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PATTERN OF ANALGESICS USE IN ORTHOPEDIC WARDS OF KING SAUD MEDICAL CITY, RIYADH, SAUDI ARABIA

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ABSTRACT

Background: Over the past 2 decades, KSA has recorded 86,000 deaths, and 611,000 injuries in road traffic accidents but information on the drug utilization pattern in the orthopedics inpatients in Kingdom of Saudi Arabia were lacking. The present study was carried out to obtain baseline information regarding the pattern of analgesic prescribing in King Saud medical city. **Methods:** The study was carried out over a two-month period at King Saud medical city, Riyadh, Saudi Arabia. Total number of drug prescriptions was recorded. The percentage of analgesics prescribed was noted and further studied. **Results:** 955 prescriptions of 204 patients admitted in the orthopedic inpatient wards were analyzed during the study period. Out of 204 patients studied 159 (78%) were male, and 45 (22%) female. Majority of the patient were below the age of 40yrs (69%). Traumatic injury from falls (46%) was the most common cause for hospitalization. Narcotics analgesics were used commonly followed by paracetamol and lornoxicam. **Conclusions:** Majority of our patients were males with fractures and road traffic accidents. Narcotic analgesics were commonly prescribed on arrival and in operation theatres and on debridement. Paracetamol and lornoxicam were commonly prescribed in wards. Most analgesic prescriptions last less than 10 days. Studies covering a larger number of patients and for a longer time period are required. A greater number of patients can be studied, seasonal variations can be overcome and drug utilization can be measured quantitatively.

KEYWORDS: Analgesics, Prescription pattern, Orthopedics, Non-steroidal anti-inflammatory drugs, Opioid.

INTRODUCTION

Pain is defined by the International Association for the Study of Pain (IASP) as "An unpleasant sensory and emotional experience associated with actual or potential tissue injury or described in terms of such injury",[1] which may be acute or chronic, able to leave sequelae and even to be life threatening.[2] Pain is both distressing and detrimental for the patient; however actions for its better evaluation and management are poorly studied.[3] It should be evaluated and managed by a multidisciplinary professional team comprising of Orthopedists, clinical pharmacists and nurses.[4]

Effective pain control is very important in post-operative phase as it improves patient comfort and therefore satisfaction, earlier mobilization, faster recovery with less likelihood of the development of neuropathic pain, a reduced risk of deep vein thrombosis, pulmonary embolism and reduced cost of care.[5,6] Evidence suggests that surgery suppresses the immune system and that this suppression is proportionate to the invasiveness of the surgery.[7,8] Good analgesia can reduce this deleterious effect. Inadequate pain control may result in increased morbidity or mortality. The failure to provide good postoperative analgesia is multifactorial. Insufficient education, fear of complications associated with analgesic drugs, poor pain assessment, and inadequate staffing are among its causes.[5,6] Analgesics are defined as drugs that relieve pain by acting in the central nervous system or on peripheral pain mechanisms, without blocking nerve impulse conduction or markedly altering sensory function. Analgesics can be broadly classified into two main categories: Narcotic or Opioid analgesics and Non-narcotic or non-opioid analgesics. **Narcotic or Opioid** analgesics inhibits pain impulses by acting on brain receptors. Opioids are very good analgesics for short term management of severe pain. Long term uses of opioid analgesics are limited due to the development of tolerance and dependence. **Non-narcotic** analgesics include non-steroidal anti-inflammatory drugs (NSAIDs) and paracetamol or acetaminophen. Paracetamol acts centrally, has weak anti-inflammatory action. NSAIDs are further classified as nonselective that inhibit cyclooxygenase 1(COX-1) and cyclooxygenase 2 (COX-2) receptor and selective that inhibit COX-2 receptor.[9] In spite of considerable improvements in the availability and control of drugs in hospitals, rational drug use is still a worldwide problem. Periodic evaluations of drug utilization pattern enable suitable modifications in analgesics prescribing to increase the therapeutic benefit and to minimize the adverse effects. Such studies monitor, evaluate and if necessary, suggest modifications in prescribing behaviors of medical practitioners to make the medical care rational and cost effective.[4] This information may assist healthcare systems

and hospitals to design educational programs that may improve prescribing and drug use. It will also help in formulating pharmacy database and stocking of commonly used analgesics. Keeping in view these important aspects, we planned this study of analgesic use.

