

## Histopathological Spectrum of Laparoscopic Sleeve Gastrectomies: A Retrospective Study

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### Abstract

**Objective:** This study was carried out to evaluate the spectrum of histopathological lesions in laparoscopic sleeve gastrectomies in morbidly obese patients at a tertiary care hospital in rural Haryana.

**Methodology:** It was a retrospective study conducted in the department of pathology, WCMSRH, Jhajjar, Haryana, over a period of two years (Dec 2016 to Nov 2018). A total of 24 morbidly obese patients underwent sleeve gastrectomies during this period. Histopathological evaluation of all the specimens was carried out and their relation with BMI (Body mass index), age and gender were evaluated.

**Result:** The mean age and BMI were 36.5 years and 45.2 respectively. Females comprised 70.83% of the sample. Out of total 24 sleeve gastrectomy specimens, 21 showed histopathologic changes, which were categorised as Chronic inactive gastritis (50%), Chronic active gastritis (16.6%), Follicular gastritis (8.3%), Lymphoid aggregates (8.3%) and Intestinal metaplasia (4.16%). Follicular gastritis and intestinal metaplasia were seen only in female patients. Chronic active gastritis was seen in patients with high BMI. Three cases (12.5%) did not show any significant pathology.

**Conclusion:** The sleeve gastrectomy specimens mainly presented with a spectrum of gastritis and chronic inactive gastritis was seen in 50% of the specimens.

**Keywords:** Laparoscopic Sleeve Gastrectomy; Gastritis; Morbid Obesity.

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## Introduction

Globally, 650 million people are obese and in India, more than 135 million individuals are affected by obesity. The prevalence of obesity in India varies due to age, gender, geographical environment, socioeconomic status and cultural factors. According to ICMR-INDIAB study 2015, prevalence rate of obesity varies from 11.8% to 31.3%. Prevalence of obesity among women is significantly higher as compared to men [1]. The World Health Organization (WHO) defines obesity according to the body mass index (BMI), which is calculated by dividing an individual's body weight in kilograms by the square of the individual's height in meters ( $\text{kg}/\text{m}^2$ ). Individuals with  $\text{BMI} < 18.5 \text{ kg}/\text{m}^2$  are underweight,  $18.5 < \text{BMI} < 24.9 \text{ kg}/\text{m}^2$  are normal weight,  $25 < \text{BMI} < 29.9 \text{ kg}/\text{m}^2$  are overweight,  $30 < \text{BMI} < 34.9 \text{ kg}/\text{m}^2$  are class 1 obese,  $35 < \text{BMI} < 39.9 \text{ kg}/\text{m}^2$  are class 2 obese and  $\text{BMI} > 40 \text{ kg}/\text{m}^2$  are morbidly obese (class 3) [2]. Non-surgical treatment of obesity seems ineffective for morbidly obese patients. Bariatric surgery can provide a substantial health benefit in these patients. Laparoscopic sleeve gastrectomy has emerged as a preferred surgical therapeutic option for treatment of morbidly obese patients [3]. There are fewer studies worldwide that examine the histopathologic outcome of sleeve gastrectomy specimens. Most of the scarce published literature on histopathologic changes in morbidly obese LSG patients is from the middle east countries [3,4,5]. While, it is presumed that LSG patients have no significant gastric pathology, the published literature shows inconsistent results. Some studies have reported that more than 50% of the specimens demonstrated histopathologic abnormality [6,7]. Others found histopathologic changes in a minority of cases [8,9] while one study inferred that routine microscopic examination of LSG specimens was unnecessary [10]. In India, however, we could not

find any published literature on histopathological changes in sleeve gastrectomy specimens in morbidly obese patients. In this study, we evaluated the histopathological changes in the sleeve gastrectomy specimens and compared them with other published findings for further analysis and interpretation.

## Materials and Methods

The retrospective study was conducted at the Department of Pathology at a tertiary care centre in rural Haryana. Patient's characteristics such as age, sex, initial BMI were recorded. Pre-operative endoscopic findings were also noted. The patients came from both rural and urban background. The findings of gross and histopathological examinations in the final biopsy reports were retrospectively reviewed. For a comprehensive analysis, the cases were categorized into the following groups on the basis of biopsy report findings: 1) Normal histology of stomach 2) Chronic inactive gastritis 3) Chronic active gastritis 4) Follicular gastritis 5) Lymphoid aggregates 6) Intestinal metaplasia. The presence or absence of *H. pylori* in final biopsy report was also noted.

