# Nitazoxanide Based Therapeutic Regimens: Will this Solve the Puzzle of Increasing Resistance of *Helicobacter pylori* to Conventional Treatment?

**Sherief Abdel-Salam**
*Tropical Medicine & Infectious Diseases department, Tanta University Faculty of Medicine, Tanta, Egypt*

*E mail: sheriefabdelsalam@yahoo.com*

*Key words: Helicobacter pylori; Gastritis; Treatment; Resistance; Nitazoxanide.*

A tiny, Gram-negative sprochete called *Helicobacter pylori (H pylori)* lives in the mucus layer that protects the stomach's epithelial cells in humans. A 50% of the world's population has this prevalent bacterial infection [8]. Additionally; it is the leading global cause of gastritis [3]. Additionally, *H. pylori* is a type 1 carcinogen and is the primary cause of stomach cancer, lymphoma, and mucus associated lymphatic tissue lymphoma (MALT), according to the World Health Organization [6] .

The recommended treatment for *H. pylori* is the current traditional triple therapy, which includes proton pump inhibitors (PPI), amoxicillin, and clarithromycin. This is the accepted worldwide standard for treating H. pylori infection[3]. In instances of allergies or resistance, metronidazole is used in place of amoxicillin or clarithromycin[11].However, a research by Gisbert et al. (2000) revealed that 30% of patients on intention to treat (ITT) and up to 50% of patients treated with a PPI-based triple therapy with metronidazole would fail treatment with a triple-based PPI treatment and first line therapy .[5]

This problem of treatment resistance calls for further research into alternative medications [10]. Due to emerging antibiotic resistance and poor patient compliance with finishing the treatment cycle, which lowers *H. pylori* elimination rates, *H. pylori* infection has grown extremely resistant to conventional first-line treatment regimens. As a result, there is a lot of interest in evaluating novel antibiotic combinations and therapy plans for *H. pylori* [4].

The antibiotic nitazoxanide (NTZ), which has been stabilised as a treatment, has microbiological properties that are comparable to those of metronidazole. It has a broad spectrum of action against microbial and anaerobic bacteria, anaerobic protozoa, and parasitic worms [1]. It is said to be helpful in treating parasitic infections of the intestines, particularly those caused by protozoa and parasitic worms [7], and was investigated as an additional therapy for chronic hepatitis C virus along with pegylated Interferon and ribavirin. Additionally, it provided early proof that the drug was effective in treating chronic hepatitis B virus (HBV) after just one round of medication [2].

Inhibition of lipid polysaccharide (LS) caused by the production of pro-inflammatory cytokines in macrophages are additional noteworthy immune properties of nitazoxanide [9].

When NTZ and omeprazole were combined (1 g of NTZ twice daily with 20 milligrammes of omeprazole once daily) for seven days, 91 patients experienced an 83% eradication rate. Despite in vivo exposure during therapy and prolonged in vitro

exposure of *H. pylori* strains to NTZ, resistance could not be seen[2,7].

All this points to the importance of further research on nitazoxanide based treatment regimens as novel regimens for *Helicobacter pylori* eradication as this may solve the puzzle of increasing resistance of *Helicobacter pylori* to conventional treatment.

## REFERENCES

1.Arya SC. Nitazoxanide as a broad-spectrum antiparasitic agent. *J Infect Dis* 2002; 185:1692.

2.Basu PP, Rayapudi K, Pacana T, Shah NJ, Krishnaswamy N, Flynn M. A randomized study comparing levofloxacin, omeprazole, nitazoxanide, and doxycycline versus triple therapy for the eradication of *Helicobacter pylori*. *Am J Gastroenterol* 2011;106:1970–5.

3.Chey WD, Wong BCY. Practice Parameters Committee of the American College of Gastroenterology. Management of *Helicobacter pylori* Infection. *Am J Gastroenterol* 2007;102:1808–25.

4.Duck WM, Sobel J, Pruckler JM, Song Q, Swerdlow D, Friedman C et al. Antimicrobial resistance incidence and risk factors among *Helicobacter pylori*-infected persons, United States. *Emerg Infect Dis.* 2004; 10: 1088- 1094.

5.Gisbert JP, González L, Calvet X, García N, López T, Roqué M et al. Proton pump inhibitor, clarithromycin and either amoxycillin or nitroimidazole: a meta-analysis of eradication of *Helicobacter pylori*. *Aliment Pharmacol Ther* 2000;14:1319–28.

6.Graham DY. Benefits from elimination of *Helicobacter pylori* infection include major reduction in the incidence of peptic ulcer disease, gastric cancer, and primary gastric lymphoma. *Prev Med* 1994;23:712–6.

7.Guttner Y, Windsor HM, Viiala CH, Dusci L, Marshall BJ. Nitazoxanide in treatment of *Helicobacter pylori:* a clinical and in vitro study. *Antimicrob Agents Chemother* 2003;4712:3780.

8.Malfertheiner P, Megraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT et al. Management of *Helicobacter pylori* infection-the Maastricht V/Florence Consensus Report. *Gut*. 2017; 66: 6- 30.

9.Parashar A, Arya R. Nitazoxanide. *Indian Pediatr*. 2005; 42: 1161- 1165.

10.Romano M, Lovene MR, Russo MI, Rocco A, Salerno R, Cozzolino D et al. Failure of first-line eradication treatment significantly increases prevalence of antimicrobial-resistant *Helicobacter pylori* clinical isolates. *J Clin Pathol* 2008;61:1112–5.

11.Stenström B, Mendis A, Marshall B. *Helicobacter pylori*—the latest in diagnosis and treatment. *Aust Fam Physician* 2008;37:608.