MATERIALS AND METHODS

A cross sectional observational study was carried out in orthopedic inpatient wards of **King Saud Medical City (KSMC),** over 2 months period. It is a tertiary care teaching hospital in Riyadh, Saudi Arabia, with 1500 beds of which 180 beds are intensive-care unit beds. Its core competencies are emergency care, trauma, orthopedics, burn, critical care, and dental care. KSMC is a main referral hospital for the Ministry of Health. KSMC have the biggest orthopedics service in the region, about 120 orthopedics beds. The study was undertaken after the permission from Institutional Ethics Committee. All medical records of patients who were admitted for various reasons under orthopedic wards of the hospital irrespective of age, sex, diagnosis, and treatment were analyzed. Prescriptions of patients attending orthopedic outpatient clinics, critically ill patient, those who were admitted in other in-patient department and those who absconded or discharged against medical advice were excluded from the study. Details regarding demographic characteristic, diagnosis, drugs prescribed, their strength, route of administration, frequency, duration and concomitant medications were noted from the patient's file and operation theatre notes. Analgesics prescribed at the time of admission to the Emergency department were noted. Total 955 prescriptions from 204 patients were collected. Data were analysed using descriptive statistics and the results were presented by using frequency distribution table with Microsoft excel 2010 and percentages.

RESULTS

Out of 204 patients studied 159 (78%) were male, and 45 (22%) female. Our patient population had a mean age of 33 with a standard deviation of 20.6. (33±20.6) Majority of the patient were below the age of 40yrs (69%) (Table1). Traumatic injury from falls (46%) was the most common condition followed by road traffic accident (39.7%) and osteoarthritis (4.4%). Congenital condition (3.9%), implant removal (2.9%), anterior cruciate ligament (ACL) injury (1.9%), osteomyelitis (0.49%) and septic arthritis (0.49%) were the other causes for the prescription of analgesics. (Table2). Of the 955 prescriptions, there were 565 (59.1%) prescriptions for analgesics only, followed by antimicrobials 205(21.4%), anticoagulants 116 (12.1%) and anti-ulcer drugs 69 (7.2%). Out of analgesic prescriptions**,** the total number of

paracetamol prescriptions was 195 (34.51%), opioid analgesics were 225 (39.82%), non-selective NSAIDs used was 138 (24.42%) and selective NSAIDs was 7 (1.23%) (Table3). Maximum analgesics (87%) were given by parenteral route. Among opioid analgesics, Fentanyl was the most commonly prescribed drug. Lornoxicam followed by diclofenac were commonly used non-selective NSAIDs. Among selective COX-2 inhibitors, celecoxib was the only drug prescribed. Majority of the patients (58.8%) received combination therapy of analgesics (Table4). Single analgesic was used in 41.6% of the patients, 47.5% patients received two analgesics and 9.3% received three analgesics,0.98% received four analgesics and 0.49% received five analgesic. Majority of patients received analgesic for ≤ 10 days. Only 10 patients received paracetamol for >15days.

Table. 1: Age-Sex Distribution.

Age Group (Years)	Males N(%)	Females N(%)	Total N=204(%)
1-10	15 (7.3)	11 (5.3)	26 (12.7)
11-20	35 (17.1)	0	35(17.1)
21-30	43 (21.0)	4 (1.9)	47(23.0)
31-40	28 (13.7)	5 (2.4)	33(16.1)
41-50	18 (8.8)	4 (1.9)	22(10.7)
51-60	11 (5.3)	7 (3.4)	18(8.8)
61-70	4 (1.9)	6 (2.9)	10(4.9)
71-80	2 (0.9)	7 (3.4)	9(4.4)
81-90	3 (1.4)	1(0.49)	4(1.9)

Table. 2: Causes for Orthopedic Admissions.

Causes	Males N(%)	Females N(%)	Total N=204(%)
1. Fracture(self-fall)			
Upper limb	29(14.2)	8 (3.9)	37(18.1)
Lower limb	35(17.1)	22 (10.7)	57(27.9)
2.Road Traffic accident			
Upper limb	25(12.2)	2 (0.9)	27(13.2)
Lower limb	49(24.0)	2 (0.9)	51(25.0)
Upper and lower limb	2(0.9)	1(0.4)	3(1.4)
3. Implant removal	6(2.9)	0	6(2.9)
4.Congenital Dislocation of Hip bilateral	3(1.4)	5(2.4)	8(3.9)
5. Anterior cruciate ligament (ACL)injury	4(1.9)	0	4(1.9)
6. Osteoarthritis			
Total knee replacement	2(0.9)	4(1.9)	6(2.9)
Total hip replacement	2(0.9)	1(0.4)	3(1.4)
7. Osteomyelitis	1(0.4)	0	1(0.4)
8. Septic arthritis	1(0.4)	0	1(0.4)

Table. 3: Types of Analgesics and Route of administration.

