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Comparison Between One Week Versus Two Weeks Vonoprazan and High Dose Amoxicillin Dual Therapy for Eradication of Helicobacter Pylori in Egyptian Patients

Asmaa Hussien Abo Elkasem[1], Hossam Mahmoud Sabry Ghoniem[1], Ali Mohammed Abdel Fattah[1], Al Zahraa Mohammed Fahmy[1*]

[1] *Tropical Medicine Department, Faculty of Medicine Bani-Suef University*

Article Info

Corresponding Author:
Asmaa Hussien Abo Elkasem
elmelegyasmas@gmail.com

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Abstract

Background: Helicobacter pylori infection is highly prevalent and associated with several gastrointestinal and extra-gastrointestinal diseases. Traditional eradication regimens face increasing antibiotic resistance, particularly to clarithromycin. Vonoprazan, a novel potassium-competitive acid blocker, offers promising acid suppression with potential to enhance eradication when combined with amoxicillin. This study aimed to compare the efficacy and safety of a 1-week versus 2-week vonoprazan and high-dose amoxicillin dual therapy in Egyptian patients with *H. pylori* infection. **Methods**: This cohort comparative observational study was conducted at Bani-Suef University Hospital over six months, enrolling 60 adult patients with confirmed *H. pylori* infection. Patients were randomized into two groups: Group A received vonoprazan 20 mg twice daily and amoxicillin 1 g three times daily for 14 days, while Group B received the same regimen for 7 days. Eradication was confirmed by stool antigen testing two weeks'

post-therapy. Adverse effects and patient compliance were monitored. **Results**: The eradication rate was 80% in Group A and 76.7% in Group B, with no statistically significant difference ($p > 0.05$). Reported side effects were mild and similar in both groups (20% vs. 23.3%, $p > 0.05$), with no severe adverse events. Multivariate analysis revealed no significant predictors of treatment response. **Conclusion**: One-week and two-week dual therapies with vonoprazan and high-dose amoxicillin yielded comparable eradication rates and tolerability in Egyptian patients. Shorter therapy may be a viable, cost-effective alternative in clinical practice.

1. Introduction:

The Helicobacter pylori infection affects around half of the world's population **[1].** Inflammation of the stomach caused by H. pylori is linked to a number of diseases, including peptic ulcer, gastric cancer, mucosa-associated lymphoid tissue (MALT) lymphoma and a number of other conditions, such as iron deficiency, vitamin B12 deficiency, and idiopathic thrombocytopenia **[2].**

The spread of H. pylori can occur directly from one person to another person or indirectly from an infected person to the environment. Moreover, H. pylori DNA has been detected in human faces, saliva, and supragingival plaque, suggesting a fecal-oral and oral-oral route of transmission. High-pressure profession, water supplies, smoking, dietary habits have been associated with a higher risk of H. pylori acquistation. It has also been suggested that gut microbiota may contribute to intra-familial transmission of H. pylori **[3].**

The eradication of H. pylori has been a challenge for us and requires constant innovation, from the initial triple therapy to non-bismuth quadruple to bismuth quadruple, and the H pylori eradication rate has been increasing **[4].**

At the same time, numerous scholars believe that the use of 2 or 3 or more antibiotics increases resistance, with clarithromycin having the highest resistance and amoxicillin

having the lowest resistance, 93.72% and 0.21%, respectively **[5].**

Therefore, there is an urgent need to break this dilemma and find a regimen with higher eradication rate, better compliance, and higher safety to help the clinic in effective treatment and bring health to patients. Currently, a new acid inhibitor, vonoprazan, is being used as a potassium competitive acid blocker, which acts as a drug prototype without acid activation and has a faster onset of action than traditional proton pump inhibitors or H2 receptor blockers, with a stronger effect of raising PH and a longer half-life **[6].** Efficient and safe regimen with vonoprazan combined with amoxicillin is still being explored, and main steam studies have found that 7-day or 10-day therapy does not achieve satisfactory eradication **[7].**

The aim of this study was to evaluate the eradication rate, 7 days versus 14 days of treatment with vonoprazan in combination with high dose amoxicillin, and to analyze the factors affecting the eradication rate.

2. Patients and methods:

Type of the study: A cohort comparative observational study.

Period of the study: Six months between January 2024 and June 2024.

Site of the study: The study was conducted in Bani-Suef University hospital. The patients were collected from the gastroenterology clinic of endemic medicine department.

Ethics: This study was performed in compliance with Helsinki Deceleration after approval of the research Ethical committee of Bani-Suef University Hospitals with a written informed consent was obtained from all patients. Only patients fulfilling the inclusion criteria were included in the study.

Sample size: 60 Egyptian patients who have a diagnosis of H. pylori infection by positive H. pylori stool antigen test or positive histopathology for H. pylori in endoscopic biopsy were included in this study. This calculator used the following formula for the sample size:

$n = N*X / (X + N -1)$

$X = Z\alpha /22p(1-p) / MOE2$ and $Z\alpha/2$ is the critical value of the normal distribution at $\alpha/2$ (e.g. for a confidence level of 95%, α is 0.05 and the critical value is 1.96), MOE is the margin of error, p is the sample proportion, and N is the population size. Note that a finite population correction has been applied to the sample.

