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Opioid Prescribing In the Emergency Department in a Tertiary Hospital

A retrospective audit of hospital discharge data

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YB, BS, AN, LC designed the study. BS collected the data. LC was responsible for data

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management and quality control. BS, YB drafted the manuscript. JK and MJ contributed to drafting of the manuscript. All authors contributed substantially to its revision. YB takes responsibility for the paper as a whole.

This study was approved by the hospital's Quality and Risk Department as a Quality Assurance project (QA 072-17).

Running Head: Emergency Department opioid prescribing practices

Abstract

Objective: Emergency departments (ED) are a common source of prescription opioids on discharge. We explored opioid prescribing practices in an ED at a tertiary hospital in Victoria, Australia.

Methods: A retrospective audit over a of 6-month period of patients discharged from the ED to the community with the maximum allowable quantities of prescription opioids (MAQPO).

Results: There were a total of 3,301 patient-episodes discharged with a prescription from the ED. Of these, 766 (23.2%, 95% CI [21.8, 24.6]) were prescribed opioids,

with over half discharged with MAQPO. Immediate Release (IR)-opioids were prescribed in 362 patient-episodes (85.8%, 95% CI [82.5-89.1]), a combination of IR and Slow Release (SR)-preparations were prescribed in 29 (6.9%, 95% CI [4.5, 9.3]) and 31 (7.3%, 95% CI [4.8, 9.8]) were prescribed a SR-opioid alone. Co-prescription of other analgesia with opioids occurred in 152 patient-episodes (36.0%, 95% CI [31.4, 40.6]). Possible drug-interactions between opioids and other medications were noted in 117 patient-episodes (27.7%, 95% CI [23.4, 32.0]). Discharge summaries were prepared for 360 patient-episodes (85.3%, 95% CI [81.9, 88.7]) but only 171 (40.5%, 95% CI [35.8, 45.2]) included a plan to address the opioids, be that an opioid weaning regimen, analgesia review or referral to a pain specialist on discharge.

Conclusion: Opioid prescribing was common in this ED, with almost one quarter of discharge prescriptions being for a prescription opioid. This audit highlights potential areas for practice improvement including review of the quantity of opioid tablets prescribed as well as an opioid plan on discharge from the ED.

INTRODUCTION

The prescription opioid crisis^{1, 2} in Western countries continues to present challenges regarding the most effective methods of improving opioid prescribing practice. The United States (US) has the highest rates of opioid prescribing globally,³ having quadrupled over the past three decades and opioid related deaths were estimated at

32,445 in 2016.⁴ In Victoria, Australia, (population 6.15 million in 2017), opioid dispensing episodes have increased 15 fold (between 1992-2012). A 21-fold increase in deaths in which oxycodone was detected and reported to the coroner has also been noted.⁵

Emergency Departments (ED) are identified among the top five specialties prescribing opioids, especially in the age group less than 39 years of age.⁶ In the US, opioid prescriptions for patients presenting to the ED increased from 20.8% to 31.0%, between 2001 and 2010, while the use of non-opioid analgesics remained relatively unchanged.⁷ There is however a paucity of data from EDs in other countries including Australia. **This** study aimed to assess recent opioid prescribing patterns in an ED in an Australian tertiary public hospital setting.

MATERIALS AND METHODS

Audit Design and Setting

This audit was approved by the hospital's Quality and Risk Department which approves all clinical audits in our institution (QA 072-17).

The hospital is a 500-bed **metropolitan** hospital. **The** ED sees up to 50,000 adult only attendances annually. The audit was single-centre and retrospective examining ED

presentations who were discharged to the community with the maximum allowable quantity of prescription opioids (MAQPO) under the Pharmaceutical Benefits Scheme (PBS), an Australian government subsidy program. The MAQPO under the PBS is twenty-tablets of Immediate Release (IR)-preparations and twenty-eight tablets of Slow Release (SR)-opioids.

The audit covered a 6-month period between 1/1/17 to 30/6/17. The duration of the audit was based on pragmatic considerations including time and funding parameters. Data was extracted from *Vulcan*, a hospital designed application that generates electronic discharge prescriptions utilised by ED doctors which links to both Medical Records Online (MRO) and to the PBS.

