BRIEF COMMUNICATION

POST-OPERATIVE PAIN AND ANALGESIA AT THE UNIVERSITY OF GONDAR HOSPITAL

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ABSTRACT

Background: *Post-operative pain has humanitarian, physiological and economic implications. So far the severity of post-operative pain and the effectiveness of analgesic prescribing has not been investigated in the University of Gondar previously.*

Methods: *Baseline data for pain in the post-operative period was gathered from 51 patients in November and December 2009, using a numerical scale or visual-analogue scale (VAS) according to patient ability. Analgesic prescription and administration information was collected for all patients, allowing the relationship between pain severity and analgesic practice to be elucidated.*

Results: *Over half (54.9%) of the patients had moderate or severe pain at rest, whilst nearly three-quarters (72.6%) had these levels of dynamic pain. No patients were prescribed paracetamol. Overall, 56.9% of the patients were prescribed a NSAID and 23.5% had received it in the preceding 8 hours. These rates did not vary significantly with pain severity. Only 3.9% of patients had opioid analgesia prescribed.*

Discussion: *Current analgesic practice could be improved. Recommendations are made to introduce a drug prescription and administration chart to the hospital, with training for the relevant staff. Future re-auditing of analgesic use may help to improve practice.*

Key words: *post-operative pain, analgesia, analgesic ladder, audit*

INTRODUCTION

Some post-operative pain is to be expected, particularly after major surgery (1,2). However, effective use of modern analgesic drugs should limit such pain, and all but mild post-operative pain is generally considered unacceptable (3,4). American Pain Society guidelines (4) suggest that no patient should return to the ward in uncontrolled pain.

Early benefits of effective post-operative analgesia may include improved respiratory outcome (5,6) and an attenuated increase in sympathetic activity and the effect of this on the cardiovascular system (6). Post-operative pain is associated with delayed mobilisation and delayed long-term functional improvement after orthopaedic surgery (7). The use of pre-emptive analgesia may limit the subsequent nociceptive cascade (8). However, other than improved respiratory morbidity, there is at present limited evidence to show significant effects on post-operative mortality and morbidity (5,9,10), possibly due to insufficient subject numbers (10,11). Chronic pain is a common problem after surgery (12,13), and the severity of acute post-operative pain is a strong predictor for chronic pain (9,12).

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As well as the humanitarian considerations, effective post-operative analgesia has other consequences. Shorter hospital stay, more rapid return to work and decreased risk of chronic pain have social and economic implications. Analgesia at rest may be a good indicator of humanitarian relief while dynamic analgesia may be necessary to limit pain-related morbidity (14).

The requirement for unified methods of quantifying pain (15) has led to the development of various pain assessment scales. Numerical scales are used widely (16), often with patient self-reported scores between 0 and 10 (3). Visual-analogue scales are also well documented (2,3,16) and may allow pain to be quantified even by those with low literacy. The visual-analogue scale has been shown to be linear for patients with post-operative pain (6) and there seems to be reasonable concordance between numerical and visual-analogue scales (3,6). The American Pain Society describes post-operative pain of 4 or more as uncontrolled (4), whilst the verbal descriptors "absent", "mild", "moderate" or "severe" correlate with scores of 0, 1-3, 4-7 and 8-10, respectively (3).

The World Health Organisation (WHO) guidelines for pain associated with malignancy (*Fig. 1*) (17) have been widely adapted for use in acute post-operative pain (8). Paracetamol is an effective analgesic for acute pain with a low incidence of adverse effects (6). Likewise, non-steroidal anti-inflammatory drugs (NSAIDs) are effective in treating acute post-operative pain (6). The combined use of both agents provides superior analgesia (6,18,19), and analgesia for dynamic pain often requires more than one agent (9,16). Both paracetamol (6,13) and NSAIDs (6,13,16) are "opioid-sparing"; reducing the opioid dose and adverse effects, such as nausea and sedation. Nevertheless, opioids are often required in addition to the "simple" analgesics (16). Moreover, peri-operative local anaesthetic techniques may be used as an adjunct for analgesia.

