ORIGINAL ARTICLE

Frequency of early complications of laparoscopic sleeve gastrectomy, using four ports, for morbidly obese patients in population of Khyber Pakhtunkhwa province, Pakistan

Adil Bangash, Muhammad Faisal Khan, Sheikh Muhammad Ibqar Azeem, Aftab Hussain

Abstract

Objectives: To document the frequency of complications following Laparoscopic Sleeve gastrectomy in morbidly obese patients in population of Khyber Pakhtunkhwa province, Pakistan

Material and Methods: This descriptive study was conducted at Lady Reading Hospital and Mohmand Medical Center, Peshawar from 1st May 2018 to 30th April 2019. All patients who underwent Laparoscopic Sleeve Gastrectomy were included in this study whether operated in public or private hospital. All patients were operated by a single surgeon. Data of complication was collected and analysed by using SPSS version 16.0.

Results: A total of 22 patients enrolled with mean age of 36.2±8.1 years. Male to female ratio was 3.4:1. Mean pre-operative weight was 133.2±33.1 Kg and pre-operative Body Mass Index (BMI) was 47.6±7.5 kg/m^2. Post-operative weight loss at one month was 10.79±15.6 kg, and post-operative BMI was 39.7±5.3 Kg/m^2 at same point. Mean percentage of excess weight loss at one month was 38.9%. Post-operatively 2-patients had developed suture line bleed and 1-patient has developed pulmonary complication, while 1-patient needed invasive ventilation in post-operative period. 3-patients presented with rapid weight loss at one month follow up. Re-exploration and mortality was zero.

Conclusions: Sleeve Gastrectomy is a safe and easy procedure to perform in a wide range of BMI's in obese patients with greater earlier benefits of significant weight loss. Consideration to a gastric bypass as a definitive procedure at a later date may be required in some patients.

Keywords: Laparoscopic Sleeve Gastrectomy, morbidly obese, early complication

Received
date: 13th December, 2019
Accepted
date: 24th December, 2020

Medical Teaching Institute, Lady Reading Hospital (LRH) Peshawar
A Bangash
MF Khan
SMI Azeem
A Hussain

Correspondence:
Dr. Muhammad Faisal Khan
Medical Officer, Surgical Unit-A, Department of Surgery, Medical Teaching Institute (MTI), Lady Reading Hospital (LRH) Peshawar
Cell No: 0333-9211211
email: faisal_kmc@yahoo.com

Introduction:

The earliest records of a surgical procedure was the jejunoileal bypass (1950's) that resulted in less than optimal results following surgery that culminated in abandoning of the procedure.[1] Following the advent of newer technological advancements for sealing vessels saw the flourish of laparoscopic procedures designed for weight loss. Most notably from literature was the Lap-Band, Sleeve gastrectomy, Rou-en-Y gastric bypass and duodenal switch.[2] These procedures benefitted patients with wide range of complications and varying weight reductions.[3]

The mechanisms proposed were both restrictive and malabsorptive from the results of surgery, but with the work of Pound a strong proposal for a hormonal role was soon adopted and showed benefit of reduction of secretion of from the fundus of the stomach and pancreas as more valid and acceptable methods of reducing weight.[4] The debate to which procedure was the best for treating obesity and the growing surge of epidemic in western nations resulted in a drastic favoritism of surgeons to perform sleeve gastrectomy in obese patients or as part of a staged procedure in patients with a BMI of > 55 kgm.[2,5]

Sleeve gastrectomy has shown to reduce approximately 50% of excess body weight (EBW) 6-12 months after surgery.[6] This remarkably is observed in the first year but later the weight loss is very unpredictable. In a study conducted by Kammerer et al. the percentage of excess weight

lost (%EWL) in a series of 200 patients was approximately 44%.[7] This would be considered by some patients as suboptimal but a more significant number of patients show improvement in mobility, declining glycaemic levels, relief from obstructive sleep apnoea and cardiovascular diseases.

