

Comparison between Diclofenac Sodium and Ketorolac in the Management of Post-Appendectomy Pain

NUZHAT JAHAN¹, MUHAMMAD JALIL MALIK², MUHAMMAD IMRAN³, MUHAMMAD WASEEM ANWAR⁴, SHAHID MUNIR⁵, IBRAHIM ZAFAR GONDAL⁶

¹Postgraduate Resident Surgery, Combined Military Hospital, Lahore

^{2,3}Consultant Surgeon, Combined Military Hospital, Lahore

⁴Associate Professor of Surgery, Abu Umara Medical and Dental College, Lahore

⁵Consultant Orthopaedic Surgeon, Combined Military Hospital, Lahore

⁶Senior Registrar, Combined Military Hospital, Lahore

Correspondence to Dr. Nuzhat Jahan, Email: nuz_imran@yahoo.com Cell No: 0321-5947139,

ABSTRACT

Aim: To compare the Diclofenac Sodium and ketorolac in the management of post-appendectomy pain.

Study design: Single blinded analytical comparative trial

Place and duration of study: Tertiary Care Hospital, Lahore from 01-03-2022 to 30-11-2022.

Methodology: One hundred and twenty three patients within 8-48 years who were suffering from acute appendicitis and required appendectomy were randomly selected. They were randomly divided into two groups. One was Diclofenac sodium group which had 61 cases in it and was selected to receive Diclofenac Sodium post-surgery. The other group having 62 patients was ketorolac group receiving ketorolac for pain relief. The patients received the pain killer post 30 and then 60 minutes after their surgery. The comparative results and efficacy of each pain killer was analyzed and assessed through faces pain scale.

Results: The mean age of the patients was 20.5±5.5 in diclofenac sodium and 21.3±6.1 in Ketorolac group. There were 75.4% males in former group while 62.9% in later group. The mean value of BMI was within normal range in both groups. The pain score recorded highest number of cases in Diclofenac Sodium and ketorolac group at score 02 within 30 minutes after surgery while the pain score significantly dropped in ketorolac group in 60 minutes to score 00 while it persisted highest in score 02 among patients given Diclofenac Sodium.

Conclusion: Intravenous ketorolac has advanced analgesic effect than Diclofenac Sodium with a substantial low risk involved in cases of appendectomy.

Key Words: Appendicitis, NSAIDS, Ketorolac, Diclofenac, Management.

INTRODUCTION

Acute appendicitis is a frequent condition faced by many health practitioners and needs immediate surgical procedure. Appendicitis is a medical condition in which appendix gets swollen and diseased¹. Appendectomy is a gold standard for the treatment and management of appendicitis². It can be performed either by laparoscopic procedure or by open surgery and accounts half of the medical procedures that performed in emergency room^{3,4}. These surgical methods have very low complication rate and lesser chances of mortality, infection rate, small intestine obstruction and abdominal discharge. Although lower rate of complications are associated with surgery but certain postoperative outcomes are related with appendectomy including pain, vomiting and nausea⁵.

Many therapeutic agents are used for the treatment and management of post-operative pain by using non-steroidal anti-inflammatory drugs (NSAIDs) and opioids. These medications are given to reduce pain however, certain side-effects are also associated with the use of these compounds including respiratory depression.⁶ These substances are induced in patients to achieve good pain control and minimize the chances of nausea and vomiting associated with post-operative complications⁷. NSAIDs are frequently used for pain management and inhibit inflammation by inhibiting prostaglandin production. Prostaglandin synthesis can be inhibited by halting the production of cyclooxygenase (COX)⁸.

NSAIDs have extensively used for various different purposes both on children and adults still side effects are associated with its use including cardiac effects, kidney and gastrointestinal problems.⁹ Ketorolac and diclofenac are two most widely used NSAIDs in clinical settings. Ketorolac is intravenously administered for moderate to severe pain management¹⁰. On the other hand, diclofenac has numerous valuable properties that prove substantial for pain management¹¹.

Received on 28-04-2023

Accepted on 18-10-2023

The aim of the present study was to investigate the efficacy of diclofenac sodium and ketorolac in the management of post-appendectomy pain. Results of the present study will prove beneficial for healthcare providers for better choice of drug for postoperative complication management.

MATERIALS AND METHODS

This single blinded analytical comparative trial which was conducted at Tertiary Care Hospital, Lahore. After permission from IRB, patients were enrolled within 8-48 years through attaining their informed consent. Patients who were suffering from acute appendicitis and required Appendectomy were randomly selected for this study. However those appendicitis cases which did not require surgery were excluded from the study. Any patients having allergic response to Diclofenac Sodium or ketorolac were also exclude from the study. Appendectomy was conducted under general anesthesia through standardized laparoscopic method and patients were shifted in recovery. A total of 123 patients were enrolled in the study wherein patients were randomly divided into two groups. One was Diclofenac sodium group which had 61 cases in it and was selected to receive Diclofenac Sodium post-surgery. The other group having 62 patients was ketorolac group receiving ketorolac for pain relief. Diclofenac 2mg/kg through IV in 100ml saline was given to patients as twice daily while Ketorolac 0.5mg /kg was administered intravenously as once daily. The patients received the pain killers post 30 and then 60 minutes after their surgery. The comparative results and efficacy of each pain killer was analyzed and assessed through faces pain scale; pain scoring method. All the clinical findings, demographic and clinical data was recorded on a well designed proforma. Data was entered in SPSS and analyzed through Chi square using value <0.05 as significant.