Inclusion criteria

Inclusion criteria for the audit comprised all patient-episodes presenting to the ED (including short-stay unit admissions) discharged to community with the MAQPO.

Exclusion criteria

Exclusion criteria included, not discharged directly to community (e.g. transfer to another hospital or facility such as a residential care facility), and patients prescribed less than MAQPO. Patients who did not require pharmacological intervention were also excluded as well as patients with cancer, chest pain or admissions for severe cough. These latter patient groups were excluded because their analgesia

requirements are usually complex and best practice guidelines for opioid prescribing⁸ usually do not apply to these specific clinical contexts.

Data Collection

A standard data collection form used for prescription opioid audits⁹ was used.

Clinical data was extracted from the MRO by a Senior Pharmacist and Research Coordinator experienced in data extraction and in alignment with chart review guidelines.¹⁰ Data included reason for admission, demographics data (gender, age, ethnicity), co-existing medical conditions, patient's regular medications, opioid medication prescribed on discharge, other analgesics co-prescribed on discharge, whether a discharge summary (DS) was sent to the family physician (FP) and whether the DS included an opioid management plan. DS were audited according to the following criteria: a) direct mention of opioid-analgesia and or b) a regimen of opioid weaning post discharge and or c) mention of opioid-analgesia needing review, and/or d) referral to pain or other specialist.

Potential drug-interactions including co-prescribed analgesics, adjuvants and regular medications the patient was taking prior to discharge were explored. Drug-interactions were classified according to Lexicomp Online[®] software - an internet based platform designed for healthcare-professionals to provide clinically useful pharmacological information.¹¹ Lexicomp[®] categories include: X-avoid combination, D-consider therapy modification and C-monitor therapy. Where there was missing

data from **the** current presentation, MRO data from previous admissions were interrogated if available.

For the purposes of data integrity, 10% of medical records were randomly selected and independently assessed by the Senior Research Data Manager. There was 97.6% concordance in the data extraction. Disputes were settled by consensus.

Outcome Measures

The two **P**Primary outcome measures were: 1) number of patient-episodes in which opioids were prescribed in **MAQPO**; and 2) frequency of opioid management/review plans addressed in the DS.

Primary Data Analysis

Raw data about the overall ED population was **analysed using** Microsoft Excel.

Results are presented using descriptive statistics.

Results

There were a total of 3,301 patient-episodes with Vulcan-generated scripts from the ED over the audit period. **Of this total**, 766 were opioid prescriptions in various quantities (23.2%, 95% CI [21.8, 24.6%]). Of these, 422 provided the MAQPO on discharge from the ED and are the focus of the ensuing analysis (55.1%, 95% CI [51.6, 58.6]).

Demographics

Just over half the study sample was male (n=227, 53.8%, 95% CI [49.0, 58.6]). The average age was 48.0 years (+/- 17.7 SD) for men and 48.9 years (+/- 18.6 SD) for women. The majority of these were born in Australia and New Zealand (n=246, 58.3%, 95% CI [53.6-63.0]) (Table 1).

Reason for presentation

The majority of those prescribed MAQPO presented with musculoskeletal (MSK) conditions (n=282; 66.8%, 95% CI [62.3, 71.3]), 115 presented with lower back pain (LBP) (40.8%, 95% CI [35.1, 46.5]), 18 patients presented with traumatic injuries (4.3%, 95% CI [2.4, 6.2]) (Table 1).

Co-morbidities

Approximately two thirds of the sample, 68.2% (n=288), had multiple medical co-morbidities. Most common were musculoskeletal problems accounting for 114 patients-episodes (27.0%, 95% CI [22.8, 31.2]). Mental health disorders occurred in 53 episodes (12.6% 95% CI [9.4, 15.8]). Recreational drug/intravenous drug user/Alcohol abuse was recorded for only 10 patients-episodes in the sample (2.4%, 95% CI [0.9, 3.9]) (Table 1). In two of these, this referred to current heroin and methamphetamine use. For the other eight patients, the only information recorded

was the note “history of intravenous-drug use” or “ex-use” or alcohol/substance abuse/dependence. There was no mention of prescription medication misuse.

