e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2022; 14(11); 587-592

Original Research Article

A Prospective Study of Postoperative Pain Following Ankle Fractures Surgery

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Received: 25-09-2022 / Revised: 25-10-2022 / Accepted: 30-11-2022

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Conflict of interest: Nil

Abstract

Background: Ankle fracture fixation postoperative pain has a significant impact on both the success of the procedure and patient satisfaction. Patients who need substantial doses of narcotics are more likely to use painkillers long-term. Only a small number of prospective studies examine patient pain during the treatment of ankle fractures.

Method: The discomfort felt by 50 patients following open reduction and internal fixation of the ankle was retrospectively assessed. Preoperatively, postoperatively (PP), at 4 days (4dPP), and 4 weeks, the Short-Form McGill Pain Questionnaire was given (4wPP). Postoperative pain that was anticipated (APP) was noted.

Results: There were no discernible changes between PP, APP, and 4dPP; however, 4wPP was much lower. Both the preoperative and postoperative Short-Form McGill Pain Questionnaire scores as well as the correlations between PP and APP were determined to be significant. Only APP was able to predict 4wPP, while PP and APP were both predictive factors of 4dPP. Age, sex, and whether a patient was an inpatient or outpatient were not significant determinants. There were no statistically significant differences in pain levels across different forms of fracture.

Conclusion: The level of postoperative pain is predicted by the severity of prior pain as well as the predicted postoperative discomfort. Orthopedic doctors ought to pay more attention to postoperative pain control and patient preferences following operations.

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Introduction

The management of postoperative pain can significantly impact the patient's and surgery's overall results. Orthopedic operations are some of the most difficult surgical operations, and individuals are at a greater risk of experiencing insufficient postoperative pain management [1-3] Ankle surgeries in particular have been reported as one of the most painful surgical procedures [2]. The potential of long-term pain and incapacity exists for patients receiving open therapy for ankle fractures [4]. However, there aren't many research in the literature examining how to

treat and alleviate postoperative pain in patients with ankle fractures. Chou et al. demonstrated that the preoperative pain tolerance was prognostic of both the patient's predicted postoperative pain and the actual postoperative pain in a systematic analysis of patients experiencing a range of foot and ankle operations [5]. Additionally, in the early postoperative phase, postoperative pain was independently predicted by anticipated postoperative discomfort. The aim of this study was to describe the preoperative and postoperative pain felt by patients having open reduction and internal fixation (ORIF) of ankle fractures, which is a reasonably common injury and frequently necessitates surgical reduction and fixation. [6]

Methodology:

Patients:

We predicted that patients with ankle fractures would experience significant postoperative pain 4 days and 4 weeks after receiving surgical care, and that the degree of preoperative pain anticipation would be correlated with the intensity of postoperative pain. Orthopedic surgeons are significantly able to inform patients about anticipated pain following surgery and to tailor the pain management plan for the postoperative period by having a stronger grasp of the pain experienced after ankle fracture surgery. One among two orthopaedic foot and ankle specialists at a single facility cared for each patient.

Pain Assessments:

It was done using the Short-Form McGill Pain Questionnaire (SF-MPQ). The SF-MPQ is sensitive enough to detect variations brought on by treatment. 6 It comprises a visual analogue scale and the Present Pain Intensity (PPI) of the Standard McGill Pain Questionnaire (VAS). On a categorical scale of 0 to 5, the PPI is graded as follows: no pain (0), mild (1), uncomfortable (2), upsetting (3), dreadful (4), and unbearable (5). (5). The VAS is calculated using a continuous scale with a range of 0 to 15 cm. Summarizing the intensity rank values for the three types of pain—sensory (SPRI, maximum score 30), affective (APRI, maximum score 10), and total (TPRI = SPRI 1 APRI, maximum score 40)—results in three pain scores. At each of the three intervals, patients were administered an SF-MPQ: Pre - operative visits are held one to ten days prior to surgery (PP), four days after the procedure (4dPP), and three weeks following the procedure (4wPP). The SF-MPQ was used to evaluate their predicted postoperative pain (APP) at their preoperative visit. The patient completed the surveys with help from an investigator either in person or online.

Statistical Analysis:

According to power analysis, 20 samples would be enough to achieve statistically significant results for our key outcome variable. For each type of pain score at the appropriate time intervals, mean values, SDs, and 90% confidence intervals (CIs) were determined. To investigate the predictive value of PP and APP with respect to 4dPP and 4wPP, Pearson correlations were computed. In order to evaluate postoperative pain score factors with respect to gender, age, and hospitalized vs. discharge status, multivariate linear regression models were used. Regardless of the type of fracture, an ANOVA was utilized to test whether there were any considerable differences in pain scores at each time period.