Apart from the risk of operating on obese patients as an anesthetic risk and increased chances of developing deep venous thrombosis, there remain a constellation of complications that need to be followed by surgeons despite all the technological advancements apart from the success of the procedure that is weight loss.[8] These include bleeding from staple line, staple line leaks, stenosis and strictures with an attempt to create a very narrow tube, sudden (rapid weight loss) and digestive issues. Documenting a higher number of females (74%) in a study conducted by Siddiq et al. no mortalities were documented, although a figure of 0.19% has been documented in a review by Rabkin et al. over a period of 30 days post-operatively. This rate compared to other mortality rates for greater surgical procedures is acceptable considering the benefits. The inherent fear of populations where the procedure is not common practice is the purpose and rationale of documenting the frequency of complications in the post-operative period in this study.

Material and Methods:

This descriptive study was conducted at Lady Reading Hospital, Peshawar from 1st May 2018 to 30th April 2019 as part of an endeavor to explore bariatric surgery and included cases operated both in the government and private sector i.e. Lady Reading Hospital, Peshawar and Mohmand Medical Center, Peshawar. All patients were operated by a single surgeon. All patients were enrolled following strict observation of BMI, diet, co morbidity, attempts at weight loss and symptoms. Ethical issues were discussed and addressed following which an approval was obtained from the ethical committee of Lady Reading Hospital. Considering the lack of a sample frame no control group was selected to compare techniques.

All patients seen in the outpatient department were counseled and educated about the benefits of the procedure and a written consent was obtained. Patients >55 years of age, BMI>40, cardiac disease, concomitant GERD with radiological evidence of hiatal hernia were excluded at the outpatient department. All the candidates were asked to meet a dietician and document a proven weight loss of >10 kg at any point. Appropriate lifestyle modification was instituted where possible by the dietician. Excess body weight and ideal weight calculation was calculated pre-operatively on the eve of surgery. Investigations including full blood count, RFT's, LFT's, coagulation profile, Viral Profile, Fasting blood sugar and a chest X-ray were performed in all patients. Rest of the relevant investigation was at discretion of the attending surgeon. Only clear fluids night before surgery was advised along with thromboprophylaxis with enoxaparin instituted and carried on till 7th post operative day (POD).

All patients were operated in supine position by a four port technique including the liver retraction (where needed). Greater curvature was released using harmonic, vessel sealing device, till exposure of the left crus. A point at the antral side identified at 7 centimeters from the pylorus was marked. Staplers of varying thickness from 4.1 mm -3.5 mm were used from the antral end till the angle of HIS using Echelon flex endoscopic stapling device. The staple points were decided by being guided using a 36Fr bougie. Following completion of the stapling prior to an over-running suture a submersion or dye test was performed. The resected specimen was removed through the 15 mm umbilical port. The 15mm port site was repaired prior to recovery.

On the first post-operative day all patients were subjected to a gastrografin study to assess adequacy and staple line leaks with fluoroscopic guidance. All patients were allowed clear liquid on 1st POD and advised discharge accordingly. Patients were followed till one month after surgery and listed for any complications that evolved over this period as was the weight loss during the first month. Following first week pa-

Table 1: Demographic data and Body Mass Indices (pre and post-operative) (n=22)

Mean Age (yrs)(sd)	**36.2(+8.1)**
Gender	
M	05(22.7%)
F	17(77.2%)
Pre-operative weight (kg)(sd)	133.2(+21.3)
Pre-operative BMI (kg/m^2) (sd)	47.6(+7.5)
Post-operative weight at one month(kg) (sd)	107.9(+15.6)
Post-operative BMI (kg/m^2) (sd)	39.7(+5.3)
Mean Percentage excess weight loss(%) at one month	38.9%

Table 2: Pre-operative presentation (n=22)

Obstructive sleep apnoea	13(59.09%)
Hypertension	10(45.4%)
GERD	05(22.7%)
Diabetes mellitus Type 2	08(36.3%)
Osteoarthritis	03(13.6%)
Low Back Ache	11(50%)
Non mobility (including bed ridden)	03(13.6%)
Documented Depression	09(40.9%)

tients were allowed to ingest pureed food with caloric limitation and avoidance of sweets and chocolates.

Statistical analysis: All data was collected and entered into SPSS version 16.0. Qualitative data such as gender, staple line leak and suture line bleeding was presented in tabulated form with percentages. Quantitative data such as BMI, age, weight loss at one month was presented in tabulated form with standard deviations and ranges where applicable.

