

## Impact of Opioid Use on Results of Interventional Back-Pain Management on Patients with Chronic Back Pain

Hannu Heikkilä\*, Aet Ristmägi

Department of Physical Medicine and Rehabilitation, Satakunta Central Hospital (Satasairaala), Sairaalan tie 3, 28500 Pori, Finland

### \*Corresponding author

Hannu Heikkilä Department of Physical Medicine and Rehabilitation, Satakunta Central Hospital (Satasairaala), Sairaalan tie 3, 28500 Pori, Finland

Submitted: 16 Nov 2021; Accepted: 22 Nov 2021; Published: 28 Nov 2021

**Citation:** Hannu Heikkilä, Aet Ristmägi (2021) Impact of Opioid Use on Results of Interventional Back-Pain Management on Patients with Chronic Back Pain. *J Anesth Pain Med* 6(2): 25-29.

### Abstract

**Objectives** Preoperative exposure to opiates has recently shown to be associated with poor outcomes after elective major surgery, but little is known as to how pretreatment opioid use affects results of interventional back-pain management. We investigated the impact of preoperative opioid use on outcomes after interventional pain management procedures on patients with chronic back pain.

**Methods** A high-volume, single-center quality register analysis was performed on patients who underwent interventional pain management for chronic back pain as a part of multidisciplinary pain

management program. Chronic opioid use was defined as having an opioid prescription concurrent with 90 days.

**Results:** A total of 797 patients underwent intervention during the study period 2019-2020. Pretreatment opioid use was present in 262 patients (33%). Patients with chronic back-pain using opiates reported significantly more pain and discomfort before treatment as well as lowered working ability. Facet-joint medial branch blocks resulted for significant improvement for both groups directly after the treatment as well as at 2-hours follow-up. However, non-opiate group reported significantly more improvement at 2-days follow up as well as at one-month follow-up compared to opiate users. Opiate users reported nearly the same pain level at one-month follow-up as before treatment.

**Conclusions:** Pretreatment opioid use is associated with greater pain discomfort, impairment and reduced functional ability, as well as poorer long-term effect of interventional back pain treatment at 1-month follow-up. In our study opiate users reported same positive effects of facet-joint nerve blocks immediately after the treatment and 2 hours after the treatment but significantly smaller effect at one-month follow-up. This could indicate that opiate use may diminish effects of pain treatments by affecting relearning, behavioral changes and central pain modulation.

These findings may help to understand the impact of pretreatment opioid use on patient care, and its implications on hospital and societal cost.

**Keywords:** Opioids, Narcotics Opioids, Interventional Pain Management, Medial Branch Block, Outcome.

### Introduction

Low back pain is one of the most common causes of chronic pain, disability, lost productivity and costs. Back pain is among the top indications for prescription opioid therapy and opiate use is associated with an approximately 25% rate of opioid misuse and 10% rate of opioid addiction [1-3]. Prescription opioid sales have quadrupled in the past two decades [2]. However, the prevalence

and severity of pain has remained constant [4,5]. Opioid analgesics play an integral role in the management of acute post-surgical pain but these medications can also predispose its users to significant harm. Common side effects of narcotic administration include tolerance, sedation, physical dependence, constipation, respiratory depression and addiction [6]. The complications of opioid use include as well immediate side effects affecting nega-

tively postsurgical outcomes. The number of patients undergoing procedures and on pretreatments narcotics is increasing. The Spine Patient Outcomes Research Trial (SPORT) found that opioid users had worse pain and quality of life measures at baseline [7]. Pre-operative opioid use has recently been associated with increased healthcare spending and worse outcomes after elective abdominal procedures as well as cervical and spinal surgery [8-12]. Needle based interventions are commonly used for low-back pain treatment and interventions of the facet (zygapophyseal) joints are the second most common procedure in interventional pain medicine [13]. The effect of opioid use on patient care after interventional pain management procedures, however, is completely unknown.

In the current study, we investigated the impact of pretreatment opioid use on outcomes after interventional pain management procedures on patients with chronic back pain. We hypothesized that pretreatment opioid use would be associated with worse outcome measured as pain VAS as well as quality of life after treatment.