## Results

A total of 24 Laparoscopic sleeve gastrectomy specimens (LSG) were received during the study period (December 2016 to November 2018). Female to male ratio was 17: 7 (71: 29). The mean age of patients was 36.5 years and mean BMI was 45.2. Table 1 shows the patients characteristics and final histopathological diagnosis. Table 2 shows the spectrum and frequency of histopathological diagnoses in LSG specimens. Grossly, the LSG specimens were unremarkable (Fig. 1).

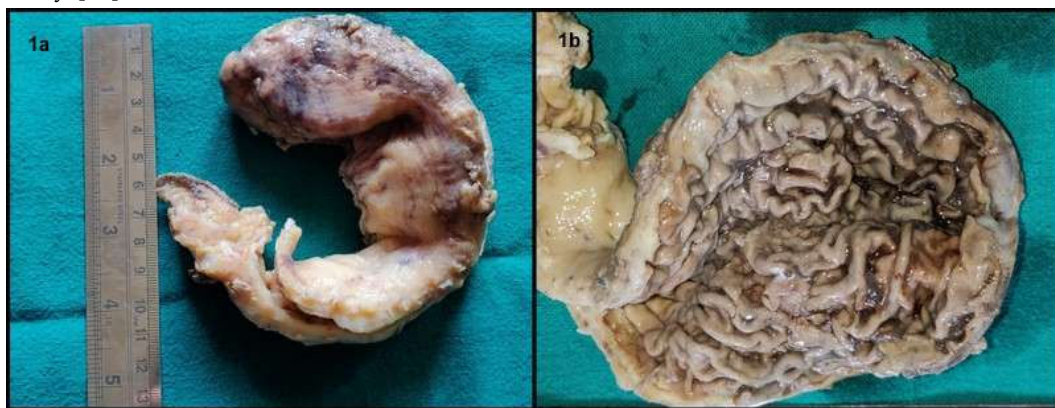
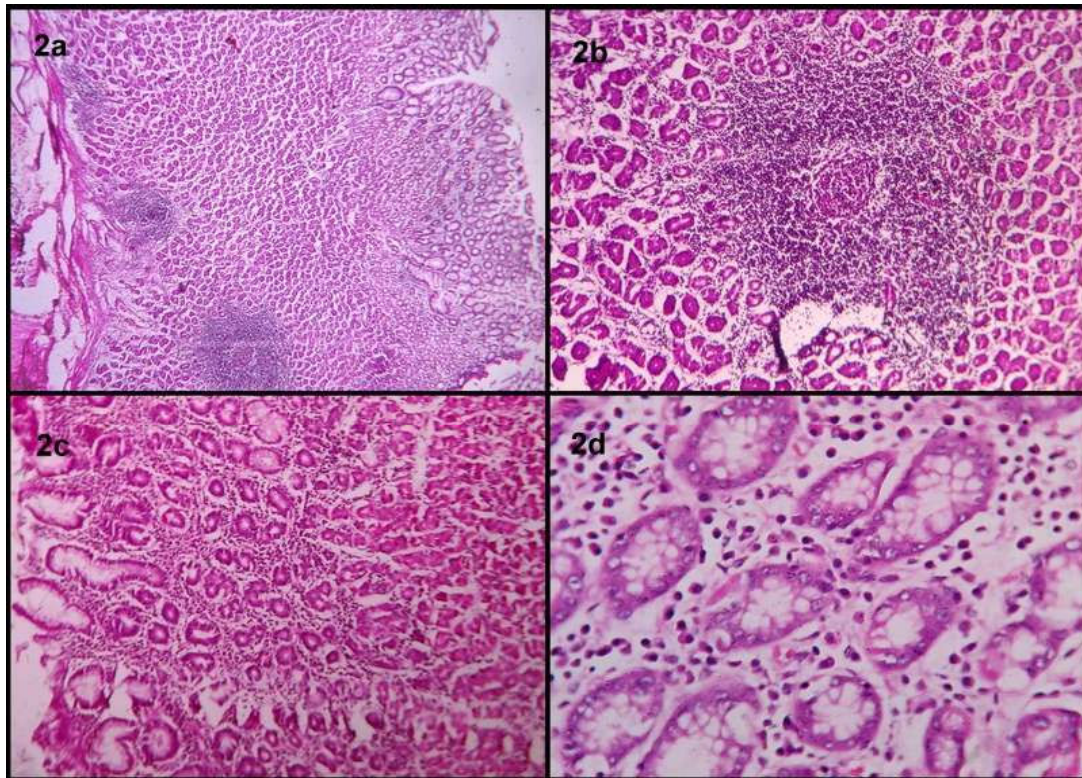
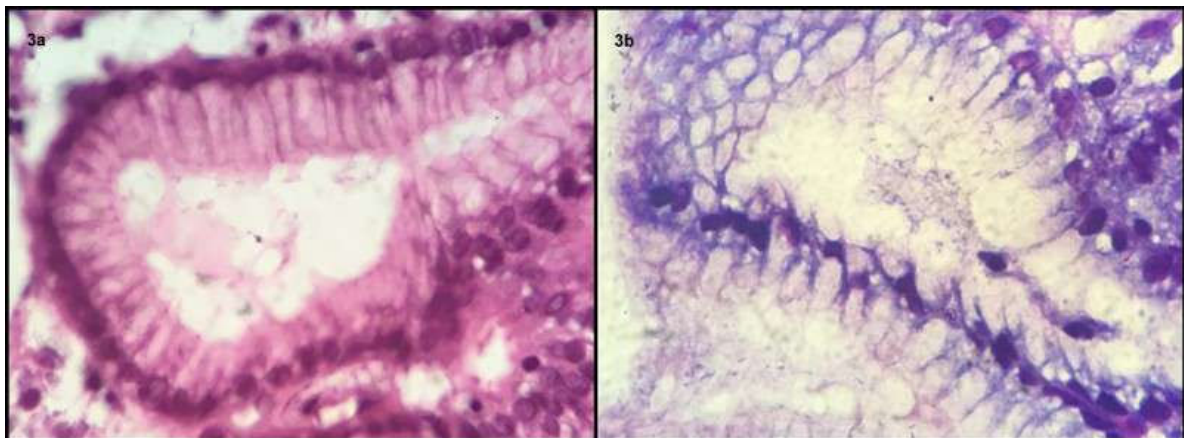


