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Editorial

The need to improve opioid prescribing and data collection in patients undergoing orthopaedic surgery

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Over the past 30 years opioids have become an accepted form of treatment for chronic non-cancer pain. This can be partially attributed to big pharma promoting the use of the WHO analgesic ladder for cancer pain for the management of types of pain that historically would be managed by simple analgesics and non-pharmacological strategies [1]. Despite the belief initially purported by the drug companies that prescribed opioids are safe, they are actually dangerous, and cause death and harm by both overdose and other adverse effects [2-4]. It is now well recognised that the global opioid crisis that commenced in the US in the 1990s and directly contributed to over 100,000 deaths worldwide in 2017, originated with the aggressive marketing and subsequent misuse of prescription opioids [2,3]. The economic and societal effects of the opioid crisis on the US economy are staggering, with an estimated 450,000 opioid-related deaths over the past two decades, and an annual financial cost to the US economy of $700 billion to $1 trillion dollars, which equates to 3.4% of the U.S. gross domestic product [2]. The lethality of opioids is not just limited to deaths attributed to overdose. There is increasing evidence that patients who take opioids for chronic non-cancer pain have an increased all-cause mortality [5]. Consequently, it is now suggested that when opioids are commenced for patients with chronic non-cancer pain, shared decision-making should include information on the increased risk of all-cause mortality [5]. The increased risk of death may be due to the effect of opioids on the immune, cardiovascular and endocrine systems [6]. In addition to increased mortality, opioids are also associated with other adverse events that limit the usefulness of opioids for patients with chronic pain, including pain from osteoarthritis [6-8] (Box 1). Thus, opioids are no longer being recommended to manage pain from osteoarthritis, and non-pharmacological strategies including exercise programmes, physical activity and psychological therapy are increasingly being advocated [8]. Furthermore, exercise is helpful in osteoarthritis [9] and should also be part of

preparation for surgery, with significantly fewer complications and reduced length of stay [10].

In this month's issue of *Anaesthesia*, a secondary analysis of a prospective study of patients undergoing total knee replacement in New Zealand is published. Kluger and colleagues [11] collected data on pre- and postoperative demographics, limitation of function, premorbidity, and psychological, pain and drug history as well as undertaking quantitative sensory testing and genetic screening. Their analysis demonstrated that although many factors did not influence persistent postoperative opioid use, patients with higher body mass index (BMI), more pain sites and those who had had an opioid prescription in the 12 months prior to surgery were at increased risk of persistent opioid use and higher opioid consumption 6 months after surgery [11]. The authors recognise that the main weakness of their study is that they calculated individual pre- and postoperative opioid consumption from the New Zealand National Prescription Database. Whilst this gives an indicator of the degree of opioid consumption, it is not totally accurate as it does not account for opioid diversion, or patients simply not completing the course of opioid prescribed. However, it is an accepted method of assessing opioid consumption, and it does overcome the issue of patients under reporting their own opioid consumption. Despite this limitation, the authors have drawn attention to the deleterious effect that pre-operative opioids have on outcomes after joint arthroplasty.

Pre-operative opioids and effect on orthopaedic surgical outcomes

As well as opioids being poor analgesics for osteoarthritis and being associated with an increased risk of fatal and non-fatal adverse events, studies have shown that patients on opioids prior to joint arthroplasty, have worse surgical outcomes (Box 2) [6,11,12].

In addition to demonstrating that the prescription of pre-operative opioids is the most important determinant of persistent postoperative opioid use after total knee replacement surgery, Kluger and colleagues [11] also demonstrate that persistent postoperative opioid is not associated with worse pain or function. These data reinforce the increasingly accepted view that chronic post-surgical pain is not the primary driver for persistent postoperative opioid use, but instead, it is the pre-operative use of opioids, and poor postoperative opioid stewardship that are the main drivers for persistent postoperative opioid use [4,13].

Thus, the prescription of pre-operative opioids can no longer be regarded as benign, as they do impact orthopaedic surgical outcomes, and consequently patients must be made aware of the impact of these drugs on the likelihood of successful surgery [14].

Mitigating the risk of opioids on orthopaedic surgical outcome

An important component of pre-operative assessment is to identify patients on opioids so that appropriate pre-operative interventions can be instituted. These interventions include shared decision-making around the use of pre-operative opioids and outcomes, and of alternatives. Appropriate expectation management, co-ordinating transition of care, and pre-operative opioid weaning/cessation are imperative [13]. These components are also integral to pre-operative assessment and optimisation, which are now acknowledged to be

key to improving surgical outcomes. The whole peri-operative team, both as individuals and through pathways, should help with optimisation [15].

Appropriate pre-operative expectation management is recognised in improving pain outcomes and reducing opioid utilisation. Thus, patients should be counselled about the degree of postoperative discomfort to be expected and the actions that can be taken to mitigate the pain [4,13].