RESULTS

The mean age of the patients was 20.5±5.5 in diclofenac sodium and 21.3±6.1 in Ketorolac group. There were 75.4% males in former group while 62.9% in later group. The mean value of BMI

was within normal range in both groups. Anxiety presentation was observed in 11.4% of the cases in Diclofenac group while in 12.9% of ketorolac group (Table 1).

The pain score recorded highest number of cases in diclofenac sodium and ketorolac groups at score 02 within 30 minutes after surgery while the pain score significantly dropped in ketorolac group in 60 minutes to score 00 while it persisted highest in score 02 among patients given diclofenac sodium (Table 2).

Table 1: Clinical and demographic details of patients

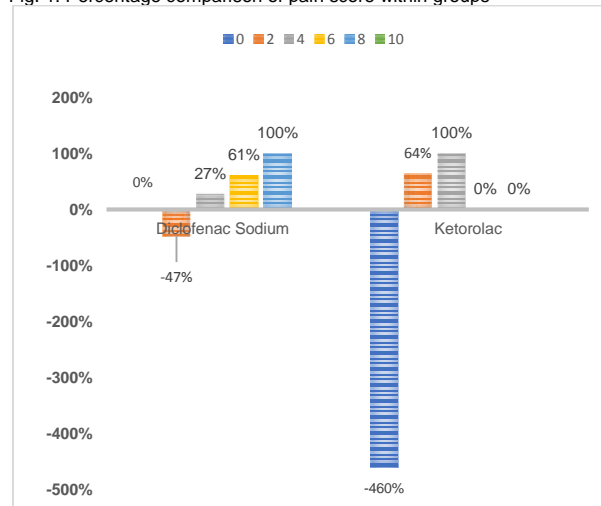
Variable	Diclofenac Sodium (n=61)	Ketorolac (n=62)	P value
Age (years)	20.5±5.5	21.3±6.1	0.76
Gender			
Males	46 (75.4%)	39 (62.9%)	0.89
Females	15 (24.5%)	21 (33.8%)	0.87
BMI	18.5±3.5	18.9 ±2.5	0.95
Anxiety	7 (11.4%)	8 (12.9%)	0.65

Table 2: Pain score comparison at 30 and 60 minutes

Pain Score	Diclofenac Sodium (n=61)	Ketorolac (n=62)	P value
Pain score post 30 min surgery			
00	-	8 (12.9%)	--
02	29 (47.5%)	48 (77.4%)	0.032
04	23 (37.75)	6 (9.6%)	0.041
06	4 (6.55%)	-	--
08	1 (1.63%)	-	--
10	-	-	--
Pain score post 60 min surgery			
00	3 (4.91%)	44 (70.9%)	0.032
02	38 (62.2%)	18 (29%)	0.041
04	17 (27.8%)	-	--
06	3 (4.91%)	-	--
08	-	-	--
10	-	-	--

Percentage variation among scores of two groups presented a highly significant difference within both groups. As there was a percentage change at score 0 to be -460% for ketorolac where as at score 02 it was -47% for diclofenac sodium and 64% for ketorolac group (Fig. 1).

Fig. 1: Percentage comparison of pain score within groups



DISCUSSION

Acute appendicitis is a common medical emergency both for children and adults. Appendectomy usually performed to treat this condition. Certain medications are required post-operatively to manage complications such as pain, nausea and vomiting. NSAIDS are widely used after appendectomy and studies have

already been published to support its usage for better outcome. Ketorolac and diclofenac have several antipyretic and pain management properties by intervening in the synthesis of prostaglandin synthesis¹²⁻¹⁴. Present study was designed for the comparison of diclofenac sodium and ketorolac in the management of post-appendectomy pain.

In the present study, demographic data represents that male were predominant than females patients. This result is in accordance with already published data which also stated that males were dominant in their studies^{15,16}. Moreover, patients had negative female history regarding appendicitis. This parameter is in contradiction with other studies in which positive family history is an important determinant in predicting chances of acute appendicitis¹⁷. This deviation might due to methodological characteristics of present study.

Ketorolac showed better efficacy and analgesic effect in contrast to diclofenac sodium after appendectomy. This result is documented in several other studies conducting in different regions of the world.¹⁸⁻²⁰ Usage of ketorolac significantly lower pain score even after few days of appendectomy. This indicates that ketorolac has higher efficacy and analgesic potency than other NSAIDS as it readily available to the body and its rapid onset of action²¹.