Fig. 1: Gross specimen of Laparoscopic sleeve gastrectomy; a) external surface; b) mucosal surface



**Fig. 2:** LSG specimen; Follicular gastritis: Microphotograph showing follicles with germinal centres in lamina propria (H & E stain; 40x); 2b showing follicles with germinal centres in lamina propria (H & E stain; 100x), 2c: Chronic inactive gastritis: Microphotograph showing mononuclear cell infiltration in the lamina propria (H& E; 100x), 2d: showing mononuclear cell infiltration with plasma cells in the lamina propria (H & E; 400x)



**Fig. 3:** LSG specimen: Microphotograph showing *H. pylori* colonization within glandular lumen; 3a: (H& E stain; 400x); 3b: (Giemsa stain; 400x)

Microscopically, three out of 24 specimens (12.5%) showed normal histology of stomach. The most common histopathologic change (50%) was chronic inactive gastritis (all the 12 cases showed moderate amount of chronic inflammatory cells in the lamina propria) (Fig. 2). Chronic active gastritis (diagnosed on the basis of presence of chronic inflammatory cells and polymorphonuclear

leucocytes in the lamina propria) was seen in 16.6% cases. Follicular gastritis (Fig. 2) and lymphoid aggregates comprised 8.3% each and one case showed intestinal metaplasia. Follicular gastritis and intestinal metaplasia were seen only in female patients. Two cases of chronic active gastritis showed *H. pylori* infection (Fig. 3). Both the cases were females.

**Table 1:** shows data analysis of patient's characteristics and histopathological diagnosis

Data analysis of patient's characteristics				
S. No.	Gender	Age	BMI	Diagnosis
1	F	31	41.65	Normal
2	F	32	42.32	Normal
3	F	33	43.35	Chronic inactive gastritis
4	F	35	43.45	Chronic inactive gastritis
5	F	34	42.81	Chronic inactive gastritis
6	F	35	43.91	Chronic inactive gastritis
7	F	36	42.75	Chronic inactive gastritis
8	F	32	43.32	Chronic inactive gastritis
9	F	34	43.33	Chronic inactive gastritis
10	F	37	44.15	Chronic inactive gastritis
11	F	39	47.11	Chronic active gastritis
12	F	41	48.33	Chronic active gastritis
13	F	40	48.15	Chronic active gastritis
14	F	39	47.5	Follicular gastritis
15	F	39	46.66	Follicular gastritis
16	F	35	45.16	Lymphoid aggregates
17	F	38	45.33	Intestinal metaplasia
18	M	33	42.33	Normal
19	M	37	44.61	Chronic inactive gastritis
20	M	38	44.65	Chronic inactive gastritis
21	M	38	46.33	Chronic inactive gastritis
22	M	36	45.5	Chronic inactive gastritis
23	M	43	52.87	Chronic active gastritis
24	M	41	49.33	Lymphoid aggregates

