

**CYP2C19 (CYTOCHROME P450 FAMILY 2 SUBFAMILY
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Population: Patients aged 18–70 years infected with H. pylori [4]. H. pylori infection will be confirmed by the urea breath test or stool antigen test [5].

ABSTRACT

Helicobacter pylori infection is widely prevalent worldwide and increases the risk of peptic ulcer disease, gastritis, and gastric cancer. Antibiotic resistance and individual pharmacokinetic variability lead to failure of eradication therapy [1]. The efficacy of proton pump inhibitors (PPIs) depends on their metabolism by the CYP2C19 enzyme, and genetic polymorphisms significantly influence individual treatment outcomes [2]. This study protocol aims to optimize the H. pylori eradication regimen by implementing personalized PPI dosing based on CYP2C19 genotyping. The study is designed as a prospective, randomized clinical trial, and the outcomes are intended to evaluate eradication success according to CYP2C19 genotypes.

Objective: *Helicobacter pylori* infection is widely prevalent worldwide and increases the risk of peptic ulcer disease, gastritis, and gastric cancer. Antibiotic resistance and individual pharmacokinetic variability lead to failure of eradication therapy [1]. The efficacy of proton pump inhibitors (PPIs) depends on their metabolism by the CYP2C19 enzyme, and genetic polymorphisms significantly influence individual treatment outcomes [2]. This study protocol aims to optimize the *H. pylori* eradication regimen by implementing personalized PPI dosing based on CYP2C19 genotyping. The study is designed as a prospective, randomized clinical trial, and the outcomes are intended to evaluate eradication success according to CYP2C19 genotypes [3].

Materials and methods:

Population: Patients aged 18–70 years infected with *H. pylori* [4].

H. pylori infection will be confirmed by the urea breath test or stool antigen test [5].

Results:

- Rapid metabolizers: lower eradication success with standard PPI dosing (65–75%).
- Intermediate metabolizers: moderate eradication success (75–85%).
- Poor metabolizers: high eradication success ($\geq 90\%$) [6].
- Personalized PPI dose adjustment is expected to significantly improve eradication success in rapid metabolizers.

• Optimization of therapy is recommended taking into account differences associated with genotypes and antibiotic resistance [7].

Conclusion: CYP2C19 genotyping is an important tool for personalizing H. pylori eradication therapy and improving the efficacy of PPIs. Genotype-guided individualized PPI dosing increases eradication success, reduces the impact of antibiotic resistance, and may be incorporated into international guidelines in the future. This study protocol is prepared for implementation as a real clinical trial [8].

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