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A COMPARISON OF INTRAVENOUS PARACETAMOL AND FENTANYL FOR PAIN RELIEF DURING AND AFTER DILATATION AND EVACUATION

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ABSTRACT:

BACKGROUND: It is necessary to employ pain management techniques because dilatation and evacuation operations can be uncomfortable. In obstetrics, dilatation and evacuation are routine daycare procedures. Nevertheless, the woman had a bad experience—both during and after the treatment. Paracetamol is a reliable and effective analgesic for mild to severe pain. Improved predictability and tolerability are potential benefits of the IV form of this medicine when compared to oral or rectal delivery modalities. After 15 to 20 minutes, it easily penetrates the blood-brain barrier and starts to work as a central analgesic. Four hours in, these effects begin to diminish. It is preferred in most surgical patients since it has no effect on mental state, bleeding, respiratory drive, stomach mucosa integrity, or renal function. Therefore, the purpose of this study was to compare the effects of intravenous fentanyl and paracetamol on pain management during and after dilatation and evacuation surgery.

AIM: The aim of the study was to compare paracetamol with fentanyl for pain relief in dilatation and curettage procedures.

MATERIAL AND METHOD: A prospective, randomized, interventional study was conducted in the anesthesia department. Every patient received a thorough pre-anesthesia examination, and all required laboratory testing was completed. After the patients were informed about the study in a way that they could comprehend, they gave their informed consent. The study included 50 patients, 25 in each group, who were scheduled for elective and emergency dilatation and evacuation under general anesthesia and were members of the American Society of Anesthesiologists I and II fit.

RESULTS: We examined fifty patients who required general anesthesia and elective D&E because they had missed their planned abortions. Random selection was used to assign patients to receive IV fentanyl and paracetamol. The measured vital signs did not show any significant differences in mean heart rate, blood pressure (systolic, diastolic, and mean arterial pressure), or respiration between the two groups during the study. There were no withdrawals from the trial. It was discovered that there was no statistically significant difference between the groups with regard to age, weight, height, and ASA status. In the recovery room, the visual analog scale (VAS) was used to score the patient's pain at 5, 15, and 30 minutes. Both groups experienced mild discomfort at five minutes; the mean pain scores for the fentanyl and paracetamol groups were 0.85 ± 1.2 and 1.45 ± 1.1, respectively.

CONCLUSION: The study provides evidence for the usefulness of IV paracetamol by demonstrating how it functions similarly to fentanyl in reducing pain during dilatation and curettage procedures. Our study backs up the usage of a single Inj injection. For both intraoperative and postoperative pain relief management in dilatation and evacuation, paracetamol was injected intravenously at a dose of 15 mg/kg body weight. This was done because the hemodynamic profile was stable, there was no respiratory depression, no significant drug-related complications, and the VAS score was favorable.

KEYWORDS: Fentanyl, Pain, Paracetamol, Dilatation and Evacuation, Non-Opioid Analgesics, Recovery of Function and Patient Satisfaction

Introduction

The International Association for the Study of Pain defines pain as "an unpleasant sensory and emotional experience connected with actual tissue damage or defined in terms of such damage."[1] Having access to sufficient pain relief should be considered a fundamental human right. It is wrong on a moral and ethical level to ignore pain. Giving prompt, effective pain relief is still a humanitarian concern, even though it can be considered a violation of fundamental human rights to let someone suffer from insufficient analgesia.[2,3] Patients who receive insufficient pain treatment frequently struggle to breathe well, cough effectively, move enough to care for themselves or take part in rehabilitation, and as a result, they feel helpless, afraid, and anxious.[4]

According to the World Health Organization, 42 million abortions occur annually in the world.[5] Before 14 weeks of gestation, in the first trimester of pregnancy, about 90% of abortions are carried out.[6,7] Abortion surgery can be performed using either vacuum aspiration or dilatation and evacuation (D&E). In obstetrics, D&E is a routine daycare treatment. This surgery needs an anesthetic approach that can produce a quick recovery because an early discharge is required.[8]

