Pain Medicine 2016; 17: 1676–1685
doi: 10.1093/pm/pnv079

OXFORD

OPIOIDS, SUBSTANCE ABUSE & ADDICTIONS SECTION

Original Research Articles

Opioid Tapering in Fibromyalgia Patients: Experience from an Interdisciplinary Pain Rehabilitation Program

Julie L. Cunningham, PharmD,*
Michele M. Evans, APRN, CNS,†
Susan M. King, RN,† Jessica M. Gehin, RN,†
and Larissa L. Loukianova, MD, PhD†

Departments of *Pharmacy; †Psychiatry and Psychology, Mayo Clinic College of Medicine, Mayo Clinic, Rochester, Minnesota, USA

Correspondence to: Julie L. Cunningham, Pharm D, Assistant Professor, Department of Pharmacy, Mayo Clinic College of Medicine, 200 1st Street, SW, Rochester, MN 55905, USA. Tel: 507-255-0415; Fax: 507-255-7556; E-mail: cunningham.julie2@mayo.edu.

Disclosure and conflicts of interest: The research was conducted at the Mayo Pain Rehabilitation Center, Department of Psychiatry and Psychology, Mayo Clinic, Rochester, MN. All authors had full access to the data, analysis, and manuscript. We declare that all authors listed on the manuscript have no financial disclosures to declare.

Abstract

Objective. Despite current guideline recommendations against the use of opioids for the treatment of fibromyalgia pain, opioid use is reported in approximately 30% of the patient population. There is a lack of information describing the process and results of tapering of chronic opioids. The purpose of this study is to describe opioid tapering and withdrawal symptoms in fibromyalgia patients on opioids.

Design, Setting, and Subjects. This retrospective research study included a baseline analysis of 159 patients consecutively admitted to the Mayo Clinic Pain Rehabilitation Center from 2006 through 2012 with a pain diagnosis of fibromyalgia completing a 3-week outpatient interdisciplinary pain rehabilitation program. Opioid tapering analysis included 55 (35%) patients using daily opioids.

Methods. Opioid tapering was individualized to each patient based on interdisciplinary pain rehabilitation team determination. Opioid withdrawal symptoms were assessed daily, utilizing the Clinical Opioid Withdrawal Scale.

Results. Patients taking daily opioids had a morphine equivalent mean dose of 99 mg/day. Patients on < 100 mg/day were tapered off over a mean of 10 days compared with patients on > 200 mg/day over a mean of 28 days ($P < 0.001$). Differences in peak withdrawal symptoms were not statistically significant based on the mean equivalent dose ($P = 22$). Patients taking opioids for <2 years did not differ in length of tapering ($P = 0.63$) or peak COWS score ($P = 0.80$) compared with >2 years duration. Patients had significant improvements in pain-related measures including numeric pain scores, depression catastrophizing, health perception, interference with life, and perceived life control at program completion.

Conclusion. Fibromyalgia patients on higher doses of opioids were tapered off over a longer period of time but no differences in withdrawal symptoms were seen based on opioid dose. Duration of opioid use did not affect the time to complete opioid taper or withdrawal symptoms. Despite opioid tapering, pain-related measures improved at the completion of the rehabilitation program.

Key Words. Opioids; Rehabilitation Medicine; Pain Management; Fibromyalgia

Introduction

The use of opioids for chronic non-cancer pain (CNCP) has dramatically increased in the past several decades [1]. This has resulted in controversy over the

appropriateness of opioid use in chronic pain management [2]. There has been a lack of randomized controlled trials for opioids in the treatment of fibromyalgia (FM), with the exception of the weak opioid receptor agonist, tramadol [3,4]. Therefore, FM treatment reviews and guidelines categorize opioids as medications that should not be prescribed, or have minimal evidence for use [5–8]. However, the reported utilization of opioids remains high in this patient population, with upward of 38% of FM patient samples [9,10].

Patients and providers may be dissatisfied with opioid use for CNCP management due to lack of functional gains, side effect burden, or addiction concerns. Other patients may no longer need daily opioids [10]. Providers are faced with a lack of guidance for safe and tolerable tapering recommendations in these clinical scenarios. There is a dearth of information on the appropriate way to taper patients off opioids after long-term use and patient outcomes. A recent literature analysis summarizes the limited research completed in opioid tapering for CNCP patients [11]. Clinical guidelines for opioid use in patients with CNCP have not provided information on the optimum method for opioid tapering [12,13]. There are a multitude of clinics offering detoxification programs that typically involve a residential admission, abrupt discontinuation of opioids, and replacement with medications such as benzodiazepines, alpha-2 agonists, antihistamines, anticonvulsants, or other medications administered for a brief period of time [14,15].

Current trends include the utilization of methadone or partial opioid agonists to replace opioids in patients with opioid dependence [16,17]. While this is an appropriate strategy for patients with addiction-related concerns, many patients can learn to manage pain with behavioral strategies off opioids and do not want to substitute one opioid for another. Pain rehabilitation programs have successfully tapered patients off opioids without the addition of adjuvant medications or maintenance opioid medications [18–20].

