

# HISTOPATHOLOGICAL SPECTRUM OF LAPROSCOPIC SLEEVE GASTRECTOMIES IN KING FAHD HOSPITAL OF THE UNIVERSITY, AL-KHOBAR, SAUDI ARABIA

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## ABSTRACT

**Objective:** This study was carried out to evaluate the spectrum of histopathological lesions in laproscopic sleeve gastrectomies (LSG) carried out at a tertiary care hospital in Saudi Arabia.

**Methodology:** This study was conducted at the department of pathology, King Fahd Hospital of the University, Al-Khobar, Saudi Arabia, from December 2010 to February 2012. We reviewed the histopathological findings of gastric resection specimens of morbidly obese patients undergoing LSG. Histopathological evaluation of all specimens was carried out. Pre-op endoscopic biopsy when available was also reviewed for any histopathological lesion. Time interval between the two procedures was noted.

**Results:** Twenty seven LSG specimens were received during the study period. Male to female ratio was 25:2 (93%:7%), mean age of the patients was  $35.74 \pm 8.68$  years, while the mean weight of LSG specimens was  $94.519 \pm 21.73$ g. The predominant histopathological finding was mild chronic quiescent gastritis (74%). Helicobacter pylori (*H.Pylori*) associated gastritis comprised a small fraction (11.1%). Pre-operative endoscopic biopsy was available in 29.63% of cases and out of these 62.5% of cases had *H.Pylori* infection.

**Conclusion:** The gastric specimens of obese Saudis undergoing LSG mainly presented with a spectrum of gastritis including *H.Pylori* infection.

**Key Words:** Morbid Obesity, Laproscopic Sleeve Gastrectomy (LSG), *H.Pylori*, Gastritis, Upper Gastrointestinal Endoscopy.

**This article may be cited as:** Ahmed A. Histopathological spectrum of laproscopic sleeve gastrectomies in King Fahd Hospital Of The University, Al-Khobar, Saudi Arabia. Khyber Med Univ J 2012;4(2): 39-44

## INTRODUCTION

Obesity is a major health problem globally. Over the last few decades, morbid obesity has become a global epidemic and the fifth leading cause of the death. More than one-tenth of the world's adult population is considered to be obese, and approximately 2.8 million deaths each year are attributed to obesity<sup>1</sup>. Morbid obesity is a chronic disease of excessive storage of fat<sup>2</sup>, with associated co-morbidities comprising diabetes, arterial hypertension, hypercholesterolemia, sleep apnea syn-

drome, arthritis, and decreased life expectancy<sup>3</sup>. The prevalence of obesity, its co-morbidities and mortality are rising at an alarming rate<sup>4</sup> and this has a major public health impact<sup>5</sup>.

The results of the current non-surgical treatment of obesity are disconcerting<sup>2</sup>. Attempts of weight loss by dieting, exercise and behavioral modifications are not satisfactory in the vast proportion of morbidly obese patients<sup>4</sup>. Surgical approaches, on the contrary, may achieve a consistent and longstanding weight loss with resolution and improvement of co-morbidities.<sup>2</sup> Bariatric surgery is commonly considered among the treatment options for the morbidly obese<sup>5</sup> and this has resulted in development of different bariatric surgical procedures. The introduction of laparoscopic surgery has revolutionized the scope of bariatric surgery<sup>6</sup>. Gastric bypass, duodenal switch and gastric banding are the most frequently conducted procedures in USA and Canada<sup>7</sup> while laparoscopic gastric restrictive procedures constitute the common bariatric procedures in Europe<sup>8</sup>.

Laparoscopic sleeve gastrectomy (LSG) is a relatively new procedure for weight loss with lower surgical risks. This is specifically more appropriate for those patients who are at a high risk for surgery, either because of their weight or the associated morbidities<sup>9</sup>. LSG has

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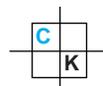
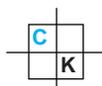
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**Date Submitted:** May 26, 2012

**Date Revised:** June 27, 2012

**Date Accepted:** June 29, 2012



emerged as the first step of a two staged operation in biliopancreatic diversion with duodenal switch (DS) or laparoscopic Roux-en-Y gastric bypass (LRYGB) for high risk morbid patients. As it is technically simple, faster to perform as compared to LRYGB, with low rates of associated complications, has good short term outcomes in weight loss and resolution of co-morbidities, it has become the procedure of choice in treating morbid obesity<sup>9,10</sup>.