Selection and Evaluation of the patient:

Selection of patients:

The following types of patients were tested for H. pylori infection either by stool antigen test or histopathology of gastric biopsies (if endoscopy indicated) and those with positive tests were treated and included in the study: Patients with undiagnosed dyspepsia, Patients with peptic ulcer disease whether complicated or not, Patients who are on maintenance therapy by anti-platelets drug or on long term use of nonsteroidal anti-inflammatory drugs and Patients with unexplained iron deficiency anemia or idiopathic thrombocytopenic purpura.

Inclusion criteria: Age more than 18 years, Positive test for H. pylori infection either by histopathology or H. pylori stool antigen test and Informed consent to be included in the study.

Exclusion criteria: Age less than 18 years, Pregnancy or lactation, Gastric malignancy, Previous therapy for H. pylori, Patients with known allergy to penicillin and Patients with severe comorbidities.

Clinical evaluation:

The following variables were recorded: Age, sex, BMI, comorbidities, alcohol consumption, place of residence and educational qualifications.

Patient grouping:

Patients were divided into 2 groups: Group A (30 patients): patients received vonoprazan (20 mg), bid + amoxicillin (1g), tid, for 14 days and **Group B** (30 patients): patients received vonoprazan (20mg), bid + amoxicillin (1g), tid, for 7 days.

Follow up of patient during and after treatment:

During the treatment period, all subjects received instructions and were asked to record their adverse reactions and compliance with the medication.

On day 14 and 7 of drug administration, the investigators conducted follow-up through telephone and microphone calls to determine adverse effects and compliance. In addition, H. pylori antigen in stool 2 weeks after end of treatment was done to assess the treatment results with the following precautions; absence of diarrhea preceding 48 hours & absence of antibiotics, PPI, anti-secretory drug intake on the preceding 2 weeks. A negative result was considered as successful eradication treatment, while a positive result was considered as failure of treatment.

Statistics:

The data has been coded to fit the program of statistical analysis (SPSS) Statistical package for special sciences (SPSS Inc., Chicago, IL, USA) version 22 under windows 10.

Description of qualitative variables by frequency and percentage and description of quantitative variables in the form of mean and standard deviation (mean ± SD) were used. Chi-square (x2) test was used for comparison of qualitative variables. Comparison between quantitative variables was carried by using: t-test. Correlation between variable using the univariate and multivariate analyses were used to identify factors associated with treatment response in the different groups using the binary logistic regression analysis. P-value was considered significant when <0.05 and highly significant when <0.001 is highly significant (HS).

3. Results:

Table 1 illustrated that there was no statistical significant difference with p-value >0.05 between two treatment regimens as regards age and sex distribution, BMI, residence, educational level, smoking and comorbidities.

Table (1): Comparisons of patients' characteristics in different study groups.

Variables	Group A (N=30)		Group B (N=30)		P-value	Sig.
	Mean	SD	Mean	SD		
Age (years)	30.7	8.3	27.6	8.1	0.15	NS
BMI (kg/m^2)	21.6	2	22.2	2.3	0.34	NS
Sex	**No.**	**%**	**No.**	**%**		
Male	25	83.3%	20	66.7%	0.23	NS
Female	5	16.7%	10	33.3%		
Residence						
Rural	18	60%	20	66.7%	0.78	NS
Urban	12	40%	10	33.3%		
Educational level						
Low	10	33.3%	8	26.7%	0.83	NS
Intermediate	8	26.7%	8	26.7%		
High	12	40%	14	46.7%		
Smoking						
Smoker	4	13.3%	6	20%	0.37	NS
Non smoker	26	86.7%	24	80%		
Comorbidities						
Yes	0	0%	1	3.3%	0.99	NS
No	30	100%	29	96.7%		

Table 2 illustrated that there was no statistical significant difference with p-value >0.05 between two treatment regimens as regards response rate.

Table (2): Comparisons of response in different study groups.

Response	Group A (N=30)		Group B (N=30)		P-value	Sig.
	No.	%	No.	%		
Response	24	80%	23	76.7%	0.99	NS
No Response	6	20%	7	23.3%		

Table 3 illustrated that was no statistical significant difference with p-value >0.05 between two treatment regimens as regard side effects.

Table (3): comparisons of treatment side effect in different study groups.

variables	Group A (N=30)		Group B (N=30)		P-value	Sig.
	No.	%	No.	%		
NO	24	80%	23	76.7%	0.99	NS
Yes	6	20%	7	23.3%		
Types of side effects						
Nausea	3	25%	3	30%	0.8	NS
Diarrhea	4	33.3%	4	40%		
Abdominal pain	4	33.3%	3	30%		
Constipation	1	8.4%	0	0%		

The multivariate logistic regression model analysis illustrated that there were no statistical significance predictors with p-value <0.05 to response to treatment (Table 4).

