as inguinal hernia repair (13). In this double-blind randomized trial, we found a superior effect of naproxen over both marcaine injection and placebo in inguinal herniorrhaphy. This was valid for the severity of the starting pain and

the morphine dosage. The decrease of the starting pain was $65 \pm 23\%$ by naproxen, while in a similar study conducted to evaluate the effect of naproxen on coronary artery bypass graft (CABG), Kulik A and colleagues reported this decrease as $47 \pm 17\%$ at the first four days and also $44 \pm 13\%$ in the second four days (14). Taheri et al. and Abbas et al. also found similar results for NSAIDs assistance in small surgeries in comparison with local anesthetics (4, 5). The decrease in the nightly and morning after pains in our study were $34 \pm 16\%$ and $19 \pm 12\%$. This long-duration superiority in analgesic effects was in conformity with Abbas et al. study, but opposed Duman et al. and Akin et al. studies, which found only early phase superiority of NSAIDs in children (6, 7). This study demonstrated the decline in morphine usage dose with naproxen as 4.4 ± 2 mg and 7.4 ± 1.3 mg respectively in the control group. In a similar study, morphine dosage was not different in case and control groups in the first 24 hours after the surgery by indomethacin suppository (15). In contrast, some other studies showed decreased need for morphine after NSAIDs administration (16, 17). Our study showed no signs of NSAIDs-associated side effects and complications. Mohammad S et al. suggested that even selective COX-2 inhibitors can cause GI disturbances (18). Recently, a meta-analysis published by "Coxib and traditional NSAID Trialists' (CNT) collaboration" suggested that even high-dose naproxen is associated with less vascular and GI risk than other NSAIDs such as diclofenac and possibly ibuprofen. Therefore, our results were as expected due to temporary and low-dose naproxen administration (19). Renal function disturbances, specifically acute kidney injury, have been implicated very rare in adults without chronic kidney diseases (16). In other studies, short-term naproxen usage was also not associated with any kind of kidney injury in patients without history of kidney disease (14, 16). We still have to keep in mind that some researches have reported some complications after post-op administration of NSAIDs (15-17).

In conclusion, rectal naproxen is associated with decreased need for morphine injection, better analgesic effect, and lower side effects and complications, in addition to lower costs of post-op care as well as both marcaine injection and placebo after inguinal herniorrhaphy. Therefore, it is recommended to consider administration of this drug before rushing into sedatives and local anesthetics in minor surgeries such as hernia repairs.

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