**Table 2:** Shows the distribution of histopathological diagnosis in LSG patients

Diagnosis	Female patients	Male patients	Total patients
Normal	2	1	3
Chronic inactive gastritis	8	4	12

**Table 3:** Compares the histopathologic spectrum of sleeve gastrectomies in our study with others.

Comparison of prevalence of histopathologic findings of LSG specimens in different studies						
	Normal	Chronic inactive gastritis	Chronic active gastritis	Follicular gastritis and/or Lymphoid aggregates	Intestinal metaplasia	H. pylori
Current study	12.5	50	16.6	16.6	4.16	8.33
Safaan T et al. [3]	52	33	6.8	4.9	1.4	40.9
Almazeedi et al. [5]	0	74.4	7.5	14.5	0.2	7.3
Lauti et al. [6]	46.3	38.9	Nil	Nil	2.6	8.6
Clapp et al. [8]	50.3	44.1	Nil	4.1	Nil	18
Ohanessian et al. [9]	69	13	1.6	Nil	1.3	3.2
Abdul Gaffar et al. [10]	54	45	8.4	Nil	0.7	10
Raess et al. [12]	35.2	24	Nil	31.2	2	5.2

All cells represent percentages

Chronic active gastritis	3	1	4
Follicular gastritis	2	0	2
Lymphoid aggregates	1	1	2
Intestinal metaplasia	1	0	1
Total patients	17	7	24
	(70.83%)	(29.16%)	(100%)

## Discussion

This study comprised sleeve gastrectomy specimens from 24 patients (Male: 36.5, Females: 71%). Our mean age and gender composition were in agreement with other studies, [3,5,10] in which the mean age varied from 33 to 42 years and the female patients comprised 64.2% to 77.31%. In accordance to our study, these also suggested that obesity was more prevalent in females or more females opted for bariatric surgery for morbid obesity. Even though in Haryana, the prevalence of obesity was 20% in males and 21% in females as per the National Family Health Survey, India, Key Findings 2015-16 [11], females in our study were 2.5 times the male patients. This could be because of cosmetic concerns and socio-cultural factors. Our mean BMI was 45.2 for the whole sample and was higher for males (46.52) than females (44.66). Table 3 compares the histopathologic spectrum of sleeve gastrectomies in our study with others. The percentage of specimens showing normal histology of stomach varied in different studies. It ranged from 0 to 69%. In this study, normal histology was seen in only 12.5% cases. This is not in agreement with studies reporting 50% or more of LSG specimens as normal [3,8,9,10].

These studies have thus suggested a limited value of routine histopathologic examination among LSG patients. However, Almazeedi et al. [5] in their study in Kuwait found no normal LSG specimens. The most common histopathologic diagnosis in our study was Chronic inactive gastritis (50%) followed by Chronic active gastritis (16.6%), Follicular gastritis (8.33%) and Lymphoid aggregates (8.33%). Our findings are in agreement with Almazeedi et al. [5] and in partial agreement with Safaan T et al. [3] and Abdul Gaffar et al. [10]. We observed that chronic active gastritis was seen more in females whereas follicular gastritis and intestinal metaplasia were reported only in females. Also, patients with advanced age and higher BMI had abnormal histopathologic findings; particularly Chronic active gastritis, follicular gastritis and lymphoid aggregates. However, this study has a limitation of small sample size. H. pylori was seen in two cases of Chronic active gastritis (8.33%). The H.pylori positivity in LSG specimens ranges from 3.2% to 18% in most of the studies [5,6,8,9,10,12]. Our finding (8.33%) is in accordance with Almazeedi et al. [5] (7.3%) and Lauti et al. [6] (8.6%). Safaan T et al. [3] in their study in Qatar, however found H. pylori in 40.9% of LSG specimens. This suggested high prevalence of H. pylori in their general community. Studies have confirmed high prevalence of H. pylori (20% to 97%) in Middle eastern populations [13]. Safaan T et al. [3] found that H. pylori infection was significantly associated with chronic active gastritis, follicular gastritis, lymphoid aggregates and with intestinal metaplasia. No malignancies were observed in our study as well as in other studies cited in Table 3. All our patients underwent routine preoperative oesophagogastroduodenoscopy and no abnormal findings were observed. The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recommended that OGD before bariatric surgery may be done if suspicion of gastric pathology exists [14]. But it is also 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 pathologic findings are asymptomatic and some lesion may be detected that can alter the treatment course [15,16]. Unless multiple gastric erosions, pyloric ulcer, and H.pylori are treated, they can cause gastric outlet obstruction after bariatric surgery and gastric stricture around pylorus [7]. High gastritis prevalence observed in many studies suggested a new disease phenomenon, namely, obesity-related gastritis [17]. Pre-operative endoscopic biopsy was not performed in our patients. In a

study by Ahmed A [4], preoperative endoscopic biopsy was done in 29.62% of cases and out of these, 62.5% had H. pylori infection. These findings suggest that systematic preoperative endoscopy and H. pylori testing should be performed in all patients scheduled to undergo bariatric surgery.