### Material and Methods

A retrospective cohort study was performed for patients admitted to the Department of Physical Medicine and Rehabilitation at Satakunta Central Hospital and who underwent interventional pain treatment procedure at the unit. In this study, we included patients who underwent lumbar medial branch blocks with local anesthetics as a complement to multidisciplinary back-pain treatment. Medial branch blocks were performed in accordance with previously published standards and techniques [14]. Of all 797 blocks 262 (33%) were performed in current opiate users. The study period was from August 1, 2019 to December 31, 2020. Patient data were collected the Quality Registry Database of the unit (THL/2182/5.09.00/2019), including use of medicine for pain before the treatment procedure. The database includes de-identified patient data. This study has been approved by Institutional Review Board (SATSHP/1192/13.01/2018). Data collected from Quality Registry include patient sex, age and pain VAS for back pain. We also used the Quality-of-Life questionnaires EQ5D EQ VAS and Oswestry index as well as working ability estimation on VAS scale

0-10 [15-18]. Follow-up data of Quality registry was collected after 1 month by telephone interview by nurse and patients were asked to complete pain-diary 30 days after the treatment and post it back to the unit. Pretreatment opioid use was defined as having an active opioid prescription and chronic opioid use was defined as having an opioid prescription concurrent with 90 days. Other studies have identified 90 days as criteria for long-term opioid therapy [2, 19-20]. All patient information was deidentified in the quality registry prior to analysis.

All statistical analyses were carried out in the Statistical Package for Social Sciences (SPSS.21). The Wilcoxon signed-rank test was applied to compare differences in treatment groups at baseline and follow-up. The alpha level for significance was set at  $P < 0.05$ . Between groups, data were examined using analysis of variances (ANOVAs). Demographic variables were compared using a t-test or chi-squared test for continuous and categorical variables, respectively. Statistical significance was defined as p value less than 0.05. Continuous variables were described as mean and SD where applicable, and compared using nonparametric tests.

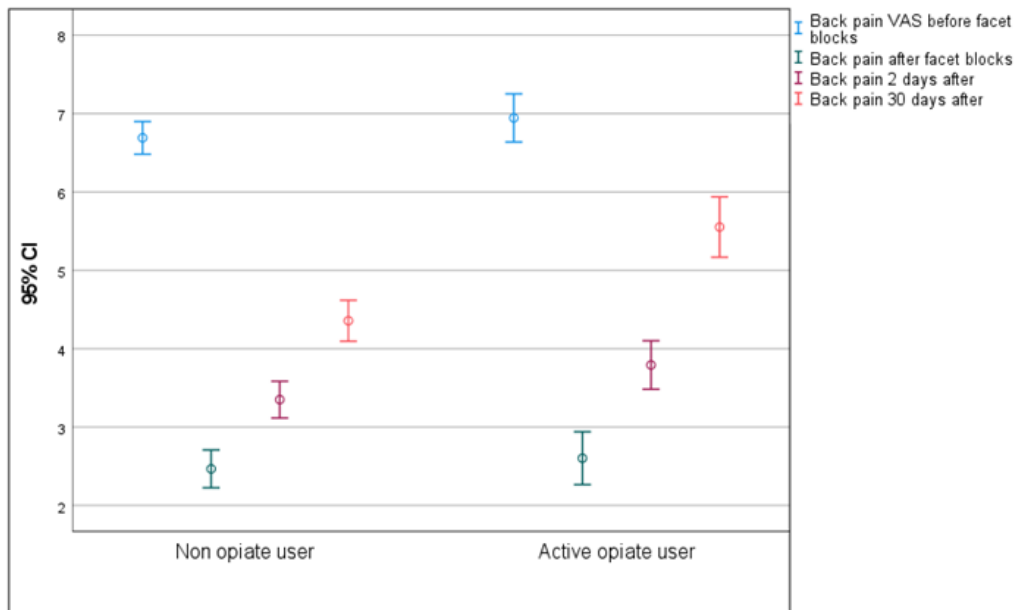
### Results

As shown in Table 1 opiate users, report more pain, discomfort and impairment before facet joint nerve blocks. Mean age was the same for both groups (62 years). Opiate users were more often men (40%) than in the non-user's group (33%). As shown in fig. 1 both groups reported significant improvement of back pain immediately after the treatment as well 2 hours after. However, at 2-days and one-month follow up opiate users reported significantly lower improvement. Back pain VAS for opiate users at 2-days was 3,8 (SD=2,2) compared to non-users VAS 3.4 (SD=2.4) (95% confidence interval -81 - -0,05, p sign. 0,03). Pain VAS values at one-month follow-up for opiate users were 5,5 (SD=2.7) and nonusers 4,4 (SD 2,6) (95% confidence interval -1,5 - -,65, p sign >0,001). Non-users still reported significant improvement of back pain at follow up one month later. Of non-users 38% reported over 50% decrease of pain at follow up compared to 20% of opiate users (Chi-Square 19,8  $p < 0,001$ ).