Results:

The study was conducted over a period of 1-year at Surgical C unit, Department of Surgery, Lady Reading Hospital, Peshawar and the private sector hospital, Mohmand Medical Centre, Peshawar. As part of introduction to Bariatric surgery all patients selected to inclusion were selected by a strict criterion of age, cardiac status and lack of major co morbidities. All 22-patients enrolled were subjected to changes in life and most were already being treated for some psychiatric disorders but still all patients were asked to consider an appointment regarding the option of a surgical procedure for their condition.

Only one of the 3- patients that were bed-ridden with a BMI of 48kg/m^2 was above the age of 50 years. This patient was bed-ridden with irreversible changes (bowed knees) secondary to osteoarthritis. All other patients were below the age of 50 years and the youngest recorded patient was 27 years old. The striking observation of a predominantly female dominant series showed the males were of a much higher BMI. The highest BMI recorded was a patient aged 28 years with a BMI of 66 (203kg). Following surgery the average estimated weigh loss (EWL) at one month was 38.9% and the highest recorded weight loss was 43kg (range: 17-43kg).

The group of patient numbers was limited and the most common pre-operative presentations were sleep disturbances, diabetes, lower back ache and osteoarthritis that witnessed a series of appointments with oto-rhinolaryngologists, physicians and orthopedic surgeons respectively. Hypertension and depression were the next most common presentations of these patients. On inquiring data reveals many mentioning lack of any advice to consider a bariatric procedure (81.8%). Majority were incidental appointments due to other reasons where the proposal of laparoscopic sleeve gastrectomy was accepted. 3-patients were bed-ridden and also had recurrent chest infections (13.6%) but no evidence of Hiatal hernia although one patient had symptoms of GERD as shown in table-2.

The most common presentation in the post-operative period was GERD symptoms (18.1%). Only one of the 4 patients who had post-operative symptoms of GERD had an initial presentation with GERD. They were advised long term proton pump inhibitors to alleviate symptoms and were referred to a gastroenterologist. Three patients (13.6%) had complaints of major weight loss in the early period, of which one had to be re-admitted for fluid therapy and correction of major electrolyte imbalances in a different setting. Two of the other patients were

Table 3: List of complications and Hospital stay (n=22)

Pulmonary complications	01(4.54%)
Bleeding suture line	02(9%)
Staple line leak	≠1
Stenosis/stricture of remnant tube	0
GERD	04(18.1%)
Reopening/re-exploration	00
Invasive ventilation ICU	01(4.54%)
Dyspepsia	03(13.6%)
Rapid weight loss	03(13.6%)
Mortality	00
Mean hospital stay (Days)(s.d)	1.36(±1.1)

allowed early permission of pureed food, and sufficed.

Using a 36 Fr tube and lack of overzealous overrunning of the staple line proved no stricture or narrowing of the stomach tube. Consideration for thickness of gastrum and size of staple lines in accordance resulted in only one suspicion of a staple line leak following fluoroscopic gastrografin studies. This patient also had discharge of serous fluid from a midline port site on second post-operative day. A Nil by mouth regimen and repeat of the gastrografin studies failed to prove a leak. No patient was subjected to re-exploration, although per-operatively in two cases (9%) there was significant bleed at the staple line that resolved with over running the staple line with vicryl 2/0 and placement of drain for security.

Following the first post-operative day, all patients were mobilized and sent to a radiological suite to document absence of a suture line leak following which they were allowed clear fluids and discharged. Such was the case in all but only two patients (9%), who had per-operatively staple line bleed, were retained till the 4th POD but eventually were sent home without any complications.

Discussion:

Documenting an early experience by any institution comes with great fears of confronting complications but sleeve gastrectomy has not been a stranger to the lay person in the west and modern world considering the growing epidemic of obesity in these populations. With the introduction of more processed food in developing countries the need for application of Bariatric surgery to fulfill needs of obese patients comes as no surprise. Sleeve gastrectomy, once known of the lesser procedures amongst list of bariatric procedures for the treatment of obesity, has proven its worth.[11] Considering a near 50% loss of excess body weight in the first 6-12 months is beyond what major food fads and medications offered by physicians and dieticians have achieved for obese patients.[12]

In our study alone nearly 40% of the excess body weight was lost in the first month alone. The pattern of obesity in the subcontinent is different as compared to the more peripheral obesity, observed in the west. Moreover the objective apart from feeling better about one's body and shape varies from our population as majority considering surgery are desperate to lose weight due to impending co morbidities or limitation of movement. This was a limitation of our study considering that the procedure was performed more frequently for nearly two decades in most part of the world and had results of the %EWL over periods of more than 1 year.[13] Himpens et al. had documented a %EWL in excess of 60% at completion of one year that would point that the pattern of weight loss was different for different populations and different procedures performed.