The primary purpose of this study was to describe opioid tapering for patients with a diagnosis of FM through the analysis of medication tapers from an outpatient interdisciplinary pain rehabilitation program, including taper rates, peak of withdrawal scores, and time-to-peak withdrawal scores based on total opioid dose and duration of opioid use. A secondary goal was to compare outcome measures of pain levels, depression, pain catastrophizing, and functional limitations in the FM patients on opioids with those patients who were not taking opioids. Outcome measures were compared at the time of admission and upon completion of an interdisciplinary pain rehabilitation program.

Methods

Patient Participants and Study Setting

This retrospective research reviewed patients admitted to the Mayo Clinic Pain Rehabilitation Center (PRC) from January 2006 through December 2012. During this period, 2,389 patients were admitted, of which 159 patients had a primary pain diagnosis of FM. The majority (65%) of the patient population were from outside of the state of Minnesota and thus referred from external providers for evaluation and treatment. Fifty-five of these FM patients (35%) were taking a daily opioid and subsequently tapered off this medication. Daily opioid dose was converted to an oral morphine equivalent dose using a conversion software program [21]. A quantitative urine drug screen with confirmatory testing for the specific drug was completed for all patients. The PRC database and the electronic medical record were utilized to identify patients with a primary diagnosis of FM, collect demographic information, and clinical outcome measures. Clinical outcome measures for pain, functionality, depression, and pain catastrophizing were measured at the time of admission and upon program completion. Patients were excluded from the study if they did not complete the PRC program or if they did not provide written institutional research consent. This study was reviewed and approved by the Mayo Clinic Institutional Review Board.

The PRC program is an intensive 3-week outpatient interdisciplinary rehabilitation program designed to assist patients with chronic non-malignant pain (CNMP) to improve adaptation to pain and related symptoms. Rehabilitative treatment in this setting is based on a cognitive-behavioral model with the primary goal of functional restoration. The program is 8 hours in length, Monday through Friday, and includes physical therapy, occupational therapy, biofeedback and relaxation training, and group therapies. Example group session topics include cognitive behavioral therapy (CBT), management of stress, the emotional impact of pain, and understanding pain sensitization. All patients meet with the treatment team twice weekly and team members including the patient care coordinator, physical therapist, occupational therapist, and group facilitators report progress toward treatment goals on a scale of 0–5.

Discontinuation of all analgesic medications (including opioids) and certain adjuvant medications used for CNMP (e.g., benzodiazepines, muscle relaxants) is another goal of treatment in this setting. During the course of the program the team regularly monitors progress in terms of medication reduction, elimination of symptom-focused behaviors, gains in physical functioning and strength, reduction in pain-related anxiety, mood stabilization, and gradual integration of program concepts into hours outside the program.

Upon admission to the PRC program, the patient is instructed to bring all current medications in the original bottles. Medication reconciliation is performed by a pharmacist or a registered nurse and the electronic health record is updated. For patients on daily opioids, a taper schedule is developed in collaboration with treatment team members and the patient. Considerations that determine the length and rate of the taper period include

the dose in total morphine equivalents, number and classification of the medications to be tapered, and medical/psychiatric comorbidities. The patient returns the specific medications (opioids, benzodiazepines, sedatives), which are distributed to the patient by an RN according to the recommended taper period for patient self-administration. The electronic health record is updated detailing the planned taper schedule and the patient is given a printed copy.

There is a lack of information on patient risk factors that increase withdrawal symptoms that may complicate opioid tapering. Within the Mayo Clinic PRC, general guidelines support the tapering process but are adjusted based on patient-specific factors:

- Patients are not converted to a different opioid for tapering purposes. Dose reductions are based on the patient's current opioid, formulation, and dose at the time of program admission. Patients may be switched to a different formulation (immediate release from extended release) as the dose decreases, necessitating smaller tablet strengths.
- In general, daily reductions of total opioid dose are made during days of program participation, avoiding weekend reductions while patients are away from the program. This process of avoiding reductions on weekends allows for better monitoring and reduces patient anxiety.
- Initial reductions may be larger, until approximately 50–80% of the total initial daily dose is decreased. The percentage of the total opioid dose is generally reduced by 10–20% with each reduction during the first half to two-thirds of the taper period, and reduced again by 2.5–10% during the final half to one-third of the taper period.
- Adjuvant medications are not added for the purpose of opioid tapering with the exception of clonidine, which is added for a small number of patients based on specific withdrawal symptoms, including but not limited to increased blood pressure.

There are multiple patient factors that influence the rate of the taper period. Response to the tapering process is monitored in all patients with the option to adjust as needed, but some patients are more at risk for difficult withdrawal. Structured tapers may be slower for those with a long duration of daily opioid use, especially those with daily use greater than 2 years. Patients with coexisting psychiatric morbidities may require a slower rate with close monitoring and support to ensure the withdrawal process does not cause destabilization of mental health. Patients with coexisting gastric complaints of chronic diarrhea or high-output conditions may also require a slower taper period. Due to the physical symptoms and stress of tapering, patients on daily steroids with adrenal sufficiency require closer monitoring and slower taper periods.

