Endoscopic Pyloromyotomy and Pyloroplasty for Medically Refractory Gastroparesis: A Safe and Effective Means of Palliation

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Introduction

- Gastroparesis is a chronic and debilitating gastrointestinal disorder characterized by impaired gastric emptying in the absence of mechanical obstruction.
- Causes include diabetic, post-surgical, and idiopathic.
- Patients may experience symptoms of nausea, vomiting, fullness, bloating, and early satiety.
- Medical management options are limited.
- Laparoscopic pyloroplasty and, more recently, per-oral endoscopic pyloromyotomy (POP) have become attractive, less invasive treatment option for refractory gastroparesis with comparable efficacy.
- This study seeks to evaluate the palliative efficacy and safety of major pyloric interventions (via either laparoscopic pyloroplasty or POP) for medically refractory gastroparesis.

Methods

- This is a retrospective review of 234 patients who underwent either laparoscopic pyloroplasty or POP from January 2015 to February 2022 by two fellowship trained foregut surgeons.
- Pre-operative and post-operative patient-reported symptom severity scores were obtained through a quality-of-life assessment, measured through a 5-point Likert scale in the areas of: nausea, vomiting, fullness, early satiety, bloating, distension, heartburn, and regurgitation.
- Symptoms were then subdivided into categories of mild (0-1), moderate (2-3), and severe (4-5) to evaluate the degree of symptom change preoperatively to postoperatively.
- Nonparametric tests were performed and p-values <0.05 were considered significant.

Results

- Patients who underwent either laparoscopic pyloroplasty (89) or POP (145) showed a significant improvement in symptom scores.
- Vomiting showed the greatest degree of symptom improvement (p<0.01) though there was significant improvement across all symptom categories (Table 1).
- There were significant decreases in the percentage of patients reporting severe symptoms (Table 2).
- Two patients returned to the operating room for a postoperative leak in the laparoscopic pyloroplasty group, but they recovered without any major morbidity. There was no morbidity in the POP group.
- There was no mortality after laparoscopic pyloroplasty or POP.

	Pre-Op	Post-Op	Corrected p-Value
Nausea	4 (3-5)	3 (0-4)	<0.01
Vomiting	3 (1-4)	1 (0-3)	<0.01
Fullness	4 (3-5)	3 (2-4)	<0.01
Early satiety	5 (3-5)	3 (2-5)	<0.01
Bloating	5 (3-5)	3 (2-5)	<0.01
Distension	4 (3-5)	3 (1-4)	<0.01
Heartburn	3 (1-4)	1 (0-3)	<0.01
Regurgitation	3 (1-4)	1 (0-3)	<0.01
Composite score	4 (3-4)	3 (1-3)	<0.01

Table 1: A comparison of the median and range of patient reported scores on the quality-of-life assessment from pre-op to post-op for patients who underwent either laparoscopic pyloroplasty or POP.

		Pre-Op	Post-Op	Corrected p-Value
Nausea	Mild (0-1)	10 (8.40%)	39 (31.71%)	0.01
	Moderate (2-3)	30 (25.21%)	41 (33.33%)	
	Severe (4-5)	79 (66.39%)	43 (34.96%)	
Vomiting	Mild (0-1)	42 (35.29%)	74 (60.66%)	<0.01
	Moderate (2-3)	27 (22.69%)	27 (22.13%)	
	Severe (4-5)	50 (42.02%)	21 (17.21%)	
Fullness	Mild (0-1)	5 (4.42%)	24 (19.67%)	0.04
	Moderate (2-3)	27 (23.89%)	41 (33.61%)	
	Severe (4-5)	81 (71.68%)	57 (46.72%)	
Composite score	Mild (0-1)	8 (6.72%)	42 (34.15%)	<0.01
	Moderate (2-3)	58 (48.74%)	61 (49.59%)	
	Severe (4-5)	53 (44.54%)	20 (16.26%)	

Table 2: A comparison of the degree of symptom severity improvement from pre-op to post-op for patients who underwent either laparoscopic pyloroplasty or POP.

Discussion

- Gastroparesis is a debilitating disease which can adversely affect a patient's quality of life.
- Laparoscopic pyloroplasty and POP have been shown to be equally effective in palliation of symptoms for patients with refractory gastroparesis through pyloric intervention, which has been thought to be helpful with symptomatic improvement by allowing for more effective gastric emptying.
- When looking at pyloric intervention (either through laparoscopic pyloroplasty or POP), this study found that patients had an improvement in all symptom categories.
- The greatest degree of symptom improvement was in vomiting, though nausea and fullness also demonstrated evidence of significant improvement.
- Nausea, vomiting, and fullness are cardinal symptoms of gastroparesis which negatively impact a patient's quality of life. This study indicates that pyloric surgery is effective in palliation among patients with medically refractory gastroparesis.

Conclusion

- Laparoscopic pyloroplasty and POP result in significant symptom improvement in gastroparesis with vomiting, nausea, and fullness showing the greatest improvement.
- Pyloric surgery is safe and effective in the palliation of medically refractory gastroparesis.

References

Bajpai, S., Khan, A., Rutledge, K.M., & Stahl, R.D. (2021, March 26). Impact of Robotic Versus Laparoscopic Pyloroplasty on Short- and Long-term Outcomes in Patients with Gastroparesis. *Journal of Gastrointestinal Surgery*, *25*(10), 2679-2680.

Garg, R., Mohan, B.P., Aggarwal, M., Ponnada, S., Singh, A., Thota, P.N., & Sanaka, M.R. (2020, March 12). Peroral Pyloromyotomy is Effective and Safe for Postsurgical Gastroparesis. *Journal of Gastrointestinal Surgery*, *24*(6), 1417-1420.

Hibbard, M.L., Dunst, C.M., & Swanström, L.L. (2011, September). Laparoscopic and Endoscopic Pyloroplasty for Gastroparesis Results in Sustained Symptom Improvement. *Journal of Gastrointestinal Surgery*, *15*(9), 1513-1519.

Jericho H, Adams P, Zhang G, Rychlik K, Saps M. Nausea predicts delayed gastric emptying in children. J Pediatr. 2014 Jan;164(1):89-92. doi: 10.1016/j.jpeds.2013.09.019. Epub 2013 Oct 13.

Landreneau, J.P., Strong, A.T., Ponsky, J.L., Tu, C., Kroh, M.D., Rodriguez, J.H., & El-Hayek, K. (2019, September 3). Enhanced recovery outcomes following per-oral pyloromyotomy (POP): A comparison of safety and cost with same-day discharge versus inpatient recovery. *Surgical Endoscopy*, *34*(7), 3153-3162.

Landreneau, J.P., Strong, A.T., El-Hayek, K., Tu, C., Villamere, J., Ponsky, J.L., Kroh, M.D., & Rodriguez, J.H. (2018, July 17). Laparoscopic pyloroplasty versus endoscopic per-oral pyloromyotomy for the treatment of gastroparesis. *Surgical Endoscopy*, *33*(3), 773-781.

Lee, A.A., & Hasler, W.L. (2018, May 31). G-POEM for Gastroparesis: Is There Pressure to Go with the Flow?. *Digestive Diseases and Sciences*, *63*(9), 2165-2167.

Malik, