



Assessment of the Additive Effect of Oral Streptomycin with Traditional Regimen Therapy to Eradicate H-Pylori

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Abstracts

Recently, an increased incidence of gastrointestinal disorders due to the overgrowth of *H. pylori* bacteria has been noticed remarkably. One of the clinical manifestations of *H. pylori* overgrowth is the increased incidence of gastric ulcers. The first line of therapy that is used frequently is triple antibiotic therapy plus gastric reducing agents, notably proton pump inhibitors (P.P.Is). Streptomycin (SM) is an injectable aminoglycoside antibiotic that has enhanced activity on gram-negative microbes. To evaluate the additive effect of SM when used orally on eradicating *H. pylori* by standard triple therapy. 109 patients were enrolled in this study with a gastroenterologist diagnosed with gastric ulcer caused by *H. pylori* colonization; 60 patients received triple therapy with oral SM, and the rest received only standard triple therapy. After 14 days of treatment, a urea breath test was done again (after baseline reading), and statistical analysis was performed to evaluate the effect of SM. The Results showed that there was a significant difference in the degree of response to triple therapy plus SM as compared to using triple therapy alone.

Introduction

Gastric ulcer is one of the most common medical conditions that insult the stomach, causing a variety of signs and symptoms like severe epigastric pain, dyspepsia, irritable bowel symptoms, indigestion, and in severe cases, bloody vomitus or stool development [1]. These ulcers may be caused by severe stress, using painkillers like NSAIDs, alcoholism, infections, and other etiologies [2]. One of the interesting causative factors is colonizing the gastric mucosal wall with *Helicobacter pylori* (*H. pylori*) [3]. This commensal gram-negative may undergo overgrowth (by dirty food, eating prolonged refrigerated foodstuffs, or even by direct contact like kissing, which introduces new colonies of this bacteria) [4], causing progressive erosions to the gastric wall and eventually induced ulceration [5]. *H. pylori*-induced gastric ulcer requires the use of standard therapy, which involves metronidazole with amoxicillin or clarithromycin along with P.P.Is like esomeprazole for fourteen days as first-line therapy [6].

Although this line is standard and frequently used, an increased incidence of reduced response to it has appeared recently, which obligates the use of other regimens like Bismuth subsalicylate plus metronidazole plus tetracycline + P.P.Is, which is less tolerated by many patients [7]. Streptomycin (SM) is a protein synthesis inhibitor that belongs to the aminoglycoside family of antimicrobial agents. This drug is given parenterally by intramuscular injection for a variety of diseases, including Malta fever, tuberculosis, severe urinary infection, and other less common indications [8].

This drug is water-soluble and not absorbed orally, so its effect remains locally in the gut if it has any impact at all, like recent studies that used SM orally to enhance intestinal motility or to evaluate oral SM on renal excretion of vitamin B family members [9].

Patients and Method

The study was carried out in a private clinic of a gastroenterologist in Kerbala during the last 3 months of 2024; 109 patients were randomly enrolled in this study and were diagnosed with *H. pylori*-induced ulcers by performing urea breath tests and endoscopic exams before treatment of these patients, sixty gave their consent to take the standard triple therapy (amoxicillin 1000 mg twice daily, metronidazole 500 mg 3 times daily, and lansoprazole 30 mg twice daily) and 500 mg of SM twice daily for 14 days after a full explanation of the effects of oral SM and possible side effects, so that all ethical issues were established for all patients in this group, while the second group received only the standard triple therapy for 14 days. After treatment, a second urea breath test (to measure the CO₂ level produced after 5 minutes, usually 0.5–5 micrograms/min) was done to evaluate the statistical difference between these two groups.

Results and Discussion

Although both groups showed a good treatment response, those who received SM plus standard triple therapy showed a reduction in CO₂ production rate and a greater number of patients with normalized urea breath tests compared to the baseline state, as shown in Tables 1, 2, and 3.

Table 1: Statistical difference in the CO₂ production rate of the urea breath test (microgram/minute) expressed as mean + SD for patients using standard triple therapy without oral SM.

| Before using Standard triple therapy | After using Standard triple therapy | P value |
|--------------------------------------|-------------------------------------|---------|
| 23.600±12.876 | 4.902±1.025 | <0.001 |

Table 2: Statistical difference in the CO₂ production rate of the urea breath test (microgram/minute) expressed as mean + SD for patients using standard triple therapy with oral SM.

| Before using SM+Standard triple therapy | After using SM+Standard triple therapy | P value |
|---|--|---------|
| 21.067±12.149 | 3.375±1.464 | <0.001 |

Table 3: Statistical difference in the CO₂ production rate of the urea breath test (microgram/minute) expressed as mean + SD between patients using standard triple therapy with or without oral SM.

| Group A (used SM + triple therapy) | Group B (used only triple therapy) | P value |
|------------------------------------|------------------------------------|---------|
| 3.375±1.464 (N=60) | 4.902±1.025 (N=49) | <0.001 |

This study suggests that the use of oral SM potentiates the efficacy of standard triple therapy for eradication of *H. pylori* at two levels; no previous data mentions the exact underlying mechanism; however, the possibility of direct action of oral SM in the aqueous media of the stomach on the targeted gram-negative bacteria was enhanced by using standard therapy [6]. Another possibility of enhancement of normal flora by competing oral SM with some gram-negative bacteria may be considered [10-11]. However, limited data about the use of oral SM in various body diseases is available, requiring more sophisticated research that may yield fruitful results.

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