Withdrawal assessment occurs one or more times per day during the opioid taper period and for several days following taper completion. Assessments include blood pressure, heart rate, temperature, and withdrawal assessment through the completion of the Clinical Opioid Withdrawal Scale (COWS) [22,23] for opioid tapers. This scale measures 11 different objective and subjective withdrawal symptoms and rates the symptom on a scale from 0 to 4 or 5 for severity. The highest possible score on this scale would be 48. If benzodiazepines are tapered, then the Clinical Institute Withdrawal Assessment (CIWA) [24] is also completed. Patients are provided with self-care activities to help decrease withdrawal symptoms including but not limited to the use of diaphragmatic breathing and relaxation, stretching and exercise in moderation, adequate fluid intake, use of distraction measures, and positive self-talk.

Measures

Baseline demographic and clinical characteristics collected at admission included age, sex, duration of pain, marital status, years of education, employment status, primary pain site, and medication use.

Pain

A numeric pain rating scale score was reported by patients on admission and dismissal from the PRC. Scores ranged from 0 to 10 with 0 indicating no pain and 10 indicating the worst possible pain. The Multidimensional Pain Inventory (MPI) subscales of pain interference with life activities and the patient's perceived pain control in their life were also measured to evaluate the impact of pain for each patient. The MPI is a 52-item self-report questionnaire that contains 12 subscales and is widely used to assess the psychosocial impact of chronic pain [25]. The Short Form-36 Health Status Questionnaire (SF-36) scale was measured to evaluate each patient's health perception [26–28]. This is a self-administered questionnaire containing eight subscales. This study used four subscales that included health perceptions, physical functioning, role limitations related to physical problems, and role limitations from emotional problems. The higher scores reflected a patient's belief of good or excellent health.

Pain Catastrophizing

Pain catastrophizing is broadly defined as negative expectations about real or anticipated pain. It is associated with heightened pain as well as increased use of health care resources, and is a strong predictor of disability. The Pain Catastrophizing Scale (PSC) is a 13-item scale that assesses rumination, magnification, and helplessness [29]. Scores greater than or equal to 30 represent clinical significance.

Depressive Symptoms

The Center for Epidemiological Studies Depression Scale (CES-D) is a self-administered questionnaire on depressive symptoms that ranks severity [30]. This scale has

been used by multiple studies in patients with FM to assess degree of depression [31–33]. The CES-D consists of 20 questions that are scored on a 0 to 4 point Likert scale. A score of 27 or higher has been used to classify major depression in patients with chronic pain [34].

Data Analysis

The differences in mean scores from admission and dismissal from the MPI, SF-36, PCS, CES-D questionnaires and pain scores were compared using two-sided paired *t* tests. Comparisons of mean scores between patients on opioids and patients not taking opioid were performed with two-sided paired *t* tests. All categorical variables were compared using two-sided chi-squared tests, and means were compared using independent two-sided *t* tests. The level of significance for all statistical tests was $P < 0.05$. All group comparisons of continuous variables were done using analysis of variance (ANOVA) or two-sample *t* tests, depending on the number of groups. If the overall ANOVA F-test was significant at the alpha = 0.05 level, then pairwise tests of means were done using the Tukey honestly significant difference (HSD) method. Non-parametric analyses using Wilcoxon rank sum tests were compared for tests of continuous variables and gave similar results at the alpha = 0.05 level. Data analysis was performed using SPSS software, version 22.0 (SPSS, Inc., Chicago, IL, USA).

Results

A total of 159 patients with a primary pain diagnosis of FM were consecutively admitted to the Mayo Clinic Pain Rehabilitation Center from 2006 through 2012. Table 1 contains the demographic information from this patient population with 55 patients taking daily opioids (35%) and 76 patients who were not taking opioids. Twenty-eight patients were using opioids on a non-daily, as-needed basis and were excluded from review. The mean duration of opioid use was 4.6 years (SD, 5.8) and 38% of patients (n = 21) were on multiple daily opioids with the combination hydrocodone/acetaminophen being the most commonly prescribed. The mean morphine oral equivalence dose (MED) for this patient population was 99 mg/day (SD, 143), with a range of 5–600 mg/day.

Fifty-one patients completely tapered and discontinued opioids during the 3-week PRC program. Four patients discontinued opioids but did not have a structured taper due to the following reasons: low opioid dose on admission (5 mg/day MED or less) (n = 2), significant cognitive impairment requiring hospitalization and opioid discontinuation (n = 1), and concerns for diversion resulting in immediate opioid discontinuation (n = 1). The majority of the patients 73% (n = 37) were on a MED of less than 100 mg/day, 61% (n = 31) of patients were on daily opioids for a duration of 2 years or more. Patients on opioids for less than 2 years were on a lower mean MED (72 mg/day) and patients on opioids for greater than 2 years were on higher mean MED (127 mg/day).