Table (4): logistic regression analysis to determine the predictors of response among study cases.

Variables	B	S.E.	Wald	Sig.	Exp(B)
Group	0.262	0.794	0.109	0.741	1.299
Age	0.032	0.051	0.407	0.524	1.033
Sex(1)	-1.654	1.397	1.401	0.236	0.191
BMI	-0.201	0.243	0.686	0.408	0.818
Residence(1)	20.135	8299.456	0.000	0.998	555336786.318
Education level	----	----	0.590	0.745	----
Education middle level	0.922	1.348	0.468	0.494	2.514
Education high level	0.427	1.298	0.108	0.742	1.533
Smoking	-0.574	1.476	0.151	0.697	0.563
Comorbidity	-21.630	40192.970	0.000	1.000	0.000
Constant	-16.978	8299.457	0.000	0.998	0.000
Side effect	0.778	0.607	1.641	0.20	2.176

4. Discussion:

In our research, the proportion of male patients is much larger than that of female patients (83.3%). These findings are comparable to those of research by **Yang, et al. [8]**, whereas those of a study by **Sue S, et al. [9]** revealed that more female patients than male patients had H. pylori infection.

According to the findings of our research, H. pylori infection is more prevalent in rural setting; 60 percent of patients in group A and 66.7 percent of patients in group B who tested positive for H. pylori in our investigations were inhabitants of rural areas, whereas 40 percent of patients in group A and 33.3 percent of patients in group B were residents of urban areas. Our findings were in line with the study **Şeyda T [10],** which discovered that residing in a rural or suburban location was substantially related to H. pylori positivity in comparison to living in an urban environment.

This study revealed that there was no statistically significant difference between the two treatment regimens as regards response to treatment, with percentage of response was 80% among patients received vonoprazan and high dose of amoxicillin for one week and percentage of response was 76.7% among patients received the same regimen for two weeks.

Near results were reported by the study of **Yang, et al [8],** who investigated efficacy of vonoprazan combined with amoxicillin dual regimen for the eradication of helicobacter pylori, According to this study, the eradication rate of vonoprazan combined with high-dose amoxicillin in group A and B was similar, without statistical difference, and both were better than the current mainstream regimen: Quadruple therapy, the study showed the combination of high dose amoxicillin and vonoprazan for 10 days was more effective, less expensive to treat and safer.

Our study revealed that smoking does not affect response to treatment. **Yang et al. [8]** showed that smoking leads to a further decrease in the pH value in the stomach. Secondly, nicotine also reduces the blood flow to the gastric mucosa, reducing the bactericidal effect of antibiotics. At the same time, it is difficult for smoking patients to quit smoking, which makes it impossible to quit smoking during the treatment period and makes it difficult to eradicate H. pylori.

In our study, BMI does not affect response to treatment in both regimens. **Furuta T et al, [11]** and Eto H (2021) have reported that the eradication regimens containing VPZ have a low adverse reaction rate and fewer severe adverse events, and the occurrence of adverse effects may be related to body mass index (BMI) and gender.

As regards the side effects of the drugs, 6 (20%) patients in the group A and 7 (23.3%) in group B reported side effects, in group A in the form of nausea (3 patients), diarrhea (4 patients), abdominal pain (4 patients), and constipation (1 patient). In the same way, in group B in the form of nausea (3 patients), diarrhea (4 patients), and abdominal pain (3 patients). There was no statistically significant difference with a p-value >0.05 between the two treatment regimens as regards side effects.

Lyu et al. [12] meta-analysis comparing the safety and effectiveness of vonoprazan-based triple treatment to proton pump inhibitor-based triple therapy for getting rid of Helicobacter pylori agreed with our results. They discovered that the total incidence of adverse events in the treatment based on vonoprazan was 32.7 percent, whereas the

incidence of adverse events in the therapy based on PPIs was 40.5 percent. In addition to that, they investigated the frequency of two typical unpleasant effects, namely diarrhea and dysgeusia. There was no discernible difference between the two treatments (diarrhea occurred in 11.6 percent of patients as opposed to 18.4 percent; dysguesia occurred in 5.7 percent of patients as opposed to 4.8 percent; p >0.05.

Age, sex, residence, smoking, co-morbidities were factors not affecting response to treatment in both groups.

Peña-Galo et al. [13] reported that female gender and rural residency are variables related to H. pylori eradication failure, which in contrast to our findings.

Choi et al. [14] investigated Triple therapy based on tegoprazan, a new potassium-competitive acid blocker, for treatment of Helicobacter pylori infection and found that multivariate logistic regression analysis showed that sex, age, smoking, CYP2C19 genotype, and type of acid blocker did not significantly affect the eradication rate. However, clarithromycin resistance had a significant negative impact (odds ratio, 0.04; 95 percent CI, 0.01 to 0.19; p 0.001).

5. Conclusion:

There is no significant difference in eradication rate between using vonoprazan and high dose of amoxicillin dual therapy for one week compared to two weeks in eradication of H. pylori in Egyptian population.

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