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Cochrane review summary

Liposomal bupivacaine peripheral nerve block for the management of postoperative pain

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Conflict of interest

None declared

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Summary statement

The mission of the Cochrane Nursing Care Field (CNCF) is to improve health outcomes through increasing the use of the Cochrane Library and supporting Cochrane's role by providing an evidence base for nurses and healthcare professionals who deliver, lead or research nursing care. The CNCF produces Cochrane Corner columns, summaries of recent nursing-care-relevant Cochrane Reviews that are regularly published in collaborating nursing-related journals. Information on the processes CNCF has developed can be accessed at: http://nursingcare.cochrane.org/evidence-transfer-program-review-summaries. This is a Cochrane review summary of: Hamilton TW, Athanassoglou V, Trivella M et al (2016) Liposomal

bupivacaine peripheral nerve block for the management of postoperative pain. Cochrane Database of Systematic Reviews. Issue 8. CD011476. doi: 10.1002/14651858.CD011476.pub2.

Cochrane review summary, evidence-based practice, pain, peripheral nerve block, post-operative pain

MANY PATIENTS CONTINUE to experience severe pain after surgery (Rockett et al 2015). Inadequately managed pain may contribute to delayed recovery, increased morbidity and mortality, increased risk of infection and associated healthcare costs. Pain management is a fundamental aspect of nursing, so it is important for nurses to be aware of research that may enhance the care of patients undergoing surgery.

Peripheral nerve blocks (PNBs) are typically administered before surgical incision, but can be used at any time for the management of postoperative pain. The most commonly used local anaesthetic for PNBs is bupivacaine (Cuvillon et al 2009); however, even with the addition of drugs intended to make its effects last longer, many people report significant rebound pain when its effects wear off (Apfelbaum et al 2003).

Liposomal bupivacaine is thought to overcome the limitations of bupivacaine by enabling a slower release of the anaesthetic (Grant et al 2004)**.** Liposomal bupivacaine is an analgesic consisting of bupivacaine hydrochloride encapsulated within multiple, non-concentric lipid bi-layers. Release of the drug is slow because of the mechanisms required for the bupivacaine hydrochloride to escape from its encapsulated vesicles. Once released, the bupivacaine acts to block the conduction of nociceptive stimuli (pain). At present, liposomal bupivacaine is not licensed for use as a PNB [not licenced for use as a PNB by the United States (US) Food and Drug Administration (FDA)]; however, there is interest in its therapeutic potential when used in this manner.

Objectives/Aim

The objective of this review was to assess the analgesic efficacy and adverse effects of liposomal bupivacaine infiltration PNB in the management of postoperative pain.

Intervention/Methods

The review included double-blind randomised controlled trials and quasi-randomised controlled trials that had at least two comparison groups for liposomal bupivacaine PNBs compared to a placebo or other types of analgesia for the management of postoperative pain. Included studies used liposomal bupivacaine transversus abdominis plane (TAP) block or PNB, had participants who were over 18 years old undergoing any type of elective surgery, and no co-morbidities were excluded. Because of the potentially different mechanism of action between TAP block and PNB, the results for these were considered separately. The primary outcome of interest was cumulative pain intensity assessed on a 100mm visual analogue scale (VAS) between 0 and 72 hours and serious adverse events**.**

The authors searched the following electronic databases up to 13-14 January 2016: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, MEDLINE In-Process, EMBASE and Web of Science. Unpublished and ongoing trials were sought from experts in the field and from searches of the metaRegister of Controlled Trials, ClinicalTrials.gov, and the World Health Organization International Clinical Trials Registry Platform.

Results

A total of 186 records were identified using electronic searches, with eight additional records identified through other sources. After removing duplicates, 104 studies were screened, and seven studies were identified that met the inclusion criteria for this review.

Three studies, with a total of 241 participants, met the inclusion criteria and had data that could be included in the review's analysis. No studies reported on the primary outcome, cumulative pain intensity over the first 72 hours following surgery assessed on a 100mm VAS. One study reported no difference in mean pain score during the first, second, and third postoperative 24-hour periods in participants receiving liposomal bupivacaine TAP block compared to no TAP block. Two studies investigating TAP block reported opposing findings concerning cumulative postoperative opioid consumption**.** One study reported a significant reduction in cumulative opioid consumption over the first 72 hours associated with the use of liposomal bupivacaine TAP block versus bupivacaine hydrochloride TAP block. However, the second study found no difference for that outcome when liposomal bupivacaine TAP block was compared to control (no TAP block)**.** No studies reported on the remaining secondary outcomes: time to first postoperative opioid; percentage not requiring opioids over the initial 72 hours; health economic analysis; patient-reported outcome measures, other than pain. The authors sought data regarding adverse events but none were available; however, no withdrawals because of adverse events were reported.

All of the studies included in the review were small and therefore at high risk of bias for sample size. The quality of the evidence was rated very low because of high risk of bias, inconsistency of results and the limited data available. Future high quality randomised controlled trials with larger sample sizes are required, and should focus on surgeries associated with higher morbidity, severe postoperative pain and delayed hospital discharge. Additionally, the cost-effectiveness and side effects profile of liposomal bupivacaine requires evaluation. When sufficient evidence is available, future reviews should analyse data for different types of surgery separately, since uncontrolled pain is more commonly associated with particular procedures such as thoracic, abdominal and joint replacement. Therefore, future pain management strategies might be informed by evidence that is more procedure-specific.

Conclusion

As a result of the lack of high quality evidence, there are insufficient data to support or refute the use of liposomal bupivacaine as a PNB for postoperative pain. Future high quality trials with larger sample sizes are required.

Implications for practice

- The safety and effectiveness of liposomal bupivacaine as a PNB for the management of postoperative pain remains unknown. Consequently, postoperative pain management will continue as per usual practice.
- Postoperative pain management is an ongoing problem for a large proportion of patients who have had surgery, and many require high levels of postoperative support. It is important to identify and evaluate improvements to postoperative pain management, including new approaches to anaesthesia, such as the use of liposomal bupivacaine. Effective pain management can reduce complications and improve patient outcomes after surgery (Rockett et al 2015).
- The safe administration and monitoring of medicines is a crucial aspect of the nurse's role. It is essential that nursing care combines knowledge and competence in pharmacological pain management alongside non-pharmacological measures, such as providing reassurance and information to reduce patients' anxiety.
- Preoperative prediction of patients who are likely to experience severe acute pain postoperatively as well as identifying patients at risk of chronic pain is becoming part of pre-assessment (Rockett et al 2015). This provides

nurses with the opportunity to optimise the patient's pain management plan before surgery, including analgesia and strategies to cope with pain.

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