Management of Acute Postoperative Pain in Hand Surgery: A Systematic Review

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Purpose To conduct a systematic review to guide hand surgeons in an evidenced-based approach in managing postoperative pain.

Methods We performed a literature review for primary research articles on management of postoperative pain in hand surgery patients using Medical Literature Analysis and Retrieval System Online (MEDLINE; PubMed), Excerpta Medica database (EMBASE), and the Cochrane Collaboration Library. Inclusion criteria were primary journal articles examining treatment of acute postoperative pain based on any modality. Data related to pain assessment, postoperative recovery, and total postoperative analgesic consumption were extracted.

Results A total of 903 publications were reviewed; 184 publications underwent abstract review. After applying inclusion and exclusion criteria, 10 primary articles were selected for inclusion in this review. Data were noted to be heterogeneous and findings were compiled. Results were divided into groups evaluating postoperative pain medications or pain infusion catheters.

Conclusions Although this review did not demonstrate a best practices model for postoperative pain management, it provides evidence for alternative medications and treatment strategies. The evidence available suggests that postoperative pain control should begin before surgery and that combining multiple strategies for pain treatment is beneficial. Given the increasing attention paid to narcotic prescriptions and the potential for abuse, surgeons should adopt evidence-based pain management practices. We provide an example algorithm for pain treatment in hand surgery based on available data and the authors' experience. *(J Hand Surg Am. 2015;40(8):1610–1619.*

Type of study/level of evidence Therapeutic III.

Key words Analgesia, hand surgery, postoperative pain, opiate.

Additional material is available online.

Approximately 80% of patients undergoing surgery experience substantial postoperative pain.[1–3] Although patients expect pain after surgery, management can be difficult and inadequate treatment can lead to postoperative complications and decreased patient satisfaction.[4–6] Furthermore, inadequate pain control can lead to stiffness and slower recovery of function.[7–9] Postoperative pain is the most frequently cited concern by patients undergoing surgery, even more so than the procedure itself.[1] In hand surgery, adequate control of postoperative pain is a key predictor of patient satisfaction.[5]

Narcotics are commonly prescribed as the primary treatment for postoperative pain but there is little evidence to support this practice. Furthermore, there is growing public concern regarding physician narcotic prescribing habits. In 2010, there were over 244 million narcotic prescriptions issued in the United States (US), at an estimated cost of nearly $8.5 billion.[10] Easy access

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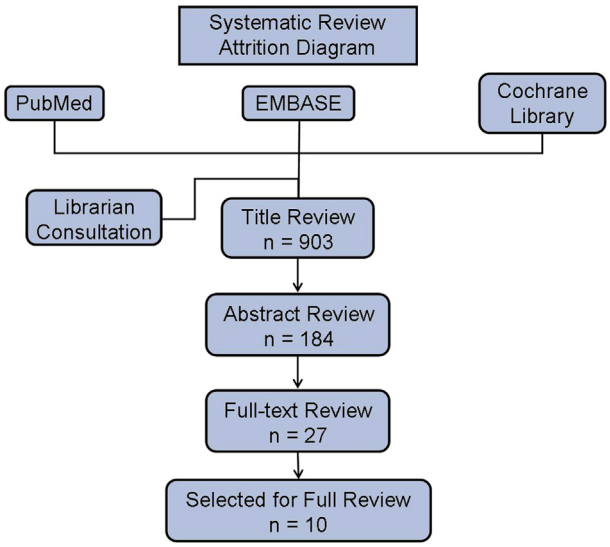

FIGURE 1: Study attrition diagram, outline of search process, and excluded studies.

TABLE 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Human subjects	Nonprimary article study design
Hand or upper extremity surgery*	Review, letter, case report, etc
Primary clinical studies	**Other types of procedures**
English language	Dental
Evaluation of postoperative pain	Ophthalmologic surgery
More than 10 subjects included	Other orthopedic
	Intrathoracic surgery
	Intra-abdominal surgery
	Obstetric surgery
	Neurologic
	Vascular/endovascular surgery
	Off-topic: eg, chronic or syndromic pain

*Included in the MEDLINE search term (Fig. 2); includes elbow, forearm, wrist, and hand surgery terms.

has resulted in escalated abuse of prescription opioids, drawing attention to inappropriate prescribing practices among clinicians. For example, patients often report having leftover medication after postsurgical pain has subsided. These drugs are now easily available to be consumed by patients or family members for nonmedical use or diverted to illegal sale.[11] Furthermore, the side effects of narcotics can be severe, including inability to perform at work, loss of cognitive function, or life-threatening respiratory depression. In 2006, the estimated cost of nonmedical prescription narcotic use was $53.4 billion, of which $42 billion (79%) was related to lost productivity.[12] In contrast, nonnarcotic medications are readily available in over-the-counter formulations and may have fewer side effects. The American Society of Anesthesiology recommends treating pain by multiple pathways, including adding a nonsteroidal anti-inflammatory drug (NSAID) or acetaminophen in the perioperative period.[13] However, concern for patient satisfaction often compels surgeons to prescribe narcotics.[14]

Understanding pain control after hand surgery is important to improving outcomes and meeting patient expectations. We designed a systematic review to summarize the available knowledge of narcotic and nonnarcotic postoperative pain management and to address the best practice for treatment of complex postoperative pain.

MATERIALS AND METHODS

We performed a systematic review of the literature per Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines.[15,16] We searched the literature using Medical Literature Analysis and Retrieval System Online (MEDLINE; PubMed), Excerpta Medica database (EMBASE), and the Cochrane Collaboration Library (Fig. 1). With the assistance of a medical librarian, a custom PubMed search term was created to provide a larger number of high-quality studies (Fig. E1, available on the *Journal's* Web site at www.jhandsurg.org). A Cochrane Collaboration Library search provided no unique articles compared with MEDLINE or EMBASE.

Inclusion and exclusion criteria were developed a priori and are displayed in Table 1. Inclusion criteria were primary study articles that assessed acute pain control in the postoperative setting for patients undergoing surgery of the hand, wrist, or forearm. Eligible studies were limited to those with greater than 10 patients. Review articles, letters, technique articles, and case reports were excluded. Articles authored by former anesthesiologist Scott Reuben, MD were excluded because of the uncertainty of their validity after admittance of academic fraud.[17]

Authors resolved any disagreements regarding study eligibility by consensus. Articles were separated into 2 groups (oral analgesics and infusion catheters) to aid in readability, because the mechanisms of these treatment methods are different. Variability between studies prevented direct comparisons or statistical analysis.