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COMPARISON BETWEEN INTRAVENOUS ACETAMINOPHEN AND INTRAVENOUS IBUPROFEN FOR PAIN RELIEF AFTER CESAREAN SECTION

Alaa Al-Haq Majed Hasan[1]* and Ahmad Yousef[2]

[1]Master Degree in Obstetrics and Gynecology, Tishreen University Hospital, Lattakia, Syria.
[2]Supervisor, Professor in Obstetrics and Gynecology, Tishreen University Hospital, Lattakia, Syria.

***Corresponding Author: Dr. Alaa Al-Haq Majed Hasan**

Master Degree in Obstetrics and Gynecology, Tishreen University Hospital, Lattakia, Syria.

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ABSTRACT

Study Aim: To compare the effectiveness of intravenous acetaminophen with that of intravenous ibuprofen in pain management following cesarean sections. **Material and Methods:** Informed consent was obtained from all participants. Pregnant women undergoing cesarean section were prepared and necessary preoperative tests performed. Participants were randomized into two groups for postoperative analgesia: one group received 1000 mg of intravenous acetaminophen, while the other received 800 mg of intravenous ibuprofen. Each woman received a single dose of postoperative analgesia, in addition to intraoperative analgesia. Follow-up occurred during hospitalization, with pain scores recorded 6 hours' post-surgery using the Wong-Baker Faces Pain Scale and FLACC. The timing of additional analgesia requests and length of hospital stay until discharge were documented, alongside the incidence and type of complications during the obstetric hospital stay. **Results:** The final sample consisted of 86 women, with 43 in the IV acetaminophen group and 43 in the IV ibuprofen group. The mean age of participants was 27.88 ± 5.41 years, with homogeneous age distribution. The mean gestational age was approximately 38.31 ± 1.1 weeks, with the first group averaging 38.4 ± 1.19 weeks and the second group 38.23 ± 1.0 weeks. Notably, 33 women (38.4%) had given birth to more than two children, while 32 women (37.2%) underwent their first cesarean section, and 32 had two or more previous cesarean deliveries. Pain assessment indicated that the simple pain category was predominant in both groups. The average pain score on the Wong-Baker Faces Pain Scale was 3.8 for the acetaminophen group and 2.4 for the ibuprofen group. For the FLACC index, average pain scores were 3.1 and 2 for the acetaminophen and ibuprofen groups, respectively, with no statistically significant difference noted. The time until additional analgesia was requested averaged 10.5 ± 7.3 hours in the acetaminophen group and 14.3 ± 8.3 hours in the ibuprofen group (P = 0.031), indicating a statistically significant difference. Mean hospitalization duration was 12.6 ± 4.9 hours for the acetaminophen group compared to 13.9 ± 5.1 hours for the ibuprofen group. Complications were recorded in only one patient in the acetaminophen group, who experienced postoperative vomiting, while six patients in the ibuprofen group encountered complications during follow-up. **Conclusion:** Both acetaminophen and ibuprofen provide effective options for postoperative analgesia, contributing to reduced overall opioid and central analgesic consumption. They are generally safe medications with minimal significant side effects

KEYWORD:- Cesarean section, Acetaminophen, Ibuprofen.

INTRODUCTION

A cesarean section is defined as the surgical delivery of a fetus through incisions made in the abdominal wall and uterus. This definition excludes the removal of a fetus from the abdominal cavity, as in cases of ectopic pregnancy or uterine rupture.[1]

The World Health Organization (WHO) reports a global increase in the use of cesarean sections, which now account for over 21% of all births. This trend is projected to increase to 30% by 2030.[2] The decision to carry out a cesarean section primarily hinges on considerations that prioritize the well-being and potential survival of the mother and fetus. Indications for cesarean sections can be classified as either absolute or relative, further categorized into maternal, maternal-fetal, and fetal indications. Maternal morbidity, as defined by the WHO, refers to any health condition related to or exacerbated by pregnancy and childbirth that adversely affects the patient's health.[3] The morbidity associated with cesarean delivery is fourfold compared to vaginal delivery.[4] Complications following cesarean delivery can occur in both the short- and long-term, encompassing issues directly related to the surgical procedure as well as those stemming from the cesarean delivery experience.