The indication for preoperative upper gastrointestinal endoscopy (UGE) for all patients before bariatric surgery is yet controversial<sup>11</sup>. Preoperative evaluation of the gastrointestinal tract by a gastroenterologist before bariatric surgery yields important information that can lead to changes in planned treatment<sup>12</sup>. The clinical implications of *Helicobacter pylori* (*H.Pylori*) in patients scheduled and undergoing LSG has not been extensively evaluated<sup>13</sup>.

In Saudi Arabia, there is a high prevalence of obesity<sup>14</sup>. According to WHO estimates of 2010, 23% of males and 36% of females over the age of 15 were classified as obese<sup>15</sup>. Despite the high burden of morbid obesity, there is paucity of studies relating to morbid obesity in this region.

In our study we planned to evaluate the spectrum of histopathological lesions in the gastric specimens from LSG and when available, evaluate the changes discerned in pre-op diagnostic biopsies and compare these with the ones from the final LSG specimens.

**METHODOLOGY**

**Specimen Selection and Clinicopathological Parameters:**

We reviewed the histopathological findings of gastric resection specimens from LSG received at the pathology department of King Fahd Hospital of the University, Al-Khobar, Saudi Arabia. This study was carried out from December 2010 to February 2012, under the approved protocols of research and ethical committee of University of Dammam. Patient demographics were also recorded from the hospital records.

Histopathological evaluation of all specimens was carried out. Pre-op endoscopic biopsy when available was also reviewed for any histopathological lesion. Time interval between the two procedures was noted.

**Fixation and tissue processing:**

The gastric specimens were fixed in 10% buffered formalin. Representative samples were taken and tissue processing was carried out in an automated tissue processor (Tissue –tek VIP-5, from SAKURA). The processing consisted of an initial 2 step fixation comprising tissue immersion in 40% formalin for two hours each, fol-

lowed by removal of fixative in distilled water for 30 minutes. Dehydration was then carried out by running the tissues through a graded series of alcohol (70%, 90%, and 100%). The tissue was initially exposed to 70% alcohol for 30 minutes followed by 90% alcohol for 1 hour and then two cycles of absolute alcohol, each for one hour. Dehydration was followed by clearing the samples in several changes of xylene. It consisted of tissue immersion for an hour in a mixture comprising 50% alcohol and 50% xylene, followed by pure xylene for one and a half hour. Samples were then impregnated with molten paraffin wax, then embedded and blocked out. Paraffin sections (4-5 um) were stained with hematoxylin and eosin, the conventional histological stain<sup>16</sup>. Stained sections were examined for any histopathological lesions and presence of *H.Pylori* infection. Histopathological grading of chronic gastritis was done as per the Sydney system<sup>17</sup>.

**Statistical Analysis:**

Data was entered into SPSS (version 19). Frequencies were calculated using descriptive statistics for categorical variables while mean and standard deviation was calculated for the numerical data.

**RESULTS**

A total of 27 specimens were received during the study period. Female to male ratio was 25:2 (93:7%). The mean of age of the patients was 35.74 ± 8.68 years and mean weight of LSG specimen was 94.519 ± 27.73 grams. Pre-operative biopsy was available in 29.63% (n=8) of cases, out of that 5 (62.5%) had *H.Pylori* associated gastritis.

The results of histopathological findings are summarized in Tables I and II, while Table-III shows the pre operative biopsy findings and time from biopsy to LSG for 8 of the patients for whom the data was available. Mean time interval for these 8 patients was 202.5 ± 150.21 days. However this SD is skewed mainly because of one patient in whom surgery took 510 days from the date of biopsy.

**GROSS FINDINGS OF SLEEVE GASTRECTOMY SPECIMENS**

Gross findings	Frequency (n=27)	%age
Unremarkable	6	22.22
Hyperemia	13	48.14
Blood clots	8	29.62
Nodularity	1	3.70
Thick prominent folds	5	18.51

Table I

**MICROSCOPIC FINDINGS OF SLEEVE GASTRECTOMY SPECIMENS**

Microscopic Findings	Frequency (n=27)	%age
Unremarkable	1	3.70
Mild chronic quiescent gastritis	20	74.07
Mild chronic quiescent, follicular gastritis	1	3.70
Mild chronic gastritis with prominence of eosinophils	2	7.40
Mildly active, chronic follicular gastritis, H.Pylori associated with prominence eosinophils	1	3.70
Mildly active chronic follicular gastritis H. Pylori associated with prominence of eosinophils	1	3.70
Mildly active, chronic gastritis, chronic gastritis H.Pylori associated	1	3.70

