



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

*'A Bridge Between Laboratory and Reader'*

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**A COMPARATIVE EVALUATION OF PROPOFOL-KETAMINE-MEPEREDINE AND  
PROPOFOL- FENTANYL IN MANAGEMENT OF THERMAL BURN DRESSING  
CHANGES**

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**ABSTRACT**

A study involving the use of a mixture of Meperedine, ketamine and Propofol was trialed to assess its effectiveness in reducing pain associated with repeated burns dressings in an adult population.

Patients undergoing burn dressing changes were given a syringe pump of Propofol to use during the procedure. In this study, a combination of propofol-fentanyl was compared with propofol-ketamine-Meperedine for an ideal technique to decrease post procedural analgesic requirements in burns patients.

During the trial period, 100 patients who underwent burn dressing changes were randomly assigned into two groups :( PF & PKM). At the end of the procedure, patients were assessed by visual analogue scale. The VAS scores immediate post operatively (P value<0.05) and Times to first analgesic demand (P value<0.001) was lower in PKM group.

The use of Meperedine & ketamine & Propofol was shown to be an effective means of pain control during burns dressings as assessed by both staff and patients.

**Keywords: Ketamine; Meperedine, Propofol, Burn Dressing**

## INTRODUCTION

Burn dressing changes, daily scar debridement, and other minor surgical procedures occurring outside the operating room can be extremely unpleasant and painful for the thermal injured patient without some form of analgesia. In our hospital, analgesia has been produced most often by IV administration of narcotics. However, several problems are associated with this technique. The most important side effect of prolonged administration of narcotics is dependency.

Provision of safe and effective analgesia for brief painful or unpleasant surgical manipulations outside of the operating room has long presented difficulties. Nowhere is the problem more acute than in a large burn center, where many patients undergo multiple dressing changes and wound debridement. If an ideal analgesic agent were to exist, it would have the following attributes: 1) Ease of administration; (2) Rapid and predictable onset of action; (3) Provision of intense analgesia and/or amnesia; (4) Absence of respiratory or cardiovascular depression; (5) Maintenance of analgesia postoperatively; (6) Absence of postoperative drowsiness or interference with alimentation; and, (7) Enough freedom from intraoperative or postoperative side effects and complications to obviate the need of a physician's supervi-

sion. Our aim was to compare an evaluation of propofol-ketamine-meperidine and propofol-fentanyl in management of thermal burn dressing changes.

Ketamine has some advantages and disadvantages in these patients. Ketamine has proved particularly valuable in the management of thermal injured patients because of its ability to stimulate the cardiovascular and respiratory systems in patients who are, at best, difficult to monitor and in whom airway manipulation may be awkward. However, several complications have been described which limit its usefulness in standard practice. Involuntary or random movements may preclude safe and effective surgical procedures. Although laryngeal or pharyngeal reflexes are maintained, patients may aspirate foreign material in the pharynx (1). Hallucinations and restlessness are common postoperatively.

Advantages of propofol over traditional agents include ultra-short onset of action of approximately 30-60 seconds (through rapid redistribution throughout the entire body) with peak effect in one to three minutes, short half-life, minimal risk of nausea, and short recovery time. However, some characteristics of propofol can make it difficult to use for moderate sedation. As the drug has no analgesic effects, patients may expe-

rience agitation, confusion, and withdrawal from painful stimuli when under moderate sedation. Optimal clinical practices require rapid achievement of desired analgesic effect, maintenance of the effect as long as necessary allowing prompt recovery after procedure. For prevention of these side effects, we use Ketamine and Ketamine because of their analgesic effects. So, according to aforementioned information we try to use these three drugs for improvement of burn dressing changes. On the other hand, Ketamine administered in very small doses, reduces opioid consumption. This effect is the result of attenuation of acute tolerance to the analgesic effect of opioids (2). Opioids are the mainstay of treatment for severe acute pain (3). To assess the effectiveness of an analgesic regimen, it is essential to regularly measure patients' pain using an appropriate instrument. However, pain is a subjective experience. Observer assessment of patient behavior is unreliable (4). Pain should be assessed and recorded by patients themselves. The "Visual Analogue Scale (VAS)" is the easiest way to measure the intensity of pain. Simple to use, it is efficient and can be analyzed quickly. Patient marks the degree of pain s/he feels. On a scale of 0-10, 0 = No pain and 10 = Worst ever pain. It is a very sensitive way to assess intensity of pain. It

assigns a numerical value to pain. VAS can measure efficiency of analgesia by a particular analgesic by noting the scores before and after treatment.