Pain is the most significant undesirable clinical outcome associated with cesarean delivery.[5] Effective postoperative analgesia is crucial for women who undergo cesarean sections, as they have distinct recovery needs, including breastfeeding and newborn care. The optimal post-cesarean analgesia regimen should provide sufficient relief without hindering the mother's ability to care for her newborn and should involve minimal transfer of medication into breast milk. For most patients, postoperative pain management should incorporate centrally acting opioid analgesics alongside scheduled non-opioid analgesics (such as acetaminophen and NSAIDs), reserving systemic opioid analgesics for instances of acute pain. The objective of postoperative pain control should not be total pain elimination, but rather a manageable level that enables normal activities. Setting realistic maternal pain expectations and delivering education regarding opioid use are essential aspects of preoperative consultations. Acetaminophen plays a crucial role in a multifaceted approach to opioid-sparing analgesia following cesarean delivery, owing to its favorable side effect profile and established efficacy when used in conjunction with NSAIDs and neuraxial opioids.[6] For optimal efficacy, acetaminophen should be administered consistently throughout the day.[7] The following dosage regimen is recommended:

- 1 Gram intravenously during surgical closure.
- Six hours post-intraoperative dose, 650 to 1000 mg orally (or intravenously for patients unable to take oral medication) every six hours during the hospital stay and after discharge until pain is adequately controlled, with a maximum of 3 to 4 grams daily.

NSAIDs should be administered regularly and around the clock following surgery for all patients without contraindications, although rare contraindications may exist (e.g., allergies). Various NSAID dosage regimens may be utilized for postoperative pain management, including:

- Ibuprofen: 600 mg orally every six hours for 48 to 72 hours post-surgery, commencing six hours after the intraoperative dose of ketorolac, or 800 mg/200 ml, given every 12 or 8 hours for 24 hours.

METHODS AND MATERIALS

Following informed consent from all study participants, detailed histories were obtained, documenting age, gestational age, number of previous births, and any obstetric complications or disorders noted during routine pregnancy follow-up. Pregnant women were prepared for cesarean delivery, undergoing necessary preoperative tests. After cesarean delivery under general anesthesia, participants were randomly assigned into two groups based on postoperative analgesia:

- Group 1: Women receiving 1000 mg of intravenous acetaminophen.
- Group 2: Women receiving 800 mg of intravenous ibuprofen.

Each woman received a single dose of postoperative analgesia, along with intraoperative analgesia through fentanyl (1-2 mcg/kg) and midazolam (0.01-0.1 mg/kg). No opioid analgesia was administered during the surgical procedure. Patients were monitored in the hospital, and pain scores were recorded six hours post-surgery using the Wong-Baker Faces Pain Scale and FLACC. Additional data collected included the timing of requests for supplementary analgesics, length of hospitalization until discharge, and the incidence and type of complications during the hospital stay recorded by the obstetrician.

Data were analyzed using SPSS v26, and statistical assessments of the results were conducted.

RESULTS

The study sample comprised 134 pregnant women who underwent elective cesarean sections at Lattakia University Hospital. Twenty-three women were excluded due to hypertension identified during pregnancy follow-up, ten women had contraindications to NSAID use, two experienced gastrointestinal bleeding during pregnancy, and thirteen chose not to participate. The final sample consisted of 86 women, divided into two groups: the intravenous acetaminophen group, consisting of 43 women, and the intravenous ibuprofen group, also comprising 43 women.

The ages of the participants ranged from 20 to 38 years, with a mean age of 27.88 ± 5.41 years. In the acetaminophen group, the mean age was 28.93 ± 5.52 years, while in the ibuprofen group, the mean age was 26.84 ± 5.15 years. The mean gestational age was approximately 38.31 ± 1.1 weeks; the acetaminophen group had a mean gestational age of 38.4 ± 1.19 weeks, and the ibuprofen group had 38.23 ± 1.0 weeks.

The majority of participants, 33 women (38.4%), had a history of more than two births, followed by 31 women (36%) with a history of one birth, and 22 women (25.6%) who were primiparous. Of those who underwent cesarean delivery, 32 women (37.2%) were undergoing their first cesarean, 32 had two or more previous cesareans, and 22 (25.6%) had one previous cesarean. No statistically significant difference was observed between the two groups regarding the number of previous cesareans ($p = 0.67$). Mild pain was predominant in both groups, with average pain scores of 3.8 in the acetaminophen group and 2.4 in the ibuprofen group on the Wong-Baker Faces Pain Scale. The FLACC index yielded average scores of 3.1 for acetaminophen and 2 for ibuprofen. Table (1) indicates that the p-value for the difference between the two groups for both indices was not statistically significant, despite Group 2 reporting greater comfort and reduced pain compared to Group 1. The mean time until additional analgesics were required was 10.5 ± 7.3 hours for Group 1 and 14.3 ± 8.3 hours for Group 2, with a p-value of 0.031, suggesting a statistically significant difference. Notably, two patients

