

## Gastric Infections in Patients with Bariatric Surgery - A Systematic Review

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### Rezumat

#### *Infecții gastrice la pacienții bariatrici - review sistematic*

**Introducere:** Având în vedere numărul mare de pacienți supuși chirurgiei bariatrice, există o lacună în literatura de specialitate cu privire la nevoile lor specifice. **Scop:** Prezentul review sistematic investighează rolul infecțiilor gastrice la pacienții supuși chirurgiei bariatrice și strategiile de gestionare a cazurilor.

**Material și Metodă:** Căutarea studiilor a fost efectuată în trei baze de date, iar studiile au fost incluse urmând o abordare în trei etape (cu screening de titlu, abstracte și text integral efectuat de doi recenzori).

**Rezultate:** Din 297 de articole, 11 au fost incluse în cele din urmă. *Helicobacter pylori* a fost cea mai prevalentă bacterie identificată la candidații la chirurgia bariatrică. Screeningul pentru *H. pylori* în populația țintă este discutabil, la fel ca și impactul diagnosticului său asupra abordării chirurgicale. Atunci când este detectat, eradicarea preoperatorie ar putea fi o opțiune.

**Concluzii:** Sunt necesare studii suplimentare la scară largă pentru a evalua utilitatea screeningului pentru *H. pylori* la candidații la chirurgia bariatrică și pentru a determina efectele pe termen lung ale terapiei de eradicare.

**Cuvinte cheie:** chirurgie bariatrică, *Helicobacter pylori*, management preoperator

### Abstract

**Background:** With an increasing number of patients undergoing bariatric surgery, there is a gap in the literature regarding their specific needs. **Aim:** The systematic review examines the role of gastric infections in patients undergoing bariatric surgery and the case management strategies used.

**Material and Methods:** The search was conducted across three databases, and studies were included using a three-step approach (with title, abstract, and full-text screening conducted by two reviewers).

**Results:** Of the 297 articles, 11 were ultimately included. *Helicobacter pylori* was the most prevalent bacterium identified in bariatric surgery candidates. Screening for *H. pylori* in the target population is debatable, as is the impact

Received: 24.09.2025  
Accepted: 20.11.2025

of its diagnosis on surgical planning. When detected, preoperative eradication might be an option.

**Conclusion:** Further large-scale studies are needed to evaluate the usefulness of *H. pylori* screening in bariatric surgery candidates and to determine the long-term effects of eradication therapy.

**Keywords:** bariatric surgery, *Helicobacter pylori*, preoperative management

## Introduction

Bariatric surgery has become a critical intervention for individuals struggling with obesity, offering substantial benefits in terms of weight loss and the decrease in obesity-related comorbidities. Among the most common types of bariatric surgery procedures are Roux-en-Y gastric bypass, having their own possible complications. The surgical intervention has been shown to improve cardiometabolic health, enhance recipients' quality of life, and reduce the risk of chronic conditions such as type 2 diabetes, hypertension, and cancer (1,2).

Gastric cancer (GC) is a leading cause of cancer-related morbidity and mortality worldwide, characterized by complex etiological factors, of which *Helicobacter pylori* is the most recognized. *H. pylori* infection can lead to chronic gastritis, and its association with gastric cancer has been well documented in the literature. The International Agency for Research on Cancer considers *H. pylori* as a Class I carcinogen, underscoring its significant role in gastric carcinogenesis (3,4). Various studies report mixed results regarding the relationship between obesity and *H. pylori* infection (5-7).

The relationship between *H. pylori* infection and bariatric surgery is a critical area of study, especially considering the infection affects 24-67% of patients scheduled for bariatric surgery, which puts these patients at risk for various postoperative complications, including marginal ulceration and gastrointestinal symptoms such as gastritis and peptic ulcers, and additional gastric cancer risk (8). Given these risks, there is ongoing debate within the medical community regarding the necessity of preoperative screening and eradication of *H. pylori* in the context of bariatric surgical procedures. The study aims to assess the pre and postoperative prevalence of *H. pylori* in patients undergoing bariatric surgery, as well as to describe the case management strategies in the case of a positive diagnosis with *H. pylori* in such patients.

## Material and Method

A systematic review was conducted accordingly to the Cochrane Handbook recommendations and reported following the PRISMA 2020 Checklist.