Patterns of opioid prescribing

Most patients were discharged with IR-opioids (n=362, (85.8%, 95% CI [82.5, 89.1]) (Table 2). In this sub-group the most common IR-preparation was Oxycodone. A minority were discharged with a combination of IR and SR-opioids both with MAQPO (n=29, 6.9%, 95% CI [4.5, 9.3]). The most common combination of IR and SR-opioids prescribed on discharge was Oxycodone-IR and Oxycodone/Naloxone-SR (Table 2).

Other analgesia

Approximately one third of the sample were also prescribed non-opioid analgesia (n=152, (36.0%, 95% CI [31.4, 40.6])). Most commonly paracetamol combined with a non-steroidal anti-inflammatory drug (NSAID) was prescribed (n=48, 11.4%, 95% CI [8.4, 14.4])). Paracetamol only, was prescribed in 38 patients (9.0%, 95% CI [6.3, 11.7])), followed by NSAID in 23 (5.5%, 95% CI [3.3, 7.7])).

Only formal prescriptions and not over the counter (OTC) medications were noted in the MRO. Other medications prescribed were combinations of Gabapentanoids, Tramadol, Panadeine Forte™ (combination of paracetamol 500mg/codeine 30mg per tablet), antidepressants, and diazepam, accounting for 18 scripts (4.3%, 95% CI [2.4, 6.2])).

Discharge Plans (Table 2)

Most of the sample, (n=360, 85.3%, 95% CI [81.9, 88.7]) had correspondence about the ED presentation sent to a FP. Opioid/analgesia management or follow-up plan was documented in less than half of the sample (n=171, 40.5%, 95% CI [35.8, 45.2]).

Potential Drug-Interactions

Over one quarter of those prescribed opioids were also on drugs with potential to augment Central Nervous System (CNS) depressant effect of the prescribed opioid (n=117, 27.7%, 95% CI [23.4, 32.0]) (Table 2). Drug-interactions using Lexicomp® classifications, indicated that 83 (70.9%, 95% CI [62.7, 79.1]) were category-D, 14 (12.0%, 95% CI [6.1, 17.9]) were category-C, 12(10.3%, 95% CI [4.8, 15.8]) were prescribed either two or more different opioids or the same opioid but in different formulations. A minority, had opioid-disease interactions (e.g. sleep apnoea, respiratory conditions, depression) (n=6, 5.2%, 95% CI [1.2, 9.2]). Of note, two patients discharged had a potential Category-X (Avoid combination) drug interaction. One was prescribed oxycodone and suboxone (buprenorphine/ naloxone), and the other oxycodone and buprenorphine patch.

DISCUSSION

This study has shown that over a 6-month period in 2017, almost one quarter of ED-presentations discharged to the community with a prescription were discharged with opioids. Internal hospital data showed no increase in the prevalence of hospital ED attendance over the audit-period compared to previous years (*Unpublished data*).

Over half of this group were prescribed MAQPO. Of those receiving MAQPO, almost two thirds had no other analgesia prescribed.

The most common reason for provision of prescription opioid was non-critical musculoskeletal pain. LBP is a common condition seen in EDs, being one of the top ten reasons for ED visits nationally¹² and internationally.¹³ Opioids are commonly prescribed in EDs and have until recently been accepted as an appropriate analgesic for acute pain that is severe enough to necessitate presentation to hospital.