Figure 1 examines tapering outcomes based on opioid dose. Patients on lower MED were tapered off opioids over a shorter duration of time. Patients on a MED of 100 mg/day or less were tapered off opioids over a mean of 10 days, 14 days for patients on a MED of 100–200 mg/day, and 18 days for patients on a MED of

Table 1 Patient demographic information

	Patients taking daily opioids (n = 55)	Patients not taking daily opioids (n = 76)
Age, mean (SD)	48.6 (13.2)	46.9 (14.6)
Female sex, no. (%)	46 (84%)	60 (78.9%)
Pain duration, years (SD)	8.6 (11.3)	13.8 (12.2)
Years education (SD)	16.6 (2.42)	14.8 (3.0)
Currently working, no. (%)	10 (18%)	23 (30.3%)
Ethnicity, Caucasian, no. (%)	50 (91%)	70 (92.1%)
Duration of opioid use, years (SD)	4.6 (5.8)	
Patients on multiple daily opioids, no. (%)	21 (38%) (range 2–4)	
Opioid: (% is >100% due to multiple opioids used)	–	
−Hydrocodone/acetaminophen, no. (%)	16 (29%)	
−Oxycodone/acetaminophen, no. (%)	7 (13%)	
−Oxycodone extended release, no. (%)	11 (20%)	
−Oxycodone, no. (%)	8 (15%)	
−Fentanyl patches, no. (%)	5 (9%)	
−Methadone, no. (%)	6 (11%)	
−Morphine, no. (%)	8 (15%)	
−Others, no. (%)	15 (27%)	
Morphine oral equivalence dose, mean (SD)	99 mg/day (143) (range: 500–600)	

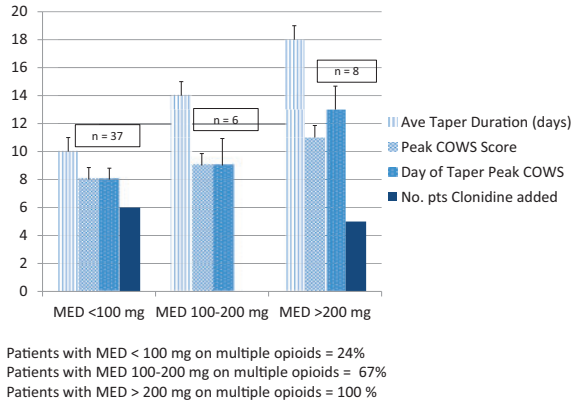

Figure 1 Tapering based on MED.

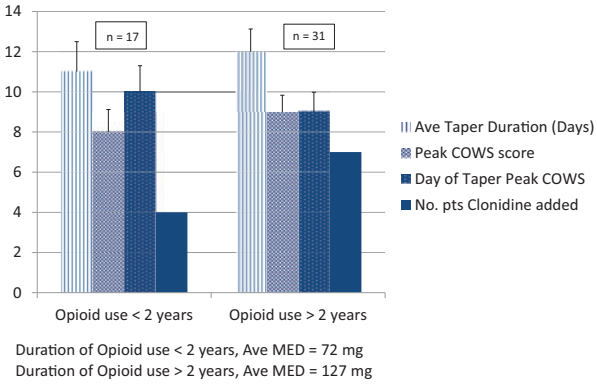

Figure 2 Tapering based on duration of use.

greater than 200 mg/day. The difference in taper period duration was significant between the MED <100 mg and MED >200 mg per day groups ($P < 0.001$) but not significant between the MED <100 mg and MED 100–200 mg per day groups ($P = 0.1$) and between MED 100–200 mg per day and MED >200 mg per day ($P = 0.5$). The withdrawal symptoms as assessed by the highest or peak COWS score were higher for patients on higher opioid doses but not significantly different based on MED ($P = 0.22$). The mean peak COWS score occurred at 80% reduction from the initial opioid dose for patients on a MED dose of 100 mg/day or less, 64% for a MED dose of 100–200 mg/day, and 72% for a MED dose of greater than 200 mg/day.

Tapering outcomes based on the duration of opioid use are shown in Figure 2. Patients were divided into two categories: opioid use for less than or greater than 2 years' time. There were no significant differences in duration of taper period ($P = 0.63$) or peak COWS score ($P = 0.80$) based on duration of use. The mean peak COWS score occurred at 90% reduction from the initial opioid dose for patients on opioids for less than 2 years and at 75% reduction for opioid use greater than 2 years.

