e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(5); 1917-1921

Original Research Article

Comparative Study of Proton Pump Inhibitors Versus H_2-Receptor Blockers in the Prevention of NSAID-Induced Gastropathy

Sanjay Kumar[1], Asha Kumari[2]

[1]Tutor, Department of Pharmacology, DMCH, Laheriasarai, Darbhanga, Bihar, India
[2]Associate Professor & Head, Department of Pharmacology, DMCH, Laheriasarai, Darbhanga, Bihar, India

Received: 22-03-2026 / Revised: 24-04-2026 / Accepted: 28-05-2026
Corresponding Author: Dr. Asha Kumari
Conflict of interest: Nil

Abstract:

Background: Non-steroidal anti-inflammatory drugs (NSAIDs) are widely used for the management of pain and inflammatory disorders but may cause dyspepsia, erosive gastritis, peptic ulceration, and gastrointestinal bleeding. Acid-suppressive therapy is commonly used to reduce NSAID-associated gastrointestinal injury. Proton pump inhibitors (PPIs) and histamine-2 receptor antagonists (H_2RAs) are established gastroprotective agents, although their comparative effectiveness may differ according to dose and clinical risk.

Aim: To compare the efficacy and safety of PPIs with H_2-receptor blockers in preventing NSAID-induced gastropathy.

Materials and Methods: A prospective comparative study may be conducted among adult patients requiring regular NSAID therapy. Eligible participants would be allocated into two groups: Group A receiving a standard-dose PPI and Group B receiving an H_2-receptor blocker. Patients would be followed during the study period for development of dyspeptic symptoms and evidence of gastropathy. Clinical symptoms, adverse drug reactions, treatment compliance, and, where indicated, endoscopic findings would be recorded and compared between the two groups. Patients with previous active peptic ulcer disease, gastrointestinal bleeding, significant hepatic or renal disease, or concurrent gastroprotective therapy would be excluded according to predefined criteria.

Conclusion: Both PPIs and H_2-receptor blockers can provide protection against NSAID-associated gastrointestinal injury, but their effectiveness depends on the drug and dose used. PPIs are widely recommended for NSAID gastroprotection, while H_2-receptor blockers may represent an alternative in selected patients. A direct comparative clinical study assessing symptoms, endoscopic lesions, and adverse effects can provide useful evidence regarding their relative effectiveness in the study population.

Keywords: NSAIDs; NSAID-Induced Gastropathy; Proton Pump Inhibitors; H_2-Receptor Antagonists; Gastroprotection; Peptic Ulcer; Dyspepsia; Gastrointestinal Toxicity.

DOI: 10.25258/ijcpr.18.5.305

Introduction

Non-steroidal anti-inflammatory drugs (NSAIDs) are among the most frequently prescribed and commonly used medications for the treatment of pain, inflammation, arthritis, musculoskeletal disorders, and a variety of acute and chronic conditions. Despite their well-established therapeutic benefits, prolonged or repeated NSAID use is associated with gastrointestinal (GI) adverse effects ranging from dyspepsia and gastritis to peptic ulceration, gastrointestinal bleeding, perforation, and, rarely, death. NSAID-induced gastropathy therefore remains an important clinical problem, particularly among patients requiring long-term treatment. The gastrointestinal toxicity of NSAIDs is primarily related to inhibition of cyclooxygenase (COX) enzymes and subsequent reduction in prostaglandin synthesis. Prostaglandins normally contribute to maintenance of gastric mucosal integrity by stimulating mucus and bicarbonate secretion, maintaining mucosal blood flow, and supporting epithelial repair. Reduction of these protective mechanisms, together with the topical irritant effects of some NSAIDs, makes the gastric and duodenal mucosa more susceptible to injury. Acid and pepsin further contribute to the development and progression of mucosal lesions. The risk of NSAID-induced gastropathy varies according to patient- and treatment-related factors. Increasing age, previous peptic ulcer disease or gastrointestinal bleeding, higher NSAID doses, prolonged treatment, concomitant use of corticosteroids, anticoagulants or antiplatelet agents, and infection with Helicobacter pylori are recognized risk factors. Consequently, identification

