

Original Article

Helicobacter pylori in sleeve gastrectomies: prevalence and rate of complications

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Abstract: Helicobacter pylori in Sleeve gastrectomies: Prevalence & Rate of Complications. Prevalence of Helicobacter pylori has not been established in sleeve gastrectomy specimens and yet initial observations indicate that it is significant. The aim is to determine prevalence of Helicobacter pylori and correlate with rate of post-operative complications. A total of 89 Sleeve gastrectomies were identified. Pathology reports and slides were re-examined. Warthin Starry special stain and clinical history were obtained. 38 cases were Helicobacter pylori positive (44%). 33 (39%) cases initially reported negative for Helicobacter pylori on routine hematoxylin and eosin stained slide; were positive when Warthin starry stain was employed. The presence of neutrophils in tissue was strongly associated with presence of Helicobacter pylori on Warthin stain ($p < 0.001$). Post-operative complications were observed in 8 patients (9%). Complications were not significantly associated with Warthin-Starry special stain status ($p=0.98$).

Keywords: Sleeve gastrectomy, helicobacter pylori, warthin starry stain, gastric leak, obesity

Introduction

Helicobacter pylori are spiral shaped bacteria, first described by Warren and Marshall in 1982 [1]. Since then, it has been implicated in the pathogenesis of various benign and malignant gastric diseases [2-6]. For example, Helicobacter pylori causes approximately 50% of low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma. The main route of infection is feco-oral. The prevalence of infection is higher in developing (>80%) than in developed countries (20-40%) [7]. Helicobacter pylori antimicrobial eradication alone will treat 60 to 80% of early stage low grade MALT lymphoma patients [8].

On the other hand, obesity is a growing epidemic in Arabian Gulf states, in certain regions the prevalence of overweight/obese individuals in the 30-60 years age group is between 70-88% [9]. Sleeve gastrectomy is a new form of laparoscopic bariatric surgery [10]. The procedure entails longitudinal resection of 85% of stomach's greater curvature [11]. Histopathologic examination of Sleeve resections demonstrat-

ed high prevalence of Helicobacter pylori related gastritis among otherwise asymptomatic overweight individuals. The aim of this study is to determine the prevalence of Helicobacter pylori infection and correlate it with rate of post-operative complications in Sleeve gastrectomies. Histopathologic features of Helicobacter pylori related gastritis is assessed by the updated Sydney system pylori for evaluation of chronic gastritis [12]. Early recognition and subsequent eradication may ameliorate and/or prevent Helicobacter pylori related gastritis, gastric lymphoma and carcinoma.

Materials and methods

All Sleeve gastrectomy specimens received in the pathology laboratory from April 2008- June 2011 were retrospectively identified. Electronic medical records and pre-operative surgical notes were reviewed for evidence of prior gastritis or any upper gastrointestinal symptoms. The symptoms sought include; abdominal pain, dyspepsia, bloating, nausea, vomiting, belching, regurgitation, heart burn, post prandial hunger 1 to 3 hours after meals [11]. Two to

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Table 1. Characteristics of Study population

	Number of Sleeve gastrectomies	Mean age (years)	Mean BMI ^a
Total	89		
Males	35	31	52
Females	54	36	46

^aBody mass index.

