

A retrospective audit of perioperative non-steroidal anti-inflammatory drugs (NSAIDs) utilisations

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Background

Nonsteroidal anti-inflammatory drugs (NSAIDs) are established components of multimodal analgesia for perioperative pain management. Perioperative use of NSAIDs reduces pain intensity, opioid consumption and opioid-related side effects[1]. Such opioid sparing effect may be beneficial for chronic opioid users who are tolerant to the effect of opioid, and for older patients and patients with significant airway disease who are prone to the side effects of opioids.

Despite their usefulness, potential side effects such as acute renal injury, gastrointestinal (GI) tract erosion, platelet inhibition, bronchospasm, cardiovascular toxicity, anastomotic leak post colorectal surgery, and non-union in orthopaedic fracture prevent their use in at-risk patient groups.

The current perioperative NSAIDs utilisation pattern in our hospital is unknown.

Aim

To determine the NSAIDs utilisation rates and to describe the difference in characteristics between surgical patients who received and did not receive perioperative NSAIDs in a large metropolitan public hospital.

Method

Medical records for adult patients undergoing operating-suite procedures in a large metropolitan hospital over a five day period in September 2016 were retrospectively reviewed. Patient age, gender, American Society of Anaesthesiologists (ASA) score, weight, estimated Glomerular Filtration Rate (eGFR), procedure, surgical unit, schedule (i.e. emergency versus elective), pre-morbid NSAIDs use, co-morbidities, and perioperative NSAIDs prescription were collected.

A prescription of perioperative NSAID is defined as a prescription for NSAID for administration during any time period starting from 12 hours before surgery to 12 hours after surgery in the current study.

Patients are deemed to be able to receive NSAIDs if they do not fulfil one or more exclusion criteria (Table 1). Characteristics of patients who received NSAIDs were compared with those who were not prescribed NSAIDs.

Statistical Analysis

A two-tailed, two-sample student's T-test with unequal variances is conducted to reject the null hypothesis that there is no statistical significant difference between the mean values of various demographic characteristics between the NSAID prescription group and the NSAID non-prescription group. A p value<0.05 rejects the null hypothesis.

Results

Medical records for 164 patients (mean age: 54±18.65 years, 51.22% male) were reviewed. Of these, 123 (75%) were deemed suitable to receive perioperative NSAIDs.

The most common exclusion criterion met was renal impairment. Four patients met study exclusion criteria but nevertheless were prescribed and administered NSAIDs.

Among patients who were deemed eligible for receiving perioperative NSAIDs, 73 (58.35%) had an NSAID prescribed. The most common NSAID regimen prescribed was sole intraoperative NSAIDs (Table 2). Parecoxib was the most common intraoperative NSAID prescribed, accounting for 98% intraoperative NSAIDs uses.

Compare with patients who had NSAID prescribed, patients who did not have NSAIDs prescribed were significantly older, more often male (Table 3). ASA score, surgery schedule, patient weight, and renal function were similar between NSAID prescription and non-prescription group.

General surgery is most common parent surgical unit for patients in the NSAID non-prescription group; obstetrics and gynaecology is the most common parent surgical unit for patients in the NSAID prescription group (Table 4).

Three NSAIDs eligible patients were on NSAIDs pre-morbidly; all three received NSAIDs perioperatively.

Table 1. Study Exclusion Criteria

Documented allergy/adverse reaction to NSAIDs
GI ulceration, bleed, perforation, or obstruction
Coagulation disorder, active bleeding, or current user of any anticoagulant
Active spinal cord injury
Unstable or significant established ischaemic heart disease, peripheral arterial disease, or cerebrovascular disease
Undergoing major vascular surgery
Nephrectomy
Moderate to severe hepatic impairment (as defined by Child-Pugh Score)
Renal impairment with an eGFR<65mL/min/1.73m ²
Pregnancy (except during delivery)

Table 2. Regimen of Perioperative NSAIDs Prescription (N=73)

Regimen – no. (%)	
Intraoperative only	33 (45.21)
Postoperative only	17 (23.29)
Intraoperative and Postoperative	22 (30.14)
Preoperative and Postoperative	1 (1.37)

Table 3. Demographic Characteristics of the Patients Eligible for Receiving Perioperative NSAIDs