H.Pylori: Helicobacter Pylori

Table II

**DISCUSSION**

In the LSG specimens the predominant histopathological lesion was mild chronic quiescent gastritis (74%). *H.Pylori* associated chronic gastritis comprised a small fraction of 11.1%. Pre-op endoscopic biopsy was available in 29.63 % of cases and out of these 62.5 % had *H.Pylori* infection. The average time interval between the biopsy and LSG was 202.5± 150.21 days and all these cases had mild chronic quiescent gastritis in the final specimen. 11.1% of cases of LSG revealed prominence of eosinophils in histopathological examination. The low prevalence of *H.Pylori* and the presence of pre-op endoscopic biopsies in mere 29.63% of cases arouses discussable issues.

Various earlier studies in Saudi Arabia have demonstrated a high prevalence of *H.Pylori* infection<sup>18-23</sup> with a trend towards rising prevalence rate with increasing age<sup>19,20,24</sup> and duodenal ulcers in which prevalence rate may reach up to 93%<sup>22</sup>. In this context, studies relating to morbidly obese patients are scarce more so in Saudi population where the burden of morbid obesity is high and on the rise. Our study demonstrated 11.1% of *H.Pylori* infection rate in morbidly obese patients in the sleeve gastrectomy specimen and if the pre-op endoscopic biopsies are also taken into consideration the cumulative rate rises to 29.63% which is still less than the minimally reported rate in other population based studies. A very high prevalence, 85.5% (n=53) of *H.Pylori* infection in morbidly obese Saudi patients has recently been documented in patients who underwent bariatric surgery<sup>19</sup>. This study group exhibited patients in a simi-

**COMPARISON OF LAPROSCOPIC SLEEVE GASTRECTOMY DIAGNOSIS WITH PRE-OP BIOPSIES DIAGNOSIS AND TIME INTERVAL BETWEEN THE TWO PROCEDURES (N=8)**

Patient No.	Pre-op Bx Dx	Gastrec-tomy Dx	Time inter-val days
1	Markedly active, mildly atrophic, chronic gastritis, H.Pylori associated	Mild chronic quiescent gastritis	120
2	Mild chronic quiescent gastritis	Mild chronic quiescent gastritis	Same time
3	Mildly active, mildly atrophic, chronic gastritis H.Pylori associated	Mild chronic quiescent gastritis	240
4	Mildly active chronic gastritis, H. Pylori associated	Mild chronic quiescent gastritis	510
5	Mild chronic quiescent gastritis	Mild chronic quiescent gastritis	210
6	Mild chronic quiescent, gastritis H.Pylori associated	Mild chronic quiescent gastritis	270
7	Mild chronic quiescent, gastritis	Mild chronic quiescent gastritis with prominence eosinophils	120
8	Mildly active, moderate chronic gastritis H. Pylori associated	Mild chronic quiescent gastritis	150

H.Pylori: Helicobacter Pylori

Table III

lar age group as ours (34.74years) with a female preponderance (females 42 versus male 20 ). Like wise we also had more of morbidly obese females (93% versus 7%).

The *H.Pylori* epidemiological trends vary greatly by nations<sup>25</sup> and is currently towards decline in developed and developing countries<sup>26-28</sup>. Recent studies report 63% in duodenal ulcers and approximately 35% in a randomly sampled cohort of medical students<sup>20</sup>. In an American study *H.Pylori* seroprevalence trends in adults demonstrated to have “secular trends with evidence for sustained race/ethnic disparities”. Tracing back, in US, adults participating in the continuous National Health and

Nutrition Examination Survey (1999-2000), *H. Pylori* seroprevalence increased with age in all racial/ethnic groups, with significantly higher age-standardized levels in Mexican Americans (64.0%) and non-Hispanic blacks (52.0%) compared with non-Hispanic whites (21.2%). The levels remained similar to those found in surveys from 1988 to 1991 among non-Hispanic blacks and Mexican Americans, they were significantly lower in non-Hispanic whites, especially at older ages. The factors driving the decline in *H. Pylori* seroprevalence appear to be acting preferentially on the non-Hispanic white population<sup>29</sup>. Following that in an 8 year long Argentinian study spanning from 2002 to 2009, the rate of *H. Pylori* infection in children with gastrointestinal symptoms showed a significant decrease with a prevalence of 41.2% for the triennium 2002-2004, dropping to 26.0% in the triennium 2007-2009<sup>26</sup>. The Saudi study<sup>19</sup> used for comparison was conducted from June 2006 to September 2008. Our low prevalence level could be attributed to the changing modified epidemiological trends over time.