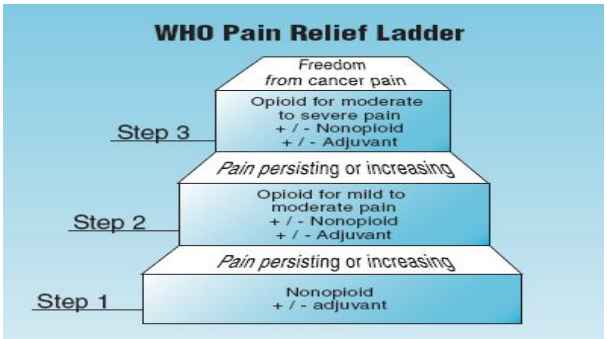


Fig.1 WHO analgesic ladder for malignancy-associated pain

Hospital-based acute pain teams tend to use a multimodal approach to post-operative analgesia (*Fig. 2*) (8). Mild pain may be managed with regular simple analgesics (paracetamol and then addition of NSAIDs). Worse pain is treated with the addition of a weak or strong opioid analgesic. If pain subsequently improves, strong opioids may be replaced by weak opioids which could subsequently be removed, followed by the withdrawal of NSAIDs in a step-wise manner. As an intermediate prescribing option, analgesics may be prescribed on an "as required" basis, if they are not required continuously. NSAIDs are not suitable for all patients, but with careful patient selection, the incidence of complications is low (6).

The objective of this study was to gather baseline data for pain in the post-operative period and to investigate post-operative analgesic prescribing and administration at the University of Gondar Hospital. This data would then enable an assessment of how prescribing and administration of analgesia varied with pain severity and to make a comparison with current best practice.