### Conclusion

The sleeve gastrectomy specimens in our study mainly presented with a spectrum of gastritis and chronic inactive gastritis was seen in 50% of the specimens. Detection of gastric pathologies, endoscopic biopsy prior to bariatric surgery and a detailed examination of sleeve gastrectomy specimens after surgery can both increase the success of the surgical operation and reduce comorbidities.

### References

1. Pradeep R, Anjana RM, Joshi SR, Bhansali A, Deepa M, Joshi PP et al. Prevalence of generalized and abdominal obesity in urban and rural India- the ICMR- INDIAB study (Phase-1). *Indian J Med Res* 2015;142(2):139.
2. Schauer PR, Schrimmer BD. The surgical management of Obesity. In: Schwartz SI, editor. *Principles of Surgery*, 10th ed. New York: Mc Graw- Hill; 2015.p.1099.
3. Safaan T, Bashali M, Ansari WEI, Karam M. Histopathological changes in laparoscopic sleeve gastrectomy specimens: Prevalence, Risk factors and value of routine histopathologic examination. *Obes Surg*. 2017;27:1741-49.
4. Ahmed A. Histopathological spectrum of Laparoscopic sleeve gastrectomies in King Fahd Hospital of the University, Al Khobar, Saudi Arabia. *Khyber Med Univ J*. 2012;4:39-44.
5. Almazeedi S, Al- Sabah S, Al- Mulla A. Gastric histopathologies in patients undergoing laparoscopic sleeve gastrectomies. *Obes Surg* 2013; 23:314-9.
6. Lauti M, Gormack SE, Thomas JM. What does the excised stomach from sleeve gastrectomy tell us? *Obes Surg*. 2016;26(4):839-42.
7. Dogan U, Suren D, Oruc MT, Gokay AA, Mayir B, Cakir T et al. Spectrum of gastric histopathologies in morbidly obese Turkish patients undergoing laparoscopic sleeve gastrectomy. *Eur Rev Med Pharmacol Sci*. 2017;21:5430-36.
8. Clapp B. Histopathologic findings in the resected gastrectomy. *JLS* 2015;19(1):e2013.00259. doi: 10.4293/ JLS 2013.00259.
9. Ohanessian SE, Rogers AM, Karamchandani DM.

- Spectrum of gastric histopathologies in severely obese American patients undergoing sleeve gastrectomy. *Obes Surg.* 2016;26(3):595-02.
10. Abdul Gaffar B, Raman L, Khamas A. Should we abandon routine microscopic examination in bariatric sleeve gastrectomy specimens? *Obes Surg* 2016;26(1):105-10.
  11. National Family Health Survey, India, Key findings. 2015-16. Available online: <http://rchiips.org/NFHS/factsheet-NFHS-4.shtml>. [Accessed 15 March 2018].
  12. Raess PW, Baird- Howell M, Aggarwal R. Vertical Sleeve gastrectomy specimens have a high prevalence of unexpected histopathologic findings requiring additional clinical management. *Surg ObesRelat Dis.* 2015;11(5):1020-3.
  13. Khedmat H, Karbasi- Afshar R, Agah S. Helicobacter pylori infection in the general population: a Middle Eastern perspective. *Caspian J Intern Med.* 2013; 4(4):745-53.
  14. SAGES Guidelines Committee. SAGES guidelines for clinical application of laparoscopic bariatric surgery. *Surg Endosc.* 2008;22(10):2281-300.
  15. Munoz R, Ibanez L, Salinas J, Escalona A, Perez G, Pimentel F. Importance of routine preoperative upper GI endoscopy: Why all patients should be evaluated? *Obes Surg.* 2009;19(4):427-31.
  16. Kuper MA, Kratt T, Kramer KM, Zdichavsky M, Schneider JH, Glatzle J. Effort, safety and findings of routine preoperative endoscopic evaluation of morbidly obese patients undergoing bariatric surgery. *Surg Endosc.* 2010;24(8):1996-2001.
  17. De Moura, Almeida A, Cotrim HP, Santos AS, Bitencourt AG, Barbosa DB, Lobo AP et al. Preoperative upper gastrointestinal endoscopy in obese patients undergoing bariatric surgery; is it necessary? *Surg ObesRelat Dis.* 2008;4(2):144-9.
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