Clinical implications of the *H. Pylori* infection in bariatric surgery patients have been shown by few studies. These include postoperative foregut symptoms, postoperative marginal ulcers and delay of surgery<sup>30-33</sup>. In order to avoid these problems, eradication of *H. Pylori* has been warranted after confirming the diagnosis.

Obesity has been shown to be an important risk factor for several gastrointestinal diseases. On pre-op endoscopic evaluation for bariatric surgery, a wide spectrum of gastrointestinal (GI) pathologies are detected in severely obese patients<sup>11</sup>. Munoz R et al, in a large series of patients, reported pathologies in a total of 46% of patients with gastritis comprising (21%), esophagitis (16%), gastric ulcers (2.7%), duodenal ulcers (2.6%), gastric polyps (1.3%), Barrett's esophagus (0.16%) and gastric cancer (0.16%)<sup>34</sup>. Moura et al described 77.2% of patients with GI lesions, with the predominant lesion being gastritis constituting 51.2%, followed by esophagitis, gastric ulcers, gastric polyps, hiatal hernias and also duodenitis<sup>11</sup>. A larger percentage of GI pathologies, nearly 80% was documented by Kuper et al, with symptomatic manifestations only seen in 20%<sup>35</sup>. In another study, overall, 91 per cent of patients had some type of pathology seen on upper endoscopy<sup>36</sup>. There is paucity of such studies in Saudi population. In one such Saudi study, sixty-five patients underwent EGD preoperatively. The mean age was 34.6 years (range: 18-52 years), majority were females (64%). Endoscopic findings included gastritis in 44 patients (67.7%), hiatus hernia in 8 (12%), gastric erosions in 7 (10.7%), reflux esophagitis in 4 (6%) and normal EGD findings in 15 patients (23%). Sixty percent of the patients had co-morbid medical conditions with diabetes mellitus being the most common<sup>37</sup>.

The indication for preoperative upper gastrointestinal endoscopy (UGE) for all patients before bariatric surgery is yet controversial<sup>11</sup>. However, routine preoperative endoscopy detects different abnormalities which need specific approach prior to surgery<sup>34</sup>. Ulcer, severe gastritis, esophagitis and duodenitis diagnosed preoperatively are treated medically before surgery and hiatal hernias are repaired intraoperatively<sup>38</sup>. It is currently being emphasized that preoperative endoscopy should be performed in all morbidly obese patients undergoing bariatric surgery, even in asymptomatic patients, as 80% of the patients with pathological findings are asymptomatic<sup>34,35</sup> as some lesion may be detected that can alter the treatment course. Upper gastrointestinal endoscopy can be performed safely. However, careful monitoring and anesthesiological support are required for patients with concomitant diseases and those receiving sedation<sup>35,36</sup>.

In our study pre-op endoscopic biopsy was available in 29.62% of cases and out of these 62.5% had *H. Pylori* infection. These cases had varied extent of inflammation, activity and atrophy. None of these showed intestinal metaplasia. In other such studies a variable prevalence pattern is reported like Kuper et al reported it to be 8.7%<sup>35</sup> and De Moura et al as 37.5%. In the study by De Moura et al, gastric biopsies were performed in 36 patients, with chronic inflammation seen in 72.2%, inflammatory activity in 30.6%, and intestinal metaplasia in 11.1%. Glandular atrophy was not found in any patient<sup>11</sup>. These findings suggest that systematic preoperative UGE and *H. Pylori* testing should be performed in all patients scheduled to undergo bariatric surgery<sup>11</sup>.

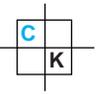
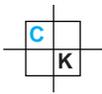
## CONCLUSION

The results of our study demonstrate that a range of gastritis comprised the histopathological spectrum in LSG. *H. Pylori* infection, although rampant was less than in most reported studies from close regions. The study however has the limitation of a small sample size.

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**AUTHOR'S CONTRIBUTION**

**AA** made substantial contributions to the manuscript regarding conception and design; collection, analysis & interpretation of data along with drafting the manuscript.

**CONFLICT OF INTEREST**

Authors declare no conflict of interest

**GRANT SUPPORT AND FINANCIAL DISCLOSURE**

NONE DECLARED

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