There are now several different medication classes available to manage intraoperative and postoperative pain. They include acetaminophens like paracetamol, opioids like fentanyl, N-methyl-D-aspartate (NMDA) receptor blockers like ketamine, NSAIDs like diclofenac, alpha-2 adrenergic agonists like clonidine, local anesthetics like bupivacaine, and acetaminophens like paracetamol. The synthetic opioid analgesic fentanyl has a quick onset and brief duration of effect. It is an effective μ¬opioid receptor agonist.[9,10] Fentanyl reduces the need for further anesthetics by exerting antinociceptive effects that intravenous anesthetics do not.[11,12] Its side effects, particularly in pediatric procedures, include respiratory depression, pruritis, and skeletal and thoracic muscular rigidity, which may cause discharge delays. It is neither inexpensive nor widely accessible.[13]

Another common analgesic for pediatric postoperative pain is paracetamol, a low molecular weight phenol molecule. The delivery method and dosage affect its effectiveness. When compared to rectal forms, the advantages of intravenous paracetamol are larger.[14,15] Depending on the NSAID used and the type of surgery, prior research involving mostly adult patients has revealed that adding paracetamol and NSAID improves analgesia in 64% of investigations.[16] The use of NSAID and paracetamol together is common practice despite the scant evidence that it improves outcomes in children. However, due to its link to the emergence of greater bronchial reactivity, there has recently been concern about the safety of paracetamol when taken in children.[17,18] For treating mild to moderate pain, paracetamol is an efficient and secure medication.[19] In ICUs, the oral and rectal forms of this medication are frequently used to treat pain and fever.[20] With its creation and the subsequent inclusion of this drug in the formulary of many countries, the use of IV paracetamol for pain management has received some acknowledgment in literature.[21-22]

It is perfect for pediatric treatments with mild to moderate pain because it has no significant negative effects, such as respiratory and circulatory depression, and it has no sedative effect. This study compared intravenous paracetamol with fentanyl for pain management during and after dilatation and curettage procedures.

MATERIAL AND METHODS

In the department of anesthesia, a prospective, randomized, interventional study was carried out. Pre-anesthesia evaluations of all patients were comprehensive, and all necessary laboratory tests were run. Informed consent was gained once the patients had been told of the study in a manner that was understandable to them. 50 American Society of Anesthesiologists I and II fit patients—25 in each group—who were scheduled for elective and emergency

dilatation and evacuation under general anesthesia participated in the study. 50 adult female American Society of Anesthesiologists (ASA) I-II patients who underwent elective D&E operations needing general anesthesia and were older than 18 years old were enrolled. Exclusion criteria included pregnancies longer than 12 weeks, hypersensitivity to any study medication, predicted difficulty breathing, morbid obesity, insufficient fasting, and hepatic problems.

All patients underwent complete pre-operative evaluations. All essential and pertinent laboratory and other research was done. Prior to surgery, all patients were kept off all oral intake for six hours. The patient was lying comfortably in the supine posture in the preoperative room when the preoperative nurse took the patient's pulse and blood pressure. Patients were informed about the 0–10 Visual Analogue Scale (VAS) for measuring pain. There were four categories for interpreting pain scores: 0 no pain, 1-4 mild pain, 5-7 moderate pain, and 8-10 severe pain.

Group P received IV paracetamol 15 mg/kg in the preoperative area 15 min prior to the start the of surgical procedure. The conduct and technique of general anesthesia were the same for both groups. After the application of standard monitoring (noninvasive blood pressure [NIBP], electrocardiogram (ECG), and pulse oximetry (SpO_2), patients were premedicated with Inj. Glycopyrrolate 0.004mg/ kg, Inj. Midazolam 0.02mg/kg and Inj. Ondansetron 0.1mg/kg. In addition to this, patients in Group F received 2mcg/kg body weight of fentanyl. Patients were pre-oxygenated for 3 minutes with 100% oxygen. Intravenous Propofol 12mg/kg body weight was used for induction of anesthesia.

Both groups underwent general anesthesia using the same protocol and technique. Patients were pre-oxygenated for 3 min. following the application of standard monitoring (noninvasive blood pressure [NIBP], ECG, and pulse oximetry [SpO2]). To induce anesthesia, Intravenous propofol 2 mg/kg was administered. A laryngeal mask airway (LMA) was implanted following the loss of consciousness. With the help of oxygen and nitrous oxide, isoflurane 1.5% was used to maintain anesthesia. NIBP was recorded, which comprises heart rate, pulse oximetry, respiratory rate, and end-tidal CO2. It also provides systolic, mean, and diastolic pressures. One of the study's authors kept track of these readings every three minutes from the start of the surgery until its conclusion. If heart rate, blood pressure, and respiration rate climbed 20% over the baseline during the production time period—which was regarded as the surgical procedure—inadequate pain control was assumed. The rescue analgesia consisting of fentanyl was delivered in 25 μg increments in the intraoperative time for both groups.