**Table 1. Pretreatment data for active opiate users and non-users before lumbar facet joint nerve blocks. Oswestry Index, Working Ability VAS, EQ5D quality of life and general health (EQ VAS), pain VAS, age and sex (percent of men) values are presented for both groups.**

		N	Mean	SD	95% confidence interval	P sign
Oswestry-index	Opiat users	240	45,0	16,6	5,01 - 10,11	<0,001
	Non users	502	37,4	15,4		
Working AbilityVAS	Opiat users	112	3,8	3,1	-1,77 - -0,36	=0,003
	Non users	205	4,8	3,0		
EQ5D-index	Opiat users	80	,69	,05	-0,06 - -0,03	<0,001
	Non users	180	,73	,07		
EQ VAS	Opiat users	77	41,3	19,6	-15,4 - -4,49	<0,001
	Non users	175	51,2	30,0		
Back pain VAS	Opiat users	239	6,9	2,2	-,64 - 0,06	=0,10
	Non users	465	6,6	2,1		
Age (mean) years	Opiat users	262	62,1	15,3	-2,33 - 1,99	p=0,88

	Non users	535	62,3	14,2		
Sex % men	Opiat users	106	40%			
	Non users	175	33%			p=0,03



**Figure 1:** Back pain VAS for both groups who underwent lumbar medial branch blocks with local anesthetics. Pain VAS before treatment, directly after the blocks, 2 days after and at 1-month follow-up for opiate users and non-users.

Patients undergoing interventional pain management reported improvements for all variables (table 2) at one-month follow up. Opiate users did not report significant improvement of perceived health (EQ VAS). EQ VAS before treatment for opiate-users was 42,3 and at follow-up 45,1 (95% confidence interval -8,1 – 2.5, p=0,30). Working ability VAS before intervention was 4,1 and at follow up 4,5 (confidence interval -,87 - ,01) and the difference was not significant (P=0,13).

**Table 2. Results at follow-up after facet joint nerve blocks for all patients. Oswestry-Index, Working Ability VAS, Quality of Life (EQ5D) and General Health (EQ VAS) initial values are compared to outcome 30 days after the treatment. Back pain VAS values are presented before blocks, immediately (15 minutes) after the blocks, back pain VAS at 2 days and at 30 days. Follow-up pain (directly after blocks, 2 days and 30 days) is compared to back pain VAS before treatment.**

		N	Mean	SD	95% confidence Interval	P sign
Oswestry-Index	Before	725	39,3	16,4	5,01 - 7,70	<0,001
	Follow-up		32,9	21,6		
Working AbilityVAS	Before	267	4,5	3,0	-,83 - -,033	<0,001
	Follow-up		5,1	3,2		
EQ5D	Before	253	,72	,06	-0,04 - -,02	<0,001
	Follow-up		,75	,09		
EQ VAS	Before	228	49,1	21,0	-8,4 - -,3,2	<0,001
	Follow-up		54,2	22,1		
Back pain VAS directly after blocks	Before	797	6,7	2,1	3,7 – 4,1	<0,001
	After		2,8	2,4		
Back pain VAS 2 days after blocks	Before	733	6,7	2,1	3,0 – 3,4	<0,001
	Follow-up		3,5	2,3		

Back pain VAS	Before	797	6,7	2,1	1,9 – 2,3	<0,001
30 days follow-up	Follow-up		4,6	2,6		

