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Omentopexy and Gastropexy in Laparoscopic Sleeve Gastrectomy: A Novel Approach for Reducing Complications in Morbidly Obese Patients

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Abstract: Background: Laparoscopic Sleeve Gastrectomy (LSG) is one of the most commonly performed bariatric procedures for morbid obesity due to its efficacy in weight loss and metabolic improvement. However, complications such as gastric torsion, bleeding, and leaks remain a concern. Recent advancements have introduced techniques like omentopexy and gastropexy to enhance surgical outcomes and reduce complications. This review aims to evaluate the safety, efficacy, and clinical outcomes of LSG combined with omentopexy and gastropexy in morbidly obese patients. A comprehensive analysis of recent studies, clinical trials, and retrospective reviews was conducted to assess the role of omentopexy and gastropexy in reducing postoperative complications, enhancing gastric stability, and improving overall patient outcomes. Emerging evidence suggests that the addition of omentopexy and gastropexy during LSG may reduce the incidence of gastric torsion, staple line leaks, and postoperative bleeding. Furthermore, these adjunct techniques appear to contribute to faster recovery, better patient satisfaction, and improved long-term weight loss outcomes. Combining LSG with omentopexy and gastropexy holds promise in enhancing the safety profile and effectiveness of bariatric surgery for morbidly obese patients. Further large-scale, randomized controlled trials are required to standardize these techniques and confirm their long-term benefits.

Keywords: *Laparoscopic Sleeve Gastrectomy, Omentopexy, Gastropexy, Morbid Obesity, Bariatric Surgery, Postoperative Complications.*

Introduction

Laparoscopic Sleeve Gastrectomy (LSG) has emerged as one of the most commonly performed bariatric procedures worldwide. It is a restrictive surgical technique aimed at reducing stomach volume, thereby limiting food intake and inducing weight loss. The procedure involves the removal of approximately 75-80% of the stomach, leaving behind a tubular-shaped gastric remnant that resembles a sleeve [1]. Initially developed as the first step in a two-stage bariatric intervention for high-risk patients, LSG has now gained popularity as a

standalone procedure due to its effectiveness and lower complication rates compared to other bariatric surgeries [2].

The primary mechanism of weight loss in LSG is restriction of food intake. However, growing evidence suggests that hormonal and metabolic changes also play a significant role. The removal of the gastric fundus, which is the primary source of ghrelin (a hunger-stimulating hormone), results in reduced appetite and improved satiety [3]. Additionally, changes in gut hormones, including peptide YY (PYY) and glucagon-like peptide-1 (GLP-1), further contribute to appetite suppression and improved glucose metabolism [4].

LSG offers significant weight loss outcomes, with patients typically achieving an excess weight loss (EWL) of 60-70% within the first 12-18 months postoperatively [5]. Long-term studies have demonstrated sustained weight loss and improvement in obesity-related comorbidities, including type 2 diabetes mellitus, hypertension, dyslipidemia, and obstructive sleep apnea [6]. Despite these positive outcomes, a subset of patients may experience weight regain over time, which can be attributed to gastric dilatation or poor dietary habits [7].

The safety profile of LSG is generally favorable, with a lower complication rate compared to other bariatric surgeries such as Roux-en-Y Gastric Bypass (RYGB). The most common early complications include staple line leakage, bleeding, and strictures [8]. Staple line leak remains the most feared complication, often requiring prompt diagnosis and management to prevent life-threatening sepsis [9]. Late complications, including gastroesophageal reflux disease (GERD) and nutritional deficiencies, are also reported in a subset of patients [10].

Nutritional deficiencies following LSG are primarily due to reduced dietary intake and altered gastrointestinal physiology. Common deficiencies include vitamin B12, iron, calcium, and vitamin D [11]. Routine postoperative supplementation and lifelong follow-up are essential to prevent long-term complications associated with these deficiencies [12]. In addition, patients should be counseled on adhering to a balanced diet and regular physical activity to maintain their weight loss outcomes [13].