Patients tapered off opioids completed outcome assessments on program admission and completion. Significant improvements ($P < 0.001$) were seen on all five outcome measures at program completion (Table 2). Outcome measures were also compared between patients on daily opioids and those not taking opioids. From the sample of 159 FM patients, 28 patients took opioids on a non-daily as-needed basis and were excluded, leaving 76 patients upon admission who were not taking opioids (Table 2). Comparing the two cohorts at program admission, patients who were taking daily opioid medication reported a significantly higher mean pain score on a numeric pain scale, 7.2 vs 5.7 ($P =< 0.001$), depression 30.4 vs 24.8 ($P = 0.01$), and pain interference with life 55.2 vs 52.3 ($P = 0.01$). There were no significant differences between these groups for pain catastrophizing, health perception, or perceived life control. At dismissal there were no significant differences between the two groups with the exception of the depression score that remained higher in the opioid group, 18.0 vs 11.5 ($P < 0.001$).

Discussion

Opioid use was prevalent in this FM study cohort with 52% of patients prescribed either as-needed or daily opioids. Daily opioid use represented 35% of the sample. This is consistent with other categorizations of opioid use in FM patient populations [7,9,31]. While there is increasing concern regarding lack of efficacy of opioid use in FM patients, there is a lack of research of methods to taper patients safely off of these medications. Various groups and guidelines have published recommendations for opioid tapering strategies that range from daily to weekly dosage reductions; however, no standard formula is appropriate for all patients [11,35–38].

In this study sample, opioid tapering occurred over a mean of 10 days for patients on lower MED and 18 days for patients on higher MED. Withdrawal symptoms peaked at a mean of 8 days for lower MED and 13 days for higher MED. Patient duration of opioid use did not significantly impact either the duration of the taper period or withdrawal symptoms. Although no standard algorithm for opioid tapering is used by this program, general guidelines are followed as outlined in the *Methods* section. Examples of a short taper for a low morphine equivalent dose patient and a longer taper for a higher morphine equivalent dose patient are illustrated in Figure 3.

Clonidine is commonly used in detoxification protocols, but was used only if needed in this study sample [35]. Clonidine use was also evaluated for both dose and duration of use. Only 11 study patients (22%) used clonidine and therefore the sample size was too small to draw conclusions of significant differences (Figures 1 and 2).

Table 2 Mean scores and outcome variables at pretreatment and posttreatment

Outcome variable	Patients taking daily opioids (n = 55)*					Patients not taking daily opioids (n = 76)*					
	Pretreatment		Posttreatment			Pretreatment		Posttreatment			
	Mean	SD	Mean	SD	Between treatment *P* value	Mean	SD	Mean	SD	Pretreatment Between subject *P* value	Posttreatment Between subject *P* value
Numeric pain rating	7.2	1.6	5.2	2.2	<0.001	5.7	2.0	4.3	2.2	<0.001	0.06
Depression (CES-D)	30.4	12.8	18.0	12.6	<0.001	24.8	12.8	11.5	8.4	0.01	<0.001
Pain catastrophizing (PCS)	27.7	11.8	15.1	11.7	<0.001	24.1	12.3	12.7	9.3	0.08	0.21
Health Perception (SF-36)	33.3	12.6	42.9	12.7	<0.001	33.9	11.1	44.0	11.6	0.75	0.60
Interference with life (MPI)	55.2	5.3	45.0	11.9	<0.001	52.3	7.7	42.4	10.9	0.01	0.18
Perceived life control (MPI)	45.3	9.3	58.7	8.6	<0.001	47.3	9.2	59.0	8.2	0.21	0.88

CES-D = Center for Epidemiologic Studies Depression Scale; PCS= Pain Catastrophizing Scale; SF-36 = Short Form-36 Health Status Questionnaire; MPI = Multidimensional Pain Inventory.
*All subjects did not complete all assessment scales.

Despite tapering off opioid medications, patients had statistically significant improvements in all outcome measures. Reductions were seen in the numerical pain, depression, pain catastrophizing, and interference of pain in life scores while increased scores were seen in the areas of health perception and perceived life control. Pain and functionality measures on program admission were compared between patients on daily opioids and those not taking opioids. Fibromyalgia patients taking daily opioids had a higher mean pain score on a numeric pain scale, increased depression scores, and more pain interference with life scores. Higher pain scores upon admission for patients taking opioids may reflect the presence of opioid-induced hyperalgesia (OIH). OIH is a state of nociceptive sensitization resulting in hyperalgesia and allodynia with opioid exposure [39]. The risk of OIH with chronic opioid exposure supports opioid tapering in this patient population [40].

All FM patients saw significant improvement in all outcome measures at dismissal with the exception of the depression score. Although decreased scores were seen for both cohorts, the depression score remained significantly higher in the opioid group. There are several reasons why depression scores may be elevated in opioid users. An association between opioid use and depressive symptomatology are recognized to co-exist in CNCP populations. Depression represents both a cause and a resulting consequence of opioid use and the risk appears to increase with duration of use and opioid dose [41–43]. Patients with depressive symptoms may also be more likely to use opioid medications inappropriately [44].

