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ORIGINAL ARTICLE

P-Cab Dependent Dual Therapy Versus PPI Dependent Triple Therapy Against H Pylori Infection in Acid Peptic Disease

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ABSTRACT

Background: H Pylori infection is associated with multiple conditions of gastroenterology like gastritis, mucosal ulcer and dyspepsia. Due to emergence of resistance against conventional therapeutic agents, new treatment regimens have been introduced and are superior to the older one.

Objective; Compare P-CAB dependent dual therapy vs PPI dependent triple therapy against H. Pylori infection

Methodology: Sample size was 400 patients, segregated into P-CAB -group and PPI-group randomly. P-CAB -group was treated with 1gm amoxicillin 8 hourly and Vonoprazole 20-mg 12 hourly daily for 4 weeks. PPI-group was treated with 1-gm amoxicillin, 500-mg clarithromycin and 20-mg Lansoprazole 12 hourly daily for 4 weeks. After four weeks of therapy, stool antigen test for H Pylori was performed to confirm H Pylori eradication. Patient with negative stool antigen test for H Pylori was labeled recovered and vice versa.

Collected data was analyzed using window application SPSS (statistical package of social Sciences software). p value under 0.05 was considered significant.

Results: Among P-CAB -group, 89 % patients become free from H.Pylori, while 11% patients could not recover from H.Pylori infection in spite of the same treatment. Similarly 69.5% patients of PPI-group recovered and 30.5% patients could not get rid of H.Pylori infection.

Conclusion: It is concluded that P-CAB dependent dual therapy is more effective than PPIs dependent triple therapy against H.Pylori infection.

Keywords: Lansoprazole, Proton Pump inhibitor, Potassium-competitive acid blocker, Vonoprazan, H. Pylori infection.

INTRODUCTION

Helicobacter pylori is notorious for involving gastric mucosa and leads to H. Pyloric gastritis (1). H.pylori induced chronic inflammation in gastric mucosa is associated with atrophic non-invasive gastritis, acid peptic disease, gastric adeno-carcinoma and gastric mucosa associated lymphoid tissue lymphoma (2,3,4). Treatment of H. Pylori infection found helpful to prevent development of all above named disorders. Nowadays resilient strains of H. Pylori have been reported that are resistant to conventional chemotherapeutic agents and responsible for failure of H. Pylori treatment regimens (5). To counter the resistance of H.Pylori infection, multiple drugs are used in different combination like standard bismuth quadruple therapy, rifabutin-based triple therapy and standard triple therapy. These regimens are used for ten to fourteen days (6,7). PPIs are the essential part of all H.Pylori treatment regimens. A new group of acid inhibiters P-CAB (potassium-competitive acid blocker) is found more effective than PPI in multiple trails.

P-CABs produce its effect by competitively inhibiting the binding of potassium ions to H^+- K^+-ATPase (Proton pump) located at gastric parietal cells involve in gastric acid secretion (8).

P-CABs are superior to PPI due to its better kinetics and stability in acidic environment. Unlike PPI, P-CABs are not pro-drug that dependents upon acidic environment for its activation (9). These features make P-CABs an ideal drug that inhibits gastric acid secretion more effectively and for much longer duration than PPIs (10). Multiple clinical trials showed more than 24-hour inhibition of proton pumps of gastric parital cells with mean intra-gastric pH greater than six by P-CABs. (11,12).

In developed countries, most prescribed triple regimen against H.Pylori infection is PPI//clarithromycin / amoxicillin or vonoprazan/amoxicillin/clarithromycin as first-line therapy and PPI/amoxicillin/metronidazole or vonoprazan /amoxicillin/metronidazole as second-line therapy (13). P-CAB showed to have a greater eradication rate compared to PPIs in almost all studies (14).

Objective: Compare P-CAB dependent dual therapy vs PPI dependent triple therapy against H. Pylori infection.

MATERIAL & METHODS

It was a randomized study conducted in outdoor patient clinic, medicine department, Farooq trust hospital, Faisalabad from July, 2021 to February, 2022. Patients were inducted in study by random sampling technique after taking their informed consent. As per inclusion criteria all patients fall between 18 to 65 years of age group presented with symptoms of acid peptic disease along with positive fecal antigen test for H. Pylori were included in the study.

As per exclusion criteria any patient with history of prior gastric surgery, hypersensitivity reaction to drugs used during study, administration of antibiotics, anti-inflammatory corticosteroids, PPIs or NSAID in last 14 days. Pregnant or lactating female were also excluded. Sample size was 400 patients, segregated into P-CAB -group and PPI-group randomly. P-CAB -group was treated with 1gm amoxicillin 8 hourly and vonoprazan 20 mg 12 hourly daily per oral for 4 weeks. PPI-group was treated with 1gm amoxicillin, 500mg clarithromycin and 20 mg lansoprazole twice daily per oral for 4 weeks. After four weeks of therapy, stool antigen test for H Pylori was performed to confirm H Pylori eradication. Patient with negative stool antigen test for H Pylori was labeled recovered and vice versa.