Anaesthesia was maintained with O_2 + N_2O + Isoflurane (0.8%,1%). Every three minutes from the commencement of the operation until its conclusion, readings were recorded and observed. If the baseline values for heart rate, blood pressure, or respiratory rate were exceeded by 20%, inadequate pain control throughout the surgical operation was assumed. For both the paracetamol and fentanyl groups, the rescue analgesia during the intraoperative phase consisted of injecting fentanyl in increments of 25mcg.

After the procedure, patients were given time to come to, and LMA was removed when they reacted to verbal orders. They were then sent to the recovery area. The same researcher who took notes during surgery also visited the patients thereafter to assess their level of pain using a numerical rating scale at 5, 15, and 30 minutes. Rescue analgesia with fentanyl 25 mg in increments was given if the patient's pain score was higher than 3 on the numerical rating scale. Also, the total amount of rescue analgesia used was noted.

STATISTICAL ANALYSIS

Version 19 of statistical packages for social science was used for all statistical analysis (SPSS Inc., Chicago, IL). While qualitative data were presented as frequency and percentage and evaluated by Chi-square test, quantitative data were presented as mean and standard deviation and analyzed using Student's t-test. Based on the statistical analysis, the study's inferences and findings were formed. P values under 0.05 were

considered significant, whereas p values <0.001 were considered very significant.

RESULT: -

We looked at 50 individuals who received elective D&E because they missed their scheduled abortions and needed general anesthesia. Patients were chosen at random to receive IV fentanyl and paracetamol. Throughout the course of the trial, the measured vital signs did not reveal any appreciable variations between the two groups in terms of mean heart rate, blood pressure (systolic, diastolic, and mean arterial pressure), or respiration. No participant dropped out of the trial. Regarding age, weight, height, and ASA status, it was found that there was no significant difference between the groups, as indicated in Table 1.

Table 1: Demographic and anesthetic measurements of the study patients

Variables	Group P (n = 25)	Group F (n = 25)
Age (years)	26.60±3.27	25.37±3.12
Weight (kg)	65.38±7.02	65.25±6.52
Height (cm)	150.3±4.07	152.1±4.77
ASA (%)		
I	15 (66.7)	15 (66.7)
II	10 (33.3)	10 (33.3)

The pain score based on the visual analog score (VAS) was assessed at 5, 15, and 30 min in the recovery room. At 5 min mild pain was observed in both groups, mean pain scores were 1.45 ± 1.1 and 0.85 ± 1.2 in the paracetamol and fentanyl groups, respectively except in 2 patients of paracetamol group who faced moderate pain and received rescue analgesia as shown in Table 2, while at 15 and 30 min, the pain was observed "mild" in all patients for both groups. We did not observe any significant side effects of drugs in either group.

Table 2: Comparison of pain relief between groups in dilation and evacuation (D&E) procedures

Pain (recovery room at 5 min)	Group P (n = 25) (%)	Group F (n = 25) (%)
Mild	23 (93.3)	25 (100)
Moderate	2 (6.7)	0 (0)
Severe	0 (0)	0 (0)

Drug side effects such fever, hypotension, gastrointestinal bleeding, headaches, agitation, hallucinations, skin responses, and issues with the liver and kidneys were extensively watched. One patient in the paracetamol group experienced a brief skin rash that went away on its own. In neither group did we see any notable neurological side effects.