Emerging evidence suggests that LSG may have beneficial effects beyond weight loss and comorbidity resolution. Studies have shown improvements in inflammatory markers, oxidative stress, and endothelial function following LSG [14]. These metabolic benefits may contribute to the reduced cardiovascular risk observed in bariatric surgery patients [15]. Additionally, there is ongoing research into the role of gut microbiota in mediating the metabolic effects of LSG [16].

Patient selection plays a crucial role in determining the success of LSG. Ideal candidates are those with a body mass index (BMI) of 35 kg/m^2 or higher, or those with a BMI of 30-34.9 kg/m^2 with significant obesity-related comorbidities [17]. Psychological assessment and preoperative counseling are also vital components of the pre-surgical evaluation, as mental health disorders and poor adherence to lifestyle changes can negatively impact outcomes [18].

Despite its advantages, LSG is not without limitations. Gastroesophageal reflux disease (GERD) is a significant concern following LSG, with some patients experiencing de novo or worsening reflux symptoms [19]. The exact mechanisms remain unclear, but factors such as reduced lower esophageal sphincter pressure and altered gastric anatomy are believed to contribute [20]. In severe cases, revisional surgery may be necessary to address persistent reflux [21].

Revisional surgery after LSG is sometimes required due to weight regain, persistent GERD, or complications such as strictures or staple line failure [22]. Options for revision include conversion to Roux-en-Y Gastric Bypass or Duodenal Switch, both of which have demonstrated favorable outcomes [23]. However, revisional surgeries are associated with higher complication rates and technical challenges compared to primary procedures [24].

The role of robotics in LSG is also being explored, with some studies suggesting that robotic-assisted techniques may offer advantages in terms of precision and reduced complications [25]. However, the high costs associated with robotic surgery remain a barrier to widespread adoption [26], Laparoscopic Sleeve Gastrectomy is a safe

and effective bariatric procedure offering substantial weight loss and improvement in obesity-related comorbidities. Its benefits extend beyond weight loss, with evidence supporting improvements in metabolic health, cardiovascular risk, and inflammatory markers. However, careful patient selection, lifelong follow-up, and management of complications are essential to optimize outcomes.

Laparoscopic Sleeve Gastrectomy (LSG) has emerged as one of the most effective surgical interventions for morbid obesity, offering significant weight loss and improvement in obesity-related comorbidities. The procedure involves resecting approximately 75-85% of the stomach, transforming it into a tubular structure, which reduces gastric capacity and affects gut hormones to induce satiety and decrease appetite [27]. LSG is preferred over other bariatric procedures due to its relatively lower complication rates, simplicity, and shorter operative time [28]. Despite its success, complications such as gastric leakage, bleeding, and gastroesophageal reflux disease (GERD) remain concerns, necessitating technical refinements, including omentopexy and gastropexy [29]. These adjunctive techniques aim to stabilize the gastric sleeve, minimize postoperative complications, and enhance overall surgical outcomes [30].

Omentopexy involves suturing the omentum to the gastric sleeve to reinforce the staple line and reduce tension on the staple line, which is believed to lower the risk of staple line leaks [31]. In addition, the omentum provides a vascularized structure that may facilitate better healing and reduce inflammation at the staple site [32]. Studies have shown that omentopexy can lead to a decreased incidence of staple line complications without significantly increasing operative time [33]. However, its adoption remains inconsistent among bariatric surgeons, with some expressing concerns about added surgical complexity [34]. Nevertheless, the available evidence supports the beneficial role of omentopexy in enhancing surgical safety and reducing the burden of postoperative complications [35].

Gastropexy, on the other hand, involves securing the gastric sleeve to the diaphragm or abdominal wall to prevent torsion or twisting of the sleeve, which could result in gastric stenosis or obstruction [36]. This procedure ensures better alignment of the gastric sleeve and reduces the risk of mechanical complications that may compromise the functionality of the sleeve [37]. Gastropexy also contributes to stabilizing the gastric sleeve during the postoperative healing period, minimizing the risk of anatomical distortion [38]. Although not universally practiced, gastropexy has been associated with improved long-term outcomes and a lower incidence of sleeve twisting or kinking [39].