four representative sections that sampled gastric corpus and antrum were submitted from each Sleeve gastrectomy case. The sections were paraffin embedded and sectioned at 4 µm, which were subsequently stained with hematoxylin and eosin. Warthin-Starry special stain for spirochetes was performed on at least one randomly selected section from each case. A total of eighty-nine cases were identified. Two histopathologists reached consensus regarding semi-quantitatively grading on different features of chronic gastritis as per the updated Sydney system [12]. Accordingly, the following histopathologic variables were examined on each case: *Helicobacter pylori* density, polymorphonuclear neutrophil activity, degree of chronic inflammation, degree of glandular atrophy, presence of intestinal metaplasia and presence of lymphoid follicles. Each variable was graded as mild, moderate or severe using Dixon et al visual analogue scale [12]. In addition, certain scoring criteria were adapted from Xiao-Yu Chen et al [13]. These criteria were slightly modified in the current study for sake of simplicity as follows: *Helicobacter pylori* density was graded as none, mild when few microorganisms were present, moderate when bacteria is present in separate foci and severe when near complete or complete surface layering with *Helicobacter pylori* was observed. Polymorphonuclear neutrophil activity was graded as none, mild when up to two crypts were involved per biopsy, moderate when up to 50% of crypts were involved and severe when more than 50% of crypts were affected. Chronic inflammation was defined as gastric mucosa infiltration by both lymphocytes and plasma cells. It was graded as none, mild when chronic inflammatory cells were scattered, moderate when chronic inflammatory cells infiltrate were diffuse and severe when chronic inflammatory cells infiltrate were diffuse and dense separating the gastric glands. Glandular atrophy was scored as none, mild, moderate and severe using the visual analogue scale [11]. This criterion proved to be most challenging and carried

a great deal of interobserver variation. Intestinal metaplasia was graded as none, mild when one focus -up to four crypts- was replaced by intestinal type epithelium, moderate when multiple foci were affected comprising less than 50% of gastric epithelium, and severe when more than 50% of gastric epithelium was replaced by intestinal metaplasia. The presence of lymphoid follicles was graded as none, mild, moderate and severe. An average of the overall score derived from examining multiple sections on the same case is performed.

Results and discussion

Gastric infection by *Helicobacter pylori* is implicated in the pathogenesis of various benign and malignant gastric diseases [2-6]. For example, *Helicobacter pylori* related gastritis causes approximately 50% of low-grade gastric mucosa-associated lymphoid tissue (MALT) lymphoma. In addition, it is linked to the development of gastric adenocarcinoma through chronic gastritis progressing to premalignant lesions namely intestinal metaplasia and dysplasia that eventually culminate in malignant transformation [8]. Other associations include: iron deficiency anemia, idiopathic thrombocytopenic purpura (ITP), vitamin B12 deficiency and peptic ulcer disease [14]. The main route of infection is feco-oral. The prevalence of infection is higher in developing -over 80%- than in developed countries -20-40%- [7]. Around 60 to 80% of early stage low grade MALT patients are treated with *Helicobacter pylori* antimicrobial eradication alone [8].

Obesity is a growing epidemic in Arabian Gulf states, in certain regions overweight/obesity prevalence in the 30-60 years age group is between 70-88% [9]. Sleeve gastrectomy is a new form of laparoscopic bariatric surgery [10]. The number of sleeve gastrectomies used to treat morbid obesity is increasing worldwide. The procedure entails longitudinal resection of 85% of stomach's greater curvature [11]. Histopathologic examination of sleeve resections demonstrated high prevalence of *Helicobacter pylori* related gastritis among otherwise asymptomatic overweight individuals.

A total of 89 sleeve gastrectomies were identified over a period 3-year, 35 male and 54 female patients. Mean ages of 31 and 36 for males and females respectively. The mean body mass index -BMI- for males was 52 and

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Table 2. Correlation between upper gastro-intestinal symptoms and Warthin Starry status

Patient's status	Patients (number and percentage)	Warthin Starry status (on gastric biopsy and/or resection)
Symptomatic	18 (20%)	12 (66.6%)
Asymptomatic	71 (79.7%)	26 (36.6%)

Table 3. Correlation between age, gender, body mass index (BMI), Warthin Starry stain status and post-operative complications