The target population was represented by patients who underwent bariatric surgery and were tested for various microorganisms before and/or after the intervention (bariatric surgery). Inclusion criteria consisted of original research articles, published in English, in ten years (between 2014 and 2024).

Exclusion criteria were review articles, studies that did not report on the established outcomes, studies published in languages other than English, animal studies, and studies conducted in vitro.

The search was carried out on PubMed, Cochrane Library and Web of Science, using the query “(bariatric surgery OR gastric bypass OR sleeve gastrectomy) AND (Helicobacter OR bacteria OR virus OR EBV OR Epstein Barr OR infection OR microbiota OR microorganisms OR microbial OR CMV OR fungal OR fungi OR parasite) AND (gastric cancer OR cancer) NOT review”.

The title screening, abstract screening, and full-text screening were conducted independently by two reviewers, with any conflicts resolved by a third reviewer. Each step was documented in the PRISMA flowchart. The quality of the included studies was assessed using the Newcastle-Ottawa Scale (NOS). Relevant data regarding the microorganisms with a possible implication in the development of gastric cancer in bariatric surgery patients, the diagnostic methods, administered medication, and case management. Two reviewers performed data extraction.

## Results

From 318 articles retrieved, 11 studies were ultimately included; the detailed screening progress is graphically represented in the PRISMA

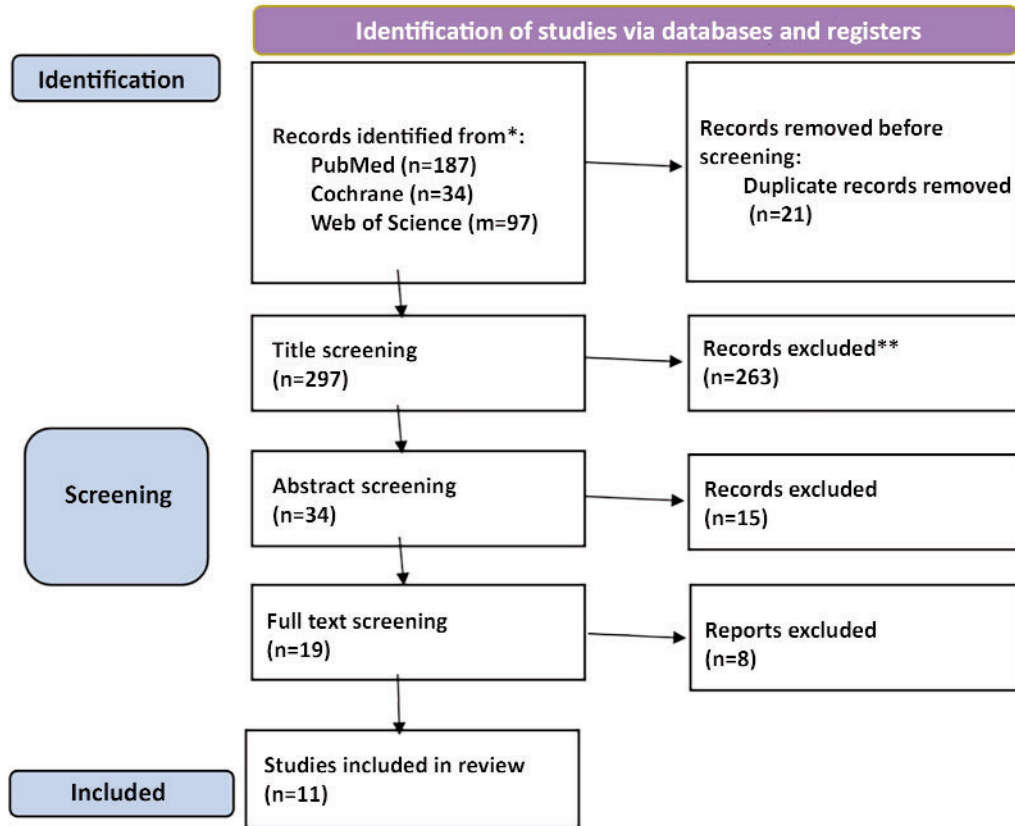


Figure 1. PRISMA flow chart

flow chart (Fig. 1). The key characteristics of the included studies are described in Table 1.

