Opioid-free anaesthesia

Adverse effects of perioperative opioids have led to the pursuit of 'opioid-free anaesthesia'. While early studies have shown that effective analgesia can be achieved without using opioids, with some reduction in unwanted effects, further research is needed to elucidate which patients may benefit most and how.

Andrew Weir[1]

Author details can be found at the end of this article

Correspondence to:
Andrew Weir;
andrew.weir2@nhs.net

Introduction

Opioids have been a key component of 'balanced anaesthesia' since John Lundy first used the term to describe the use of intravenous morphine alongside inhalational anaesthesia in 1924. Opioids are a class of drugs which act as agonists at the μ-opioid receptor and are potent analgesics. Benefits of their use in anaesthesia include postoperative analgesia, obtunding the stress response to surgery and reducing the concentration of volatile anaesthesia required intraoperatively. However, the use of opioids is associated with unwanted side effects and the concept of opioid-free anaesthesia has emerged in recent years.

Adverse effects of opioids

There are several common side effects of opioid use that may adversely impact patient experience and outcomes perioperatively. These include respiratory depression, constipation, urinary retention, itching, and postoperative nausea and vomiting. These effects can lead to delayed discharge from recovery or hospital, or in the case of respiratory depression, to severe morbidity or mortality. The use of high doses of potent opioids may also be associated with opioid-induced hyperalgesia, leading to a paradoxical increase in sensitisation to painful stimuli (Colvin et al, 2019).

Beyond the acute postoperative setting, the use of perioperative opioids can lead to long-term use in opioid-naïve patients, with one study demonstrating that over 3% of patients were still using opioids 3 months after surgery (Clarke et al, 2014).

There are also concerns about the immunosuppressive effects of opioids in patients undergoing cancer surgery, with some evidence preclinically and clinically that their use may predispose to metastasis and reduced survival. However, currently available evidence is contrasting and randomised controlled trials in this area are ongoing (Diaz-Cambronero et al, 2018).

Achieving opioid-free anaesthesia

It is important to stress that opioid-free anaesthesia does not mean analgesia-free anaesthesia, and therefore adequate analgesia must still be achieved through alternative methods. A variety of multimodal pharmacological agents can be used to facilitate this, including N-methyl-D-aspartate (NMDA) receptor antagonists such as ketamine, alpha-2 agonists such as clonidine and dexmedetomidine, intravenous lidocaine, magnesium, dexamethasone, paracetamol and non-steroidal anti-inflammatory drugs.

Regional anaesthesia including neuraxial techniques may also be used, and an effective block may provide complete anaesthesia (and postoperative analgesia) for an operation. Alongside multimodal analgesic techniques, attenuation of the sympathetic response may be targeted separately with beta-blockers such as esmolol.

Evidence and outcomes

Research into the use of opioid-free anaesthesia is challenged by varying definitions of 'opioid-free'. For example, one area of discussion is whether the use of postoperative opioids means that a surgery can not be considered to have taken place under opioid-free

How to cite this article:
Weir A. Opioid-free anaesthesia. Br J Hosp Med. 2024. https://doi.org/10.12968/hmed.2023.0344

anaesthesia. Most studies limit the opioid-free period to the intraoperative period, so patients are still exposed to opioids during the recovery phase (Elkassabany and Mariano, 2019).

A meta-analysis (Frauenknecht et al, 2019) provided the clearest summary of the available evidence to date: on reviewing 23 trials including over 1300 patients, the authors found no significant difference in postoperative pain scores at 2 hours or length of stay in recovery, but noted a 20% reduction in postoperative nausea and vomiting in the first 24 hours in the opioid-free group.

Conclusions

Opioid-free anaesthesia is an emerging concept, with no clear accepted definition and several outstanding research questions, including long-term outcomes. However, there is a strong pharmacological argument for avoiding, or at least minimising, the use of opioids to avoid unwanted side effects. The existing evidence demonstrates that opioid-free anaesthesia is achievable and not inferior to opioid-inclusive regimens, at least for the management of early postoperative pain.

As with much of anaesthetic practice, there is unlikely to be a 'one-size-fits-all' answer, and anaesthetists should continue to take into account the circumstances of the individual patient in front of them when making clinical decisions.

Author details

[1]Birmingham School of Anaesthesia, Birmingham, UK

References

Clarke H, Soneji N, Ko DT, Yun L, Wijeysundera DN. Rates and risk factors for prolonged opioid use after major surgery: population based cohort study. BMJ. 2014;348(3):g1251. https://doi.org/10.1136/bmj.g1251

Colvin LA, Bull F, Hales TG. Perioperative opioid analgesia-when is enough too much? A review of opioid-induced tolerance and hyperalgesia. Lancet. 2019;393(10180):1558–1568. https://doi.org/10.1016/S0140-6736(19)30430-1

Diaz-Cambronero O, Mazzinari G, Cata JP. Perioperative opioids and colorectal cancer recurrence: a systematic review of the literature. Pain Manag. 2018;8(5):353–361. https://doi.org/10.2217/pmt-2018-0029

Elkassabany NM, Mariano ER. Opioid-free anaesthesia – what would Inigo Montoya say? Anaesthesia. 2019;74(5):560–563. https://doi.org/10.1111/anae.14611

Frauenknecht J, Kirkham KR, Jacot-Guillarmod A, Albrecht E. Analgesic impact of intra-operative opioids vs. opioid-free anaesthesia: a systematic review and meta-analysis. Anaesthesia. 2019;74(5):651–662. https://doi.org/10.1111/anae.14582