Result:

Table 1: Includes information on the patient's demographics and the fracture's features.

Baseline	Number
Average age	39
Gender	
Women	27
Men	33
Syndesmotic injury	10
lateral malleolus	29
bimalleolar fractures	15
medial malleolus	2
trimalleolar fracture	1

There were 33 men in total and 27 women. 39 was the average age. The ankle fracture injury was the only surgical damage that was received. The following 50 fractures were exempt from syndesmotic repair: 29 lateral malleolus fractures alone, 15 bimalleolar fractures alone, 2 medial malleolus fractures alone, and 1 trimalleolar fracture alone. Ten injuries involving the syndesmosis required repair: four in association with lateral malleolus fractures, three isolated tibial-fibular syndesmosis injuries, and two bimalleolar fractures.

The average length of stay for inpatients at the hospital was two nights. For outpatients, oral analgesics were used according to a normal schedule to treat postoperative pain. Except in cases where there were particular indications for the use of a different medicine, the majority of outpatients received prescriptions for acetaminophen with hydrocodone postoperatively. Hydromorphone patient-controlled analgesia was used to treatment patients in the hospital. All patients received prescriptions for acetaminophen and hydrocodone upon their release from the hospital. Regional nerve blocks were delivered to 47 of the 60 patients.

The intensity of the pain peaked at the 4-day postoperative assessment and significantly subsided by 4 weeks later. Most patients reported having minimal to no discomfort at the 4-week postoperative evaluation. Both the PPI and VAS pain scores confirmed this.

Table 2: Displays the mean PPI and VAS scores at each time point.

Outcome for VAS vs PPI			
	Mean	SD	90% CI
VAS			
4 days postoperative pain	5.24	3.16	4.42-6.05
4-week postoperative pain	0.62	1.47	0.31-0.94
Preoperative pain	4.34	3.30	3.52-5.16
APP	5.74	2.67	5.05-6.43
PPI			
4 days postoperative pain	2.90	1.56	2.55-3.25
4-week postoperative pain	0.34	1.07	0.31-0.94
Preoperative pain	2.48	1.56	2.11-2.88
APP	2.74	1.07	2.46-3.02
APP = anticipated postoperative pain, CI = confidence interval; PPI = Present Pain Intensity; VAS = visual analog scale			

On the PPI scale, the following values were recorded: PP 2.48 (SD, 1.56; 90% CI, 2.11 to 2.88); APP 2.74 (SD, 1.07; 90% CI, 2.46 to 3.02); 4dPP 2.90 (SD, 1.33; 90% CI, 2.55 to 3.25); and 4wPP 0.34 (SD, 0.70; 90% CI, 0.16 to 0.52). On the VAS scale, the following values were recorded: PP = 4.34 (SD = 3.30; 90% CI = 3.52 to 5.16), APP = 5.74 (SD = 2.67; 90% CI = 5.05 to 6.43), 4dPP = 5.24 (SD = 3.16; 90% CI = 4.42 to 6.05), and 4wPP = 0.62 (SD = 1.47; 90% CI = 0.31 to 0.94). On both the PPI and VAS scales, overlap in the 90% CI between PP, APP, and 4dPP was discovered, indicating that there were no appreciable differences in these values. On the PPI and VAS scales, the 4wPP significantly outperformed PP, APP, and 4dPP. PP was contrasted with APP, 4dPP, and 4wPP applying Pearson coefficients.

Table 3: APP was also evaluated with 4dPP and 4wPP.

PPI Scale and VAS Time Intervals Pearson Correlation Coefficients		
Correlations	Pearson Coefficient	P Value
VAS		
APP vs 4dPP	0.52	<0.002
APP vs 4wPP	0.35	<0.02
PP vs 4dPP	0.33	<0.02
PP vs 4wPP	0.28	<0.04
PP vs APP	0.35	<0.02
PPI		
APP vs 4dPP	0.31	<0.04
APP vs 4wPP	0.33	<0.02
PP vs 4dPP	0.26	<0.04
PP vs 4wPP	0.28	<0.04
PP vs APP	0.44	<0.002

SPRI, APRI, TPRI, and PPI (r = 0.58, 0.44, 0.53, 0.63, and 0.55, respectively; P < 0.002) are all measures of the intensity of pain. On the VAS scale, APP had a stronger correlation with 4dPP and 4wPP than did PP (r = 0.33, P <0.02 and r = 0.28, P < 0.04, respectively) (r = 0.52, P < 0.002 and r = 0.35, P < 0.02, respectively). On the PPI scale, only APP was linked with 4wPP (r = 0.33, P < 0.02) while PP and APP were strongly correlated with 4dPP (r = 0.26 and 0.31, respectively, P < 0.04).

