Article type : Editorial

EDITORIAL

If you cannot measure it, you cannot improve it

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Key words: opioids; surgery; postoperative.

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This editorial accompanies a paper by Daliya et al. *Anaesthesia* 2021, https://doi.org/10.1111/anae.15460

William Thomson was an eminent scientist and professor at the University of Glasgow for 53 years until he died in 1907 at the age of 83. Ennobled in 1892, he became Lord Kelvin, named after the River Kelvin, a river that flowed by his laboratory at the University of Glasgow. Among other things, Lord Kelvin was responsible for determining with accuracy the lowest limit of the temperature, absolute zero, which is -273.15°C. In 1883, Lord Kelvin stated: "*If you cannot measure it, you cannot improve it*." Daliya et al. should be commended for being among the first to measure the quality of opioid prescriptions after surgery when patients are discharged home in Europe, and more

specifically in England [1]. Now that it has been measured, improvements can be made. While this article did not explore the link between prescriptions and opioid consumption or long-term outcomes, these associations have been previously described in the USA and Canada.

The use of prescribed opioids more than doubled between 2001 and 2013 with devastating consequences [2], and this rise in opioid consumption has contributed to the almost 50,000 deaths annually, or 136 deaths per day, in the USA [3]. Whereas the rising rate of opioid-related overdose is largely due to increased use of heroin and illicit fentanyl, studies have found that most of the people who use intravenous opioids start with prescription pills [4]. In the USA and Canada, opioids are the mainstay of pain control after surgery and are commonly prescribed at discharge in excess of patient needs and even for low risk surgeries [5, 6]. Moreover, new chronic opioid use after surgery is one of the most common morbidity outcomes [7, 8], with some studies estimating rates of 6% [9]. Of note, even opioids considered weak, such as tramadol, may be problematic, as they can also lead to prolonged opioid use [10]. While high prescribing can directly contribute to morbidity for surgical patients, the excess pills can also become a source of misuse by others, including vulnerable paediatric populations. The *Monitoring the Future* study found that adolescents with medical and non-medical uses of opioids had significantly greater odds of heroin use in adulthood [11].

While there has been an explosion of published studies describing opioid-related outcomes after surgery in North America, less is known about opioid prescriptions at postoperative discharge in Europe. A recent review by Neuman et al. showed that other countries throughout the world, including Sweden, France, the Netherlands and Hong Kong, prescribe fewer opioids at discharge after surgery when compared with the USA [12]. There are many factors that likely contribute to these differences, including surgical training, cultural norms and patient expectations. Some of these differences are likely also due to the increasing trend for early discharge after surgery in the USA whereby patients' needs for opioids cannot be assessed in the inpatient setting as they would be in many European countries. While the opioid crisis is clearly more acute in the USA and Canada, data from the International Narcotics Control Board found that during the steep drop in opioid prescribing in the USA, prescribing in western Europe was still slightly rising through 2018 [13]. Global marketing of opioids and pressures to decrease the duration of inpatient stay after surgery may lead to concerns about uncontrolled postoperative pain after discharge and thereby increase opioid prescribing after surgery. In the Netherlands, prescribing of oxycodone increased between 2013 and 2017, with an associated increase in hospital admissions and fatal opioid overdoses [14]. Hence, there is opportunity for other countries to learn from the North American experience with surgical opioid prescribing and avoid the same mistakes.

New evidence

With this retrospective study, Daliya et al. have filled a gap of knowledge and taken a positive step to better opioid stewardship after surgery [1]. They included 509 patients undergoing intermediate and major surgery from 14 NHS hospitals in England and reported that 21% were discharged home with a prescription for opioid painkillers. Among those who had an opioid prescription, around one-third did not have a specified duration of prescription and around two-thirds did not receive any deprescribing or postoperative weaning advice. Of course, this study suffers from a few limitations. It would have been better to have included a larger sample of patients and also a description of prescribing practices in patients undergoing minor and ambulatory surgery. Notwithstanding, these weaknesses do not undermine the results of the study that highlight prescribing practices in England. Finally, the authors report that none of the physicians had access to formal guidelines for discharge analgesia or received proper training. Of course, a figure of 21% of patients being discharged home with an opioid prescription is significantly less than what was previously reported in the USA [15], and that could be viewed positively. Unfortunately, the absence of proper training for discharge analgesia is a matter of worry, and probably mirrors the condition of many other institutions, while guidelines on the prescription of pain medication exist in the literature [16]. The substance of these guidelines is summarised in Box 1.