Total number of complications	8 cases
Gastric leak	5 cases
Gastric bleeding	1 case
Wound infection	2 cases
Complications and age	$p = 0.32$
Complications and gender	$p = 0.26$
Complications and BMI	$p = 0.24$
Complications and Warthin Starry status	$p = 0.98$

for females 46 (**Table 1**). 18 patients (20%) had pre-operative upper gastro-intestinal complaints such as nausea, heart burn and abdominal pain. Only 5 symptomatic patients underwent pre-operative upper esophago-gastroscopy and received *Helicobacter pylori* eradication therapy. Four of the treated patients did not have *Helicobacter pylori* on their subsequent resections. Seven cases (38.8%) out of the 18 symptomatic patients, were positive for *Helicobacter pylori* using Warthin-Starry stain on subsequent Sleeve gastrectomy. Interestingly, 26 (36.6%) asymptomatic patients were positive for *Helicobacter pylori* using Warthin-Starry on surgical resections (**Table 2**). This could in part be due to patients under reporting or physicians under documentation. 11 patients received post-operative *Helicobacter pylori* eradication therapy. Post-operative complications such as leak and/or bleeding were not significantly associated with body mass index ($p = 0.24$), age ($p = 0.32$), gender ($p = 0.26$) or Warthin-Starry special stain status ($p = 0.98$). A total of 8 complications were observed with a complication rate of 8.9%. Males had more complications than females (5 vs. 3 cases), however not statistically significant (OR 0.353; 95% CI: 0.08 -1.58). The presence of neutrophils was strongly associated with presence of *Helicobacter pylori* bacteria on Warthin stain ($p < 0.001$). Thirty-three (39%) cases which were recorded negative for *Helicobacter pylori* using routine hematoxylin and eosin -H&E- stained slide turned positive when examined by Warthin-Starry special stain. If positivity for either test is considered to sig-

nify infection, then a total 38/89 were *Helicobacter pylori* positive (44%). Thus, prevalence of *Helicobacter pylori* in study group is high. Based on this observation, Emirati patients undergoing sleeve gastrectomy should be treated as high-risk group for infection with low threshold to order Warthin-Starry special stain especially in presence of infiltrating neutrophils.

This is a retrospective review of all patients undergoing sleeve gastrectomies for morbid obesity among United Arab Emirates (U.A.E.) population. A recent study indicated that 35% of adults in Abu Dhabi (U.A.E.) are obese and additional 32% are considered overweight [14]. All of our patients were young - in their thirties - with mean body mass index (B.M.I.) of 52 and 46 for males and females respectively. The female to male ratio in this study was 1.5: 1, possibly reflecting a higher prevalence of obesity among U.A.E. women [15]. An alternative explanation is that women tend to be more cautious regarding body image and seek medical help more often.

Sleeve gastrectomy involves partial resection of stomach using stapler, known complications related to stapler line include leakage in 2% and bleeding in 1% of cases [2]. In our series, we had 8 patients with postoperative complications including gastric leak in 5 cases (62.5%), bleeding in 1 case (12.5%) and wound infection in 2 (25%) cases (**Table 3**). Many factors can affect the rate of postoperative complications. Some are related to the technique of the operation, the type of staplers and the use of reinforcement [16]. Another possibility may be related to the presence of gastric mucosal inflammation and edema secondary to *Helicobacter pylori* infection. This causes mucosal swelling and hyperemia. Thus, interfering with good closure of the stapler and possibly predisposing patients to leak, bleed or wound infection. This theory was not confirmed in our study as there was no significant relationship between the presence of *Helicobacter pylori* related gastritis and the incidence of postoperative complications.

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Performing routine upper gastro-intestinal endoscopy before sleeve gastrectomy and offering eradication therapy for those who test positive for *Helicobacter pylori* is still controversial. Many patients feel reluctant to undergo upper gastro-intestinal endoscopy and more so if asymptomatic. It should be noted that pre-operative endoscopy can be useful in obtaining additional clinical information like presence of hiatal hernia. Since Sleeve gastrectomy entails gastric antral resection with pylorus preservation. In theory this antral resection removes *Helicobacter pylori* habitat and hence eradicating it without medical therapy, which is considered cost effective [17, 18]. In conclusion, eradication therapy is not necessary for all patient undergoing sleeve gastrectomy. Nonetheless, the study sample is small and minor statistical differences might not be readily apparent. Further studies with larger number of patients and longer term follow up will be helpful in delineating the incidence of Helicobacter related gastritis in gastric remnants.

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