To reduce the known risk of pre-operative opioids on surgical outcomes, pre-operative weaning of opioids is advocated [4,6,13,16,17]. The evidence to support this intervention is expanding, but it must be undertaken in a controlled manner, as uncontrolled weaning can lead to significant harm [6]. Appositely, for patients undergoing orthopaedic surgery, the reported benefits of weaning of opioids prior to total joint arthroplasty include improved joint function and activity scores, and reduced persistent postoperative opioid use [16,17].

Postoperative opioid stewardship

Examples of poor postoperative opioid stewardship that increase persistent postoperative opioid use include the use of modified release opioids, excessive duration of initial opioid prescription, automatic repeat prescriptions with no deprescribing efforts made, and an absence of educational resources that advocate postoperative opioid weaning and cessation [3,4]. Despite national and international guidance, these practices still exist [18]. A major challenge of peri-operative medicine is to implement effective postoperative opioid stewardship in order to ensure that the benefits of surgery are not negated by the effects of persistent postoperative opioid use.

Shared decision-making is dependent on knowing the risk

Shared decision-making [19] is now an integral component of good medical practice [20]. Fundamentally, it is dependent on three things: first, the patient, as an expert in their own values and preferences informing the health professional of their attitudes to illness and risk; secondly, the health professional as an expert in disease management, discussing the possible risks and benefits of the available treatment options that are pertinent for that individual patient; and thirdly, and most importantly, a shared decision based on these attributes. It is, therefore, imperative that doctors can provide their patients with an estimate of the degree of additional risk caused by the individual patient's comorbidity (including pre-existing opioids). Informed patients are in a better position to choose alternative options, optimise their comorbidity or accept the additional risks [15].

The UK National Joint Registry, which collects mainly surgical data has enabled massive reductions in major complications and revision surgery following joint replacement [21]. However, the National Joint Registry only "records patient information and provides data on the performance and longevity of replacement joint implants; the surgical outcomes for the hospitals where these operations are carried out; and on the performance outcomes of the surgeons who conduct the procedures." [21].

A continued focus on technique and implant is now misplaced when most complications are related to patient or peri-operative factors, many of which are modifiable and improvable. It is now more important that patients are aware of the individual patient risk factors that increase the risk of procedural failure. Procedural failure whilst not directly leading to death may lead to a state of worse pain and function and/or necessitate that the patient cannot

return to their previous level of residence. These types of complications contribute to surgical regret which has been quoted to occur in 17% of patients undergoing total knee replacement [22].

Utilising UK data to improve UK practice

The UK has a proud history of surgeons and anaesthetists working collaboratively to collect patient data. Well known examples include the National Emergency Laparotomy Audit (NELA), National Confidential Enquiry into Patient Outcome and Death (NCEPOD), the National Cardiac Audit Programme (NCAP) and the Peri-operative Quality Improvement Programme (PQIP). These qualitative and quantitative reports are highly respected and have directly transformed organisational and individual practice within the UK, and some of the databases are now so large, that individual prognostication can be performed to aid shared decision-making [23].

As well as pre-operative opioids having an adverse effect on outcomes from arthroplasty, it is well recognised that other conditions such as diabetes and frailty also have a negative impact [24,25]. Currently, UK practitioners are reliant on overseas data to inform shared decision-making on the relative risks and benefits of any proposed joint arthroplasty. Similarly, the same overseas data are used to inform UK patient pathways and guidelines. At present there is no UK database that collects detailed pre-operative comorbid or pharmacological data and the subsequent patient outcome for patients undergoing joint arthroplasty. Thus, the National Joint Registry should be adapted to collect pre-morbid data that would lead to an improvement of care of patients undergoing orthopaedic surgery.

Conclusions

This editorial and the study by Kluger and colleagues [11] demonstrate that the preoperative use of opioids have a significant and negative impact on the success of arthroplasty, and that opioids are not a benign class of drugs. The impact of opioids on outcomes of arthroplasty is only going to get worse – caused by the cessation of surgery during the COVID-19 pandemic, and that patients' orthopaedic pain will increasingly be managed with opioids [11]. Not only is it imperative for primary and secondary care teams to change practice to mitigate the negative impact of opioids on patients, it is also necessary for the National Joint Registry to collect more data, so that patients in the UK can be better informed of the risks and benefits of arthroplasty that are pertinent to their own individual risk factors. Collecting and then appropriately interpreting patient-centric data would lead to safer and more effective delivery of orthopaedic healthcare.

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Box 1: Opioid-related adverse drug events (ORADEs) that especially limit usefulness of opioids for patients with osteoarthritis pain

- Increased overall mortality
- Acute toxicity leading to opioid induced ventilatory impairment
- Osteopaenia
- Osteoporosis
- Fractures
- Weight gain
- Worsening diabetes mellitus
- Confusion
- Dizziness
- Falls

Box 2: Adverse effects of pre-existing opioids on outcomes after orthopaedic surgery

- Increased risk of surgical site and periprosthetic infections
- Increased rate of early revision arthroplasty
- Prolonged hospital stay
- Greater likelihood of non-home discharge
- Higher re-admission rates
- Increased healthcare costs (from before admission to up to 1 year after discharge)
- More frequent post-discharge emergency department visits