The only reported microorganism across the studies was *H. pylori*, with a prevalence ranging between 4.9% and 64%. In 10 out of 11 studies, the *H. pylori* identification took place before the

surgical intervention, while in one study conducted by Rusalil et al (9), the detection of *H. pylori* was done after the surgery, from the operative specimen. The diagnostic methods used for diagnosis were histopathology, serology, and urea breath test (Table 2).

Table 1. Key characteristics of the included studies

First author	Publication year	Type of study	No of patients	Mean age (all patients)	Mean BMI
Šebunova	2017	retrospective	68	45.3±9.6	44.7±4.8
Alimadadi	2022	retrospective	637	34.4±9.2	45.1±7.3
Benvenga	2020	prospective	78	51	44.2±4.6
Tomasicchio	2022	retrospective	95	43	44.62
Kopach	2016	retrospective	511	58.5	43.1
Anand	2019	retrospective	26	37.5	45.3
Rudasill	2023	retrospective	203	NA	NA
Schneider	2018	retrospective	1225	42.2	45
Endo	2019	retrospective	155	40	45
Han	2021	retrospective	94	38	38.9
Ge	2019	retrospective	649	46.2	45.2

**Table 2.** Diagnostic methods

First author	Publication year	H. pylori infection (n, %) before surgery	Diagnostic method - preoperative/ during surgery
Šebunova	2017	38 (55.9%)	Histopathology
		43 (64.7%)	PCR (caqA, glmM)
Alimadadi	2022	392 (61.5%)	Histopathology
Benvenga	2020	8 (28.6%)	Histopathology
Tomasicchio	2022	38 (40%)	Histopathology, Serology
Kopach	2016	14 (6.9%)	Histopathology
Anand	2019	2 (7.69%)	Histopathology
Rudasill	2023	37 (18.2%)	Histopathology (operatory specimens)
Schneider	2018	158 (13.3%)	Histopathology
Endo	2019	11 (7.09%)	Histopathology
Han	2021	34 (36.17%)	Serology IgG
Ge	2019	32 (4.9%)	Histopathology

Various approaches for the clinical management of *H. pylori* were proposed in the literature. Some authors (e.g. Šebunova 2017, Alimadadi 2022) (10) (11) reported preoperative screening for *H. pylori*. The screening results were followed by preoperative *H. pylori* eradication in 5 of 11 studies and by changing the surgical plan in only 1 study (11).

Table 3 summarizes the findings on preoperative screening and its impact on case management.

The study conducted by Han et al (12) suggests the introduction of ABC classification based on *H. pylori* identification and pepsinogen levels, as risk stratification in gastric cancer development after bariatric surgery.

In the light of their findings, Kopach et al, do not consider preoperative endoscopy with biopsy necessary for every candidate for bariatric surgery, in the absence of symptoms (13).

Schneider 2018, on the other hand, recommends

endoscopy before bariatric surgery (14). Endo et al reported that preoperative endoscopy changed the management of the case in 10% of the cases (for 16 out of 155 patients) (15).

Benvenga et al assessed the *H. pylori* infection 6.3 ± 0.8 years after sleeve gastrectomy and found 28 patients with *H. pylori* infection out of 78 who underwent endoscopy, with a prevalence of 35.9% (16).

Tomasicchino reported a 16% prevalence of *H. pylori* infection (15 out of 95 patients) at a 12-month follow-up, 2 of whom were positive before the surgery, and 13 patients had the infection for the first time (17).

Risk of bias among the 12 included studies was assessed using the Newcastle-Ottawa Scale (NOS). Two studies were considered of low quality, 6 studies were moderate, and 2 were of good quality, as shown in Fig. 2.

**Table 3.** Preoperative screening for *H. pylori*

First author	Publication year	Preoperative screening for <i>H. pylori</i>	Preoperative eradication of <i>H. pylori</i>	Changes in surgical plan due to <i>H. pylori</i>
Šebunova	2017	yes	NA	NA
Alimadadi	2022	yes	Yes-triple therapy	Postpone after therapy
Benvenga	2020	yes	NA	NA
Tomasicchio	2022	yes	yes	NA
Kopach	2016	yes	NA	NA
Anand	2019	yes	yes	NA
Rudasill	2023	NA	NA	NA
Schneider	2018	yes	yes	NA
Endo	2019	Yes	Yes 9/11	NA
Han	2021	yes	NA	NA
Ge	2019	yes	NA	NA

