

*East African Medical Journal Vol 88 No. 3 March 2011*

## USE OF COMBINED PARACETAMOL AND LOW DOSE KETAMINE IN PAIN CONTROL DURING CHANGE OF DRESSINGS IN BURN PATIENTS

K. P. Werunga, MBChB, MMed Anaesthesia(NBI), Diploma ICU and Pain, Lecturer, Moi University, School of Medicine, P. O. Box 4606, Eldoret, Kenya, S. O. Khainga, MBChB(NBI), MMed (surg) FCS (Plast) COSECSA, Lecturer, Department of Surgery, College of Health Sciences, University of Nairobi, P. O. Box 19676-00202, Nairobi, Kenya, P. Musau, MBChB (Moi) MMed (surg) NBI, Lecturer, A. M. Emarah, MBChB (NBI), MMed(surg) Lecturer and L. Lumarai, MBChB, MSC(surgery), MD (surg and plast) Lecturer, Moi University, School of Medicine, P. O. Box 4606, Eldoret, Kenya

Request for reprints to: Dr. K. P. Werunga, Moi University, School of Medicine, P. O. Box 4606, Eldoret, Kenya

## USE OF COMBINED PARACETAMOL AND LOW DOSE KETAMINE IN PAIN CONTROL DURING CHANGE OF DRESSINGS IN BURN PATIENTS

K. P. WERUNGA, S. O. KHAINGA, P. MUSAU, A. M. EMARAH and L. LUMARAI

### ABSTRACT

**Objective:** To determine the effectiveness of Paracetamol and low dose Ketamine in controlling burn pain during dressings.

**Setting:** The burns ward of Moi Teaching and Referral Hospital, a 750 bed capacity tertiary centre in Western Kenya.

**Subjects:** Consenting patients were recruited to the study on admission. Babies and minors had consent given by their parents or guardians.

**Results:** Of the Fifty nine patients who were recruited into the study, seventy percent of them were children. Male to Female ratio was 1.2:1. There was statistically significant change in the pain score on both FLACC and VAS (both  $p < 0.001$ ) after the introduction of low dose Ketamine with Paracetamol. The patients and healthcare providers were satisfied with the new mode of pain management during change of dressings for burn wounds.

**Conclusion:** The use of oral Paracetamol combined with the low dose intravenous Ketamine, is effective in controlling burn pains during change of dressings. It is a safe and cheap alternative, that can be applied in remote and resource limited medical facilities.

### INTRODUCTION

A burn wound is one of the most painful injuries a person can suffer. If direct pain is not well controlled, not only will the patient suffer immediately, but he or she may take longer to recover and may develop chronic pain. Worryingly, studies show that pain is frequently under-estimated and under-treated, even in specialised burn centers (1).

Literature is scanty on burn trauma patients in Africa but we know that it contributes to a significant number of total hospital admissions. Studies done have shown burns to account for between 5% and 14.6% of the injuries documented (2,3). In Moi Teaching and Referral Hospital patients with burn injury are managed in the general surgical wards where protocols specifically for burns patients are non-existent. They undergo frequent change of dressings in the wards and in the operating theatres.

In this study we evaluated how burns pain is managed in Moi Teaching and Referral Hospital and assessed the effectiveness of low dose ketamine plus oral Paracetamol for dressing burn wounds in the wards.

The cornerstone in the management of procedural pain in burned patients is the ultra short acting opioids including; remifentanyl, alfentanil and fentanyl alone or in combination with other sedatives and Nsaids (3). High costs of these efficacious medications and lack of anaesthetic back up required for safe use of these opioids, has rendered their use out of reach for many hospitals in the developing countries (4,5).

Low dose Ketamine has been used in children for painful procedures with wide safety margins and is even a better analgesic than acetaminophen with codeine phosphate and diphenhydramine for wound care procedures in children with burns (6,7).

Paracetamol on the other hand can be used for background pain as described by Meyer and colleagues but may not be sufficient for frequent change of dressings when used alone in most burn patients (8).

### MATERIALS AND METHODS

Consenting patients with burn injuries were recruited for the study. Babies and minors had consent granted by their parents/guardians. Pain assessment and

control measures were documented on a standard questionnaire. The researcher then observed the whole process of wound dressing in selected patients and an assessment made on effectiveness of the pain control measures applied.

