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**ORIGINAL ARTICLE**

# Antimicrobial Activity of Moxifloxacin 4th Generation Quinolones Against H-Pylori in Tertiary Care Hospital Peshawar

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## ABSTRACT

**Objective:** The aim of current study was to evaluate effectiveness of moxifloxacin 4th generation quinolones against patients of H-pylori infection admitted in a tertiary care hospital Peshawar.

**Study Design:**Observational study

**Place and Duration:** This study was carried out at Khyber Teaching Hospital, Peshawar from December 2021 to February 2022

**Methods:** There were 180 patients of both genders had age 18-55 years with H-pylori infection were included. After obtaining informed written consent detailed demographics of all cases were recorded. Patients were equally divided in two groups. Group I received 400mg moxifloxacin for 6-days and group II received moxifloxacin for 12-days. All the patients received 1000mg amoxicillin and lansoprazole 30 mg twice day. Posttreatment results were compared in terms of eradication rate and complications among both groups.

**Results:**We found that 105 (58.3%) patients were males and 75 (41.7%) patients were females. Mean age of the patients was 47.6±11.74 years and had mean BMI 25.8±12.34 kg/m$^2$. Majority of the patients 98 (54.4%) were smokers. Most common comorbidity was hypertension found in 62 (34.4%) cases, diabetes mellitus in 42 (23.3%) cases, chronic pulmonary disease in 28 (15.6%) and ischemic heart disease in 13 (7.2%) cases. We found that eradication rate among cases of group I was lower found in 59 (65.6%) cases compared to group II found in 80 (88.9%) cases with p value <0.005. Most common complications were diarrhea, nausea, abdominal pain and dizziness but their frequency was higher in group II but difference was insignificant.

**Conclusion:** We concluded in this study that the use of moxifloxacin4th generation quinolones against H-Pyloriinfection for 12-days in reduction of disease severity and higher eradication rate as compared to 7-days treatment. Complications were higher in 10-days of treatment because of excess usage of regular antibiotics but found no any significant difference to 7-days treatment.

**Keywords:** Eradication rate, H-pylori, Complications, Moxifloxacin

## INTRODUCTION

Patient with ulcer illness, gastric mucous lining hemopoietic cancer, and preclinical stomach cancer following endoscopic submucosal dissection have traditionally been advised to have H. pylori eradicated[1]. There are a number of additional recognized diagnoses as of right now, including cognitive indigestion, chronic use of NSAIDs like ibuprofen, iron deficiency anemia, idiopathic thrombotic haemorrhages, and H. pylori illness after a subtotal gastric bypass surgery for stomach cancer.[2]

Triple therapy, consisting of proton pumps inhibitors (PPI), azithromycin, and amoxicillin, has become the gold standard for treating H. pylori infection. In spite of growing interest in treating H. pylori, resistance to erythromycin and amoxicillin has led to a decline in the eradication rate[3]. Triple treatments based on levofloxacin, sequential therapies based on levofloxacin, concurrent therapies based on levofloxacin, hybrid therapies based on levofloxacin and rifabutin, and high-dose dual therapies based on levofloxacin have all been used to treat H. pylori infection.

In light of rising resistance to clarithromycin, Korean guidelines[4] advocate a bismuth-containing quadruple therapy as first-line treatment in addition to the more traditional triple therapy. In addition, first-line regimens in several other regions use sequential and concurrent therapies[5]. Because of this, availability of rescue therapy is becoming more important. After traditional triple and doped quadruple treatments have failed, fluoroquinolone-based triple therapy, including levofloxacin, is used as a second-line treatment inside the Maastricht IV/Florence Consensus[2]. According to reports, the second-line therapeutic fluoroquinolone moxifloxacin has a high rate of eradicating H. pylori.[6]

Since several FQs had life-threatening side effects, their use has been restricted or even prohibited. Unfortunately, the therapeutic value of FQs has been severely diminished due to these side effects. Concerns about their safety have been heightened by these side effects [7]. Some of the most significant unwanted effects associated with FQ usage are tendinitis, neurotoxic effects, and dysglycemia [8]. Because of its potentially fatal hepatotoxicity, photo-toxicity, and cardiotoxicity, both trovafloxacin and sparfloxacin were taken off the market. Since temocillin and levofloxacin are phototoxic, they are hardly used currently [9]. Enoxacin, Lomefloxacin, and Fluoroquinolones were once major contributors to life-threatening hypoglycemia. Both hypoglycemia and diabetes have been associated with the use of levofloxacin and gatifloxacin. The drug gatifloxacin was taken off the market because it caused severe hyperglycemia in too many people [10]. Gatifloxacin, Levofloxacin, and Fluoroquinolones are three commercially available fluoroquinolones that the Canadian Harmful Drug Event Monitoring Program classified as having the potential to cause Metabolic and Nutritional Problems (CADRMP). In 1999 [11], the US Food and Drug Administration gave moxifloxacin the go light. Alterations in blood sugar homeostasis and anomalies, including hypoglycemia and hyperglycemic consequences, have also been documented with moxifloxacin [12].