During the PRC program, patients report a daily mood score on a scale of 0–10 with 0 indicating a very poor mood with suicidal thinking and 10 indicating a very good mood. Suicide assessment is performed on admission and discharge from the program, as indicated by mood scores, and in circumstances of verbal concerns or observation of concerning behaviors. Prior to completing the program, follow-up care is discussed. Patients are provided with a list of CBT providers close to home and assisted with arranging an appointment. Additionally, patients complete a difficult day plan that is used to manage mood and pain and a two-week schedule to plan for continuing implementation of program concepts when returning home.

Return to opioid use is an ongoing concern. Opportunities for opioid relapse education is provided via a specialized track during the 3-week PRC program. These sessions are held six to eight times per week for patients identified with the greatest risk of relapse. Additionally, aftercare is offered through a 1-day program every 3 weeks and patients are encouraged to participate on a regular basis.

At program dismissal, the patient is encouraged to discard medications that have been discontinued. If the patient does not agree to medication disposal, an education discussion ensues to help patients understand

Case #1: low dose opioid taper (40 mg morphine equivalent dose): LB is a 46 year old female with fibromyalgia. She has been on hydrocodone/acetaminophen 10/325 mg tablets, 1 tablet by mouth four times daily for 2 years. Opioid tapering plan is to decrease hydrocodone by 5 mg each day, holding the dose stable on weekends (Friday, Saturday, and Sunday) when patient is not in pain rehabilitation program. Continue to administer the medication in divided doses.

Day	Total daily dose (mg)
1	40
2	35
3	30
4	25
5,6,7	20
8	15
9	10
10	5
11	completed

Case #2: high dose opioid taper (150 mg morphine equivalent dose): AC is a 58 year old female with fibromyalgia who has been on oxycodone extended release (ER) 40 mg twice daily and oxycodone immediate release (IR) 5 mg four times daily for the past 5 years. Opioid tapering plan is to decrease oxycodone ER by 10 mg each day, holding the dose stable on weekends (Friday, Saturday, and Sunday) when patient is not in pain rehabilitation program and continue oxycodone IR until the ER formulation is completed. Then taper oxycodone IR by 5 mg each day. Continue to administer in divided doses similar to patient home regimen.

Day	Total daily dose oxycodone ER (mg)	Total daily dose oxycodone IR (mg)
1	80	20
2	70	20
3	60	20
4	50	20
5,6,7	40	20
8	30	20
9	20	20
10	10	20
11	completed	20
12,13,14		15
15		10
16		5
		completed

Figure 3 Opioid taper case examples.

the risks in resuming medications, especially following the use of high opioid doses. The patient is dismissed with a printed updated medication list and medication changes are communicated to the patient's local health care provider(s).

Prescription opioid use disorder is estimated to affect more than one-third of patients with CNCP [45]. In one multisite, randomized clinical trial >90% of patients were shown to relapse by eight weeks after detoxification [46]. More favorable outcomes are reported in those patients, who completed opioid detoxification in the course of comprehensive interdisciplinary pain rehabilitation programming focused on functional restoration. Relapse rates of 22.5% 12-month posttreatment from the Cleveland Clinic pain rehabilitation data, [20] and 13.9% 6-month posttreatment from the Mayo Clinic PRC patient population longitudinal study completed in 2005–2006 [19]. These findings suggest an important role of pain rehabilitation in reducing return to prescription opioids in patients with CNCP. Opioid tapering strategies that take into account risk factors associated with relapse (e.g., opioid withdrawal, craving, pain intensity, depressive symptoms) may contribute to better outcome after detoxification [20,47]. However, a randomized treatment-control study is necessary to validate these observations.

There is growing interest in the development of pain rehabilitation programs [48]. New programs should focus on providing support and assessment for those patients tapering off opioids but also emphasize how medications are replaced with new cognitive behavioral tools. Patients should be encouraged to also avoid over the counter pain medications during the months following opioid tapering and rehabilitation program completion. This helps avoid falling back into the old patterns of taking medications on a regular basis to manage pain symptoms. Interdisciplinary program should consist of a skilled team providing a cohesive mission and message regarding program concepts and philosophy for successful participant outcomes.

There are limitations to this study. This study was conducted in a 3-week, Monday to Friday outpatient pain rehabilitation program. There is inherent selection bias as participants choosing this program with a well-known philosophy of opioid cessation may not represent patients in the general pain population. Because the program provides 8 hours of structured therapies daily, it is also dissimilar to both inpatient and general outpatient care. The variability in taper rate due to patient factors also makes results difficult to generalize in a standardized fashion. The demographics of the study population could also limit generalizability as the population was overwhelmingly Caucasian and well educated and may not represent the characteristics of the general pain population in other clinical settings. Opioid tapering results are meant to provide a general framework for providers to utilize in designing a taper based on patient specific characteristics.