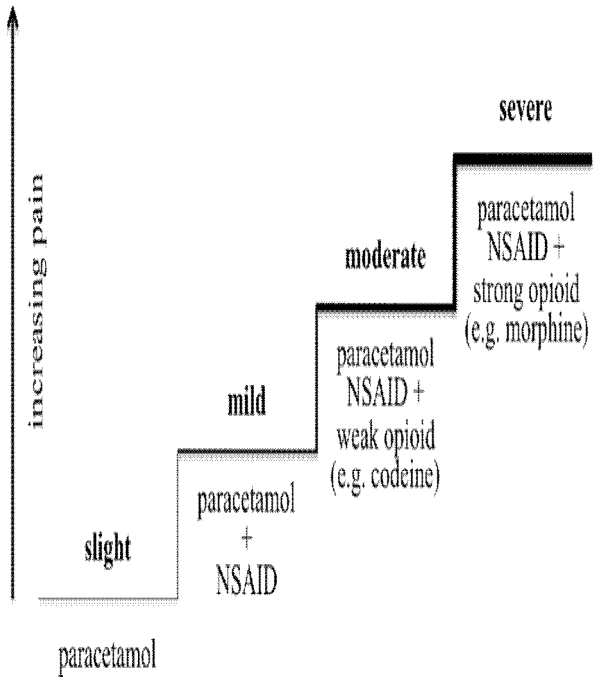


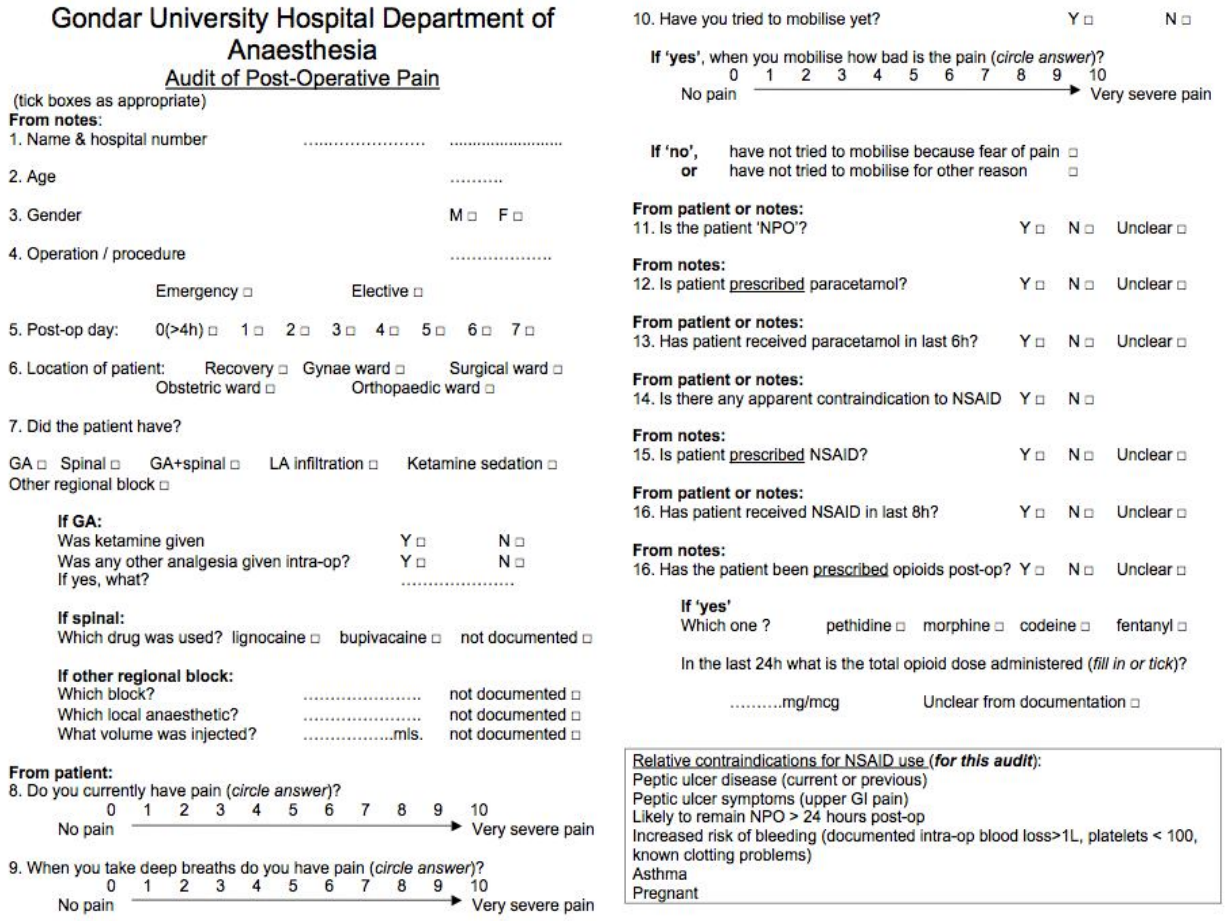
Fig. 2 A representation of current best practice for pharmacological management of acute pain. In addition, peri-operative local anaesthetic infiltration or direct nerve blocks may provide additional initial analgesia.

METHODS

This audit is an institution-based cross-sectional study. We reviewed every post-operative patient throughout the University of Gondar Hospital on three consecutive Wednesdays in November and December 2009. All adults (18 years or more) between post-operative days 1 and 7 (inclusive) were included, except those who had surgery under local anaesthesia only. A proforma (*Fig. 3*) was completed for each patient, with information taken from the patient and from their notes. Some patients could not manage to quantify their pain with a numerical scale between 0 and 10, in which case they were asked to indicate by pointing to the line underneath the numbers.

Pain scores at rest were recorded. In addition, patients were asked for their pain scores when taking deep breaths and when mobilising, from which we produced a dynamic pain score (the higher of the two numbers for each patient).

An analgesic was considered to have been prescribed if it was specifically mentioned by name anywhere in the notes. If there was no documentation of analgesia administration, the patient was asked so as to minimise the confounding issue of poor documentation. Relative contra-indications to NSAID prescribing and administration were drawn up in advance, peptic ulcer disease (previous or current), peptic ulcer symptoms (upper GI pain), likely to remain "nil by mouth" for more than 24 hours, increased risk of bleeding (documented intra-operative blood loss of more than 1 L, platelets less than $100x10^9$/L or known clotting problems), asthma or pregnancy (20,21). When present, these were recorded for each patient. Results were collated and analysed with Microsoft Excel.



Gondar University Hospital Department of Anaesthesia

Audit of Post-Operative Pain

(tick boxes as appropriate)

From notes:

1. Name & hospital number ....
2. Age .....
3. Gender M □ F □
4. Operation / procedure .....

Emergency □ Elective □

5. Post-op day: 0(>4h) □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7 □
6. Location of patient: Recovery □ Gynae ward □ Surgical ward □ Obstetric ward □ Orthopaedic ward □
7. Did the patient have?

GA □ Spinal □ GA+spinal □ LA infiltration □ Ketamine sedation □ Other regional block □

If GA:
Was ketamine given Y □ N □
Was any other analgesia given intra-op? Y □ N □
If yes, what? .....