Moxifloxacin, a fluoroquinolone of the second generation, is often used to treat bacterial and fungal skin and lung infections [13]. It has a short half-life (between 9 and 16 hours), is readily absorbed after orally administered, and may be given once daily. The most frequent adverse effects of this medication are temporary stomach upset (nausea and diarrhea) [14].Based on these results, our team researched and demonstrated the

effectiveness of a week of moxifloxacin-based therapy vs the gold standard treatment therapy back in 2007 [15].

The purpose of this investigation was to examine how moxifloxacin resistance and treatment duration affected the efficacy of a treatment plan for eliminating H. pylori infection.

## MATERIAL AND METHODS

This observational study was conducted at Khyber Teaching Hospital, Peshawar from December 2021 to February 2022 and consisted of 180 patients with H-pylori infection. After obtaining informed written consent detailed demographics of all cases were recorded. Patients having duodenal or gastric ulcers, GI bleeding, prior efforts to eliminate H. pylori, antibiotic and/or anti-gastric acid medication within the last 30 days, bismuth therapy during the past 90 days, non-steroidal anti-inflammatory medicines, corticosteroids, or gold-based pharmaceuticals use were not included in this study.

Non-ulcer dyspepsia and concomitant H. pylori infection were diagnosed during an esophago-gastric endoscopic evaluation of the patient's dyspeptic symptoms.

Using biopsy forceps, we collected eight stomach mucosal biopsies from each patient for histology, culture, and fast urease testing (CLO test). The CLO test, which required a sample from both the antrum and the corpus, was declared positive if a colour change occurred within 24 hours. Two biopsies were taken, one from the antrum and one from the corpus, and both were examined by histology. Following an overnight fast and collection of a baseline exhaled breath sample, a C-urea breath test was conducted. Each patient was given orange juice to drink to slow the emptying of their stomachs (200 ml). Then, 30 millilitres of C-urea solution (equal to 75 milligrammes) was orally delivered. The second breath sample was taken 30 minutes after the first. An isotope-ratio mass spectrometer was used to evaluate each breath sample. A C02 rise of more than 4 over the control value was diagnostic of H. pylori infection.

Patients were equally divided in two groups. Group I received 400mg moxifloxacin for 6-days and group II received moxifloxacin for 12-days. All the patients received 1000mg amoxicillin and lansoprazole 30 mg twice day.The follow-up was conducted between Weeks 4 and 6 following therapy, at which time any noticeable changes in clinical symptoms and signs were recorded. The second endoscopy was scheduled at the same time, despite the fact that the researchers had not seen the E-test findings. Microbiologist and pathologist evaluating biopsy samples were unaware of patients' treatment assignments.

## RESULTS

Among all cases, we found that 105 (58.3%) patients were males and 75 (41.7%) patients were females. (figure 1)

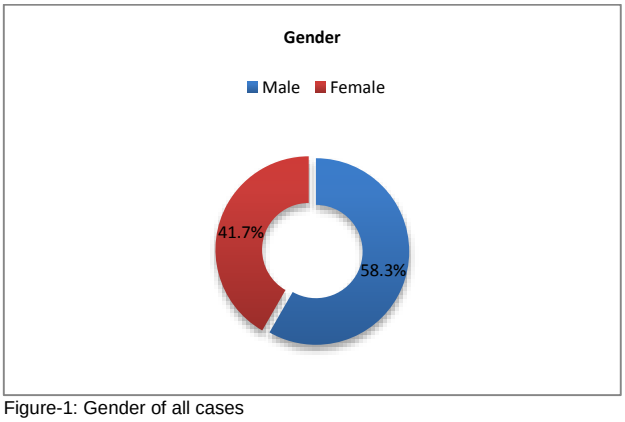


Figure-1: Gender of all cases

Mean age of the patients was 47.6±11.74 years and had mean BMI 25.8±12.34 kg/m$^2$. Majority of the patients 98 (54.4%) were smokers. Most common comorbidity was hypertension found in 62 (34.4%) cases, diabetes mellitus in 42 (23.3%) cases, chronic pulmonary disease in 28 (15.6%) and ischemic heart disease in 13 (7.2%) cases. 101 (56.1%) cases were alcohol drinkers.(table 1)

Table-1: Demographics of the included cases

| Variables | Frequency | Percentage |
|---|---|---|
| Mean age (years) | 47.6±11.74 | |
| Mean BMI (kg/m$^2$) | 25.8±12.34 | |
| Smokers | | |
| Yes | 98 | 54.4 |
| No | 82 | 46.6 |
| Alcohol Abuse | | |
| Yes | 101 | 56.1 |
| No | 79 | 43.9 |
| Comorbidities | | |
| HTN | 62 | 34.4 |
| DM | 42 | 23.3 |
| CPD | 28 | 15.6 |
| IHD | 13 | 7.2 |

