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Effectiveness of 2 Weeks Administration of Potassium Competitive Acid Blocker vs Proton Pump Inhibitor Therapy in Patients with *H. pylori* Induced Gastritis in Pakistan

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ABSTRACT

Helicobacter pylori cause major gastric and associated gastrointestinal complications, including gastritis and gastric malignancy. Latest evidence hints at the decline in the effectiveness of therapies having conventional proton pump inhibitors (PPI). Potassium competitive acid blockers (PCAB) have emerged as a potential option owing to longer and faster duration of action. However, limited data are available locally comparing PPI to PCAB-based therapies. **Objectives:** To compare and contrast the efficacy of two weeks of PCAB vs. PPI-based bismuth-containing quadruple therapy for *H. pylori* eradication. **Methods:** The quasi-experimental study conducted at the Department of Medicine, Jinnah Hospital, Lahore, recruited a total of 120 patients (60 in each group), aged 18-70 years, with confirmed *H. pylori* gastritis. Group A received Vonoprozan (PCAB) while Group B received Esomeprazole (PPI). **Results:** 86.67% of the patients achieved effectiveness in group A as compared to only 68.33% in group B, with a duration of symptoms of 8 weeks, almost similar in each group. The difference in effectiveness was statistically significant. (p=0.016). **Conclusions:** Vonoprazan (PCAB) based quadruple therapy is more effective at treating *H. pylori*-induced gastritis than Esomeprazole (PPI) containing therapies.

INTRODUCTION

Gastritis is defined as inflammation of the gastric mucosal wall, whereas gastropathy refers to damage and healing without significant inflammation [1]. Primary mechanisms involving gastritis include autoimmunity and infections with etiological agents like *Helicobacter pylori* (*H. pylori*), although some cases are idiopathic. *H. pylori* gastritis is one of the most prevalent infections involving an alarming almost 4.4 billion patients. Nigeria, Portugal, Estonia, Kazakhstan, and Pakistan have reported the highest prevalence relative to their populations, while Switzerland has the lowest. Its distribution is mainly affected by socioeconomic conditions and ethnicity [2-4]. The eradication rates for *H. pylori* gastritis have unfortunately been declining due to increased antibiotic resistance. Untreated chronic infections with *H. pylori* can cause several morbidities, including peptic ulcer disease and gastric malignancies, thereby warranting prompt and effective treatment [5]. Several antibiotic regimens have

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been tried for complete eradication of *H. pylori,* but the resistant strains have been increasing rapidly, necessitating the need for better therapeutic options [6]. Eradication regimen typically consists of a combination of an anti-secretory agent and multiple antibiotics. Triple regimen containing clarithromycin has been used conventionally as the first-line therapy, but its effectiveness has declined owing to clarithromycin-resistant strains. Multiple other options include quadruple therapy, concurrent therapy, and sequential therapy [7]. The effectiveness of an antibiotic for eliminating *H. pylori* is enhanced in less acidic environments, necessitating the use of anti-secretory agents. A pH above 5 is hence crucial. Proton pump inhibitors (PPI) provide only a short-term acid suppression as compared to potassium competitive acid blocker (PCAB), which provides a long-lasting and much faster action by inhibiting H+/K+-ATPase [8]. PCAB`s superiority to PPI in the eradication of *H. pylori* gastritis has been endorsed by Murakami *et al.* revealing a 92.7% eradication rate as compared to 75.9 % [9]. Some other studies have demonstrated similar results, including Maruyama *et al.* (95.8% v 69.6%) [10]. Further evidence hints at better eradication rates with fewer complications and shorter treatment duration with PCAB. However, due to paucity of local data, this study highlights the efficacy and safety profile of two weeks of PPI vs PCAB therapy within a bismuth-containing quadruple therapy.

Although proton pump inhibitors (PPIs) have traditionally been used as part of eradication regimens, their limited and short-term acid suppression may compromise treatment efficacy. Potassium-competitive acid blockers (PCABs) offer faster and more sustained acid inhibition and have shown superior eradication rates in international studies; however, local comparative data remain scarce. Therefore, this study aims to evaluate the efficacy and safety of two-week PPI versus PCAB therapy as part of a bismuth-containing quadruple regimen for the eradication of *H. pylori* gastritis.