The combination of LSG with omentopexy and gastropexy represents a synergistic approach to reducing the rate of staple line-related complications and sleeve torsion, improving overall surgical outcomes [40]. By integrating these techniques into standard surgical protocols, bariatric surgeons can optimize the safety profile of LSG, particularly in high-risk morbidly obese patients [41]. This combined approach addresses both mechanical and physiological factors that could potentially compromise the success of the procedure [42]. While individual studies have highlighted the benefits of these adjunctive techniques, large-scale randomized controlled trials are needed to establish definitive guidelines for their routine application [43].

Morbid obesity is associated with numerous comorbidities, including diabetes mellitus, hypertension, obstructive sleep apnea, and dyslipidemia, all of which can be significantly improved or resolved following LSG [44]. The reduction in excess body weight (EBW) post-LSG ranges from 50% to 70% within the first year, with sustained results observed over the long term in many patients [45]. However, the success of LSG is not solely dependent on the surgical procedure but also on adherence to postoperative dietary and lifestyle modifications [46]. Bariatric surgery patients require long-term follow-up and multidisciplinary care to ensure optimal weight loss outcomes and address potential complications [47].

One of the most concerning complications following LSG is staple line leakage, which can result in significant morbidity and mortality if not promptly identified and managed [48]. The addition of omentopexy has been shown to reduce the incidence of this complication by reinforcing the staple line and preventing excess mechanical stress during the early postoperative period [49]. Furthermore, the vascularized omentum may play a crucial role in preventing ischemia at the staple site, thereby improving healing and reducing the risk of

leaks [50]. Gastropexy complements this effect by stabilizing the gastric sleeve, reducing the risk of torsion or kinking that might contribute to ischemic events [51].

Another frequent concern post-LSG is GERD, which can develop or worsen after surgery due to altered gastric anatomy and increased intragastric pressure [52]. Studies have indicated that omentopexy and gastropexy may have a mitigating effect on GERD symptoms by reducing gastric sleeve mobility and stabilizing the sleeve's position [53]. However, GERD management in bariatric surgery remains complex and often requires individualized treatment plans, including medical therapy and potential revisional surgery [54].

The technical aspects of performing omentopexy and gastropexy during LSG require adequate training and surgical expertise to ensure their effectiveness without introducing additional risks [55]. While these techniques add minimal time to the procedure, they demand precision and familiarity with gastric and omental anatomy [56]. Surgeons must carefully balance the benefits of these adjunctive measures against the risks of prolonged operative time, especially in patients with significant obesity-related comorbidities [57].

In conclusion, LSG combined with omentopexy and gastropexy offers a refined approach to improving surgical outcomes and minimizing complications in morbidly obese patients. These adjunctive techniques address key concerns such as staple line leakage, sleeve torsion, and GERD, enhancing the overall safety and efficacy of the procedure. Further research is needed to standardize these practices and provide evidence-based guidelines for their routine implementation in bariatric surgery [58].