Conclusion

Study results were consistent with others reporting a high utilization of opioids in FM patients. The range of MED was 7.5–600 mg/day with a mean dose of 99 mg/day. The range of tapering duration was 2–24 days. Patients with higher MED are tapered over longer periods of time but duration of use did not impact the length of the taper period. The peak withdrawal score occurred when the opioid taper was 60–80% completed. Tapering opioids without the addition of adjuvant medications in FM patients in conjunction with cognitive behavioral tools is an effective model for opioid discontinuation.

Acknowledgments

We would like express appreciation to Karen Weiss, PhD, for her statistical analysis contributions to this manuscript.

References

1 Manchikanti L, Helm S, 2nd, Fellows B, et al. Opioid epidemic in the United States. Pain Physician 2012; 15(suppl 3):ES9–38.

2 Ballantyne JC. Opioid analgesia: Perspectives on right use and utility. Pain Physician 2007;10(3):479–91.

3 Russell IJ, Kamin M, Bennett RM, et al. Efficacy of tramadol in treatment of pain in fibromyalgia. J Clin Rheumatol 2000;6(5):250–7.

4 Bennett RM, Schein J, Kosinski MR, et al. Impact of fibromyalgia pain on health-related quality of life before and after treatment with tramadol/acetaminophen. Arthritis Rheum 2005;53(4):519–27.

5 Goldenberg DL, Burckhardt C, Crofford L. Management of fibromyalgia syndrome. JAMA 2004; 292(19):2388–95.

6 Hauser W, Thieme K, Turk DC. Guidelines on the management of fibromyalgia syndrome–a systematic review. Eur J Pain 2010;14(1):5–10.

7 Hauser W, Walitt B, Fitzcharles MA, Sommer C. Review of pharmacological therapies in fibromyalgia syndrome. Arthritis Res Ther 2014;16(1):201

8 Ngian GS, Guymer EK, Littlejohn GO. The use of opioids in fibromyalgia. Int J Rheum Dis 2011;14 (1):6–11.

9 Fitzcharles MA, Ste-Marie PA, Gamsa A, Ware MA, Shir Y. Opioid use, misuse, and abuse in patients labeled as fibromyalgia. Am J Med 2011;124(10): 955–60.

10 Ahmed A, Khurana H, Gogia V, Mishra S, Bhatnagar S. Use of sustained release oral morphine as a bridge in withdrawal of morphine in patients on high doses of oral immediate release morphine for cancer pain. Am J Hospice Palliat Med 2010;27(6):413–5.

11 Berna C, Kulich RJ, Rathmell JP. Tapering long-term opioid therapy in chronic noncancer pain: Evidence and recommendations for everyday practice. Mayo Clin Proc 2015;90(6):828–42.

12 Chou R, Fanciullo GJ, Fine PG, et al. Clinical guidelines for the use of chronic opioid therapy in chronic noncancer pain. J Pain 2009;10(2):113–30.

13 Manchikanti L, Abdi S, Atluri S, et al. American Society of Interventional Pain Physicians (ASIPP) guidelines for responsible opioid prescribing in chronic non-cancer pain: Part 2–guidance. Pain Physician 2012;15(3 Suppl):S67–116.

14 Miller NS, Swiney T, Barkin RL. Effects of opioid prescription medication dependence and detoxification on pain perceptions and self-reports. Am J Ther 2006;13(5):436–44.

15 Van den Brink W, Haasen C. Evidenced-based treatment of opioid-dependent patients. Can J Psychiatry 2006;51(10):635–46.

16 Pade PA, Cardon KE, Hoffman RM, Geppert CM. Prescription opioid abuse, chronic pain, and primary care: A co-occurring disorders clinic in the chronic disease model. J Subst Abuse Treat 2012;43(4):446–50.

17 Brands B, Blake J, Sproule B, Gourlay D, Busto U. Prescription opioid abuse in patients presenting for methadone maintenance treatment. Drug Alcohol Depend 2004;73(2):199–207.

18 Rome JD, Townsend CO, Bruce BK, et al. Chronic noncancer pain rehabilitation with opioid withdrawal: Comparison of treatment outcomes based on opioid use status at admission. Mayo Clin Proc 2004;79 (6):759–68.

19 Townsend CO, Kerkvliet JL, Bruce BK, et al. A longitudinal study of the efficacy of a comprehensive pain rehabilitation program with opioid withdrawal: Comparison of treatment outcomes based on opioid use status at admission. Pain 2008;140(1):177–89.

20 Huffman KL, Sweis GW, Gase A, Scheman J, Covington EC. Opioid use 12 months following interdisciplinary pain rehabilitation with weaning. Pain Med 2013;14(12):1908–17.

21 DuPen S, Dupen A, Opioid Conversion Calculator. Poulsbo, WA: Cynergy Group; 2000.

22 Wesson DR, Ling W. The Clinical Opiate Withdrawal Scale (COWS). J Psychoactive Drugs 2003;35(2): 253–9.

23 Tompkins DA, Bigelow GE, Harrison JA, et al. Concurrent validation of the Clinical Opiate Withdrawal Scale (COWS) and single-item indices against the Clinical Institute Narcotic Assessment (CINA) opioid withdrawal instrument. Drug Alcohol Depend 2009;105(1-2):154–9.