METHODS

The quasi-experimental study conducted at the Department of Medicine, Jinnah Hospital, Lahore, recruited a total of 120 patients (60 in each group), aged 18-70 years, with confirmed *H. pylori* gastritis. The study duration was from August 2025 to October 2025. Patients with *H. pylori* gastritis confirmed either endoscopically or with a positive urea breath test were selected from the Department of Medicine, Jinnah Hospital, Lahore, after obtaining permission from the ethical review board (ERB 193/4/29-08-25/AIMC/JHL). A total of 120 patients were selected using consecutive random sampling and then randomly assigned to either group (60 in each group) using a computer-generated random number table to minimize selection bias. It was based on eradication rates of 92.6% (PCAB) v 75.8% (PPI) [9]. The study had 80% power with a confidence level of 95% and 5% significance level for sample size calculation. Inclusion criteria: *H. pylori* gastritis confirmed cases of both genders between 18 and 70 years of age, and no prior treatment history for *H. pylori* eradication. Exclusion criteria: Pregnant female, patients with significant comorbidities including malignancy of any kind, chronic liver or kidney disease, and Patients with drug or alcohol abuse. After informed consent, demographic data were collected, and patients were recruited on a positive urea breath test and segregated into groups A and B. Group A received Vonoprazan (PCAB) while group B was given Esomeprazole (PPI). Patients were monitored for two weeks and were given a daily medication intake chart, and pill counts were verified during the follow-up visit. It was reinforced via follow-up calls on the 5th and 10th day, resulting in no dropouts. After completion of 2 weeks, patients underwent a repeat urea breath test to confirm eradication. The same diagnostic test was used for pre and post eradication assessment to ensure consistency with a reported efficacy exceeding 95%. Data were analyzed by using SPSS version 25.0. Chi-square test was deployed to compare the effectiveness between both the groups, with p-values ≤ 0.05 being considered significant.

RESULTS

The age range for the study was from 18 to 70 years, with a mean of 56.79 ± 8.93 years. Patients of group A aged 54.58 ± 11.57 years on average, while those of group B aged 57.28 ± 10.75 years. Mean duration of symptoms ranged from 8.0 ± 3.11 weeks in group A to 8.20 ± 3.117 weeks in group B. BMI was almost similar in both groups (27.67 ± 3.57 kg/m^2 in group A, 27.33 ± 3.54 kg/m^2 in group B). The study displays the distribution of patients by different variables (Table 1).

Table 1: Distribution of Different Variables (n=120)

Characteristics		Group A (n=60)	Group B (n=60)
		Number (%)	Number (%)
Age (Years)	18-45	13 (21.67%)	08 (13.33%)
	46-70	47 (78.33%)	52 (86.67%)
Gender	Male	35 (58.33%)	33 (55.0%)
	Female	25 (41.67%)	27 (45.0%)
BMI (kg/m^2)	≤25	21 (35.0%)	23 (38.33%)
	>25	39 (65.0%)	37 (61.67%)
Residence	Rural	36 (60.0%)	33 (55.0%)
	Urban	24 (40.0%)	27 (45.0%)
Duration of Symptoms (Weeks)	≤8	38 (63.33%)	47 (78.33%)
	>8	22 (36.67%)	13 (21.67%)

At the end of two weeks of treatment, 52 patients (86.67%) in group A (PCAB) and 41 patients (68.33%) in group B (PPI) demonstrated effectiveness. The p-value was 0.016 (Table 2).

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Table 2: Comparison of Effectiveness (n=120)

Variable	Group A (n=60)	Group A (n=60)	Group B (n=60)	Group B (n=60)	p-value
	Yes	No	Yes	No	
Effectiveness	52 (86.67%)	08 (13.33%)	41 (68.33%)	19 (31.67%)	0.016

Stratification of effectiveness by age, gender, BMI, duration of symptoms, and residence is displayed (Table 3).