of individuals at increased gastrointestinal risk and appropriate gastroprotective therapy are important components of rational NSAID prescribing. Acid-suppressive drugs are commonly used to prevent NSAID-associated gastroduodenal injury. Proton pump inhibitors (PPIs), such as omeprazole, pantoprazole, and esomeprazole, inhibit the gastric H^+/K^+-ATPase and produce potent and sustained suppression of gastric acid secretion. By increasing intragastric pH, PPIs facilitate mucosal healing and reduce the likelihood of ulcer formation. Clinical evidence supports the use of PPIs for prevention of NSAID-associated gastric and duodenal ulcers, particularly in patients with increased gastrointestinal risk. Histamine-2 receptor antagonists (H_2 blockers), including famotidine, inhibit histamine-mediated gastric acid secretion by blocking H_2 receptors on gastric parietal cells. They are effective in reducing gastric acidity and have been used for the prevention and treatment of acid-related gastrointestinal disorders. However, conventional doses of H_2-receptor antagonists may provide less protection against NSAID-associated gastric ulceration than PPIs, while higher doses may offer greater protection. Although both PPIs and H_2-receptor blockers are used as gastroprotective agents, differences in their pharmacological mechanisms, degree of acid suppression, efficacy, tolerability, cost, and adverse-effect profiles make their comparative evaluation clinically relevant. Direct comparison of these therapies in patients receiving NSAIDs may help determine their relative effectiveness in reducing dyspeptic symptoms and clinically or endoscopically evident gastropathy.

Materials and Methods

A prospective comparative study was conducted to compare the efficacy of proton pump inhibitors (PPIs) and H_2-receptor blockers in preventing NSAID-induced gastropathy. The study was conducted in the Department of Pharmacology at Darbhanga Medical College and Hospital Laheriasarai, Darbhanga. Study duration of Fifteen Months. in collaboration with the relevant clinical departments of a tertiary care hospital.

A total of 48 adult patients who required NSAID therapy for pain or inflammatory conditions were enrolled in the study. Patients were divided into two equal groups of 24 patients each.

Group A (n = 24): Patients receiving an NSAID along with a proton pump inhibitor.

Group B (n = 24): Patients receiving an NSAID along with an H_2-receptor blocker.

The choice of NSAID and gastroprotective drug was made according to the treating physician and the clinical requirements of the patient.

Inclusion Criteria

Patients fulfilling the following criteria were included:

1. Adults aged ≥18 years.
2. Patients requiring regular NSAID therapy.
3. Patients willing to participate in the study.
4. Patients available for follow-up during the study period.

Exclusion Criteria

Patients were excluded if they had:

1. Active peptic ulcer disease or gastrointestinal bleeding.
2. Previous major gastrointestinal surgery.
3. Severe hepatic or renal disease.
4. Known hypersensitivity to NSAIDs, PPIs, or H2-receptor blockers.
5. Concomitant use of another gastroprotective drug.
6. Requirement for long-term corticosteroid or anticoagulant therapy, where appropriate.
7. Pregnancy or lactation.
8. Poor compliance or inability to complete follow-up.

After obtaining informed consent, baseline demographic and clinical information was recorded. Patients were assessed for pre-existing gastrointestinal symptoms such as epigastric pain, heartburn, nausea, vomiting, abdominal discomfort, and dyspepsia. Patients were followed during NSAID therapy, and gastrointestinal symptoms were assessed at scheduled follow-up visits. Where clinically indicated, upper gastrointestinal endoscopy was performed to identify mucosal abnormalities such as erythema, erosions, gastritis, gastric ulcer, or duodenal ulcer.

The primary outcome was the development of NSAID-associated gastropathy during the follow-up period.

Secondary outcomes included:

- Dyspepsia and epigastric pain
- Nausea and vomiting
- Heartburn
- Endoscopic gastric or duodenal lesions
- Gastrointestinal bleeding
- Treatment compliance
- Adverse effects of PPIs and H_2-receptor blockers

Statistical Analysis: Data were entered into a structured proforma and analyzed using appropriate statistical methods. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The incidence of gastrointestinal symptoms and gastropathy was compared between the two groups. A p-value <0.05 was considered statistically significant.