If spinal:
Which drug was used? lignocaine □ bupivacaine □ not documented □

If other regional block:
Which block? ..... not documented □
Which local anaesthetic? ..... not documented □
What volume was injected? .....mls. not documented □

From patient:

8. Do you currently have pain (*circle answer*)?
0 1 2 3 4 5 6 7 8 9 10
No pain → Very severe pain
9. When you take deep breaths do you have pain (*circle answer*)?
0 1 2 3 4 5 6 7 8 9 10
No pain → Very severe pain
10. Have you tried to mobilise yet? Y □ N □

If 'yes', when you mobilise how bad is the pain (*circle answer*)?
0 1 2 3 4 5 6 7 8 9 10
No pain → Very severe pain

If 'no', have not tried to mobilise because fear of pain □
or have not tried to mobilise for other reason □

From patient or notes:
11. Is the patient 'NPO'? Y □ N □ Unclear □

From notes:
12. Is patient prescribed paracetamol? Y □ N □ Unclear □

From patient or notes:
13. Has patient received paracetamol in last 6h? Y □ N □ Unclear □

From patient or notes:
14. Is there any apparent contraindication to NSAID Y □ N □

From notes:
15. Is patient prescribed NSAID? Y □ N □ Unclear □

From patient or notes:
16. Has patient received NSAID in last 8h? Y □ N □ Unclear □

From notes:
16. Has the patient been prescribed opioids post-op? Y □ N □ Unclear □

If 'yes'
Which one ? pethidine □ morphine □ codeine □ fentanyl □

In the last 24h what is the total opioid dose administered (*fill in or tick*)?

.....mg/mcg Unclear from documentation □

Relative contraindications for NSAID use (***for this audit***):
Peptic ulcer disease (current or previous)
Peptic ulcer symptoms (upper GI pain)
Likely to remain NPO > 24 hours post-op
Increased risk of bleeding (documented intra-op blood loss>1L, platelets < 100, known clotting problems)
Asthma
Pregnant

Fig. 3 The proforma used for data collection.

RESULTS

Fifty-one patients with a mean age of 37.3 years (ranging from 18-80 years) were included; 56.9% were male; 60.8% were emergency cases, and the rest elective operations. *Fig. 4* shows the distribution of cases by post-operative day.

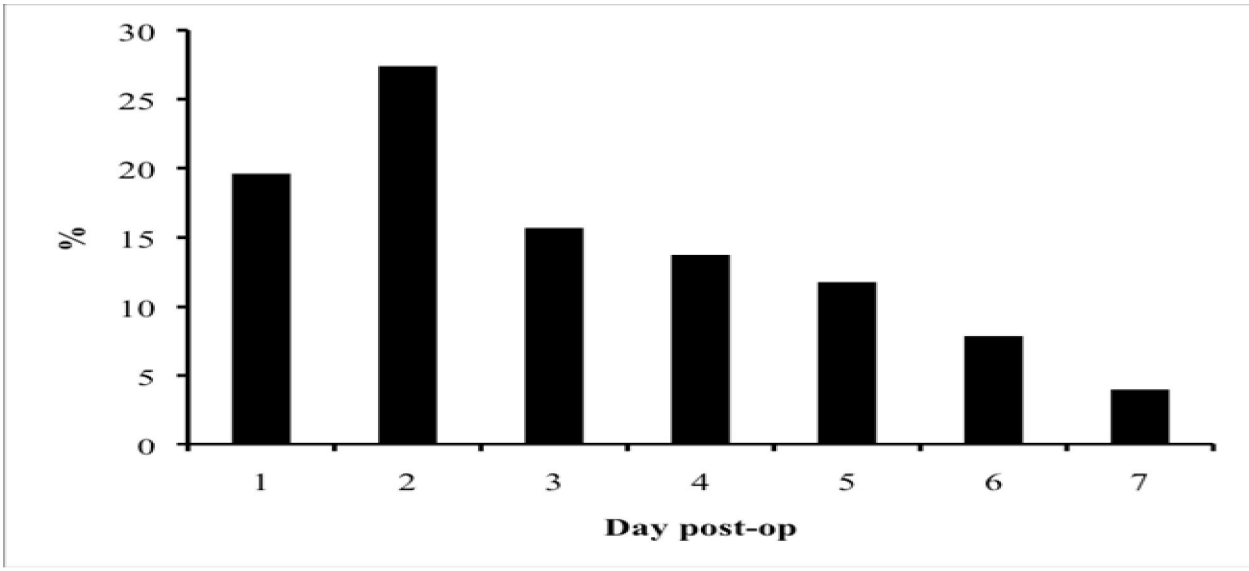


Fig. 4 Distribution of patients by post-operative day.