DISCUSSION

Short-term and long-term problems are caused by poor pain management during the perioperative phase. An effective analgesic treatment strategy reduces postoperative anxiety, morbidity, expense, and length of hospital stay. Although D&E is a quick surgery, there is some mild to severe pain involved. Pain during and after surgery can cause emotional distress, mental anguish, and unpleasant sensory sensations. Surgery triggers pain, which is frequently accompanied by autonomic, endocrine, metabolic, physiological, and behavioral reactions. For the patient, pain relief is of utmost importance since pain causes discomfort, delays mobilization with the resulting problems, and lengthens hospital stays. Working conditions can range from great to bad in emerging nations due to resource unpredictability, though. Opioids and other narcotic medicines are frequently unavailable or experience abrupt shortages in these locations,

which forces anesthetists to search for safe substitutes. Contrary to other opioids, fentanyl has less side effects but can still result in dose-dependent respiratory depression, which may speed up bradycardia, produce hypotension, or cause delayed awakening.[23]

In a daycare surgery, fentanyl, a synthetic opioid with a short half-life, is frequently given to reduce both intraoperative and postoperative discomfort. Fentanyl activates quickly and is extremely lipid soluble. It starts working in 2 minutes and keeps working for 30 to 60 minutes. Respiratory depression, pruritis, and rigidity of the skeletal and thoracic muscles are some of its negative consequences. The non-opioid analgesic paracetamol. For treating mild to moderate pain, it is a reliable and secure medication. The absence of adverse effects associated with the use of opioid analgesics is its principal benefit.

Sinatra et al.2004[24] compared IV paracetamol with placebo after orthopedic lower limb surgery. They found that IV paracetamol was administered over a 24th period in patients with moderate to severe pain after orthopedic lower limb surgery provided Graph 13: Comparison of Visual Analogue Scale rapid and effective analgesia and was well tolerated. **El Hamamsy M, ElKawaly H, and Aziz hegazy M 2016**[25] studied the postoperative use of intravenous paracetamol versus that of intravenous fentanyl in patients who were posted for lower limb orthopedic surgeries. Their research shown that paracetamol given intravenously provided analgesia that was comparable to that of fentanyl while also enabling patients to move around more quickly and with fewer side effects.

Sinatra et al.2005[26] compared IV paracetamol with placebo after major orthopedic surgery. During orthopedic surgery, they discovered that IV paracetamol given over a 24-hour period to patients experiencing moderate to severe pain quickly and effectively reduced pain and was well-tolerated. A study comparing IV paracetamol and oral ibuprofen as the analgesic supplement to morphine in patients undergoing lower segment cesarean sections found that individuals receiving IV paracetamol had superior pain control than the ibuprofen group.

Tsang et al. 2013[27] did a study to see the opioids sparing effects of paracetamol in preoperative hip fracture patients, and they found that IV paracetamol had a significant opioid-sparing effect and satisfactory pain relief in preoperative hip fracture patients.

Cakan et al.2008[28] on 40 patients in a randomized double-blind clinical trial, studying post-lumbar laminectomy pain management, in addition to morphine administration, one group received one g IV Paracetamol every six hours and the other group received an IV placebo. The two groups did not differ significantly in the amount of IV morphine utilized. Vomiting was seen less frequently in the group receiving the placebo. The Paracetamol group showed superior pain management profiles than the placebo group.

Ali M, Shamim F, Chughtai S., et al. 2015[29] studied the difference between intravenous paracetamol and fentanyl for intraoperative and postoperative pain relief in dilatation and evacuation. The study concluded that there was no significant difference in the postoperative period at the post. group F was significantly lower during the first 15 minutes postoperatively as compared to the group.

Our study was constrained by its small sample size, lack of a placebo arm, single-blinded design, and brief follow-up period. All of these could have enhanced the findings of our investigation, but it was not feasible due to technological constraints and a lack of resources. Consequently, according to our study's Inj. Paracetamol results and satisfactory VAS scores, intraoperative and postoperative discomfort were decreased in patients undergoing dilatation and evacuation. The pain relief provided by paracetamol was comparable to that provided by injected fentanyl, but without the respiratory depression or other serious side effects. Nonetheless, this little study suggests that IV paracetamol and IV fentanyl have comparable pain-relieving abilities for mild to severe pain.

CONCLUSION:

The study supports the value of IV paracetamol by showing how it reduces pain during dilatation and curettage procedures in a manner

comparable to fentanyl. Our research supports the use of one injection of Inj. Given that the hemodynamic profile was stable, there was no respiratory depression, there were no significant drug-related complications, and the VAS score was favorable, paracetamol was administered intravenously at a dose of 15 mg/kg body weight for both intraoperative and postoperative pain relief management in dilatation and evacuation.

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