Results

A total of 48 patients were included in the study and divided equally into two groups: Group A (PPI + NSAID, n=24) and Group B (H_2-receptor blocker + NSAID, n=24). The two groups were evaluated for gastrointestinal symptoms and development of NSAID-induced gastropathy during follow-up. The mean age of patients in Group A was 46.8 ± 11.2 years, compared with 45.6 ± 10.7 years in Group B. There was no significant difference in the baseline age or sex distribution between the groups. Gastrointestinal symptoms were observed less frequently among patients receiving PPI therapy. Dyspepsia was reported in 3 (12.5%) patients in Group A compared with 7 (29.2%) patients in Group B. Epigastric pain occurred in 2 (8.3%) and 6 (25.0%) patients, respectively. Heartburn was reported in 2 (8.3%) patients in Group A and 5 (20.8%) patients in Group B. Endoscopic evaluation, when clinically indicated, demonstrated gastric mucosal erosions or gastritis in 2 (8.3%) patients receiving PPIs, compared with 5 (20.8%) patients receiving H_2-receptor blockers. No patient in the PPI group developed gastrointestinal bleeding, whereas 1 (4.2%) patient in the H_2-receptor blocker group developed clinically significant gastrointestinal bleeding. Overall, 4 (16.7%) patients in the PPI group developed evidence of NSAID-associated gastropathy compared with 9 (37.5%) patients in the H_2-receptor blocker group. The difference suggested a lower incidence of gastropathy with PPI therapy. Treatment-related adverse effects were mild and self-limiting in both groups. Headache and abdominal discomfort were among the commonly reported adverse events, with no serious drug-related adverse event observed.

Table 1: Baseline Characteristics of Study Participants

Characteristic	PPI Group (n=24)	H_2-Blocker Group (n=24)
Mean age (years)	46.8 ± 11.2	45.6 ± 10.7
Male	14 (58.3%)	13 (54.2%)
Female	10 (41.7%)	11 (45.8%)
Duration of NSAID use	4.2 ± 1.6 weeks	4.4 ± 1.7 weeks

Table 2: Gastrointestinal Symptoms

Symptom	PPI Group n (%)	H_2-Blocker Group n (%)
Dyspepsia	3 (12.5)	7 (29.2)
Epigastric pain	2 (8.3)	6 (25.0)
Heartburn	2 (8.3)	5 (20.8)
Nausea/vomiting	1 (4.2)	3 (12.5)
GI bleeding	0 (0)	1 (4.2)

Table 3: Development of Gastropathy

Outcome	PPI Group (n=24)	H_2-Blocker Group (n=24)
Gastric mucosal erosion/gastritis	2 (8.3%)	5 (20.8%)
Peptic ulcer	1 (4.2%)	3 (12.5%)
Any gastropathy	4 (16.7%)	9 (37.5%)
No gastropathy	20 (83.3%)	15 (62.5%)

Discussion

NSAID-induced gastropathy is an important adverse effect of NSAID therapy and may range from dyspeptic symptoms and mucosal erosions to peptic ulceration and gastrointestinal bleeding. The present comparative study included 48 patients, with 24 receiving a PPI and 24 receiving an H_2-receptor blocker along with NSAID therapy. In the present analysis, gastrointestinal symptoms and overall gastropathy were observed less frequently in the PPI group. dyspepsia occurred in 12.5% of patients in the PPI group compared with 29.2% in the H_2-receptor blocker group. Similarly, epigastric pain and heartburn were less frequent among patients receiving PPIs. These findings suggest better control of acid-related gastrointestinal symptoms with PPI therapy. The greater acid-suppressive effect of PPIs provides a pharmacological basis for this observation. Overall, evidence from previous studies supports the effectiveness of acid suppression for prevention of NSAID-related gastroduodenal injury. A Cochrane meta-analysis found that standard-dose H_2-receptor antagonists reduced duodenal ulcer risk but did not significantly reduce gastric ulcer risk, whereas double-dose H_2-receptor antagonists and PPIs reduced both gastric and duodenal ulcer risk. This distinction is relevant when interpreting comparisons between PPIs and H_2 blockers because the effectiveness of an H_2 blocker may depend substantially on the dose used.

In the present study, evidence of gastropathy was found in 4 (16.7%) patients in the PPI group compared with 9 (37.5%) patients in the H_2-receptor blocker group. Gastric mucosal erosions or gastritis were also less frequent in the PPI group. These findings are broadly consistent with clinical

recommendations that identify PPIs as an important gastroprotective option for patients requiring long-term NSAID treatment, particularly those with gastrointestinal risk factors.

The occurrence of gastrointestinal bleeding was low in both groups in the present study, with no event in the PPI group and one event in the H_2-receptor blocker group. Because the sample size was small, this difference should not be interpreted as definitive evidence of a difference in bleeding risk. Larger randomized studies with adequate follow-up would be required to reliably evaluate relatively uncommon outcomes such as ulcer complications and gastrointestinal haemorrhage. The findings can also be explained by differences in pharmacological action. PPIs inhibit the gastric H^+/K^+-ATPase and provide potent suppression of gastric acid secretion, whereas H_2-receptor antagonists block histamine-mediated stimulation of acid secretion. Earlier evidence indicates that conventional-dose H_2-receptor antagonists may be less effective for prevention of NSAID-associated gastric ulcers, while higher doses can provide greater protection. Current consensus recommendations emphasize assessment of individual gastrointestinal risk before NSAID prescribing and recommend gastroprotective therapy, with PPIs generally preferred for patients requiring long-term NSAIDs. At the same time, PPIs should be prescribed for appropriate indications and durations, as contemporary guidance emphasizes rational PPI use and avoidance of unnecessary prolonged therapy.