However, the significant escalation in opioid prescribing and its adverse consequences in Western countries leading to overdose deaths over the last twenty years has prompted reviews of opioid-prescribing practices.^{14, 15, 16} Opioid-analgesia therefore is no longer a first line indication for LBP,¹⁷ being indicated only for the most resistant cases, and in such situations supply of less than 3-days is recommended if other analgesia has been tried.¹⁸ While there are no Australian guidelines for ED Discharge Opioid Prescribing, in the US, recent guidelines on opioid prescribing¹⁸ state there is no evidence supporting the use of opioids as first line therapy in treatment of acute pain or chronic non-cancer pain in hospital or the ED context¹⁸ upon discharge. Recommendations are for non-pharmacological strategies, followed by NSAID, IR-opioids are only advocated as third line analgesia

and no longer than 3-days' supply (on discharge). Patients needing more opioid analgesia need follow up and review of pain treatment plans.¹⁸

Over half of our sample were prescribed more than 3-days opioid-analgesia, being prescribed the MAQPO of IR-preparation or SR-preparation or both IR and SR-opioids together. This practice of providing MAQPO, rather than the recommended 3-days' supply may reflect strong expectations of the public that they should receive full packets of opioids, notwithstanding best practice guidelines advising otherwise.¹⁹ This highlights growing tensions between an obligation to treat pain appropriately, increasing scrutiny over prescribing of opioids and patient satisfaction.

These patterns of prescribing have potentially significant implications. Both higher initial opioid doses and prolonged opioid prescribing for acute pain may be linked to increased risk of long-term opioid use.²⁰ In one study, patients prescribed opioids for more than 7-days were at double the risk of becoming chronic opioid users at one year compared with patients given one day's supply only.²¹ Prescribing in excess of need may also increase risk of diversion and misuse. Excess opioid pills are commonly kept by patients after hospital admissions and stored in unsecure locations.²² Furthermore, around 50% of prescription opioid misusers report that they obtained opioids from friends or family.²²⁻²⁴ These findings emphasise the considerable downstream risk of excessive opioid prescribing and should be borne in mind by health professionals.

The majority were discharged on one IR-opioid, while a minority left with both IR and SR-opioid or with an SR-opioid. This is consistent with clinical guidelines for opioid prescribing in ED where non-opioid analgesia has been tried.^{25, 26} These guidelines, however, recommend prescribing for only a short duration (e.g. ≤ 3 days), translating to less than 20 tablets. Our audit revealed that over half were prescribed MAQPO IR-opioids (20 tablets), or IR and SR-opioids (48 tablets), or SR-opioids alone (28 tablets). Splitting packets of opioid medication to provide enough for only 3-days however may not be expedient and review of packet sizes to reduce unnecessary supply of MAQPO is being considered to improve practice in Australia.²⁷

More than a quarter of the sample was discharged with a combination of multi-modal analgesia that could potentiate CNS depressant effects of opioids, putting this group of patients potentially at risk of medication-misadventure. This risk may be as high as ten times greater than in patients taking opioids alone and includes excessive sedation, falls, respiratory depression, dependence or fatal overdose compared to patients taking opioids alone.^{28, 29}

DS were provided for the majority of patients and is consistent with other areas of our institution.⁹ While this is encouraging, less than half included a reference to the opioids that have been prescribed. This is another potential area for improved practice. Education, policies or protocols regarding the key points to include about the opioids in DS may encourage better opioid prescribing practice.

In addition to the legitimate need for opioid-analgesics, EDs may encounter patients who engage in questionable practices to obtain prescription opioids. These patients may be opioid dependent or may be involved in diversion of the analgesic.³⁰ There did not however appear to be clear evidence for this in this sample. There was only one patient that presented for a repeat script after allegedly losing it, as a reason for admission.

Several limitations to this audit need acknowledgement. Data was based on an electronic Vulcan prescribing system, MRO and DSs, Vulcan would not have captured hand written scripts. Given few such scripts occur in hospital practice today, the potential underestimate in our assessment of opioid prescribing is expected to be minimal. In contrast, this audit worked on the assumption that scripts generated were filled, and this may potentially have over-estimated opioid use. The limits of MRO and DSs as a relatively poor source of quality data is also acknowledged.

Opioid prescribing practice is often influenced by what analgesia has been previously tried, both pharmacological and non-pharmacological. The medical notes do not systematically record recommendations to purchase OTC paracetamol or ibuprofen, nor whether the patient is opioid-naïve or not. This limits the interpretation of the findings and highlights an area for improved practice – that is, systematic documentation regarding whether the patient is opioid-naïve or not, and documentation of type, dose, and duration of analgesia that has been trialled before ED presentation. Potential for human error in data collection in this audit also needs

acknowledgement, although we believe this to be minimal as tests of data integrity showed high concordance in data extraction. Finally, as this was a single-centre study over a 6-month period, generalizability of these results to other hospitals is limited. Notwithstanding these limitations however, the audit provides a snapshot of opioid prescribing patterns in a large ED context in Australia and raises suggestions for potential areas that could be addressed to improve opioid prescribing practice in the ED.