24 Busto UE, Sykora K, Sellers EM. A clinical scale to assess benzodiazepine withdrawal. J Clin Psychopharmacol 1989;9(6):412–6.

25 Kerns RD, Turk DC, Rudy TE. The West Haven-Yale Multidimensional Pain Inventory (WHYMPI). Pain 1985;23(4):345–56.

26 Ware JE Jr., Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 1992;30 (6):473–83.

27 McHorney CA, Ware JE, Jr., Rogers W, Raczek AE, Lu JF. The validity and relative precision of MOS short- and long-form health status scales and Dartmouth COOP charts. Results from the Medical Outcomes Study. Med Care 1992;30(suppl 5):MS253–265.

28 McHorney CA, Ware JE Jr., Raczek AE. The MOS 36-Item Short-Form Health Survey (SF-36): II. Psychometric and clinical tests of validity in measuring physical and mental health constructs. Med Care 1993;31(3):247–63.

29 Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. Psychol Assess 1995;524–32.

30 Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Appl Psychol Meas 1977;1(3):385–401.

31 Hooten WM, Townsend CO, Sletten CD, Bruce BK, Rome JD. Treatment outcomes after multidisciplinary pain rehabilitation with analgesic medication withdrawal for patients with fibromyalgia. Pain Medicine 2007;8(1):8–16.

32 White KP, Nielson WR, Harth M, Ostbye T, Speechley M. Chronic widespread musculoskeletal pain with or without fibromyalgia: Psychological distress in a representative community adult sample. J Rheumatol 2002;29(3):588–94.

33 Ercolani M, Trombini G, Chattat R, et al. Fibromyalgic syndrome: Depression and abnormal illness behavior.

Multicenter investigation. Psychother Psychosom 1994;61(3-4):178–86.

34 Geisser ME, Roth RS, Robinson ME. Assessing depression among persons with chronic pain using the Center for Epidemiological Studies-Depression Scale and the Beck Depression Inventory: A comparative analysis. Clin J Pain 1997;13(2):163–70.

35 Warner EA. Opioids for the treatment of chronic noncancer pain. Am J Med 2012;125(12):1155–61.

36 Furlan AD, Reardon R, Salach L. The opioid manager: A point-of-care tool to facilitate the use of the Canadian Opioid Guideline. J Opioid Manage 2012; 8(1):57–61.

37 National Guideline C. Interagency guideline on opioid dosing for chronic non-cancer pain: An educational aid to improve care and safety with opioid therapy. 2010; Available at: http://www.guideline.gov/content.aspx?id=23792&search=taper. (accessed March 2015).

38 VA/DoD Clinical Guideline for Management of Opioid Therapy for Chronic pain. Washington, DC: Department of Veterans Affairs/Department of Defense; 2010.

39 Chu LF, Angst MS, Clark D. Opioid-induced hyperalgesia in humans—Molecular mechanisms and clinical considerations. Clin J Pain 2008;24(6):479–96.

40 Silverman SM. Opioid Induced Hyperalgesia: Clinical implications for the pain practitioner. Pain Physician 2009;12(3):679–84.

41 Scherrer JF, Svrakic DM, Freedland KE, et al. Prescription opioid analgesics increase the risk of depression. J Gen Intern Med 2014;29(3):491–9.

42 Sullivan MD, Edlund MJ, Zhang L, Unutzer J, Wells KB. Association between mental health disorders, problem drug use, and regular prescription opioid use. Arch Intern Med 2006;166(19):2087–93.

43 Edlund MJ, Austen MA, Sullivan MD, et al. Patterns of opioid use for chronic noncancer pain in the Veterans Health Administration from 2009 to 2011. Pain 2014;155(11):2337–43.

44 Grattan A, Sullivan MD, Saunders KW, Campbell CI, Von Korff MR. Depression and prescription opioid misuse among chronic opioid therapy recipients with no history of substance abuse. Ann Fam Med 2012;10(4):304–11.

45 Boscarino JA, Rukstalis MR, Hoffman SN, et al. Prevalence of prescription opioid-use disorder among chronic pain patients: Comparison of the DSM-5 vs. DSM-4 diagnostic criteria. J Addict Dis 2011;30(3):185–94.

46 Weiss RD, Potter JS, Fiellin DA, et al. Adjunctive counseling during brief and extended buprenorphine-naloxone treatment for prescription opioid dependence A 2-phase randomized controlled trial. Arch Gen Psychiatry 2011;68 (12):1238–46.

47 Heiwe S, Lonnquist I, Kallmen H. Potential risk factors associated with risk for drop-out and relapse during and following withdrawal of opioid prescription medication. Eur J Pain 2011;15 (9):966–70.

48 Gatchel RJ, McGeary DD, McGeary CA, Lippe B. Interdisciplinary chronic pain management: Past, present, and future. Am Psychol 2014;69 (2):119–30.