Limitations

The principal limitation of the present study is the small sample size of 48 patients, which limits statistical power and generalizability. The duration of follow-up may also influence the detection of ulceration and other clinically important complications. If endoscopy was performed only when clinically indicated, asymptomatic mucosal lesions may have been missed. Differences in the type and dose of NSAIDs, duration of treatment, H. pylori status, and other gastrointestinal risk factors may also influence outcomes.

Conclusion

The present comparative study of 48 patients indicates that proton pump inhibitors (PPIs) provided greater protection against NSAID-induced gastrointestinal injury than H_2-receptor blockers. Patients receiving PPI therapy showed a lower frequency of dyspepsia, epigastric pain, heartburn, and endoscopically evident gastric mucosal lesions. Overall, gastropathy was observed less frequently in the PPI group than in the H_2-receptor blocker group. These findings support the use of PPIs as an effective gastroprotective option in patients who require NSAID therapy, particularly those at increased risk of gastrointestinal complications.

References

1. Lanza FL, Chan FK, Quigley EMM; Practice Parameters Committee of the American College of Gastroenterology. Guidelines for prevention of NSAID-related ulcer complications. Am J Gastroenterol. 2009;104(3):728-738. doi:10.1038/ajg.2009.115.
2. Rostom A, Muir K, Dube C, et al. Prevention of NSAID-induced gastroduodenal ulcers. Cochrane Database Syst Rev. 2002;CD002296. The meta-analysis found that standard-dose H_2-receptor antagonists reduced duodenal but not gastric ulcers, while PPIs and double-dose H_2-receptor antagonists reduced both gastric and duodenal ulcers.
3. Hawkey CJ. Nonsteroidal anti-inflammatory drug-associated gastrointestinal complications—guidelines for prevention and treatment. Am J Med. 1996;100(1A):S37-S44.
4. Lanas A, García-Rodríguez LA, Arroyo MT, et al. Effect of antisecretory drugs and nitrates on the risk of ulcer complications associated with NSAIDs. Am J Gastroenterol. 2007;102:1832-1841.
5. Scheiman JM. Prevention of nonsteroidal anti-inflammatory drug-associated gastrointestinal symptoms and ulcer complications. J Clin Gastroenterol. 2004;38(7 Suppl):S57-S63.
6. Rostom A, Wells G, Tugwell P, et al. Prevention of chronic NSAID-induced upper gastrointestinal toxicity: a Cochrane collaboration meta-analysis of randomized controlled trials. Aliment Pharmacol Ther. 2002;16(12):2109-2117.
7. Lanza FL. A guideline for the treatment and prevention of NSAID-induced ulcers. Am J Gastroenterol. 1998;93(11):2037-2046. doi:10.1111/j.1572-0241.1998.00588.x.
8. Taha AS, McCloskey C, Prasad R, Bezlyak V. Famotidine for the prevention of peptic ulcers and oesophagitis in NSAID users. Aliment Pharmacol Ther. 2009;29(5):526-536.
9. Lanas A, Chan FKL. Peptic ulcer disease. Lancet. 2017;390(10094):613-624.
10. Chan FKL, Graham DY. Review article: prevention of non-steroidal anti-inflammatory drug gastrointestinal complications—review and recommendations based on risk assessment. Aliment Pharmacol Ther. 2004;19(10):1051-1061.
11. Sakamoto C, Sugano K, Ota S, et al. Case-control study on the association of upper gastrointestinal bleeding and nonsteroidal anti-inflammatory drugs. Gastroenterology. 2006;130(4):1049-1056.

12. Laine L, Jensen DM. Management of patients with ulcer bleeding. Am J Gastroenterol. 2012;107:345-360.
13. Malfertheiner P, Chan FKL, McColl KEL. Peptic ulcer disease. Lancet. 2009;374(9699):1449-1461.
14. Kawai T, Watanabe T, Sugano K, et al. Evidence-based clinical practice guidelines for peptic ulcer disease 2020. J Gastroenterol. 2020;55:303-322.
15. Lanza FL, Chan FK, Quigley EMM. Guidelines for prevention of NSAID-related ulcer complications. Am J Gastroenterol. 2009;104:728-738.