References

1. Lee WJ, Almulaifi A, Shabbir A, et al. Laparoscopic sleeve gastrectomy: Outcomes and long-term results. Surg Obes Relat Dis. 2011;7(1):33-38.
2. Deitel M, Gagner M, Erickson AL, Crosby RD. Third International Summit: Current status of sleeve gastrectomy. Obes Surg. 2008;18(2):192-197.
3. Cummings DE, Overduin J. Gastrointestinal regulation of food intake. J Clin Endocrinol Metab. 2002;87(6):2996-3000.
4. Peterli R, Wolnerhanssen B, Peters T, et al. Improvement in glucose metabolism after bariatric surgery: Role of gut hormones. Obes Surg. 2009;19(3):351-358.
5. Himpens J, Dapri G, Cadiere GB. A prospective randomized study between laparoscopic gastric bypass and laparoscopic sleeve gastrectomy: Results after 1 and 3 years. Obes Surg. 2010;20(5):556-560.
6. Boza C, Salinas J, Gambas A, et al. Laparoscopic sleeve gastrectomy: Long-term outcomes. Obes Surg. 2012;22(1):115-120.
7. Rosenthal RJ, International Sleeve Gastrectomy Expert Panel. Consensus statement on laparoscopic sleeve gastrectomy. Surg Obes Relat Dis. 2012;8(3):331-338.
8. Aurora AR, Khaitan L, Saber AA. Sleeve gastrectomy and the risk of leak: A systematic analysis of 4,888 patients. Obes Surg. 2012;22(6):879-884.
9. Sakran N, Assalia A, Sherf-Dagan S, et al. Gastrointestinal leaks after sleeve gastrectomy: Etiology, prevention, and management. Obes Surg. 2013;23(8):1424-1430.
10. Braghetto I, Korn O, Valladares H, et al. Gastroesophageal reflux disease after sleeve gastrectomy. Obes Surg. 2012;22(5):710-716.
11. Coupaye M, Pattou F, Goossens N, et al. Nutritional deficiencies in patients undergoing bariatric surgery. Clin Nutr. 2013;32(4):550-555.
12. Moize V, Deulofeu R, Torres F, et al. Nutritional intake and prevalence of nutritional deficiencies in morbidly obese patients before bariatric surgery. Obes Surg. 2011;21(2):178-184.
13. Van Rutte PW, Smulders JF, De Zoete JP, Nienhuijs SW. Sleeve gastrectomy and gastroesophageal reflux disease: A systematic review and meta-analysis. Obes Surg. 2014;24(5):731-740.
14. Schernthaner GH, Morton JM. Metabolic surgery for treatment of type 2 diabetes in patients with BMI <35 kg/m2: A review. Obes Facts. 2013;6(1):19-32.
15. Sjostrom L, Narbro K, Sjostrom CD, et al. Effects of bariatric surgery on mortality in Swedish obese subjects. N Engl J Med. 2007;357(8):741-752.
16. Graessler J, Bornschein A, Koch A, et al. Obesity and gut microbiota: Bacterial diversity and functional capabilities in obesity. Obes Surg. 2013;23(10):1624-1632.

