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Visual Analog Pain Scores Reported to a Nurse and a Physician in a Postoperative Setting

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Abstract

Background: The purpose of this study was to compare postoperative foot and ankle patient-reported visual analog pain scores (VAS) to nursing staff and the treating surgeon during a single encounter. Prior literature established preoperative patients reported higher pain scores to a surgeon as compared to nursing staff. We hypothesized that there will be no differences in postoperative patients' pain scores when reporting to nursing staff vs a surgeon.

Methods: This study was a retrospective cohort of 201 consecutive postoperative foot and ankle patients with 3 follow-up encounters treated by a single surgeon. The patients were asked to rate their pain intensity using the VAS with 0 "no pain" and 10 "worst pain" at 2, 6, and 12 weeks postoperatively by a nurse and surgeon.

Results: At all time intervals, the mean pain score was significantly higher when reported to the surgeon, although these were not clinically relevant. The mean scores at 2 weeks were 2.8 reported to the surgeon and 2.5 reported to the nurse ($P < .001$). The mean scores at 6 weeks were 2.0 reported to the surgeon and 1.8 reported to the nurse ($P = .002$). The mean scores at 12 weeks were 2.3 reported to the surgeon and 2.0 reported to the nurse ($P = .005$).

Conclusion: This study found that postoperative foot and ankle patients did not overemphasize their VAS pain scores to the physician vs nursing staff. These findings contrast with our 2 previous studies that found preoperative and nonoperative patients reported clinically significant higher scores to the surgeon.

Level of Evidence: Level III, comparative study.

Keywords: visual analog scale, pain, patient-reported outcome measures, foot and ankle, postoperative

Introduction

The use of patient-reported outcome measures (PROMs) in orthopedics has increased substantially since the 1990s.[1] PROMs are utilized both for research and in clinical practice to assess patient outcomes. Thus, the demand for accurate and reliable measures has become increasingly more prominent.[7] Depending on the situation, research vs patient care, PROMs can be used to assess the quality of treatments, inform orthopedic surgeons of potential areas of improvement, and allow for cooperative plans of action.[2] They also allow health care professionals the ability to measure subjective data.[11] In light of the numerous PROMs that exist, the importance of choosing a reliable and individualized PROM in an orthopedic setting is important for both research and patient care.[5]

The visual analog scale (VAS) is a common choice for health care professionals because of its reliability. It is also one of the easiest PROMs to navigate and obtain quantifiable data.[3] However, the VAS is inherently subjective.[10] Along with this subjectivity is the question of whether patients reliably report their pain scores in different settings. There

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have been prior studies that have documented differences in a patient's clinical evaluation when evaluated by a nurse or physician.[6] Therefore, it is not unreasonable to believe this could happen when evaluating a subjective marker such as pain.

This study aimed to serve as a follow-up evaluation of patient-reported VAS scores in a postoperative outpatient clinical setting. Our 2 previous studies concluded that patients who went on to have surgery and those who did not, both reported increased pain scores to the surgeon when compared to the nursing staff.[13,14] Therefore, we hypothesized that there would be clinically significant differences in postoperative patients' pain scores when reporting to a treating surgeon vs a nurse.

Methods

The current study was a retrospective cohort design to assess 201 consecutive postoperative foot and ankle patients treated at the same facility by a single orthopedic surgeon. This study is a second follow-up to the original study, using the same facility, design, and providers with a different patient population. Patients consisted of active-duty and retired members of the US Army, along with their dependents, who were seen at a local US Army community hospital. Patients seen in this facility were called by nursing staff and escorted to an examination room to evaluate their pain using the VAS pain scale. The VAS pain scale consisted of an 11-point scale ranging from 0-10 with "no pain" being a "0" labeled with a "smiley face" to the "worst possible pain" being a "10" labeled with a "sad face." After the nurse left, the single orthopedic surgeon would follow within 5 minutes and assess the patient using the same VAS pain scale. This framework was used for each patient at 2-, 6- and 12-week postoperative intervals. The VAS was reported before physical examinations and discussion of postoperative treatment. Ranges given by patients within the VAS pain scale were averaged and recorded. Nonoperative patients were excluded from the study.

