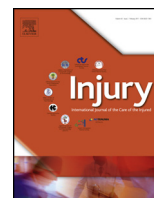




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Review

A systematic review of opioid use after extremity trauma in orthopedic surgery

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ABSTRACT

Background: The United States is in a prescription opioid crisis. Orthopedic surgeons prescribe more opioid narcotics than any other surgical specialty. The purpose of this study was to evaluate the state of opioid use after extremity trauma in orthopedic surgery.

Methods: A computerized literature search of PubMed/MEDLINE was conducted to evaluate the status of opioids after extremity fractures. Six articles were identified and included in the review.

Results: Patients who consume more opioids communicate greater pain intensity and less satisfaction with pain control. Intraoperative multimodal drug injection and nerve blockade are viable alternatives for postoperative pain control and can help decrease systemic opioid use. Orthopedic surgeons are overprescribing opioids. Compared to other countries, the United States consumes more opioids with no better satisfaction with pain control.

Conclusion: Orthopedic trauma surgeons should tailor their postoperative opioid prescriptions to the individual patient and utilize alternative options in order to control postoperative pain. Patients should be counseled regarding narcotic addiction and dependence. Patients unable to manage pain postoperatively should be followed closely and receive the proper chronic pain management, mental and social health services referrals.

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Background

The United States is in a prescription opioid crisis. In 2015, 63% of 52,404 overdose deaths involved an opioid [1]. Overdoses from methadone have decreased since 2008, but deaths due to synthetic

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opioids and heroin are still on the rise across many states [1]. History of prescription opioid abuse is a strong risk factor for heroin use [2,3]. An estimated two million Americans are addicted to prescription painkillers [4]. Physicians need to play a role combatting opioid addiction, especially addictions that stem from prescriptions.

Although the United States comprises only 4.6% of the world's population, it is responsible for 80% of the world's opioid consumption and 99% of the world's hydrocodone consumption [5]. Orthopedic surgeons prescribe more narcotics than any other surgical specialty [6,7]. The purpose of this systematic review was to evaluate the current state of practice with regards to prescription of opioids in orthopedic trauma surgery, particularly in the postoperative period, to evaluate patient factors that may contribute to higher amounts of opioid requirements, to describe opioid alternatives, and to compare opioid prescribing practices between the United States and other countries.

Methods

Literature search strategy and study eligibility

We performed a computerized literature search using the PubMed/MEDLINE database to identify studies for inclusion. The search algorithm entered was: ((“orthopaedic”[All Fields] OR “orthopedics”[MeSH Terms] OR “orthopedics”[All Fields] OR “orthopedic”[All Fields]) AND ((“injuries”[Subheading] OR “injuries”[All Fields] OR “trauma”[All Fields] OR “wounds and injuries”[MeSH Terms] OR (“wounds”[All Fields] AND “injuries”[All Fields]) OR “wounds and injuries”[All Fields]) OR (“fractures, bone”[MeSH Terms] OR (“fractures”[All Fields] AND “bone”[All Fields]) OR “bone fractures”[All Fields] OR “fracture”[All Fields])) AND ((“analgesics, opioid”[Pharmacological Action] OR “analgesics, opioid”[MeSH Terms] OR (“analgesics”[All Fields] AND “opioid”[All Fields]) OR “opioid analgesics”[All Fields] OR “opioid”[All Fields]) OR (“narcotics”[Pharmacological Action] OR “narcotics”[MeSH Terms] OR “narcotics”[All Fields] OR “narcotic”[All Fields])).