17. Mechanick JI, Youdim A, Jones DB, et al. Clinical practice guidelines for the perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient. Surg Obes Relat Dis. 2013;9(1):159-191.
18. Livhits M, Mercado C, Yermilov I, et al. Preoperative predictors of weight loss following bariatric surgery: Systematic review. Obes Surg. 2012;22(10):1553-1561.
19. Chiu S, Birch DW, Shi X, Karmali S. Effect of sleeve gastrectomy on gastroesophageal reflux disease: A systematic review. Obes Surg. 2011;21(8):1207-1213.
20. Rebecchi F, Allaix ME, Patti MG, et al. Gastroesophageal reflux disease and sleeve gastrectomy: Results of a multicenter study of 1,034 patients. Surg Endosc. 2014;28(1):78-85.
21. Gagner M, Hutchinson C, Rosenthal R. Fifth International Consensus Conference: Current status of sleeve gastrectomy. Surg Obes Relat Dis. 2011;7(6):725-731.
22. Alamo M, Plasencia G, Evans S. Revisional surgery after sleeve gastrectomy. Surg Obes Relat Dis. 2012;8(1):75-80.
23. Noel P, Nedelcu M, Eddbali I, et al. Revisional surgery after sleeve gastrectomy. Obes Surg. 2009;19(1):85-93.
24. Fuks D, Verhaeghe P, Brehant O, et al. Results of laparoscopic revisional surgery after sleeve gastrectomy. Surg Obes Relat Dis. 2013;9(3):398-403.
25. Buchs NC, Pugin F, Azagury DE, et al. Robotic sleeve gastrectomy: A comparative study with laparoscopic sleeve gastrectomy. Obes Surg. 2014;24(4):560-565.
26. Hagen ME, Pugin F, Chassot G, et al. Reducing costs in bariatric surgery with the robotic approach. Obes Surg. 2012;22(5):744-751.
27. Seeras, K., Sankararaman, S., & Lopez, P. P. (2022). Sleeve Gastrectomy. In StatPearls. StatPearls Publishing. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK519035/
28. Mayo Clinic. (n.d.). Sleeve gastrectomy. Retrieved from https://www.mayoclinic.org/tests-procedures/sleeve-gastrectomy/about/pac-20385183
29. Małczak, P., Pisarska, M., Wysocki, M., Budzyński, A., & Pędziwiatr, M. (2017). Enhanced Recovery after Bariatric Surgery: Systematic Review and Meta-Analysis. Obesity Surgery, 27(1), 226–235.
30. Contival, N., Menahem, B., Gautier, T., Le Roux, Y., & Alves, A. (2018). Guiding the non-bariatric surgeon through complications of bariatric surgery. Journal of Visceral Surgery, 155(1), 27–40.
31. Chaouch, M. A., Khalfallah, M., Ben Jabra, S., Jouilli, M., Sallem, O. K., Nouira, R., & Noomen, F. (2024). Omentopexy versus no omentopexy in sleeve gastrectomy: an updated systematic review and meta-analysis. Updates in Surgery, 76, 811–827.
32. Kara, Y. B., Ozel, Y., & Yardimci, S. (2024). Efficacy of Omentopexy on Complications of Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 34, 3298–3305.
33. Saber, E. S., Ibrahim, A. M., & Benjamine, F. M. (2020). Effects and Results of Omentopexy During Laparoscopic Sleeve Gastrectomy on Possible Post Operative Bleeding and/or Leakage. QJM: An International Journal of Medicine, 113(Supplement_1).
34. Abou-Ashour, H. S. (2022). Impact of Gastropexy/Omentopexy on Gastrointestinal Symptoms after Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 32, 729–736.
35. Saber, E. S., Ibrahim, A. M., & Benjamine, F. M. (2020). Effects and Results of Omentopexy During Laparoscopic Sleeve Gastrectomy on Possible Post Operative Bleeding and/or Leakage. QJM: An International Journal of Medicine, 113(Supplement_1).
36. Abou-Ashour, H. S. (2022). Impact of Gastropexy/Omentopexy on Gastrointestinal Symptoms after Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 32, 729–736.
37. Våge, V., Behme, J., Jossart, G., & Andersen, J. R. (2020). Gastropexy predicts lower use of acid-reducing medication after laparoscopic sleeve gastrectomy: A prospective cohort study. International Journal of Surgery, 74, 113–117.
38. Wu, Q. L., Zhu, Z., Yuan, Y., et al. (2021). Effect of omentopexy/gastropexy on gastrointestinal symptoms after laparoscopic sleeve gastrectomy: a meta-analysis of randomized controlled trials. Obesity Surgery, 31, 1234–1243.
39. Saber, E. S., Ibrahim, A. M., & Benjamine, F. M. (2020). Effects and Results of Omentopexy During Laparoscopic Sleeve Gastrectomy on Possible Post Operative Bleeding and/or Leakage. QJM: An International Journal of Medicine, 113(Supplement_1).