Table 3: Stratification of Effectiveness with Respect to Age, Gender, BMI, Duration of Symptoms, and Residence

Effectiveness		Group A (n=60)	Group A (n=60)	Group B (n=60)	Group B (n=60)	p-value
		Yes	No	Yes	No	
Age (Years)	18-45	12 (92.31%)	01 (7.69%)	05 (62.50%)	03 (37.50%)	0.091
	46-70	40 (85.11%)	07 (14.89%)	36 (69.23%)	16 (30.77%)	0.062
Gender	Male	32 (91.43%)	03 (8.57%)	23 (69.70%)	10 (30.30%)	0.023
	Female	20 (80.0%)	05 920.0%)	18 (66.67%)	09 (33.33%)	0.279
BMI (kg/m^2)	≤25	20 (95.24%)	01 (4.76%)	18 (78.26%)	05 (21.74%)	0.101
	>25	32 (82.05%)	07 (17.95%)	23 (62.16%)	14 (37.84%)	0.053
Residence	Rural	33 (91.67%)	03 (8.33%)	25 (75.76%)	08 (24.24%)	0.071
	Urban	19 (79.17%)	05 (20.83%)	16 (59.26%)	11 (40.74%)	0.126
Duration of Symptoms (Weeks)	≤8	31 (81.58%)	07 (18.42%)	37 (78.72%)	10 (21.28%)	0.743
	>8	21 (95.45%)	01 (4.55%)	04 (30.77%)	09 (69.23%)	0.001

In group A, 3 of 60 patients (5%) experienced mild adverse effects, including nausea, vomiting, diarrhea, or epigastric discomfort, while 5 patients (8%) in the PPI-containing group reported similar symptoms. 1 patient in the PCAB group experienced moderate epigastric pain. Symptomatic relief medications were provided, and patients were closely monitored for symptom progression. No adverse events necessitated treatment discontinuation in either group.

DISCUSSION

P-CABs are quickly absorbed, reaching maximum plasma concentration within 2 hours of oral administration. Their plasma half-life is almost 9 hours, compared to only about 2 hours for regular PPIs. Therefore, P-CABs are available longer and provide lasting acid-blocking action [11]. This study aimed to assess the efficacy of two weeks of PCAB administration vs PPI and bismuth-containing quadruple therapy (PPI/PCAB plus bismuth subsalicylate plus metronidazole plus tetracycline) in patients with gastritis caused by *Helicobacter pylori*. This study evaluated treatment outcomes among treatment-naïve patients. After two weeks of therapy, 52 patients (86.67%) in the PCAB group and 41 patients (68.33%) in the PPI group achieved eradication, with a statistically significant p-value of 0.016. In a similar Japanese study, the P-CAB group exhibited a higher eradication rate (89.6%) compared to the PPI group (71.9%) in the ITT analysis [12]. Yamada *et al.* observed that treatment-naïve *H. pylori* patients who received P-CABs demonstrated a higher eradication rate than those who received PPIs (85.7% vs. 73%, p-value>0.001)[13]. Matsumoto *et al.* found that when P-CABs were added along with a second-line eradication regimen in two groups of patients who had already been treated, the eradication rate was 76.1% [12]. When PPIs were introduced in a second-line regimen, the cure rate dropped drastically to 40.2% [12]. According to ITT analysis, Yamada *et al.* found that PCABs eliminated *H. pylori* in 89.4% of treatment-experienced patients [12], whereas in PP analysis, they eradicated it in 96.7% of patients. According to ITT analysis, PPIs resolved the problem in 89.9% of patients, and according to PP analysis, they did so in 92.8% of patients [13]. Data from the first Phase were reported by Chey *et al.* to demonstrate the safety profile and effectiveness of PCABs vs PPI-based therapy for *H. pylori* eradication. They randomly assigned 1,064 adults with an untreated *H. pylori* infection to either vonoprazan dual therapy (20 mg vonoprazan twice daily with 1 g amoxicillin thrice daily) or triple therapy (20 mg vonoprazan or 30 mg lansoprazole, 1 g amoxicillin, and 500 mg clarithromycin) for 14 days. Eradication rates for vonoprazan triple therapy, dual therapy, and lansoprazole triple therapy were 65.8%, 69.6%, and 31.9%, respectively [14]. Collectively, the findings from this study and Japanese research indicate that P-CAB therapy groups tend to achieve higher eradication rates than PPI-based groups. As for treatment-related adverse effects that the participants in this trial had, one of the 60 participants who received vonoprazan-based treatments had a significant event: moderate to severe stomach distress and vomiting that required hospitalization. Three other patients, on the other hand, had mild side effects such as mild epigastric discomfort, nausea, vomiting, and diarrhea. Similar mild adverse effects were observed in 5 patients from the PPI-based therapy group. 34.1% of patients receiving vonoprazan-based regimens had treatment-related adverse events, according to Chey *et al.* [14]. This was the case for 34.5% of