Both the PP and APP VAS scores were revealed to be independent predictors of the 4dPP and 4wPP VAS scores by multivariable linear regression analysis. The 4dPP and 4wPP PPI scores were significantly predicted by APP but not PP. At the 3-day and 4-week] postoperative examinations, neither gender, age, nor the presence of an inpatient versus an outpatient status was shown to be significantly linked with VAS or PPI. The varied fracture types' pain levels at each time interval were compared using analysis of variance (ANOVA). l. We evaluated syndesmotic injuries either with or without concomitant fracture and single malleolar fractures. On either the PPI or VAS measure at any point in time, no discernible variations between both the fracture types were discovered.

Discussion

It's important to manage patient expectations and medication use throughout the perioperative phase in order to effectively control pain after open repair of ankle fractures. More than 10% of ambulatory surgery patients having ankle procedures experience severe pain in the post-anesthesia care unit, according to Chung et al. [1]. These individuals usually need substantial doses of narcotics and run the risk of using painkillers for an extended period of time. Postoperative

discomfort among patients undergoing ambulatory surgery is linked to extended post-anesthesia care unit stays, a higher likelihood of unplanned admission or readmission following surgery, and higher costs [7, 8]. According to research by Chou et al, postoperative pain was higher than anticipated for patients having orthopaedic foot and ankle procedures, and preoperative and anticipated pain were both highly predictive of postoperative pain [5]. The patients in their study, however, underwent a wide range of foot and ankle operations, which could cause a range of pain sensations. The preoperative and early postoperative periods were when pain was the highest in patients undergoing ORIF for ankle fractures; PP, APP, and 4dPP showed no significant changes. By four weeks, pain scores had significantly decreased. For 4dPP, PP and APP were both predictive, while for 4wPP, only APP was. Less discomfort was experienced by patients who only had isolated lateral malleolus fractures. Previous research has shown that patients who need syndesmotic stabilisation in addition to malleolar fixation experience worse functional outcomes following surgery than those who just need malleolar fixation [9,10]. There was no statistically significant difference in pain in this trial. Comparison between ankle fractures that are syndesmotic and nonsyndesmotic. The average preoperative pain score and APP were greater than the total mean pain scores on the VAS scale and PPI scale, nevertheless, when isolated syndesmotic injuries without a fracture were analysed independently. The four-day and four-week postoperative pain levels were comparable to the overall average. In order to determine if these changes are statistically significant, a larger sample of patients is required. Because of the small sample size in our investigation, statistical comparisons between fracture types did not include the patients who experienced trimalleolar fractures. They both had significant preoperative pain scores, nevertheless, and their pain levels remained high at the 4-week mark. In a prospective analysis of surgically treated unstable ankle fractures, Tejwani et al. showed that trimalleolar ankle fractures had noticeably lower results than other fracture types ([11]. Studies have also revealed that bigger posterior malleolar fragment sizes are linked to worse results [12,13]. If trimalleolar fractures are linked to noticeably greater pain levels during the perioperative period, further research including a larger sample size is required. A greater indicator than preoperative pain level was the patient's personal assessment of how intense their postoperative pain will be. [14] This assessment independently predicted pain at both early and extended postoperative periods. This may indicate a participant's personal self-awareness and propensity to anticipate their pain, but it could also be a sign of the intricate relationships between numerous mediators and the actual pain experience. The results of this study should be evaluated in the context of some constraints. Although the postoperative pain management strategy was the same for the majority of patients, there were some differences in the use of regional blocks and the length and dosage of postoperative opioid use. Following up, there was no assessment of current opioid use.

Conclusion:

Our analyses show a strong correlation between preoperative pain severity and the anticipated postoperative pain levels for patients and the actual postoperative pain experienced following surgical treatment of an ankle fracture. Additionally, despite often employed painkiller regimes, the majority of patients still report significant pain shortly after ankle fracture repair, suggesting that the present approaches might not be enough. For patient counselling, creating the postoperative pain control regimen, and calculating the

length of hospital stay, it is critical to anticipate postoperative pain.

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