	NSAID not prescribed group (N=50)	NSAID prescribed group (N=73)	P value
Age - year			
Mean	55.50±16.9*	44.63±14.4	0.000342
Age Range – no. (%)			
18-54 yr	23 (46)	55 (75.34)	
55-64 yr	10 (20)	10 (13.7)	
65-74 yr	10 (20)	7 (9.59)	
75+ yr	7 (14)	1 (1.37)	
Weight - kg			
Mean	77.18±18.92	80.01±21.77	0.447
Range	44-136	30-173.1	
Male sex – no. (%)	30 (60)	32 (43.84)	0.079
ASA score			
Mean	2.04±0.88	1.91±0.80	0.433
ASA score – no. (%)			
1	15 (30)	25 (34.25)	
2	21 (42)	31 (42.47)	
3	11 (22)	17 (23.29)	
4	3 (6)	1 (1.37)	
Emergency cases – no. (%)	12 (24%)	20 (27.4%)	0.674
Mean eGFR -mL/min/1.73m ²	88.06±4.83	88.67±3.78	0.455

Table 4. Parent Surgical Units of Patients Eligible for Receiving Perioperative NSAIDs

	NSAID not prescribed group (N=50)	NSAID prescribed group (N=73)
Surgical Unit – no. (%)		
General Surgery	14 (28)	21 (28.77)
Plastics	13 (26)	3 (4.11)
Urology	10 (20)	8 (10.96)
Orthopaedic	6 (12)	14 (19.18)
Obstetric & Gynaecology	5 (10)	22 (30.14)
Vascular	1 (2)	0 (0)
ENT	1 (2)	4 (5.48)
Thoracic	0 (0)	1 (1.37)

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Discussion

The current study demonstrates that NSAIDs were under-utilised in the perioperative setting. Patients' age appeared to be the most significant demographic characteristic influencing NSAIDs prescription.

Anecdotally, some anaesthetists avoid the use of NSAIDs regardless of comorbidity due to concern with their toxicity. Such precaution might be unnecessary, as most NSAID toxicities appear to be associated with the prolonged use; and single dose of perioperative NSAIDs has been found to be effective and causing minimal side effect [2-5]. Furthermore, the availability of COX-2 selective NSAIDs has diminished the potential for GI erosion and platelet inhibition.

Discussion with anaesthetists also revealed a commonly held misconception that NSAIDs use are generally contraindicated beyond the age of about 50 to 65 years. This is not supported by evidence; parecoxib has been trialled in patients aged 65 to 96 years of age during clinical studies and was found to be no less safe and effective when compared to its use in younger patient population [6].

It is worth noting that elderly patients are often more sensitive to the effect of opioids; the optimisation of NSAID use has the potential to delay and decrease the need for rescue opioid analgesics, thus reducing the emergence of opioid related toxicity such as respiratory depression and delirium.

Lastly, tissue trauma during surgery leads to the release of inflammatory mediators that can often result in augmented pain sensitivity (hyperalgesia) and misperception of pain to innocuous stimuli (allodynia). Due to NSAIDs' function in inhibiting cyclooxygenase and dampens down the inflammatory response, they may provide additional benefits in relieving neurogenic inflammation, suppressing peripheral sensitisation, and preventing the development of hyperalgesia and allodynia [7].

Limitations

Due to the retrospective nature of the current study, sample size is chosen for convenience.

The majority of patients within the NSAID prescription group who were admitted under Obstetrics & Gynaecology underwent Lower Uterine Segment Caesarean Section (LUSCS). Given NSAID is a standard of care in LUSCS, this may have attributed to the overall younger age and large female representation in the NSAID prescription group.

Many plastics procedures performed in the NSAID non-prescription group were excision of skin lesion in older men. These procedures may be minor and procedural pain will be minimal with the use of local anaesthetic. It is hypothesised that anaesthetists might not feel the need to prescribe NSAIDs, leading to a lower NSAIDs prescription rate.

Due to a lack of definitive GFR cut-off for perioperative NSAID use in the published guidelines, an eGFR of 65mL/min/1.73m² was selected based on current anaesthetic practice within the hospital. Only two patients with eGFR<65 received perioperative NSAIDs in the current study.

eGFR was chosen instead of calculated GFR because eGFR is readily accessible from electronic medical record and it is the indicator most commonly used by anaesthetists to evaluate patient's renal function.

Implications for Practice

- ❖ Perioperative NSAIDs were under-utilised in patients without contraindications.
- ❖ Advancing age was significantly associated with NSAID under-utilisation.
- ❖ There were some misconceptions among anaesthetists regarding the risk associated with perioperative NSAIDs use and the upper age limit at which perioperative NSAIDs can still be used safely.
- ❖ There is a need to provide education to promote the rational use of perioperative NSAIDs and to correct common misconceptions.