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Major review

Factors associated with postoperative pain and analgesic consumption in ophthalmic surgery: A systematic review

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ABSTRACT

Pain in ophthalmic surgery is a neglected area. We systematically reviewed the factors associated with postoperative pain and analgesic consumption in ophthalmic surgery and found 12 studies with 1,515 participants. The median number of patients in the included studies was 59. Female sex, longer duration of surgical procedure, second eye surgery as a consecutive procedure, type of surgery, general anesthesia, lower satisfaction with anesthesia, and postoperative nausea may contribute to increased postoperative pain intensity. Type of surgery, type of anesthesia, and patient satisfaction with anesthesia were associated with increased analgesic consumption. The studies reviewed were heterogeneous in terms of surgical procedures, patient populations, tools for pain assessment, and timing of postoperative pain measurement. Multiple factors may be associated with increased postoperative pain and analgesic consumption and warrant further research.

1. Introduction

Ophthalmic surgery is widely believed to cause little or no postoperative pain because it involves less trauma than other types of surgery.[22] For example, a 2006 article in a nursing journal questioned whether pain needed to be measured at all in patients undergoing cataract surgery.[21] As Koay has noted, in ophthalmic surgery pain relief is often prescribed by one profession and assessed and administered by another, so the prescriber often has little or no notion of the intensity of pain that patients are actually experiencing, believing they are not in pain unless they complain about it or perhaps that pain is

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inevitable after surgery.[25] It is our experience that one in two patients does not receive a single dose of analgesic after complex ophthalmic surgical procedures.[27]

Little attention has been devoted to quantitative analysis of the factors related to postoperative pain in ophthalmic surgery. This kind of assessment is important for outcome analysis as one seeks to improve not only the anatomical results, but also the subjective patient experience.[14] Postoperative pain affects health and therefore understanding the factors that may reduce postoperative pain may help to improve health care delivery.[14]

A recent systematic review on predictors of postoperative pain and analgesic consumption analyzed 48 studies assessing pain after various surgical procedures and concluded that more rigorous studies with robust statistics and validated designs are needed.[23]

Systematic reviews represent the highest level of evidence in medicine.[8] Understanding the current evidence is important because it can inform practice and alleviate patients' pain and suffering, as well as provide direction for future research. We therefore conducted a systematic review of the literature assessing factors associated with postoperative pain and analgesic consumption in ophthalmic surgery.

2. Results

The search strategy identified 6,634 records, from which 36 reports were identified as possibly relevant and retrieved for further assessment. Figure 1 shows the study selection process.

2.1. *Excluded studies*

We excluded 23 papers reporting 22 studies because they analyzed children together with adults,[19] did not have appropriate outcomes,[12,15,20,21,26,30,32,42] or were interventional pharmacological studies,[28,39] qualitative studies,[43] review articles,[3,9–11,29,41,46] or publications about phantom eye pain.[18,34,35] One study was excluded because it studied pain experienced during surgery, not postoperative pain.[13]

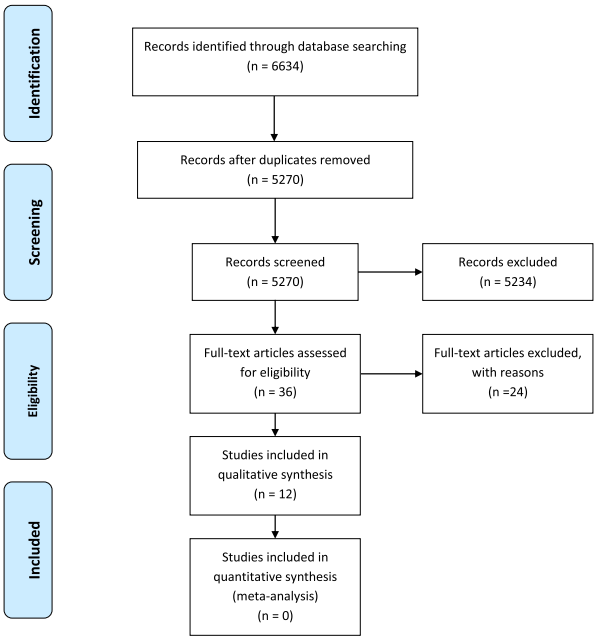

Fig. 1 – Flow diagram of study selection.

2.2. *Included studies*

We included 13 publications reporting 12 studies, involving 1,515 participants.[1,2,5,14,16,22,24,25,31,36,40,44,45] Characteristics of included studies are shown in Table 1. One study reported in two publications is treated as a single study with both references cited.[44,45]

Study design was not uniform. Ten were observational.[1,5,14,16,22,24,25,31,36,44,45] One identified itself as being "randomized," but did not include any details in the methods or results.[2] Only one study was a randomized, controlled trial with adequate allocation concealment.[40] Nine were in English,[1,2,14,16,22,25,31,40,44,45] and one each in Spanish,[5] Japanese,[24] and German.[36]

The number of patients ranged from 20 to 500 (Table 1) with a median of 59. Nine analyzed only one type of ophthalmic surgery, two included multiple types of surgery and indicated the number of patients receiving each type, and one did not indicate the type of surgery (Table 1).

Methods differed considerably. Postoperative pain intensity was measured only once or a few times in most of the included studies. Half of the studies measured pain intensity only at various time intervals on the day of surgery. Two measured pain daily for 6–7 days postoperatively, and one analyzed persistent pain 6 months after surgery. Pain scales used included visual analogue scale, numeric rating scale, and various versions of verbal descriptive scales. Studies also used different statistical methods, with some reporting significance without specifying the test that was used (Table 1). In one, factors associated with pain were analyzed only in a subset of patients with postoperative pain intensity rated on a numerical analogue scale $\geq$5 out of 10 at any time postoperatively and only in patients undergoing certain surgical procedures considered to cause more pain than others.[22]

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2.3. *Factors associated with postoperative pain*

Variables analyzed included age, sex, weight, preoperative comorbidity, duration of surgery, side of surgery, order of surgery, prior surgery, intravenous methylprednisolone, type of surgery, type of anesthesia, patient cooperation, satisfaction with anesthesia, and postoperative nausea and vomiting. One study explored factors specific to orbital implants such as optic nerve motion, frequency of painful atrophy, motion of the implant, and attachment of the optic nerve.[1]

2.3.1. *Age*

Four analyzed the relationship between age and postoperative pain intensity.[1,14,22,44,45] Abramoff et al found that patients with chronic persistent pain after orbital implant were significantly younger than those without pain, but they