Statistical Analysis: Collected data was analyzed using window application SPSS (statistical package of social Sciences software). p value under 0.05 was considered significant.

RESULTS

Age distribution among study groups: Mean age of study population was 36.04+11.01 years. Mean age observed in patients of P-CAB -group was 37.78 + 10.84, while that in PPI-group was 32.23 +15.53.

Table 1: Age distribution among study groups **(years)**

Age	P-CAB -group	PPI-group	Total
Mean+SD	37.78 + 10.84	32.23 +15.53	36.04+11.01

Gender distribution among study groups: Gender distribution among study population was 59% females and 41% males. Gender distribution among P-CAB -group was 57% females and

43% males whereas in PPI-group females were 61% and males were 39%. In both groups female gender was dominating.

Table 2: Gender distribution among study groups

Gender	P-CAB -group		PPI-group		Total	
	No of patients	%	No of patients	%	No of patients	%
Male	86	43	78	39	164	41
Female	114	57	122	61	236	59
Total	200	100	200	100	400	100

Comparison of P-CAB dependent therapy vs PPI dependent therapy against H Pylori infection: Total 400 patients were observed in this study. At the end of four weeks 317 patients showed negative fecal antigen test for H. Pylori while 83 patients showed positive fecal antigen test for H. Pylori. Among 200 patients of P-CAB -group, 178 (89%) patients become free from H.Pylori after vonoprazan treatment, while 22 (11%) patients could not recover from H.Pylori infection in spite of the same treatment evident by report of fecal antigen test for H. Pylori. Similarly out of 200 patients of PPI-group, 139(69.5%) patients completely recovered from H.Pylori after PPI intervention, while 61 (30.5%) patients could not get rid of H.Pylori infection in spite of the getting same regimen evident by results of fecal antigen test for H. Pylori.

Comparison of P-CAB dependent therapy and PPI dependent therapy for H. Pylori extermination showed that P-CAB dependent therapy is superior to PPI dependent therapy (p-Value <0.05)

Table 3: Efficacy of P-CAB dependent therapy vs PPI dependent therapy against pylori infection.

Efficacy	P-CAB -group		PPI-group		Total	
	No of patients	%	No of patients	%	No of patients	%
Patient Recovered.	178	89	139	69.5	317	79.25
Patient Failed to Recover	22	11	61	30.5	83	20.75
Total	200	100	200	100	400	100
p-value <0.05						

DISCUSSION

The Gender distribution among both groups showed that females are more prone to develop acid peptic disease than males. In past this disease was more common among male gender. But now the distribution is totally reversed. Many researchers have documented this shift in incidence of disease from male to female globally (15).

In P-CAB -group success rate was 89% and failure rate was 11% only. While in PPI-group treatment success rate was 69.5% and failure rate was 30.5%. The P-CAB -group shares significantly higher success rate than PPI-group. So the P-CAB is a preferred choice over PPI for H. Pylori treatment in native population. The H-Pylori treatment failure is due to the emergence of resilient strains of H. Pylori that are not eradicated by conventional therapeutic regimens (16). The pH of gastric environment plays key role for effectiveness of H-Pylori treatment regimen. At neutral gastric pH (6-8) the H-Pylori entered into dividing and replicating phase of cell division that make it an easy target for antibacterial agents, as antibiotics mainly target rapidly growing bacteria than non-replicating one (17). Parallel to this, handerson hasalbach equation demonstrates that gastric pH also alter the kinetics of drug (18). The PPIs are prodrug that are activated in canaliculi of parital cells, more over the PPIs are acid labile. The PPI undergo CYP2C19-dependent metabolism. Remember CYP2C19 gene shows polymorphism hence the efficacy of PPIs is greatly differ among different races. Asians are observed as moderate to fast metabolizers of PPI (19). Compared to PPIs, P-CAB is not a prodrug that needs activation. Neither P-CAB is metabolized by CYP450 enzyme system nor alters the CYP-dependent metabolism of other drugs (20). In addition to these, studies suggest that gastric acid inhibition by P-CAB is much stronger and persistent than PPIs (21). Hence the P-CAB - dependent H-pylori treatment regimen improved the eradication of H-Pylori infection.

CONCLUSION

It is concluded that P-CAB dependent dual therapy is more effective than PPIs dependent triple therapy against H.Pylori infection.

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