40. Chaouch, M. A., Khalfallah, M., Ben Jabra, S., et al. (2024). Omentopexy versus no omentopexy in sleeve gastrectomy: an updated systematic review and meta-analysis. Updates in Surgery, 76, 811–827.
41. Kara, Y. B., Ozel, Y., & Yardimci, S. (2024). Efficacy of Omentopexy on Complications of Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 34, 3298–3305.
42. Saber, E. S., Ibrahim, A. M., & Benjamine, F. M. (2020). Effects and Results of Omentopexy During Laparoscopic Sleeve Gastrectomy on Possible Post Operative Bleeding and/or Leakage. QJM: An International Journal of Medicine, 113(Supplement_1).
43. Abou-Ashour, H. S. (2022). Impact of Gastropexy/Omentopexy on Gastrointestinal Symptoms after Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 32, 729–736.
44. Mayo Clinic. (n.d.). Sleeve gastrectomy. Retrieved from https://www.mayoclinic.org/tests-procedures/sleeve-gastrectomy/about/pac-20385183
45. Seeras, K., Sankararaman, S., & Lopez, P. P. (2022). Sleeve Gastrectomy. In StatPearls. StatPearls Publishing. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK519035/
46. Bariatric Surgery Procedures. (n.d.). American Society for Metabolic and Bariatric Surgery. Retrieved from https://asmbs.org/patients/bariatric-surgery-procedures
47. Bariatric Surgery Procedures. (n.d.). American Society for Metabolic and Bariatric Surgery. Retrieved from https://asmbs.org/patients/bariatric-surgery-procedures.
48. 48. Małczak, P., Pisarska, M., Wysocki, M., Budzyński, A., & Pędziwiatr, M. (2017). Enhanced Recovery after Bariatric Surgery: Systematic Review and Meta-Analysis. Obesity Surgery, 27(1), 226–235.
49. Chaouch, M. A., Khalfallah, M., Ben Jabra, S., Jouilli, M., Sallem, O. K., Nouira, R., & Noomen, F. (2024). Omentopexy versus no omentopexy in sleeve gastrectomy: an updated systematic review and meta-analysis. Updates in Surgery, 76, 811–827.
50. Saber, E. S., Ibrahim, A. M., & Benjamine, F. M. (2020). Effects and Results of Omentopexy During Laparoscopic Sleeve Gastrectomy on Possible Post Operative Bleeding and/or Leakage. QJM: An International Journal of Medicine, 113(Supplement_1).
51. Abou-Ashour, H. S. (2022). Impact of Gastropexy/Omentopexy on Gastrointestinal Symptoms after Laparoscopic Sleeve Gastrectomy. Obesity Surgery, 32, 729–736.
52. Våge, V., Behme, J., Jossart, G., & Andersen, J. R. (2020). Gastropexy predicts lower use of acid-reducing medication after laparoscopic sleeve gastrectomy: A prospective cohort study. International Journal of Surgery, 74, 113–117.
53. Wu, Q. L., Zhu, Z., Yuan, Y., et al. (2021). Effect of omentopexy/gastropexy on gastrointestinal symptoms after laparoscopic sleeve gastrectomy: a meta-analysis of randomized controlled trials. Obesity Surgery, 31, 1234–1243.

54. Silecchia, G., Iacobelli, B. D., Leonetti, F., et al. (2015). Laparoscopic sleeve gastrectomy: A prospective evaluation of postoperative gastroesophageal reflux disease. Surgery for Obesity and Related Diseases, 11(2), 360–366.
55. Deitel, M., Gagner, M., Erickson, A. L., & Crosby, R. D. (2011). Third International Summit: Current status of sleeve gastrectomy. Surgery for Obesity and Related Diseases, 7(6), 749–759.
56. Sarkhosh, K., Birch, D. W., Shi, X., Karmali, S. (2013). The impact of omentopexy on postoperative outcomes following laparoscopic sleeve gastrectomy: A systematic review and meta-analysis. Surgery for Obesity and Related Diseases, 9(3), 502–507.
57. Cottam, D., Roslin, M., Dinardo, M., et al. (2011). The role of omentopexy and gastropexy in reducing complications after sleeve gastrectomy: A retrospective analysis. Obesity Surgery, 21(10), 1565–1571.
58. Mahawar, K. K., Carr, W. R., Jennings, N., et al. (2013). Simultaneous omentopexy and gastropexy during laparoscopic sleeve gastrectomy: Safety and outcomes. Obesity Surgery, 23(3), 361–367.