Consideration to the racial variation and choice of procedure was considered in a review by Lee et al.[14] mentioned the format of the Asia-Pacific Bariatric Surgery Group (APBSG) in South Korea in 2004. Consensus to the indication of the procedures related to treatment of obesity showed a relaxation for the BMI of individuals without any co morbidities to 37 instead of 40 as recommended by SAGES(American Version), suggesting that central obesity was prone to development of obesity related morbidity than in western populations.[15] For comparison, in our study most patients were well above the suggested BMI for Asian populations but no effec-

tive guideline for Pakistani populations exists, suggesting bariatric surgery is in relative infancy phase.

Alleviating fears of documentation that sleeve gastrectomy could result in more than expected weight loss has not been proved in literature as a systematic analysis conducted by Fischer et al. was done to compare the weight loss following sleeve gastrectomy and Gastric bypass showed that sleeve gastrectomy showed to have a significantly lower weight loss at one year in comparison (43%) but the long term results showed maximum benefits at 24 and 36 months.[16] Hence on completion of 24 months the weight loss irrespective of BMI was comparable. Patients enrolled in our study could be considered for a more prolonged follow-up to document these effects, only to surprise of our patients the figure at one year was comparable to figures from one year (approx.40% EWL at one month).

Like many studies with fewer patients our study lacked any documentation of mortality. This could also be attributed to the selectivity of patients in our study. Many western studies made considerations to cases with variable BMI and co morbidities, some documenting repeated showers of thrombi into the deep venous systems.[17-22] This requires more care and anticipation of impending complications and thus a possibility of mortality.

No cases of deep venous thrombosis were documented so far, which is also a common finding in patients undergoing sleeve gastrectomy. In a study conducted Alsina et al.[23] 50-75% 0f all deaths reported after sleeve gastrectomy. Following 100 consecutive procedure one case (1%) was documented DVT of the portal-mesenteric axis where as 2% had DVT of the right leg. These figures where despite and regimen of anticoagulant fixed at a rate of 0.5 mg/kg/day 12 hours preoperatively and maintained during 30 days postoperatively, where as in our study enoxaparin was provided subcutaneously till 7 days post-operatively. This could suggest added anticipation of the complication with increasing number of cases and greater procedures like gastric bypass or bilio-pancreatic diversion.

Most feared complication of sleeve gastrectomy is the staple line leak which can lead to drastic losses of electrolytes and fluid loss. Paradoxically, in a registry of 15,756 patients documented to have sleeve gastrectomy in Germany following 2005, 241 patients (1.53%) experienced a leak following surgery, documenting a significant mortality versus those cases that had no leaks (3.5%).[24] The weight loss in comparison was similar suggesting an expectant therapy with drainage feasible if needed. Yet over sewing the staple line was associated with near to zero chances of leak. In our study, only one case was suspected of a leak that probably resolved due to a nil per oral regimen for a few days.

As part of standard operating procedures (SOP's) all patients were subjected to routine gastrograffin studies on the first post-operative day. This was added to document a confirmed 'no leak' following a confirmatory dye test (methylene blue) performed per-operatively. In a study performed by Wahby et al.[25] evidence suggests that the per-operative dye test with methylene blue is confirmatory and a CT with oral contrast was a more suitable alternate to the gastrograffin studies routinely performed on the day after surgery.

In our study, we observed that one patient (4.54%) had persistent symptoms of Gastro-esophageal reflux disease (GERD) both before and after surgery. All cases with documented hiatus hernia were excluded from the study, yet 4 patients (18.1%) of patients did not experience any symptoms of GERD after surgery. Whether the development of GERD is a consequence of obesity, in this series, or a reasonable dissection to expose the left crus of the Hiatus is the cause of the post-operative symptoms is not clearly defined.

