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EFFECTIVENESS OF PREEMPTIVE ANALGESIA IBUPROFEN 10 MG / KGBB PER ORAL FOR POSTOPERATIVE PAIN MANAGEMENT IN CHILDREN UNDERGOING MASS CIRCUMCISION

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Abstract: Management of post-mass circumcision pain is often overlooked and not optimal because the administration of analgesia will be given when circumcision is complete. This study aims to determine the effectiveness of oral 10 mg / KGBB ibuprofen as preemptive analgesia for the management of post-mass circumcision pain. After obtaining permission from the ethics commission of the FK UMSU clinical research, a prospective double-blind randomized controlled clinical trial was conducted on 28 children in consecutive sampling who met the inclusion and exclusion criteria. Samples were randomized into 2 groups, A was given ibuprofen 10 mg/kg BW orally 1 hour before incision and B was given ibuprofen 10 mg/kg BW orally at the time immediately after the circumcision was completed. Pain scale measurements were performed using FPR-S (Faces Pain Scale-Revised) at the 1st, 2nd, 4th, 6th and 8th postoperative hours. Monitoring of the 1st to 4th hours is carried out at the location of the activity, while the 6th to 8th hours are carried out by telephone. There was a significant decrease in pain scale at the 1st hour (p = 0.031) in group A. At the second to eighth-hour monitoring, the effectiveness of the two methods was the same. In conclusion, the method of preemptive analgesia is effective for the management of post-mass circumcision pain.

Keywords: preemptive analgesia, post-circumcision pain

INTRODUCTION

Mass circumcision or better known in the community as "mass circumcision" is a phenomenon that is widely heard in the environment around us when the school holiday season arrives. There are various kinds of institutional backgrounds and forms of activities that choose this activity as a form of their concern for the underprivileged people who have elementary school-age children (elementary school) to junior high school (junior high school). However, from the observations we made, there was one clinical aspect that was overlooked in each of these activities, which was the management of post-operative pain that was not optimal. The pain usually appears when the effects of local anesthetics used during the circumcision procedure

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have disappeared, so this situation will make the patient feel uncomfortable and in pain. Unfortunately, it is not uncommon for their complaints to be ignored without adequate treatment. Although circumcision is classified as minor surgery, the management of acute postoperative pain is an important thing that must be considered and treated properly to prevent chronic pain.

Preemptive analgesia is one of the methods currently used in the treatment of acute postoperative pain. Preemptive analgesia is the administration of analgesic drugs that are initiated before surgery is performed, aiming to prevent the formation of central sensitization caused by injury due to incision and the release of inflammatory mediators during surgery and the post-operative period.[1,2,3,4] Therefore, this method has a protective effect on the nociceptive system so that it has the potential to be more effective when compared to the administration of the same analgesic drug that is given at the time after the surgical action is complete. Preemptive analgesia can directly reduce postoperative pain and prevent chronic pain by reducing changes in central sensory processes.[1,4,5]

Pain is subjective.[6] Then the self-report is generally considered the most reliable way to assess the degree of pain and should be used wherever possible in any clinical condition. So the selection of measuring instruments that are appropriate for a particular population to assess the intensity of acute pain is important if someone wants to get a valid degree of pain assessment. The Faces Pain Scale-Revised (FPS-R) is a self-report tool that is useful for assessing pain intensity in preschool-age and school-age children who may not be able to use pain gauges others such as Visual Analog Scale (VAS) or Numeric Rating Scale (NRC).[7]

Based on the description above, the research problem formulation is: (1) post-mass circumcision pain is a problem that often arises but is always ignored, (2) acute pain that is not handled properly will cause central sensitization that results in chronic pain, (3) No one has applied preemptive analgesia to mass circumcision activities as a post-operative pain management because analgesic administration is usually done after the circumcision is complete (conventional).

The objectives of this study are: (1) to determine the effectiveness of 10 mg/kg BWpreemptive analgesia per oral with conventional post-circumcision pain management, and (2) to compare the effectiveness of 10 mg/kg BW preemptive analgesia per oral with conventional methods.

METHODS

This study is a double-blind randomized controlled clinical trial using a prospective design. The sample in this study were all children who would undergo mass circumcision measures that met the criteria of 28 people and were determined by consecutive sampling method. Inclusion criteria: (1) Elementary school-age children to Junior High School, (2) Accompanied by parents/guardians, (3) Willing to take part in briefings, (4) Willing to voluntarily attend research implementation procedures, (5)

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Parents/guardians have a cell phone or landline that can be contacted. Exclusion criteria: (1) Children with a history of blood clotting disorders, (2) Children with circumcision contraindications, namely hypospadias, and micropenis, (3) Have a history of allergy to ibuprofen. Drop out criteria: (1) Post-circumcision complications occur, such as bleeding, hematoma, drug allergies, (2) Uncooperative children, (3) Parents/guardians cannot be called when the team follows up at 6 and 8 hours after surgery.