## **MATERIAL & METHOD**

100 patients with thermal burns, of ASA grade II & III, between ages 18-50 years, who required dressing changes of 30-40 minutes duration were chosen for the study. Written informed consent was obtained from all patients. Ethical clearance was obtained.

After assessing the research proposal in the Bioethics Committee, we can obtain the informed written consent. We analyzed the data using descriptive statistics via SPSS 11.5. Inclusion criteria included:

>18 and < 50 years of age, Percentage of burns 20-60% in patients, Closed dressings indicate.

Patients with myocardial failure (NYHA3, 4), chronic obstructive pulmonary disease, increase in ICP, patients receiving monooxidase in first 48 hours of burns, and addict patients were excluded. The patients were randomly allocated into 2 groups: 1. Group PF-propofol-fentanyl. 2. Group PKM-propofol-ketamine-meperidine.

In this study, patient had to have a spontaneous breathing, so sedation should have a smooth initiation. Because of these reasons, drugs were administered in minimal dose

and with interval. When the patient was transferred to burn dressing room, s/he received 50-100 mg IV meperedin. Patients received IV propofol (0.75-1 mg/kg) in the burn dressing room after 2-3 minutes. After 1-3 minutes, patients received 15-25 mg IV ketamine. Spontaneous respiration was maintained with 100% O<sub>2</sub> with mask and Bain's circuit with assistance in times of apnea. (In case of apnea, Jaw thrust maneuver is performed). Now, the patient may have some involuntary movement which is because of ketamine administration. Then, after 2-3 minutes, propofol infusion (50 µg/kg/min) during burns dressing was used for maintenance of sedation.

The characteristics used to evaluate the analgesic state included presence and degree of vocalization by the patient, withdrawal from painful stimuli, and involuntary movements (a common occurrence under ketamine anesthesia). Visual analogue scores (0-10) were assessed at the end of the procedure, once the patient was oriented (asked to grade their pain from 0-10 by means of a 10 mm visual analogue scale, with 0= "no pain" and 10= "worst possible pain" and their VAS scores were noted). Standard lead II of the electrocardiogram (ECG) was monitored.

## RESULTS

In this study, 100 patients were selected. Eight hour after completing the procedure, patients were assessed with visual analogue scale. The characteristics of the patient population are shown in Table 1. As shown in the table both groups were comparable. There were no apnea and desaturation in two groups, except three patients with apnea in PF group. Times for recovery and orientation are shown in table2. VAS scores immediate post operatively are shown in table 3. The VAS scores were significantly lower in the PK group compared to the PF group. Times to first analgesic demand are shown in table 4. The patients in the PK group had lower VAS scores and demand for analgesics in the first 2 hours. Earliest time to first analgesic demand was 32 min in the PF group as compared to 64 min in the PK group. Incidence of emergence reactions: Were only 3 out of 50 in the PKM group. These patients complained of unpleasant dreams.

## DISCUSSION

Burn pain can be described as one of the most intense types of nociception. Burn care involves a series of aggressive procedures that stimulate nociceptive afferent fibres on a daily basis for days, weeks or months after initial injury. Pain from burn injuries is un-

dertreated; As a result, it has physiological effects and strongly correlates with psychological outcome. Procedures such as burn dressing when performed under anesthesia can bring down analgesic demand between dressings and anticipatory anxiety is decreased before dressings (5).

Intramuscular narcotics and sedatives were the principal method for producing analgesia through the early 1960s. Barry Smith and Hollis (6), in 1966, reported on the use of Innovar for 80 dressing changes, achieving useful sedation in 95 percent of their cases. However, intravenous routes were required and transient cyanosis from respiratory depression was observed in 20 percent of the patients.