We found that eradication rate among cases of group I was lower found in 59 (65.6%) cases compared to group II found in 80 (88.9%) cases with p value <0.005.(figure 2)

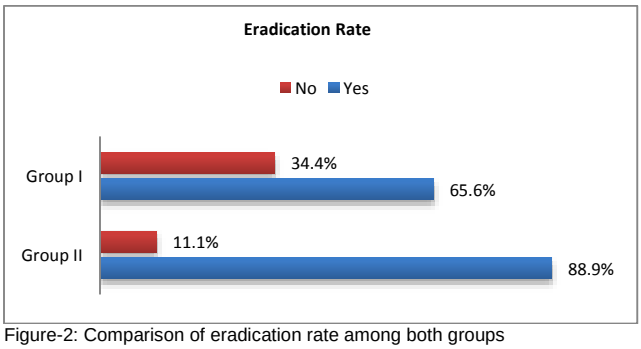


Figure-2: Comparison of eradication rate among both groups

Most common complications were diarrhea, nausea, abdominal pain and dizziness but their frequency was higher in group II but difference was insignificant. (table 2)

Table-2: Post-treatment comparison of complications among both groups

| Variables | Group I | Group II |
|---|---|---|
| Complications | | |
| Diarrhea | 3 (3.3%) | 6 (6.7%) |
| Nausea | 4 (4.4%) | 7 (7.8%) |
| Abdominal pain | 5 (5.6%) | 3 (3.3%) |
| Dizziness | 3 (3.3%) | 5 (5.6%) |
| Headache | 4 (4.4%) | 5 (5.6%) |
| Constipation | 0 (0) | 4 (4.4%) |

We found that 83.3% satisfaction rate among all 180 cases. (figure 3)


Figure-3: Overall satisfaction among all cases

## DISCUSSION

Many antimicrobial drugs have been studied up to this point, but deciding which one will be most effective as a first-line therapy for H. pylori is still difficult. Antibiotic resistance [16] is only one cause of treatment failure; patients may not take their medication as directed due to unpleasant side effects, the length of time they must be on treatment, or the sheer number of tablets they must take each day [17]. This is why it was important to create a new therapy plan that would improve eradication rates while using fewer antibiotics in smaller doses over a shorter treatment time. This will lead to more patient compliance, fewer negative side effects, and reduced treatment costs. New treatment plans using fluoroquinolones like levofloxacin and fluoroquinolones have been studied internationally in recent years.[18]

In current study 180 patients of H-pylori infection was included and among these, 105 (58.3%) patients were males and 75 (41.7%) patients were females. In previous study same results were presented in which males were higher in numbers than females.[19] Previous research found a greater eradication rate in patients with PUD than in non-ulcer individuals by moxifloxacin. [20] Even while there isn't much data to back up hopes for better eradication rates in PUD, there are a few theories that might help explain why that is the case. The prevalence of PUD and the success of eradication efforts were both increased in H. pylori strains with high virulence factors as compared to low virulence strains. When H. pylori is eradicated, it may be due in part to the antrum inflammation that occurs as a consequence of PUD. Because inflammation breaks down mucus and epithelial layers and increases vascular and epithelial permeability, it may improve medication penetration and delivery.[21]

In our study, eradication rate was higher in 10-days treatment with 400mg moxifloxacin found in 80 (88.9%) cases as compared to 7-days treatment.Previous studies have shown that triple treatment with moxifloxacin leads to very high eradication rates. First-line treatment with a triple antibiotic regimen incorporating moxifloxacin had an eradication rate of 84.1–89.0 percent, which is greater than that of conventional triple therapy[22,23]. In addition, it has been shown to be effective as a second-line therapy, with 90% eradication rates in certain cases from 2008[24]. Although bismuth-containing quadruple treatment has traditionally been utilized as a 2nd treatment[25], moxifloxacin-containing medication is favored due to low eradication rates, poor compliance due to adverse effects, and difficult dosage regimens with bismuth-containing quadruple therapy. Other studies have shown that using triple therapy with levofloxacin as a rescue treatment is successful, even more so than using bismuth-containing quadruple therapy[26].

Most common complications were diarrhea, nausea, abdominal pain and dizziness but their frequency was higher in group II but difference was insignificant. These were comparable to the previous study.[27]Our research team performed this survey to assess the influence of moxifloxacin tolerance and therapy length on the efficacy of a treatment plan for eradicating H. pylori infection in an effort to enhance treatment based on these results. Consequently, we analyzed the efficacy, safety, and patient adherence of several treatments for H. pylori.

## CONCLUSION

We concluded in this study that the use of moxifloxacin4th generation quinolones against H-Pylori infection for 12-days in reduction of disease severity and higher eradication rate as compared to 7-days treatment. Complications were higher in 10-days of treatment because of excess usage of regular antibiotics but found no any significant difference to 7-days treatment.

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