Conclusion

The ED highlights an acute care context in which opioid prescribing practices can be improved. These include multimodal analgesia, limited opioid prescribing and where opioids are recommended, a plan that specifies a weaning regimen for the opioid or a review of the analgesia plan. Increasing awareness of the dangers of overprescribing opioids and encouraging best practice in all contexts of health care is paramount to addressing the major public health problem of prescription opioids.

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Table 1 – Characteristics of the patients discharged from the Emergency Department with full Pharmaceutical Benefit Scheme (PBS) quantity of opioids (n= 422).

	Type	Number (percentage, 95% CI [LL-UL])
Age and Gender (n=422)	Female Mean Age = 48.9 years (+/- 18.6 SD)	195 (46.2%, 41.4-51.0%)
	Male Mean Age = 48.0 years (+/- 17.7 SD)	227 (53.8%, 49.0-58.6%)
Country of Birth (n=422)	Australia, New Zealand	246 (58.3%, 53.6-63.0%)
	Europe	91 (21.6%, 17.7-25.5%)
	Asia	51 (12.1%, 9.0-15.2%)
	Other	34 (8.1%, 5.5- 10.7%)
Reason for presentations (n=422)	Musculoskeletal	282 (66.8%, 62.3-71.3%)
	Urogenital	42 (10.0%, 7.1-12.9%)
	Gastrointestinal	36 (8.5%, 5.8-11.2%)
	Other	20 (4.7%, 2.7-6.7%)
	Trauma	18 (4.3%, 2.4-6.2%)
	Infection	9 (2.1%, 0.7-3.5%)
	Respiratory	8 (1.9%, 0.6% to 3.2%)
Comorbidities (n=288 with at least one comorbidity)	Dental	7 (1.7%, 0.5-2.9%)
	Musculoskeletal	114 (27.0%, 22.8-31.2%)
	Cardiovascular Disease	106 (25.1%, 21.0-29.2%)
	Endocrine	66 (15.6%, 12.1-19.1%)
	Gastrointestinal	59 (14.0%, 10.7-17.3%)
	Mental Health	53 (12.6%, 9.4-15.8%)
	Urogenital	48 (11.4%, 8.4-14.4%)
	Previous cancer	38 (9.0%, 6.3-11.7%)
	Respiratory	35 (8.3%, 5.7-10.9%)
	Neurological	33 (7.8%, 5.2-10.4%)
	Other	18 (4.3%, 2.4-6.2%)
	Recreational drug use/IVDU/Alcohol abuse	10 (2.4%, 0.9-3.9%)

CI-confidence interval, LL-lower limit, UL-upper limit, IVDU-intravenous drug use

Table2. Discharge characteristics of the patients prescribed full Pharmaceutical Benefit Scheme (PBS) quantity of opioids on discharge from ED (n=422)

Discharge characteristics	Number (percentage of 422 patients, 95% CI [LL-UL])
Type of opioids on discharge Immediate Release (IR), Slow Release (SR) or both	IR only: 362 (85.8%, 82.5-89.1%) (Oxycodone=360, Tapentadol=1) IR and SR: 29 (6.9%, 4.5-9.3%) (Oxycodone and Oxycodone/Naloxone SR) SR only: 31 (7.3%, 4.8-9.8%) (Oxycodone/Naloxone SR=30, Tapentadol=1)
Other analgesia prescribed in addition to opioids	152 (36.0%, 31.4-40.6%)
Potential drug interactions with other Central Nervous System depressants	117 (27.7%, 23.4-32.0%)
Opioids discharge plan included in the discharge documents or a specialist referral	171 (40.5%, 35.8-45.2)

CI-confidence interval, LL-lower limit, UL-upper limit