Analgesics	I V	I M	P O	Suppository	Total N=565(%)
1. Paracetamol	165	0	28	4	195(34.5)
2. Opioid					
Tramadol	4	1	16	0	21(3.7)
Pethidine	25	41	0	0	66(11.6)
Fentanyl	108	1	0	0	109(19.2)
Morphine	28	1	0	0	29(5.1)
3. Non-Selective NSAIDs					
Lornoxicam	105	0	3	0	108(19.1)
Diclofenac	0	13	1	14	28(4.9)
Ibuprofen	0	0	1	0	1(0.1)
Indomethacin	0	0	1	0	1(0.1)
4. Selective NSAIDs					
Celecoxib	0	0	7	0	7(1.2)

Table. 4: Number and type of Analgesic therapy.

Type of Analgesic Therapy	N = 204 (%)
Monotherapy	
Paracetamol	75(36.7)
NSAID	9(4.4)
Combination therapy	
NSAID + PARACETAMOL	
Lornoxicam + Paracetamol	77(37.7)
Diclofenac + Paracetamol	14(6.8)
NSAID + NSAID + PARACETAMOL	
Lornoxicam + Ibuprofen + Paracetamol	1 (0.4)
Lornoxicam + Diclofenac + Paracetamol	5 (2.4)
Lornoxicam + Celecoxib + Paracetamol	4(1.9)
Lornoxicam + Celecoxib +Indomethacin+ Paracetamol	1 (0.4)
OPIOID+NSAID+ PARACETAMOL	
Tramadol + Paracetamol	6(2.9)
Tramadol + Lornoxicam	1(0.4)
Tramadol + Lornoxicam + Paracetamol	9 (4.4)
Tramadol + Lornoxicam +Celecoxib+ Paracetamol	1 (0.4)
Tramadol + Lornoxicam +Celecoxib+ Paracetamol+ Diclofenac	1(0.4)

DISCUSSION

Data regarding demographic details of patients in our study showed majority of patients admitted to orthopaedic wards were male subjects and were in the age group of 21-40 years. Most common indication for admission was fracture of bones. We understand that males in Saudi Arabia usually get involved in physically challenging endeavours and are more active outdoors whereas females usually stay indoors. Males also go for driving especially on long routes and therefore end up having more road traffic accidents (RTA). According to the

morbidity and mortality records in the Ministry of Health (MOH) hospitals, 20% of beds are occupied by RTA victims.[10] Over the past 2 decades, KSA has recorded 86,000 deaths and 611,000 injuries in RTAs with 7% resulting in permanent disabilities.[11]

Out of 565 analgesic prescriptions, forty percent were for opioid analgesics. Opioid analgesics are commonly used in emergency department and during perioperative period because of their predictable anesthetic sparing and pain relieving properties. Patient when admitted to the emergency department was prescribed injectable fentanyl and morphine. In the wards, pethidine was prescribed for postoperative pain, debridement/dressings and small procedures. However, concern regarding opioids related effects e.g. nausea, vomiting, biliary spasm, urinary retention, respiratory depression, abuse potential should be watched properly. Ehikhamenor et al studied analgesics prescribing pattern in accident and emergency unit of a tertiary teaching hospital in Nigeria. They reported that Non-opioid type of analgesics was utilized more than opioid. Paracetamol was the commonest prescribed analgesic in accident and emergency department and when opioid was necessary, pentazocine was prescribed.[12] But in our study we observed that fentanyl and morphine followed by pethidine and tramadol were commonly prescribed as majority had traumatic injury at the time of admission which was in accordance to Trauma Pain Management based on WHO Pain Ladder.[13] Pentazocine was not used in our hospital. And some patients were managed with NSAIDs namely injection lornoxicam and diclofenac but paracetamol was not the drug of choice in emergency unit of KSMC. Our hospital has a very effective narcotic prescription policy. All prescriptions have to be signed in triplicate by in charge Consultant. So the chances of misuse or prescription by doctors with less experience are therefore eliminated.