in Group 1 and six in Group 2 did not require additional analgesics within the first 24 hours. The mean hospitalization duration was 12.6 ± 4.9 hours for Group 1 and 13.9 ± 5.1 hours for Group 2, with no statistically significant difference between the two groups. Complications were observed in one patient from Group 1, who experienced postoperative vomiting. In Group 2, six women encountered complications, including one patient who required a blood transfusion for bleeding; another had an allergic reaction to ibuprofen, managed with intravenous hydrocortisone and antihistamines, with subsequent improvement. Gastrointestinal disturbances were noted in four women from the ibuprofen group. While the incidence of complications was higher in Group 2, the difference was not statistically significant.

DISCUSSION

The final sample consisted of 86 women, with 43 receiving intravenous acetaminophen and 43 receiving intravenous ibuprofen. The mean ages for acetaminophen and ibuprofen groups were 28.93 ± 5.52 years and 26.84 ± 5.15 years, respectively. The two groups exhibited homogeneity in age, indicating no significant difference that could impact study outcomes. This aligns with the findings of Alhashemi,[8] Poljak,[9] and Mauwloudi,[10] where the predominant age group was young women. The mean gestational age was similar to that reported by Alhashemi[8] and Towers,[11] confirming that all cesarean sections were performed at full term. Regarding birth history, a greater proportion of participants had given birth to more than two children, consistent with findings from Blue,[12] indicating a higher number of experienced mothers compared to primiparous women. The overall cesarean rate among patients reflects increased awareness of the advantages of natural childbirth and the associated risks of cesarean delivery, corroborating Poljak's[9] findings regarding first-time cesarean rates.

Mild pain predominated among study patients in both groups, with a mean pain score of 3.8 on the Wong-Baker Faces Pain Scale for the first group and 2.4 for the second group. The mean pain score on the FLACC was 3.1 for the first group and 2 for the second group.

The mean time to request additional analgesics for the first group was 10.5 ± 7.3 hours, compared to 14.3 ± 8.3 hours for the second group, indicating a statistically significant difference. Al-Hashemi[8] reported acceptable satisfaction with postoperative pain management in both groups, with no noticeable difference. Blue.[12] corroborated these findings. Poljak[9] noted that patterns and timing of analgesic administration significantly affected opioid consumption, but observed no significant difference between ibuprofen and acetaminophen regarding analgesic efficacy. Mauwloudi[10] also reported a significant reduction in the use of central analgesics and opioids following the administration of both analgesics, though this did not reach statistical significance. Studies comparing intravenous and oral acetaminophen found no significant difference in opioid consumption reduction, as noted in Wilson's study.[13] Overall, our findings align with international studies in demonstrating no significant difference in analgesic effectiveness between acetaminophen and ibuprofen. However, our study uniquely focused on the timing of additional analgesic requests, as opposed to the quantity requested, which has been the primary focus of many other studies.

Notably, two patients in the first group and six in the second group did not request any additional analgesia within the first 24 hours. The mean hospitalization duration for patients in the first group was 12.6 ± 4.9 hours, while for patients in the second group, it was 13.9 ± 5.1 hours, indicating similar hospitalization times between groups. Complications were recorded in only one patient in the first group, who experienced postoperative vomiting twice. In the second group, six women experienced complications, including one case of bleeding requiring a single blood transfusion. Another patient had an allergic reaction to ibuprofen, treated with 100 mg of intravenous hydrocortisone and 10 mg of intravenous antihistamine, with complete recovery. Gastrointestinal disturbances were noted in four women in the second group.

The incidence of complications was not statistically significant. Although more complications were observed in the second group, this difference lacked statistical significance across the total patient population. Gastrointestinal disturbances were the most common in the Alhashemi study,[8] which reported no differences between the groups. Itching was more prevalent in the ibuprofen group, with a statistically significant difference noted. Blue's study,[12] found no significant differences in complications between groups and reported that ibuprofen did not significantly affect maternal blood pressure compared to acetaminophen, indicating its safe use.

Through our findings, alongside those of international studies, we recognize the high analgesic efficacy of both acetaminophen and ibuprofen when administered immediately post-surgery, leading to reduced reliance on additional analgesics, particularly opioids. In terms of safety, both analgesics can be confidently administered to patients without contraindications.

CONCLUSIONS

Our study, in conjunction with international comparisons, confirms that both acetaminophen and ibuprofen are effective options for postoperative analgesia, resulting in decreased overall consumption of opioids and central analgesics. Furthermore, both analgesics can be considered safe, presenting no significant side effects.

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