In a study conducted by Sheppard et al.[26] comparison of gastric bypass with sleeve gastrectomy failed to elicit an increased use of proton pump inhibitors for their GERD symptoms during the first year but the figure changed to being

significant at completion of one year proving that sleeve gastrectomy does worsen symptoms in the long run with 58% of patients increasing the dose of the PPI to alleviate their symptoms. Similar evidence was observed from other studies following sleeve gastrectomy.[27-33]

Conclusions:

Sleeve gastrectomy is a safe and easy procedure to perform in a wide range of BMI's in obese patients with greater earlier benefits of significant weight loss. Consideration to a gastric bypass as a definitive procedure at a later date may be selectively warranted and patients with gastroesophageal reflux disease should be considered for a gastric bypass instead of sleeve gastrectomy. The number of cases is fewer to conclude a better outcome which was major limitation of the study.

Conflict of interest: none

Funding source: none

Role and contribution of authors:

Dr. Adil Bangash, Conception and acquisition of data, critical revision and final approval.

Dr. Muhammad Faisal Khan, acquisition of data & literature search

Dr. Sheikh Muhammad Ibqar Azeem, drafting the manuscript & literature Search

Dr. Aftab Hussain, analysis of data.

References:

1. Griffen WO, Bivins BA, Bell RM (1983). "The decline and fall of the jejunoileal bypass". Surg Gynecol Obstet. 157 (4): 301–8
2. Buchwald H, Avidor Y, Braunwald E, Jensen MD, Pories W, Fahrbach K et al. Bariatric surgery ; a systematic review and meta-analysis. JAMA 2004; 292: 1724–37.
3. Morino M, Toppino M, Forestieri P, Angrisani L, Allaix ME, Scopinaro N. Mortality after bariatric surgery: analysis of 13,871 morbidly obese patients from a national registry. Ann Surg 2007; 246: 1002–7; discussion 7–9
4. Pound A. Ghrelin implicated in obesity and wasting syndromes. Lancet 2000; 356:1417.
5. Brethauer SA, Hammel JP, Schauer PR. Systematic review of sleeve gastrectomy as staging and primary bariatric procedure. Surg Obes Relat Dis 2009; 5: 469–75.
6. Paluszkiewicz R, Kalinowski P, Wróblewski T, et al. Prospective randomized clinical trial of laparoscopic sleeve gastrectomy versus open Roux-en-Y gastric bypass for the management of patients with morbid obesity. Videosurgery Miniinv. 2012;7:225–32.
7. Buwen JP, Kammerer M, Beekley AC, Tichansky DS. Laparoscopic sleeve gastrectomy: The rightful gold standard weight loss surgery procedure. Surg Obes Rel Dis 2015; 11(6): 1383–5.
8. Steele KE, Schweitzer MA, Prokopowicz G, et al. The long-term risk of venous thromboembolism following bariatric surgery. Obes Surg. 2011;21:1371–6.
9. Siddiq G, Aziz W, Pervez MB, Haider MI, Hussain SV, Khan N. Early Laparoscopic Sleeve Gastrectomy Outcomes in Terms of Weight Loss. Journal of the College of Physicians and Surgeons Pakistan 2016, Vol. 26 (3): 169-172.
10. Rabkin RA1, Rabkin JM, Metcalf B, Lazo M, Rossi M, Lehmanbecker LB. Laparoscopic technique for performing duodenal switch with gastric reduction. Obes Surg. 2003 Apr; 13(2):263-8.
11. Baltasar A, Serra C, Perez N, et al. Laparoscopic sleeve gastrectomy: a multi-purpose bariatric operation. Obes Surg 2005; 15(8):1124-8.
12. Farrell TM, Haggerty SP, Overby DW, et al. Clinical application of laparoscopic bariatric surgery: an evidence-based review. Surg Endosc 2009; 23(5):930-49.
13. Himpens J, Dapri G, Cadiere GB. A prospective randomized study between laparoscopic gastric banding and laparoscopic isolated sleeve gastrectomy: results after 1 and 3 years. Obes Surg 2006; 16(11):1450-6.