After obtaining permission from the Faculty of Medicine, University of Muhammadiyah North Sumatera Clinical Research Ethics Committee, the research was begun by conducting a briefing on the procedure of researching the research subjects and parents/guardians. On this occasion, the research team explained about the participation of parents/guardians in assessing the pain scale using the FPR-S (Faces Pain Scale-Revised) 7-9 at 6 and 8 hours after surgery and asked for their willingness to report the results of the examination when the team follows up by telephone. For this reason, the team will train parents/guardians in assessing the pain scale using the FPR-S correctly. After signing the statement of willingness as a research subject, patients will be randomized into 2 groups A and B. A is called the treatment group, and B is called the control group. To carry out this double-blinded study, group A will be given ibuprofen 10 mg/kg BW orally 1 hour before incision and placebo immediately after the circumcision is complete.[10,11] While group B was given placebo orally 1 hour before incision and ibuprofen 10 mg/kg BW orally immediately after the circumcision was completed. Then an FPR-S assessment is conducted at the 1st to 8th hours. The first 4-hour assessment will be directly observed when the subject and the parent/guardian are still at the activity site, while for the next hour (6th to 8th hour) the FPR-S will be assessed via mobile phone or home phone based on parent/guardian observation. Besides, an assessment of drug side effects was also carried out.

The data that has been collected will be tabulated and analyzed. Demographic data will be analyzed univariate to obtain the distribution of characteristics of research subjects. The data normality test used the Kolmogorov-Smirnov test. The analysis for the hypothesis test is the Mann-Whitney test because the data distribution is not normal. Statistical tests were considered significant if $p < 0.05$ with a confidence level of 95%.

RESULTS

This research was carried out on Sunday, August 26th, 2018 in the event "Mass Circumcision, Blood Donation and Pro Bono Health Counseling held by the Head of Muhammadiyah Youth Branch of Tanjung Morawa located in Madrasah Tsanawiyah Muhammadiyah 13 Tanjung Morawa B". From a total of 40 children participating in this activity, 28 samples were taken by consecutive sampling based on inclusion and exclusion criteria. The data obtained can be seen in the description below:

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Table 1. Demographic Data of Research Subjects

Variable	Mean	SD	n
Age (years)	10,79	1,26	28
Weight (kg)	27,32	6,15	28

The data normality test used the Kolmogorov-Smirnov test and obtained an abnormal data distribution with p = 0,000.

Table 2. Difference Value of The FPR-S at The 1st to 8th Postoperative Hours

Time	Group	Mean FPR-S	n	*p*
1st hour	A	0,43	14	0,031
	B	2,14	14	
2nd hour	A	0,57	14	0,077
	B	1,57	14	
4th hour	A	0,29	14	0,334
	B	0,71	14	
6th hour	A	0,29	14	1,0
	B	0,29	14	
8th hour	A	0,29	14	0,578
	B	0,43	14	

At the first postoperative hour (after circumcision) a significant difference in mean FPR-S between the two groups was obtained (p = 0.031). Whereas in the 2nd to 8th postoperative hours (after circumcision) no significant difference in the mean value of the FPR-S was obtained between the two groups (p> 0.05).

In table 3 it can be seen that 71.4% of the subjects had no drug side effects. While the most common side effects of drugs occurred were nausea and dizziness of 10.7% of subjects respectively. During monitoring hours 2 to 8, there were no drug side effects.

Table 3. Distribution of Drug's Side Effects

Time	Drug Side Effects	Group		n(%)
		A	B	
1st hour	Not present	11	9	20 (71,4)
	Nausea	3	1	3 (10,7)
	Vomit	1	0	1 (3,6)
	Headache	0	1	1 (3,6)
	Dizziness	0	3	3 (10,7)
2nd to 8th hour	Not present	14	14	28 (100)

DISCUSSION

This study uses Faces Pain Scale-Revised (FPS-R) as a measure of the degree of pain to the subject. FPS-R is a pain degree assessment device consisting of 6 facial images that illustrate the severity of pain, starting from the "no pain" contained in the image at the far left (rated 0) to "very very painful" in the most far-right (given a score of 10). The FPS-R was adapted from the original Faces Pain Scale and created a scoring system that is appropriate for the pain scale.[7] The use of FPS-R as a measure of the degree of pain was initially validated on 90 samples of postoperative patients aged between 4-12 years.[8] The degree of pain in the FPS-R is highly correlated with the score of other validated self-report instruments. Most children who are 4 years or older can easily understand and use this scale. This scale also has high feasibility, meaning that by using the FPS-R scale the measurement of the degree of pain is easier to translate in the form of a score and easy to interpret.[12]

The use of ibuprofen 10 mg/kg BW orally given 1 hour before an incision (preemptive analgesia) shows a pain scale at the first