In 1969, Baskett and his colleagues (7) improved this technique by decreasing the dose of Fentanyl by 50 percent and supplementing the neuroleptic analgesic with 50 percent nitrous oxide in oxygen. This approach provided adequate analgesia in all patients, with minimal respiratory depression. However, it also requires IV administration of the drugs as well as a mask for nitrous oxide administration. The latter may be particularly persecutor to some patients especially patients with facial burns.

Packer and Titell (8) used the hand-held Abbott Analgizer with methoxyflurane for

changing burn dressings. Eleven patients received 60 exposures lasting from 25 minutes to 2.5 hours. Onset of analgesia occurred in 3 to 5 minutes and was clinically established in 10 minutes. Analgesia was self-administered except for children, who needed masks, and for adults too severely injured to manipulate the device. Methoxyflurane was administered in concentrations up to 0.8 percent in air, which may be in the range implicated in the nephrotoxicity associated with this drug. Three of the 11 patients required IV or IM supplementation for satisfactory analgesia. No serious complications were noted.

In 1971, Laird and Gray (9) compared similarly administered methoxyflurane, 0.35 percent in air, and trichloroethylene, 0.5 percent in air. Methoxyflurane demonstrated a significant superiority, both objectively and subjectively. The agent was self-administered by 14 patients on 51 occasions. If the patient became drowsy, the vaporizer was removed. Fifty-three percent of the patients demonstrated a better mood at the end of the experience than was seemed before the dressing change. Investigators evaluated analgesia as complete in 59 percent and slight to nil in 26 percent of patients, while patients reported complete or considerable analgesia in 94 percent and slight in 6 per-

cent of exposures. Restlessness during debridement was apparent in 18 percent of the exposures, but was considered less than that found with narcotic sedation. No significant complications were noted.

Bovill and Dundee (10) demonstrated significant analgesic properties of intravenously administered subhypnotic doses of ketamine. Sadove's group (11) similarly reported the effects of sub-dissociative doses of ketamine in 6 volunteers as measured by electrical ear algesimetry. In their study, 0.44 mg/kg of ketamine administered IV produced significantly greater analgesia than intramuscularly administered.

Meperedin (1 mg/kg) and placebo. Intense analgesia persisted for approximately 60 minutes and control levels were not reached for 105 minutes.

Bennett and Bullimore (12) administered 5 mg/kg doses of ketamine IM in 10 children on 160 occasions for radiation therapy. This technique was chosen because of the impracticality of the anesthesiologist staying with the child. It provided sedation and immobility in all exposures and was associated with no major complications. Tolerance to ketamine, as manifested by decreasing duration of effect with fixed dose administration, was observed by Bennett and Bullimore in 7 of 10 children after several exposures.

Intravenous administration of subanesthetic doses of ketamine has provided useful and reliable analgesia for debridement and dressing changes in the thermal injured patient. Onset of action was rapid and predictable and was clearly heralded by nystagmus, psychic relaxation, and the appearance of a blank affect. Now, this manner revealed that no patient had unpleasant memories of his experience, and a significant improvement in patient attitude toward debridement and dressing change became apparent.

This combination meets most of the criteria enumerated for the ideal analgesic agent; However, the occurrence of occasional airway obstruction and emergent delirium requires administration by trained personnel.

## CONCLUSION

In conclusion, burns patients suffer from daily background pain as well as procedural pain. Sedation for burns procedures brings down background pain and analgesic requirement. The combination of propofol-ketamine-meperidine for these dressings provides excellent intraoperative conditions and respiratory parameters and prolonged postoperative analgesia with a low incidence of emergence delirium.

Although our experience with this technique of providing analgesia has been limited to dressing changes and debridement in the

thermal injured patient, the potential applications are numerous. Dressing changes, suture removal, myringotomies, removal of pressure-equalizing tubes, and minor orthopedic manipulations are just a few possible uses. Its safety and ease of administration make it desirable for any bedside procedure in which intense analgesia is required for a short time.

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