Studies were included that 1) evaluated opioid use after orthopedic trauma surgery, 2) assessed patient factors related to post-operative opioid use, 3) evaluated opioids using prescription drug databases, 4) evaluated potential non-opioid postoperative pain control methods, and 5) compared the United States with other countries with regards to opioid use, 6) were Level III and higher evidence, and 7) reported on extremity fractures. Studies were excluded if they contained pelvic and acetabular trauma, pediatric patients, spine trauma, or other orthopedic specialty procedures (soft tissue procedures, non-urgent hip and knee arthroplasty for arthritis, arthroscopy, ligament repair or reconstruction). Articles were also excluded if they were expert opinion, letters, editorials, or book chapters; meta-analysis, or systematic reviews; case reports or case series; not English; had no full text available; or animal studies. The authors sought articles that compared patient factors related to systemic narcotic use, compared methods for perioperative systemic narcotic reduction (block, multimodal anesthesia versus systemic narcotic use) and compared the United States to other countries. Outcomes measured were based on patient satisfaction with pain control and the amount of systemic opioids used. Studies were identified for inclusion by 2 independent reviewers (RMK, UCO) and consensus agreement was arrived after discussion with the senior author (LKC) regarding final study inclusion.

Results

Search results

The computerized search yielded 416 results. After initial screening, 42 articles were reviewed for full-text evaluation. Six

articles remained for inclusion. Fig. 1 describes the study screening.

Description of included studies

Does opioid use after fracture surgery correlate with pain intensity and satisfaction with pain relief?

Bot et al. [8] conducted a prospective cohort study of 97 patients that gauged pain intensity on a numeric rating scale, satisfaction with pain relief, self-efficacy when in pain, and symptoms of depression or anxiety on any of the postoperative days 1–4 after fracture repair and then with a phone follow-up 7–26 days after enrollment. The amount of opioids consumed 24 h postoperatively was then calculated using morphine equivalents. Patients who took more opioids reported greater pain intensity ($r=0.38$). In multivariate analysis, depression or anxiety disorder ($p=0.019$), smoking ($p=0.047$) and greater opioid intake ($p=0.001$) were associated with greater pain intensity. Bivariate analysis revealed greater oral opioid intake ($p=0.041$) and less self-efficacy ($p=0.003$) were associated with less than ideal satisfaction with pain relief. This study demonstrates that patients who used more opioids communicated greater pain intensity and less satisfaction with pain control.

What are alternatives to opioids or methods for reduction of opioid use in orthopedic trauma surgery?

Koehler et al. [9] performed a prospective randomized controlled trial of the efficacy of surgical-site multimodal drug injections in 102 patients undergoing definitive operative treatment for femoral fractures. Patients either received ropivacaine, epinephrine and morphine into the surgical site's deep and superficial tissues intraoperatively or they received no injection. Narcotic consumption, visual analog scale (VAS) scores, and medication related side effects were recorded for 12 h post-operation. Immediately postoperatively and at 4, 8, and 12 h, the median VAS score in the injection group was significantly lower than that in the control group. Opioid consumption was also significantly lower for the injection group in the first 8 h (5.0 mg vs. 9.7 mg; $p=0.007$). Because the patient is not rendered insensate, the surgeon can continue to perform neurovascular exams and

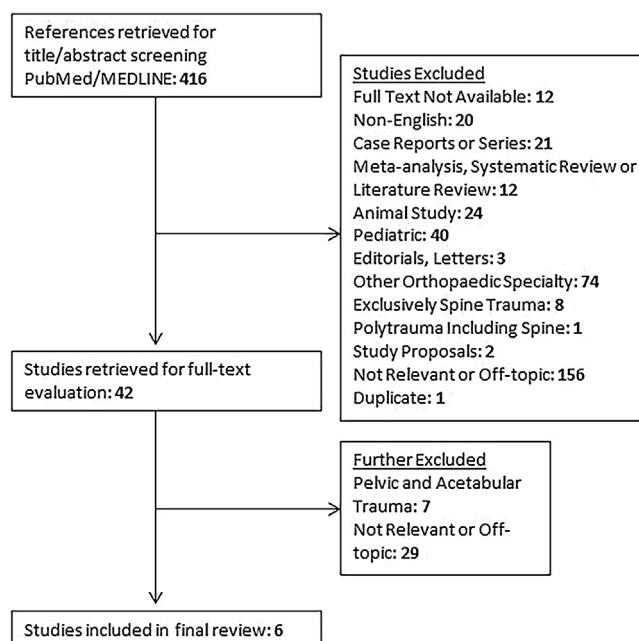


Fig. 1. Flowchart of the study screening.

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