The dressing room was equipped with oxygen in a cylinder, self inflating bag for ventilation, face masks, laryngoscopes, oxygen delivery system, intravenous fluids, and resuscitation tray with basic resuscitation drugs (adrenaline, atropine among others). Oxygen was connected to the *ambu* bag ready for use if oxygen saturation dropped to less than 90%. A suction machine was made available for use incase it became necessary.

The selected patients took oral Paracetamol 20mg /kg (tablets for adults and syrup for children < 7yrs) an hour before the procedure. Single shot intravenous Ketamine at 1mg /kg was administered in the dressing room five minute before the procedure. Normal saline was run intravenously 100ml/kg/hr.

Monitoring consisted of oxygen saturation probe, and observation of pain in the child was made using the FLACC SCALE (9). VAS (10) pain scale was similarly used for adults. Evaluation and documentation of pain was done at the end of the procedure and for the next two hours using the standard questionnaire.

The nurses involved in the dressing the wounds were asked about their evaluation of pain control in burns patients under their care using close and open ended questions to assess their satisfaction.

At the end of dressing, the patients/ guardians were interviewed to assess their level of satisfaction about the overall pain control measures using 3 point Likert scale.

Descriptive statistics was used. Data were entered into a computer incorporating the statistical package for social sciences (SPSS Version 17.0) Frequency distribution tables were generated. Student t-test was used to compare the mean values of these pain score

## RESULTS

Fifty nine patients with Burn injuries were recruited for the study, 73% of whom were children. Male to female ratio was 1.2:1. Majority (61%) of the patient were classified as ASA 1 while the rest were ASA 2.

Majority of the burns (82%) were accidental while the rest were due to interpersonal conflicts. Total body surface area burnt ranged from 9 to 40%.

The pain score in FLACC before ketamine and paracetamol administration was significantly higher than after ( $6.9 \pm 1.3$  vs.  $1.1 \pm 0.9$ ,  $p < 0.001$ ). The same was noted on the VAS score ( $6.7 \pm 0.7$  before and  $1.3 \pm 0.7$  after,  $p < 0.001$ ).

Majority of health care providers (88%) involved in the wound dressings were satisfied with the new mode of pain management in these patients after the study.

**Table 1**

*Level of satisfaction before and after the introduction of paracetamol and low dose ketamine*

Answer	Before (%)	After (%)
satisfied	2(3.4)	52(96)
partially satisfied	46(78)	4(22)
unsatisfied	11(19)	3(5)
Total	59	59

## DISCUSSION

Pain associated with change of dressing is most common unbearable to patients regardless of the age and gender despite advances in wound care and new ideal analgesics. The situation in developing countries is worse with the health sector poorly funded. Ketamine in combination with paracetamol represents a choice of well known analgesics whose analgesic properties are complementary and suitable for resource constrained countries.

Ketamine and paracetamol act through different mechanisms with a possibility of synergism in their actions. Ketamine is an N-Methyl D-Aspartate receptor antagonist (NMDA) and acts post synaptically to reduce the hyper-excitability of the spinal nociceptors (10). On the hand, paracetamol inhibits Prostaglandin synthesis exhibiting analgesia with antipyretic activity (11).

Combining Paracetamol with low dose ketamine at (1mg/kg) would allow better pain control and sedation with less adverse reactions due to ketamine. After the procedure, the patients, guardians and staff were satisfied with the use of ketamine/paracetamol protocol we introduced. This can partly be attributed to the relative calm of the patients during the procedure due to better pain control. It is not possible to make a comparison of the outcomes obtained in this study in the use of IV ketamine/paracetamol in pain control because of paucity in published data on same, but (Carrougner GJ) reports levels of satisfaction with oral ketamine though varied (14).

The side effects associated with ketamine are less at low dosage but precautionary measures should be taken to handle any complication that may arise. The patients vital signs should be monitored appropriately throughout the procedure, oxygen suction equipment resuscitation equipment and drugs must be readily available in the procedure room / ward to ensure safe outcome.

In conclusion, combined paracetamol, Ketamine

can be employed as part of multimodal approach to better control procedural pain in burn patients. It is safe, cheap alternative that can be applied in remote setting and resource limited medical facilities.

#### ACKNOWLEDGEMENTS

Mr. Henry Mwangi for statistical support and Moi Referral and Teaching Hospital for logistical assistance.

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