Needless to say, it is of utmost importance to disseminate these recommendations widely in order to improve opioid prescriptions when patients are discharged home and to avoid chronic opioid use after surgery in opioid-naïve patients. In addition to disseminating the above recommendations, surgery-specific best practices for opioid prescribing at discharge should be developed. Such recommendations have been developed in the USA [17]; however, tailoring may be needed for other countries to account for differences in care patterns and duration of inpatient admissions after surgery. Better education about postoperative pain and opioid management for surgery and anaesthesia trainees represents another key opportunity. Furthermore, patients need to be educated about appropriate expectations for pain after surgery and the role of opioids which cannot fully eliminate postoperative pain. These changes can make an immediate impact while ongoing and future studies of behavioural economic interventions will teach us how to address surgical providers who continue to prescribe above recommendations [18].

Why anaesthetists?

Some may argue that postoperative prescriptions are written by surgeons in most countries, and this is therefore not a matter of concern for the anaesthetist. However, addressing peri-operative opioid

use and informing post-discharge opioid prescribing offers an opportunity for anaesthetists to positively impact the long-term health of surgical patients and address a major public health issue. The intensity of acute pain in the postoperative period is strongly associated with chronic pain condition after surgery [19, 20], and opioids are usually the treatment of choice for severe postoperative pain. Contrary to existing beliefs, opioid administration during surgery may not be associated with a reduction in pain scores in the immediate postoperative period [21] and might even be associated with an increase in opioid consumption, as a result of secondary hyperalgesia [22]. Consequently, adopting an opioid-sparing anaesthetic strategy by using a multimodal anaesthetic technique inclusive of intra-operative acetaminophen, non-steroidal anti-inflammatory drugs, dexamethasone, magnesium, and regional anaesthetic techniques may reduce both opioid consumption and pain scores in the postoperative period [23–28]. Postoperative analgesia can be further prolonged by the insertion of perineural catheters when suitable [29]. These different options will definitely improve patient comfort, further reducing the number of patients requiring opioids when discharged home after surgery. Reduction in inpatient opioid use may decrease opioid use after discharge [30]. Moreover, surgery-specific guidelines can greatly reduce opioid prescribing without worsening pain or satisfaction [31].

We applaud Daliya et al. for providing an inventory of the postoperative discharge prescribing practices. According to Lord Kelvin, now that the quality of prescribing practice has been measured, it can be improved. Improvement can be made through proper adherence to education and guidelines; by embracing simple measures such as prescription of non-opioid analgesics at regular intervals; specification on the duration of the course of immediate-release opioid tablets; avoidance of long-acting opioid formulations and compound analgesic preparations; and advice on deprescribing. Certainly, these measures will positively impact the ongoing opioid epidemic.

Acknowledgments

EA has received grants from the Swiss Academy for Anaesthesia Research (SACAR), Lausanne, Switzerland, B. Braun Medical AG and the Swiss National Science Foundation to support his clinical research. EA has also received honoraria from B. Braun Medical AG, Sintetica Ltd UK and MSD AG. CB receives funding from the National Institutes of Health, Michigan Department of Health and Human Services, Substance Abuse and Mental Health Services Administration, and the Centers for Disease Control and Prevention. He also serves as a Consultant for Heron Therapeutics, Vertex Pharmaceuticals and Alosa Health, and provides expert testimony. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH, MDHHS, or SAMHSA. No other competing interests declared.

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Box 1. Summary of recommendations for the prescription of pain medication, adapted from [16].

- Simple analgesics such as acetaminophen and non-steroidal anti-inflammatory drugs should be prescribed at regular intervals
- Immediate-release opioid tablets should be prescribed 'when required' and not at regular intervals, and only for a limited duration
- Long-acting opioid formulations and compound analgesic preparations should be avoided
- Limited and defined duration of prescription should always be stated for any analgesic
- Doses should be titrated to age
- Deprescribing advice should be given
- Disposal of unused medicines, especially opioids should be made available
- Repeat prescriptions should be avoided in most situations