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the lansoprazole triple therapy group, as well as the vonoprazan triple and dual therapy groups. Of the cases, 1.7%, 1.4%, and 0.9% experienced significant treatment-emergent adverse events. The Japanese study reported higher rates of complete *H. pylori* eradication than this study. This could be because the patients in Japan and Egypt are of different races. The Japanese experiments were done in 2016, but the present study was done in 2025. Over the period of time, more deadly and resistant strains of *H. pylori* might have evolved. Culture methods indicate that only 50% or less of the *H. pylori* population in Egypt harbors strains resistant to clarithromycin, according to Alboraie *et al.* [15]. Another description for the disparity in eradication rates between the current and the Japanese studies is the use of different medications in the management. Amoxicillin and VPZ together, known as VPZ dual therapy, have surfaced as a potential first-line treatment for *H. pylori* gastritis. Furthermore, one RCT contrasted a standard 14-day bismuth-based quadruple therapy with a 10-day VPZ-amoxicillin dual therapy. There were fewer side effects, and eradication rates were on par with or better than those of the combined therapy [16]. The effectiveness of this treatment compared with conventional methods for eliminating *H. pylori* was examined in a systematic review and meta-analysis. The combination treatment of VPZ and amoxicillin achieved eradication in 85.0% cases by ITT and 90.0% by PP analysis, based on combined data from 15 studies including 4,568 patients. Interestingly, this treatment outperformed PPI-containing triple therapy, demonstrating its primacy [17]. A meta-analysis of both VPZ-amoxicillin dual therapy and bismuth-containing quadruple therapy found that the VPZ-based regimen had equivalent rates of bacterial killing and a better safety profile. All of these results show that VPZ containing dual therapy is a good alternative for first-line eradication of *H. pylori* since it is more effective and relatively safer [18-20].

The study had a relatively small sample size and short follow-up, limiting assessment of long-term eradication durability and late relapse. Additionally, antibiotic resistance patterns and bacterial genotyping were not evaluated, which may have influenced eradication outcomes. Larger multicenter trials incorporating antimicrobial resistance testing are recommended to optimize PCAB-based regimens for first-line *H. pylori* eradication.

CONCLUSIONS

Bismuth quadruple therapy containing a PCAB results in a higher eradication rate of *H. pylori* gastritis as compared to a PPI-based regimen. Long-lasting acid suppression attained by PCAB contributes to improved antibiotic effectiveness and better treatment outcomes. Larger multicenter, double-blinded randomized controlled trials in divergent populations are recommended. Evidence from local population data and antibiotic resistance patterns will help clinicians in the selection of an appropriate regimen for complete eradication of *H. pylori* gastritis.

Authors' Contribution

Conceptualization: MAI, SA
Methodology: MAI, UT, SA
Formal analysis: MAI, KMK, AS, UT, SA, NR
Writing and Drafting: MAI, KMK, AS, UT, SA, SK
Review and Editing: MAI, KMK, AS, UT, SA, NR, SK

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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