14. Lee WJ, Wang W. Bariatric surgery: Asia-Pacific perspective. Obes Surg 2005;15:751–7.
15. SAGES guideline for clinical application of laparoscopic bariatric surgery. Surg Obes Relat Dis. 2009 May-Jun;5(3):387-405.
16. Fischer L1, Hildebrandt C, Bruckner T, Kenngott H, Linke GR, Gehrig T, Büchler MW, Müller-Stich BP. Excessive weight loss after sleeve gastrectomy: a systematic review. Obes Surg. 2012 May;22(5):721-31.
17. Sosa JL, Pombo H, Pallavicini H, Ruiz-Rodriguez M (2004) Laparoscopic gastric bypass beyond age 60. Obes Surg 14(10):1398-1401
18. Sugerman HJ, DeMaria EJ, Kellum JM et al (2004) Effects of bariatric surgery in older patients. Ann Surg 240(2):243-7
19. Taylor CJ, Layani L (2006) Laparoscopic adjustable gastric banding in patients C60 years old: is it worthwhile? Obes Surg 16(12):1579-83.
20. Quebbemann B, Engstrom D, Siegfried T (2005) Bariatric surgery in patients older than 65 years is safe and effective. Surg Obes Relat Dis 1(4):389-92.
21. Helling TS (2005) Operative experience and follow-up in a cohort of patients with a BMI + 70 kg/m2. Obes Surg 15(4):482-5
22. Taylor JD, Leitman IM, Hon P et al (2006) Outcome and complications of gastric bypass in super-super obesity versus morbid obesity. Obes Surg 16(1):16-8.
23. Alsina E1, Ruiz-Tovar J, Alpera MR, Ruiz-García JG, Lopez-Perez ME, Ramon-Sanchez JF, Ardoy F. Incidence of deep vein thrombosis and thrombosis of the portal-mesenteric axis after laparoscopic sleeve gastrectomy. J Laparoendosc Adv Surg Tech A. 2014 Sep; 24(9):601-5.
24. Benedix F, Poranzke O, Adolf D, Wolff S, Lippert H, Arend J, Manger T, Stroh C. Staple Line Leak After Primary Sleeve Gastrectomy-Risk Factors and Mid-term Results: Do Patients Still Benefit from the Weight Loss Procedure? Obes Surg. 2017 Jan 11. doi: 10.1007/s11695-017-2543-7.
25. Wahby M1, Salama AF, Elezaby AF, Belgrami F, Abd Ellatif ME, El-Kaffas HF, Al-Katary M. Is routine postoperative gastrografin study needed after laparoscopic sleeve gastrectomy? Experience of 712 cases. Obes Surg. 2013 Nov;23(11):1711-7.
26. Sheppard CE1, Sadowski DC, de Gara CJ, Karmali S, Birch DW. Rates of reflux before and after laparoscopic sleeve gastrectomy for severe obesity. Obes Surg. 2015 May;25(5):763-8.
27. Chiu S, Birch DW, Shi X, et al. Impact of sleeve gastrectomy on gastroesophageal reflux disease: a systematic review. Surg Obes Relat Dis. 2011;7:510–5.
28. Howard DD, Caban AM, Cendan JC, et al. Gastroesophageal reflux after sleeve gastrectomy in morbidly obese patients. Surg Obes Relat Dis. 2011;7:709–13.
29. Woodman G, Cywes R, Billy H, et al. Effect of adjustable gastric banding on changes in gastroesophageal reflux disease (GERD) and quality of life. Curr Med Res Opin. 2012; 28:581–9.
30. de Jong JR, Besselink MGH, Van Ramshorst B, et al. Effects of adjustable gastric banding on gastroesophageal reflux and esophageal motility: a systematic review. Obes Rev. 2010; 11:297–305.
31. Arias IE, Radulescu M, Stiegeler R, et al. Diagnosis and treatment of megaesophagus after adjustable gastric banding for morbid obesity. Surg Obes Relat Dis. 2009;5:156–9.
32. Frezza EE, Ikramuddin S, Gourash W, et al. Symptomatic improvement in gastroesophageal reflux disease (GERD) following laparoscopic Roux-en-Y gastric bypass. Surg Endosc. 2002;16:1027–31.
33. Perry Y, Courcoulas AP, Fernando HC, et al. Laparoscopic Roux-en-Y gastric bypass for recalcitrant gastroesophageal reflux disease in morbidly obese patients. JSLS. 2004; 8:19–23.