Fig. 5 shows the rest pain scores and the dynamic pain scores for all patients 54.9% of whom had moderate or severe pain at rest, and 72.6% moderate or severe dynamic pain when mobilising or taking deep breaths. There were 14 patients who were yet to mobilise, of whom 6 (42.9%) said their reason for not mobilising was "fear of pain".

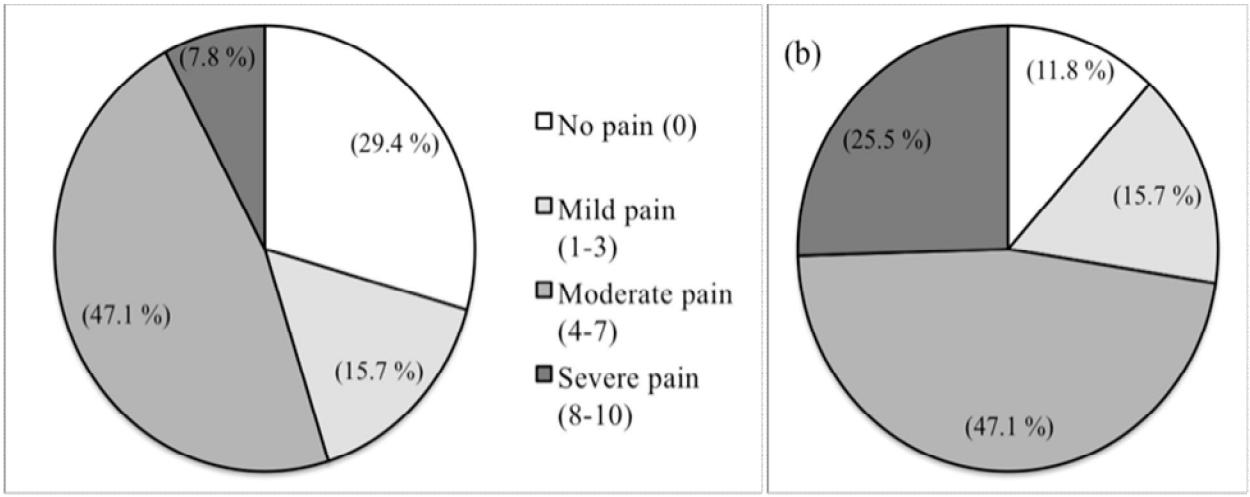


Fig. 5 Scores of (a) rest pain and (b) dynamic pain for all patients.

The administration of analgesia was not documented for any patient; therefore, all episodes of analgesic administration were recorded following direct patient questioning.

Forty-four of the patients were able to eat and drink and were therefore able to take paracetamol. No patients were prescribed paracetamol. One patient (2.3% of those who could take it) received paracetamol (although it was not prescribed.)

Overall, 56.9% of the patients had a NSAID prescribed although 24.1% of these had a relative contra-indication (as listed above). Out of 23.4% of the patients who received a NSAID in the previous 8 hours, a quarter had relative contra-indications. A different quarter of those who received a NSAID did not have one prescribed.

We analysed the prescribing and administration practices with regard to the pain scores (*Tables 1 & 2*.) We found that the likelihood of patients being prescribed NSAIDs did not vary with an increasing rest pain score or with increasing dynamic pain score. Similarly, the likelihood of patients being administered NSAIDs did not vary with either pain score ($p>0.05$, Chi-squared analysis.)