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postoperative (circumcision) low in subjects with an average FPR-S value of 0.43 vs. 2.14 at subjects whose analgesics were given shortly after circumcision was completed (conventional), and statistically showed significant differences with p = 0.031. Pain management in the first hours after our circumcision is considered very important to be considered and overcome because it is at this phase that the effects of local anesthetics will begin to diminish and wear off, so that if the analgesics given are inadequate because the onset of drug action has not been reached, then that's when the subject will experience acute pain.[13] Preemptive analgesia means the administration of analgesic drugs before injury due to surgery (incision) or before tissue damage occurs.[1,14] Preemptive analgesia is a clinical concept development which involves administering an analgesic regimen before the onset of the noxious stimulus, aiming to prevent nervous system (peripheral or central) sensitization to subsequent stimuli that can exacerbate postoperative pain. The most effective preemptive analgesia regimen is one that can inhibit nervous system sensitization throughout the perioperative period.[13,15,16] However, with the development of knowledge in the field of pain, the term preemptive is no longer popularly used and is replaced by the term preventive analgesia which implies the management of pain before, during and after surgery (pain and inflammation stimulus occurs).[15,17]

Pain is a problem that is often not treated adequately in half the cases of surgical procedures.[14,18] The inability to verbally communicate this experience (for example in children) does not rule out the possibility that someone does not feel pain, and everyone has the right to get appropriate treatment to relieve the pain. Pain is always subjective.[6] This painful experience can be embedded permanently in the nervous system which will strengthen the response to subsequent noxious stimuli (hyperalgesia) and ultimately, causing allodynia, a condition in which sensations that should not be painful will be responded to as painful experiences. Chronic pain will sometimes develop into conditions that cause prolonged pain after surgery. Previous experience of pain is a predictor of increased pain and the need for analgesic drugs in subsequent surgery.[6,13,16]

Ibuprofen was chosen as an analgesic in this study because this drug is a cyclo-oxygenase-1 (COX-1) inhibitor and cyclo-oxygenase-2 (COX-2) is not selective.[10,11,18] Although its anti-inflammatory properties may be weaker than other NSAIDs, ibuprofen has a stronger analgesic and antipyretic effect. This is due to the ability of ibuprofen to inhibit cyclo-oxygenase which plays a role in prostaglandin synthesis. Prostaglandin itself is a mediator that plays an important role in producing pain, inflammation, and fever.[11,18,19]

Ibuprofen is well absorbed in oral administration, with peak levels in serum achieved within 1-2 hours after oral administration. The drug quickly undergoes biotransformation with a serum half-life of around 6 hours. The drug will be eliminated within 24 hours after giving the last dose. More than 99% is bound to

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protein, extensively metabolized in the liver so that only a few are excreted in an unchanging form..[10,18] Based on the results of the study it can be seen that the pain scale in the two treatment groups as they entered the 2nd hour and so on did not show any statistically significant difference. For example, in the second hour after circumcision, the two groups showed an average FPR-S value of 0.57 vs 1.57. This is due to the effect of the drug which has started working in group B.

The results also showed the side effects. The most common side effects of the drug were nausea and dizziness in each of 10.7% subjects. However, this situation can be overcome by encouraging children to rest and lie down in the observation room. During monitoring hours 2 to 8, there were no drug side effects. The main side effects of ibuprofen are disorders of the gastrointestinal, kidney and coagulation systems. Based on clinical research data, gastrointestinal reactions that require cessation of ibuprofen use are hematemesis, peptic ulcer, severe gastric pain or vomiting with an incidence of 1.5%. Ibuprofen has the potential to increase the risk of gastrointestinal bleeding, increase the risk of gastric ulcer, kidney failure, epistaxis, apoptosis, heart failure, hyperkalemia, confusion, and bronchospasm. Other rare and ever reported side effects to include thrombocytopenia, rash, headache, dizziness, blurred vision, and some cases of toxic amblyopia, fluid retention, and edema. The effects of ibuprofen on the kidneys (similar to other NSAIDs) include acute kidney failure, interstitial nephritis, nephrotic syndrome, but this is very rare.[10,11,19]

CONCLUSION

Based on the research results obtained, it can be concluded that the use of Ibuprofen 10 mg/kg BW orally as preemptive analgesia is effective for the management of postoperative pain in children undergoing mass circumcision. The use of Ibuprofen 10 mg/kg BW orally as preemptive analgesia significantly reduces pain scale at the first postoperative hour in children undergoing mass mg/kg BW orally as preemptive analgesia significantly reduces pain scale at the first postoperative hour in children undergoing mass circumcision when compared with conventional methods.

The use of Ibuprofen 10 mg/KgBB orally as preemptive analgesia in children is safe because it does not cause harmful side effects of drugs until the 8th hour of monitoring. The most side effects that appear on the subject of this study are nausea and dizziness.

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