First author	Year	Quality of studies (NOS)
Šebunova	2018	moderate
Alimadadi	2022	good
Lee	2022	moderate
Kopach	2016	moderate
Anand	2019	low
Benvenega	2020	moderate
Schigt	2014	moderate
Schneider	2018	good
Rudasill	2024	low
Endo	2018	moderate
Han	2020	good

**Figure 2.** Graphical representation of the ROB results

## Discussions

*H. pylori* infection is frequently detected among candidates for bariatric surgery, and its clinical significance in this context has been of growing research interest. Patients infected with *H. pylori* have an increased risk of developing gastric carcinoma compared to uninfected individuals, establishing it as a primary etiological factor in carcinogenesis (11).

Although the study aimed to identify all the microorganisms of interest in the target population, *H. pylori* was the only species reported, and the studies mention different prevalence rates. The differences in *H. pylori* prevalence might also be explained by the various diagnostic methods used. Studies using molecular biology reported a higher infection rate, which may be explained by the tests' high sensitivity and specificity. (10) Histopathology remains the most used diagnostic method for *H. pylori* infection.

Given the importance of *H. pylori*, the literature contains contradicting expert opinions on the utility of screening for *H. pylori* in bariatric surgery candidates. If left untreated, the infection might evolve into serious postoperative complications. Chronic gastritis and peptic ulcer disease are

common outcomes of persistent infection that may undermine staple-line integrity after sleeve gastrectomy or contribute to marginal ulceration at gastrojejunostomy sites following Roux-en-Y gastric bypass (18). In surgical procedures where a remnant stomach remains inaccessible postoperatively, undiagnosed mucosal disease has clinical significance as future surveillance or intervention is technically limited (19).

Bariatric procedures inherently modify gastric physiology and accessibility. After Roux-en-Y reconstruction, residual stomach segments become excluded from alimentary flow and are difficult to reach via standard endoscopy (19). Any untreated *H. pylori*-related pathology in these areas could progress undetected toward ulceration or neoplasia over years.

In high-prevalence areas, where gastric cancer rates are also elevated (e.g. Japan), routine upper gastrointestinal endoscopy for all bariatric candidates regardless of symptoms was proposed (12).

Proactive screening has a series of advantages: it allows timely eradication therapy before irreversible anatomical changes limit access; it reduces exposure of healing tissue to inflammatory insult; and it offers an opportunity to identify coexistent foregut pathologies that might warrant simultaneous repair or adaptation of operative technique (17,20,21).

Current guidelines do not provide recommendations for the management of *H. pylori* infection in SG surgery candidates, and given the cost of *H. pylori* screening tests and histopathological examination of the sleeve gastrectomy specimen, screening and eradication prior to surgery are debatable (21).

In a study by S. Anand (20), a higher rate of abnormal endoscopic mucosal findings was observed in the *H. pylori*-positive group, including malignant ulcers and metaplasia. This finding underscores the importance of routine *H. pylori* screening before bariatric surgery to minimize complications and reschedule surgical intervention after *H. pylori* eradication.

Eradication therapy is also controversial, and our results showed that almost half of the included studies reported on this approach, suggesting a lack of consensus on the issue.

The lack of data across studies on other types of bacterial infections and on long-term follow-up information regarding the development of gastric cancer is a study limitation. Overall, the results highlight the lack of uniformity regarding the clinical management of *H. pylori* following its

detection in bariatric surgery candidates. Future research should focus on larger studies examining the long-term impact of *H. pylori* infection in bariatric patients.

## Conclusion

The growing population of bariatric surgery patients enlarges the number of research questions that arise regarding their clinical management. *H. pylori* prevalence in the bariatric surgery candidates varies depending on the geographical region.

*H. pylori* infection diagnosis opens the Pandora's box regarding the clinical management of patients undergoing bariatric surgery. Screening, eradication therapy and surgical planning remain unstandardized, with still to be discovered long-term implications. Larger studies are required to assess the utility of *H. pylori* screening in bariatric surgery candidates and the long-term impact of eradication therapy. The complex relationship between obesity and *H. pylori* is worth exploring in future research.

## Conflicts of Interests

The authors declared no potential conflicts of interest.

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