STUDY PROTOCOL AND STATISTICAL ANALYSIS PLAN (SAP)

Official Title: Real-World Effectiveness of Helicobacter pylori Eradication Regimens in a Single-Center Retrospective Observational Study

NCT Number: *[To be assigned]*

Document Date: *2024.05.28*

Sponsor: Shenzhen Hospital of Southern Medical University

1. Background and Rationale

Helicobacter pylori (H. pylori) infection is highly prevalent in China and is associated with chronic gastritis, peptic ulcer disease, gastric mucosa–associated lymphoid tissue lymphoma, and gastric cancer. Increasing antibiotic resistance has reduced eradication success rates in real-world clinical practice.

Shenzhen Hospital of Southern Medical University manages more than 5,000 H. pylori tests and over 2,000 eradication treatments annually. Despite standardized training, eradication success rates remain suboptimal (<80% in internal data).

This study aims to evaluate the real-world effectiveness of commonly used eradication regimens and identify factors associated with treatment outcomes.

2. Study Objectives

2.1 Primary Objective

To determine the real-world eradication success rate of different H. pylori eradication regimens.

2.2 Secondary Objectives

- To identify demographic, clinical, and treatment-related factors associated with eradication success or failure.

- To compare the effectiveness of commonly used eradication regimens in routine clinical practice.

3. Study Design

This is a **single-center, retrospective, observational study** using routinely collected clinical data from Shenzhen Hospital of Southern Medical University.

- **Study Period:** 2016–2023
- **Study Type:** Observational
- **Time Perspective:** Retrospective
- **Sampling Method:** Non-probability, consecutive sampling
- **Intervention:** None (standard-of-care only)

No study-driven treatment or randomization will occur. All treatments are determined by treating physicians as part of routine care.

4. Study Population

4.1 Target Population

Patients who underwent H. pylori testing and/or eradication treatment at Shenzhen Hospital of Southern Medical University between 2016 and 2023.

4.2 Inclusion Criteria

- Age ≥ 14 years
- Underwent H. pylori testing and/or eradication treatment during the study period
- Diagnosis of H. pylori infection based on national consensus guidelines or clinically accepted methods

4.3 Exclusion Criteria

- Age < 14 years
- Pregnant or breastfeeding women
- Patients deemed unsuitable by the investigator

5. Data Sources and Data Collection

Data will be extracted from electronic medical records (EMR), including:

1. Demographics (age, sex)
2. H. pylori testing method and results (C13 breath test, histology, culture, external hospital data)
3. DOB values for C13 testing
4. Comorbidities
5. Allergy history
6. Concomitant medications
7. Number of eradication attempts
8. Treatment regimen details (drug names, doses, duration, regimen abbreviation)
9. Post-treatment test results

No additional visits, tests, or procedures will be performed.

6. Outcome Measures

6.1 Primary Outcome

H. pylori eradication success rate, defined as a negative post-treatment test (C13 breath test, stool antigen, histology, or other accepted method) within 4–12 weeks after therapy.

6.2 Secondary Outcomes

- Factors associated with eradication success or failure
- Comparison of eradication rates across regimens
- Distribution of comorbidities
- Number of eradication attempts before success

7. Ethical Considerations

This study applies for a **waiver of informed consent** because:

- Data originate from routine clinical care
- The study poses no more than minimal risk
- Waiver will not adversely affect participant rights
- The study cannot be practicably conducted without the waiver
- Privacy and confidentiality will be strictly protected

The protocol and waiver request will be reviewed and approved by the institutional ethics committee.

8. Data Management

- Data will be stored in a secure, password-protected database (Access).
- Double data entry will be performed.
- Source data verification will occur before database lock.
- After locking, no changes will be made; corrections may be applied during statistical programming if necessary.
- Participants will be identified only by study ID codes.

9. Statistical Analysis Plan (SAP)

9.1 Sample Size

All eligible patients from 2016–2023 will be included. Estimated sample size: **~3,000 patients**.

9.2 Statistical Methods

Descriptive Analysis

- Continuous variables: Mean ± SD
- Categorical variables: counts and percentages

Univariate Analysis

- t-test for continuous variables
- Chi-square test for categorical variables

Multivariate Analysis

- Multivariable logistic regression to identify independent predictors of eradication success

Statistical Significance

- Two-sided tests
- $P \leq 0.05$ considered statistically significant

Software

- SPSS
- R

10. Quality Control and Assurance

- All study personnel will receive protocol and SOP training.
- GCP training is required for all investigators.
- Quality control personnel will verify data accuracy and protocol adherence.
- Study documents will be archived after completion.

11. Study Timeline

- **May 2024 – September 2024:** Data extraction and cleaning
- **October 2024 – December 2024:** Statistical analysis and report preparation
- **January 2025 – May 2025:** Manuscript writing and academic dissemination

12. Publication Policy

The sponsor holds exclusive rights to study data. Publications require sponsor approval before submission.

13. Human Genetic Resources Compliance

Any handling of human genetic resources will comply with national regulations.