## Discussion

In our single-center analysis, we studied the implications of pre-treatment opioid use on patient outcomes after lumbar medial branch blocks as a back-pain treatment. Our findings demonstrate that opioid users have diminished long-term effects of back pain treatments at 1 month follow up. The results of this investigation identify opioid use as an independent risk factor for treatment failure. Despite evidence and recommendations, a high number of patients with chronic back pain are still being managed with long-term opiates [1, 21]. This is contributing to the large number of patients undergoing procedures with pain related indications, who are on pretreatment opioids. The negative impact of preoperative opioid use on surgical outcomes has been shown recently in the orthopedic literature. Exposure to opiates prior to surgery has been shown to affect adversely outcomes across multiple orthopedic procedures [22-28]. In addition to worse patient outcomes and increased resource utilization, active opioid users achieved sub-optimal pain management after operative intervention. In recent studies, the general surgery population also suffered suboptimal outcomes when exposed to opioids prior to elective surgery [8-9]. Preoperative opioid use was associated with greater hospital costs, higher readmission rates, and prolonged hospital stay. Thus, previous authors have identified opioid use as a potentially modifiable risk factor address in the outpatient setting prior to surgery [8, 23-28]. The precise mechanism how opiate use effect on pain perception is not yet understood but it is generally thought to result from neuroplastic changes in the peripheral and central nervous system (CNS) that lead to sensitization. Chronic opioid therapy can paradoxically sensitize patients to acute pain, a condition termed "opioid-induced hyperalgesia" [29, 30]. Opioid-induced hyperalgesia (OIH) is defined as a state of nociceptive sensitization caused by exposure to opioids [31]. The condition is characterized by a paradoxical response whereby a patient receiving opioids for the treatment of pain could actually become more sensitive to certain painful stimuli demonstrating enhanced pain perception. The type of pain experienced might be the same as the underlying pain or might be different from the original underlying pain [31].

With a growing number of active opioid users, it is important to understand the impact of active opioid use on outcomes after interventional pain treatment procedures. Our findings demonstrate diminished long-term results on back pain after medial branch blocks with local anesthetic for opiate users. These data provide insight into the impact of opioid use on rehabilitation and outcomes on patients with chronic back pain syndromes. Our results must be considered with regard to several limitations:

- This study reflects an analysis of opioid prescriptions and use rather than the actual number of pills consumed.
- The retrospective nature of data collection exposes it to reporting biases.
- The disease processes themselves may possibly predispose patients to different degrees of opiate use.
- As a single-center analysis, these data may not be generalizable to other institutions.
- Although we have identified preoperative opioid use as a risk

factor for treatment failure, we were unable to determine the size of the association based on our statistical analysis and sample size.

## References

1. Deyo RA, Von Korff M, Duhkoop D (2015) Opioids for low back pain. *BMJ* 350: 6380.
2. Chevy Chase, MD (2016) Opioid addiction: 2016 facts and figures. American Society of Addiction Medicine 2016.
3. Dowell D, Chou R, Tamara M Haegerich (2016) CDC Guideline for Prescribing Opioids for Chronic Pain - United States, 2016. *Morbidity and Mortality Weekly Report* 65: 1-49.
4. Chang HY, Daubresse M, Kruszewski SP, Alexander GC (2014) Prevalence and treatment of pain in EDs in the United States, 2000 to 2010. *Am J Emerg Med* 32: 421-431.
5. Daubresse M, Chang HY, Yu Y, Viswanathan S, Shah ND, et al. (2013) Ambulatory diagnosis and treatment of nonmalignant pain in the United States, 2000-2010. *Med Care* 51: 870-878.
6. Benyamin R, Trescot AM, Datta S, Buenaventura R, Adlaka R, et al. (2008) Opioid complications and side effects. *Pain Physician* 11: 105-120.
7. Radcliff K, Freedman M, Hilibrand A, Isaac R, Lurie JD, et al. (2013) Does opioid pain medication use affect the outcome of patients with lumbar disc herniation? *Spine (Phila Pa 1976)* 38: 849-860.
8. Cron DC, EnglesbeMJ, Bolton CJ, Joseph MT, Carrier KL, et al. (2017) Preoperative Opioid Use is Independently Associated With Increased Costs and Worse Outcomes After Major Abdominal Surgery. *Ann Surg* 265: 695-701.
9. Kim Y, Cortez AR, Wima K, Dhar VK, Athota KP, et al. (2018) Impact of Preoperative Opioid Use After Emergency General Surgery. *Journal of Gastrointestinal Surgery* 22: 1098-1103.
10. Kalakoti P, Volkmar BA, Bedard NA, Eisenberg JM, Hedrickson NR, et al. (2019) Preoperative Chronic Opioid therapy negatively impairs Long-term outcomes following cervical fusion surgery. *Spine (Phila Pa 1976)* 44: 1279-1286.
11. Jain N, Sharma M, Wang D, Ugiliweneza B, Darzin D, et al. (2021) Burden of preoperative opioid use and its impact on healthcare utilization after primary single level lumbar discectomy. *Spine J.* 21: 1700-1710.
12. Wilson JM, Farley KX, Gottschalk MB, Daly CA, Wagner ER (2021) Preoperative opioid use is an independent risk factor for complication, revision, and increased health care utilization following primary total shoulder arthroplasty. *J Shoulder Elbow Surg* 30: 1025-1033.
13. Cohen SP, Huang JH, Brummett C (2013) Facet joint pain - advances in patient selection and treatment. *Nat Rev Rheumatol* 9:101-116.
14. Cohen SP, Williams KA, Kurihara C, Nguyen C, Shields C, et al. (2010) Multicenter, randomized, comparative cost-effectiveness study comparing 0, 1, and 2 diagnostic medial branch (facet joint nerve) block treatment paradigms before lumbar facet radiofrequency denervation. *Anesthesiology* 113: 395-405.