Paracetamol was next commonly prescribed analgesic during the period of study. Overall, it represented 34.5% of analgesic prescriptions. Preference for paracetamol by doctor could be due to its well-established safety, lack of significant drug interactions, few contraindications and multiple modes of administration such as oral (tablet, liquid suspension) and parenteral (intravenous, or intramuscular) routes. Paracetamol is generally well tolerated. In recommended doses, paracetamol does not cause gastric irritation; affect blood coagulation as much as NSAIDs, or affect kidney function.[4,15]

NSAIDs accounted for 25.6% of analgesic prescriptions in our study. Commonly prescribed NSAIDs were lornoxicam followed by diclofenac. In a hospital based retrospective study from orthopedic department from India, Padmanabha T S shows the use of conventional

NSAID with high frequency of diclofenac (73.75%) followed by paracetamol (15%) and tramadol (6.25%), ibuprofen (2.5%).[16] In our study diclofenac was used minimally and so was ibuprofen. It seems the choice of NSAIDs depends primarily on the choice of doctor and availability of the drug.

Lornoxicam is a member of the oxicam group of NSAIDs, produce analgesic and antipyretic effects through the non-selective inhibition of COX1 and COX2 receptors. It also increases endorphin levels promoting central analgesic and anti-inflammatory effects. Intravenous lornoxicam (8mg) has been shown to be as effective as morphine (20mg), pethidine (50mg) and tramadol (50mg) in the treatment of postoperative pain. Safety of the use of lornoxicam during pregnancy, lactation and in patients under 18 years has not yet been established.[17] There is no dose recommendation for children and adolescents. However, in our study 10 patients under 18 years received lornoxicam.

Staunstrup et al in his study comparing efficacy and tolerability of lornoxicam versus tramadol for postoperative pain relief following arthroscopic reconstruction of the anterior cruciate ligament showed that intramuscular lornoxicam offers a useful alternative to tramadol for the treatment of moderate to severe postoperative pain.[18] Inan et al studied efficacy of lornoxicam as postoperative analgesic after total knee replacement surgery. In this double blind randomized placebo controlled study, the effect of lornoxicam (16mg intravenously 15 minutes before surgery followed by 8mg postoperatively at 12th and 24th hours on morphine consumption was investigated. It was observed that lornoxicam administration decreased morphine consumption in postoperative period significantly and there were fewer side effects.[19] In our study, for postoperative pain relief, inj pethidine was prescribed. The use of lornoxicam in moderate to severe postoperative pain has decreased the narcotic prescription to considerable extent.

Multiple analgesic prescribed in our study were used sequentially, not necessarily simultaneously. Reason was either patient did not respond to one analgesic or analgesic was not available in the pharmacy or patient did not tolerate the drug. Prescribing combination of analgesics may have adverse health outcomes and also may not lead to improvement in efficacy.[20] There are several studies which describe that the danger of rigorous drug reactions causing damage to the liver and kidney and still higher in case of simultaneous use of two NSAIDs.[21,22] In our study, combination therapy with lornoxicam and paracetamol (37.7%) was the most commonly prescribed followed by a combination of diclofenac with

paracetamol (6.8%). Children were treated with injectable, oral, rectal paracetamol or with diclofenac suppositories. Synergism between paracetamol and NSAID is observed in acute pain. The addition of an NSAID to paracetamol may confer additional analgesic efficacy. Combining two NSAIDs is irrational as the two drugs act on the same pathway and there is no synergism when two drugs acting on the same enzyme are combined. Thus combining two NSAIDs does not and cannot improve the efficacy of treatment. Combining opioid analgesics with NSAID is more rational, as the two drugs act on different pathways.[23] An interesting observation in present study was that no prescription of selective COX-2 inhibitor was noted in perioperative period. Although COX-2 inhibitors have advantage of reduced gastric toxicity, but possibility of causing cardiovascular risk, cost, non-availability of parenteral preparation might be reason for nonprescription of this category of drugs. Concomitant administration of anti-ulcer drugs with NSAIDs were observed in 33.8% of patients which can be considered rational and justified as these classes of drugs are most effective in countering NSAID related ulcerogenicity.

CONCLUSION

We studied 204 patients admitted over 2 month's period. Narcotics were commonly used drugs for pain control followed by paracetamol and Lornoxicam. A longer study with greater number of patients and the quantitative measurements of drug variables will provide more information in this area. Hence, further studies are required to provide optimum health care to improve the overall health of the community. Pain assessment can be done using scales to avoid large subjective variability. This type of study helps in evaluating the existing drug use pattern and in planning appropriate interventions to ensure rational drug therapy.

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