In total, 201 consecutive patients presenting to the orthopedic clinic with foot and ankle pain participated in this study for 12 weeks with a maximum of 6 total reported scores per patient. A total of 1144 pain scores were given by participants in this study because only 171 patients had pain scores for all 12 weeks. Participants reported 1 score to the nurse and then, within 1 to 5 minutes, reported to the treating surgeon during the same office visit. Of these 201 patients, 71 (35%) were females and 130 (65%) were males, of varying age with a mean of 37, mode of 35, and standard deviation of 12.3 years of age.

Descriptive statistics and dependent *t* tests were calculated to evaluate mean differences in VAS pain scores reported by each patient to 2 different health care professionals (doctor and nurse) during outpatient clinic encounters at postoperative time points, 2, 6, and 12 weeks. A 2-way repeated measures analysis of variance was used to evaluate the effect of time, provider, and interaction of both of those on patient reported outcomes. For the 2-way repeated measures analysis of variance, Mauchly test indicated that the assumption of sphericity had been violated for time but not for the interaction of time vs type of provider; therefore, degrees of freedom were corrected using Huynh-Feldt estimates of sphericity for time. Regression analysis were performed to determine significant effects of time, use of narcotics, presence of comorbidity, and other demographic factors. All data were analyzed using SPSS version 26.0 (IBM Corp, Armonk, NY) with an α level of $P < .05$.

Table 1. Mean Pain Scores Reported to Doctors and Nurses Combined at Various Postoperative Time Points and the Mean Difference of Pain Scores Between Postoperative Time Points.

Time	Mean	Difference	*P*	95% Confidence Interval
2 wk	2.6			2.3, 2.9
6 wk	2.0			1.7, 2.2
12 wk	2.2			1.9, 2.5
2-6 wk		0.6[a]	<.001	0.3, 1.0
6-12 wk		–0.2	.28	–0.5, 0.1
2-12 wk		0.4[a]	.029	0.0, 0.9

[a]Statistically significant ($P < .001$).

Results

Patients reported higher pain scores to the surgeon in 65 (33%) of encounters at 2 weeks, 60 (30%) at 6 weeks, and 58 (34%) at 12 weeks. Higher pain scores were reported to the nursing staff in 35 (17%) of the encounters at 2 weeks and 32 (16%) at 6 and 27 (16%) at 12 weeks. Scores reported as equal between the nurse and surgeon occurred in roughly 50% of the encounters, that is, 101 (50%), 109 (54%), and 86 (50%) at 2, 6, and 12 weeks, respectively.

For the 2-way repeated measures analysis of variance, Mauchly test indicated that the assumption of sphericity had been violated for time but not for the interaction of time vs type of provider; therefore, degrees of freedom were corrected using Huynh-Feldt estimates of sphericity for time. There was a significant main effect of time on patients' reported pain scores, $F(1.8, 301.9) = 10.02$, $P < .01$ (Table 1). The mean difference, for VAS pain scores, was significantly different between 2 and 6 weeks and 2 and 12 weeks (Table 1). There was a significant main effect of provider on patients' reported pain scores, $F(1, 170) = 24.8$, $P < .01$, with scores reported to the doctor (mean 2.4) being significantly higher than those reported to the nurse (mean 2.1), with an average mean difference of 0.3 ($P < .01$). There was no significant interaction between provider and time on patients' reported pain scores, $F(2, 340) = 0.5$, $P = .60$. Patients reported statistically significant higher pain scores to a doctor vs a nurse at every time point (Table 2). There were no significant interactions found between gender, age, active duty status, BMI, presence of comorbidities, narcotics or tobacco use in this sample.

Table 2. Mean Pain Scores Reported to a Nurse and Doctor and the Difference at Various Time Points.