Pain at rest		Prescribed (%)	Administered
None (0) (n = 15)	Paracetamol	0	0
	NSAID	53	27
	Opioid	0	0
Mild (1-3) (n = 8)	Paracetamol	0	13
	NSAID	50	38
	Opioid	0	0
Moderate (4-7) (n = 24)	Paracetamol	0	0
	NSAID	54	13
	Opioid	8	*
Severe (8-10) (n = 4)	Paracetamol	0	0
	NSAID	100	50
	Opioid	0	0

Table 1 Prescribing and analgesic administration related to current pain score (*opioid administration was not clearly documented)

Dynamic pain		Prescribed (%)	Administered (%)
None (0) (n = 6)	Paracetamol	0	0
	NSAID	67	33
	Opioid	0	0
Mild (1-3) (n = 8)	Paracetamol	0	13
	NSAID	38	38
	Opioid	0	0
Moderate (4-7) (n = 24)	Paracetamol	0	0
	NSAID	54	17
	Opioid	8	*
Severe (8-10) (n = 13)	Paracetamol	0	0
	NSAID	69	23
	Opioid	0	0

Table 2 Prescribing and analgesic administration related to the dynamic pain score (*opioid administration was not clearly documented)

In total, 2 patients (3.9%) were prescribed opioid analgesia, but it was unclear how much they had received in the previous 24 hours.

It was noted that the mean dynamic pain score on day 1 post-operatively was higher for emergency (mean=8.3, n=4) patients than for elective (mean=3.3, n=6) patients ($p<0.05$, two-tailed Student's t-test), though this preliminary finding from sub-group analysis would require a separate study to verify it.

DISCUSSION

As indicated above, control of post-operative pain has multiple benefits beyond humanitarian concerns (5,6,7,9,10,12,13). There is good evidence for a multi-modal approach to analgesia (6,9,16,18,19) (*Fig. 2*). This study looked at the level of post-operative pain and compared the prescribing and administration of analgesia with "best practice".

Regarding the study design and data collection, the burden of pain might have been underestimated, because patients were asked for their current pain, rather than the worst pain that day. It was possible that drug administration was under-reported due to poor documentation and patient uncertainty. That

was minimised as much as possible by using all available sources of information. There was a high proportion of emergency cases in the sample reflecting the departmental workload. The distribution of patients by post-operative day (*Fig. 4*) showed that there were fewer cases later after surgery, indicating patient discharge from hospital. The days further from surgery are likely to have an increasing proportion of major cases, but we consider that this is not a problem because this study does not investigate the relationship between size of surgical insult and pain, but rather how any post-operative pain is managed. Despite the fact that a relatively small number was studied, clear patterns have been discernable from the data.

A high proportion of patients experienced unacceptable levels of post-operative pain, defined as a score of 4 or more on the VAS (3,4,14). Pain scores were excessive for over half of the post-operative patients at rest and nearly three-quarters of the dynamic pain scores were too high.

Generally, there was limited documentation. When prescriptions were made, they were written anywhere in the patient notes, since there was no formal drug prescription and administration chart in the hospital. Also there was no record of drug administration in the notes.

General prescribing of analgesia was below current best practice (6,13,16,18,19), with no paracetamol prescriptions and only just over half of the patients being prescribed a NSAID. Furthermore, the pattern of NSAID prescribing seemed to ignore contra-indications (20,21). In fact, a slightly higher proportion of those with contra-indications were prescribed NSAID analgesia than those without contra-indications. Opioid analgesia was highly under-prescribed (16). The data suggested that the prescribing of analgesia was not tailored to the pain experienced by individual patients, since there was no significant difference between prescribing for those with lower pain scores compared to those with higher pain scores.

A similar pattern was seen in the administration of analgesia. The suggestion that patients arrange their own paracetamol was made to us on several occasions. However, only one patient received paracetamol, indicating that this is not the case. A minority of patients received NSAID analgesia, and there was a problem with patients receiving NSAIDs without their being prescribed. As with prescribing, there was no significant difference between the administration of NSAID analgesia for those with lower pain scores compared to those with higher pain scores.

The following recommendations, based on the above findings, are meant to improve analgesic prescribing and administration. There should be an increased awareness of the importance of analgesia and knowledge of current best practice with a "multi-modal" approach among the medical staff (*Fig. 2*). We suggest the development of clear analgesic guidelines based on this approach. To improve analgesia delivery to patients, there should be clear documentation of prescribing and administration. A formal drug chart is suggested to allow safe and effective prescribing (22,23,24). Such documentation should clearly state whether NSAID analgesia is contra-indicated. Adoption of the chart will require training for prescribers and for those who use the chart (24,25). These proposals would require minimal training or expense for large potential improvements in patient analgesia (3).

Repeat auditing of post-operative analgesic use after the above recommendations are implemented could improve practice (26,27).

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