15. Brooks R (1996) EuroQol: the current state of play. *Health Policy* 37: 53-72.
16. EuroQoL Group (1990) EuroQoL: a new facility for the measurement of health-related quality of life. *Health Policy* 16: 199-208.
17. Fairbank JCT, Couper J, Davies JB, O'Brien JP (1980) The Oswestry Low Back Pain Disability Questionnaire. *Physiotherapy* 66: 271-273.
18. Ilmarinen V, Ilmarinen J, Huuhtanen P, Louhevaara V, Näsmän O (2015) Examining the factorial structure, measurement invariance and convergent and discriminant validity of a novel self-report measure of work ability: work ability - personal radar. *Ergonomics* 58: 1445-1460.
19. Edlund MJ, Martin BC, Devries A, Fan MY, Braden JB, et al. (2010) Trends in use of opioids for chronic noncancer pain among individuals with mental health and substance use disorders: the TROUP study. *Clin J Pain* 26: 1-8.
20. Sullivan MD, Howe CQ (2013) Opioid therapy for chronic pain in the United States: promises and perils. *Pain* 154: 94-100.
21. Boudreau D, Von Korff M, Rutter CM, Saunders K, Ray GT, et al. (2009) Trends in long-term opioid therapy for chronic non-cancer pain. *Pharmacoepidemiol Drug Saf* 18: 1166-1175.
22. O'Donnell JA, Anderson JT, Haas AR, Percy R, Woods ST, et al. (2018) Preoperative Opioid Use is a Predictor of Poor Return to Work in Workers' Compensation Patients after Lumbar Discectomy. *Spine (Phila Pa 1976)* 43: 594-602.
23. Smith SR, Bido J, Collins JE, Yang H, Katz JN, et al. (2017) Impact of Preoperative Opioid Use on Total Knee Arthroplasty Outcomes. *J Bone Joint Surg Am* 99: 803-808.
24. Cheah JW, Sing DC, McLaughlin D, Feeley BT, Ma CB, et al. (2017) The perioperative effects of chronic preoperative opioid use on shoulder arthroplasty outcomes. *J Shoulder Elbow Surg* 26: 1908-1914.
25. Aasvang EK, Lunn TH, Hansen TB, Kristensen PW, Solgaard S, et al. (2016) Chronic pre-operative opioid use and acute pain after fast-track total knee arthroplasty. *Acta Anaesthesiol Scand* 60: 529-536.
26. Armaghani SJ, Lee DS, Bible JE, Archer KR, Shau DN, et al. (2014) Preoperative opioid use and its association with perioperative opioid demand and postoperative opioid independence in patients undergoing spine surgery. *Spine (Phila Pa 1976)* 39: 1524-1530.
27. Menendez ME, Ring D, Bateman BT (2015) Preoperative Opioid Misuse is Associated with Increased Morbidity and Mortality After Elective Orthopaedic Surgery. *Clin Orthop Relat Res* 473: 2402-2412.
28. Morris BJ, Sciascia AD, Jacobs CA, Edwards TB (2016) Preoperative opioid use associated with worse outcomes after anatomic shoulder arthroplasty. *J Shoulder Elbow Surg* 25: 619-623.
29. Angst MS, Clark JD (2006) Opioid-induced hyperalgesia: A qualitative systematic review. *Anesthesiology* 104: 570-587.
30. Chu LF, Angst MS, Clark D (2008) Opioid-induced hyperalgesia in humans: Molecular mechanisms and clinical considerations. *Clin J Pain* 24: 479-496.
31. Lee M, Silverman S, Hanssen H, Patel V, Manchikanti L (2011) A Comprehensive Review of opioid-Induced Hyperalgesia. *Pain Physician* 14: 145-161.

**Copyright:** ©2021 Hannu Heikkilä. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.