Time	Surgeon	Nurse	Difference	*P*	95 % Confidence Interval
2 wk	2.8	2.5	0.3	.001	0.1, 0.5
6 wk	2.0	1.8	0.2	.002	0.1, 0.4
12 wk	2.3	2.0	0.3	.005	0.1, 0.5

Discussion

The current study found that postoperative foot and ankle patients reported similar pain scores to the nurse and the surgeon at all time intervals examined. Although our results demonstrated a statistically significant difference, they were not clinically relevant and had no impact on deciding proper treatment protocols or accurately assessing outcomes. Previous studies concluded that it is necessary to have patients rate their pain by greater than or less than 2 points on the 11 point scale (0 no pain and 10 worst possible pain) to have clinical relevance.[8,9,17] These results contrasted with our hypothesis stating that postoperative foot and ankle patients would report clinically similar pain scores to both the treating surgeon and the nursing staff.

Pain itself is a complicated phenomenon that is difficult to completely summarize in one encompassing number at the clinical visit. Patient populations in various disciplines do not reliably report their pain scores in different settings for various reasons in order to either receive or avoid certain treatments.[16] Because postoperative patients should be at the end of their treatment plan, there is no need to overemphasize or underemphasize pain scores to receive or avoid treatments. However, this theory cannot be proven from the results of this study. Patients might unreliably report their pain scores because of other outside factors such as avoiding work or getting out of active duty training. Other reasons might include assuming the sick role in addition to numerous other external influences. Some studies, when using the VAS, define pain as the worst over the past 24 hours whereas others define it as pain an individual is currently experiencing.[15,19] Both these methods can lead to confusion for patients as pain can fluctuate throughout the day, and for chronic issues, can lead to more challenges summarizing all the fluctuations into one single number. Postoperative patients may have a more acute recollection of how their pain felt before surgery and how it compares to each postoperative visit. This could also be why postoperative patients report no clinically relevant differences in pain scores to the nurse vs surgeon. However, these theories are outside the scope of the current study.

This study along with our 2 previous studies relied solely on the VAS and thus its limitations and strengths. The limitations of this study included the pain scale itself that we used. There are many different validated and reliable pain scales available to assess musculoskeletal pain[12]; however, we only chose to look at the VAS. It is uncertain if this phenomenon would also hold true across the spectrum for all patient-reported outcome measures. Our data reporting and gathering has remained consistent across multiple studies with one male surgeon, and one female nurse within a primarily active duty military population. The effects of gender were not completely assessed in the current study, although there were no differences between male and female participants. We also did not randomize whether the patient would report the pain to the physician or nurse first and do not know if order plays any role. The active duty military population is unique because of the high physical demands of their job and the fact that medical decisions can impact whether soldiers can participate in training, their career assignments, and whether they can deploy to a combat theater or not. Therefore, the results of this study cannot be as easily generalized to a broader diverse population. The strengths of this study include utilizing the same staff members over thousands of encounters within a fixed patient population of active duty military members. Further strengths include how pain was assessed, documented, and reported. Another inherent strength is the simplicity of the VAS allowing for easy statistical analysis and comparison.

Accurate pain reporting is paramount in research and in a value-based system of evaluations.[18] Our study helps validate future and past research that use research nursing staff to contact and collect PROMs. In a value-based system where surgeons are under immense scrutiny involving postoperative pain and opioid consumption, our study further strengthens the reliability of the VAS.[4] Within the limitations of the current study, surgeons should have an increased level of confidence in the reported VAS nursing staff place in the medical records postoperatively.

Conclusion

We found that postoperative foot and ankle patients reported similar pain scores to the nurse and the surgeon at follow-up appointments. This study stands in contrast to our 2 previous studies which illustrated that preoperative and nonoperative patients consistently report higher pain scores to the surgeon that were both statistically significant and clinically relevant. The reason for the discrepancy is likely multifactorial and outside the scope of the current study. This study demonstrates no clinically relevant differences in postoperative VAS scores reported to a nurse or a surgeon.

Ethics Approval

Ethical approval was not sought for the present study because there is no IRB at the current institution.

Declaration of Conflicting Interests

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