CONCLUSION

Intravenous ketorolac has advanced analgesic effect than diclofenac sodium with a substantial low risk involved in cases of appendectomy.

Authorship and contribution declaration: Each author of this article fulfilled following Criteria of Authorship:

1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

All authors agree to be responsible for all aspects of their research work.

Conflict of interest: None

Funding: None

REFERENCES

1. Alaadeen D, Cook M, Chwals W. Appendiceal fecalithis associated with early perforation in pediatric patients. *J Pediatr Surg* 2008; 43(5):889-92.
2. Gorter R, Eker H, Gorter-Stam M, Abis G, Acharya A, Ankersmit M. Diagnosis and management of acute appendicitis. EAES consensus development conference 2015. *Surg Endosc* 2016; 30(11):4668-90.
3. Smink D, Finkelstein J, Garcia PeñaB, Shannon M, Taylor G, Fishman S. Diagnosis of acute appendicitis in children using a clinical practice guideline. *J Pediatr Surg* 2004; 39(3):458-63.
4. Kharbanda A. A clinical decision rule to identify children at low risk for appendicitis. *Pediatrics* 2005;116(3):709-16.
5. Schwartz S, Brunnicardi F. Schwartz's manual of surgery. New York: McGraw-Hill Medical Pub. Division; 2006.
6. Sakurai M, Suleman M, Morioka N, Akça O, Sessler D. Minutesphere acupuncture does not reduce postoperative pain or morphine consumption. *Anesthesia and Analgesia*. 2003; 96(2):493-7.
7. Pal A, Saha D, Swaika S, Chatterjee S, Dawar N. Ondansetron, ramosetron, or palonosetron: Which is a better choice of antiemetic to prevent postoperative nausea and vomiting in patients undergoing laparoscopic cholecystectomy?. *Anesthesia: Essays Res*2011; 5(2):182.
8. Brunton L, Hilal-Dandan RC, Knollmann B, Goodman and Gilman's: the pharmacologicalbasicsoftherapeutics. 13th ed. McGraw-Hill Education; 2018.
9. Whalen K, Finkel RA. Panavelil T. Lippincott Illustrated Reviews: Pharmacology.6thed.WoltersKluwer; 2015.
10. Martindale The Complete Drug Reference. 36th ed. Pharmaceutical Press; 2009.
11. Purday J, Reichert C, Merrick P. Comparative effects of three doses of intravenous ketorolac on morphine emesis and analgesia for restorative dental surgery in children. *Canadian J Anaesthesia* 1996; 43(3):221-225.

12. Thagaard K, Jensen H, Raeder J. Analgesic and anti emetic effect of ketorolacvs. Betamethasone or dexamethasone after ambulatory surgery. *Acta Anaesthesiologica Scandinavica* 2007; 51(3):271-277.
13. Strom B. Parenteral ketorolac and risk of gastrointestinal and operative site bleeding. *JAMA* 1996;275(5):376.
14. Forsyth MG,Clarkson DJ, O'Boyle CP.A systematic review of the risk of postoperative bleeding with perioperativen on-steroidalanti-inflammatory drugs (NSAIDs) in plastic surgery. *Eur J Plastic Surg*2018; 41(5):505.
15. Marudanayagam R, Williams G, Rees B. Review of the pathological results of 2660 appendectomy specimens. *J Gastroenterol* 2006;41(8):745-9.
16. Drescher MJ, Marcotte S, Grant R, Staff I. Family history is a predictor for appendicitis in adults in the emergency department. *West J Emerg Med* 2012; 13(6): 468–71.
17. Gauderer MW, Crane MM, Green JA, DeCou JM, Abrams RS. Acute appendicitis in children: the importance of family history. *J Pediatr Surg.*2001;36(8):1214-7.
18. Mendel H, Guarneri K, Sundt L, Torjman M. The effects of ketorolac and fentanyl on postoperative vomiting and analgesic requirements in children undergoing strabismus surgery. *Anesthesia Analgesia* 1995; 80(6):1129-33.
19. Urday J, Reichert C, Merrick P. Comparative effects of three doses of intravenous ketorolacmorphineon emesis and analgesia for restorative dental surgery in children. *Canadian J Anaesthesia* 1996; 43(3):221-5.
20. McNicol E, Rowe E, Cooper T. Ketorolac for postoperative pain in children. *Cochrane Database SysRev*2018.
21. Kumar G, Sherif L. Acompassion of ketorolac, diclofenac and paracetamol for postoperative analgesia following abdominal hysterectomy. *J Evolution MedDentSci.*2015; 4(95):16017-20.

This article may be cited as: Jahan N, Malik MJ, Imran M, Anwar MW, Munir S, Gondal IZ: Comparison between Diclofenac Sodium and Ketorolac in the Management of Post-Appendectomy Pain. *Pak J Med Health Sci*, 2023; 17 (12): 32-34.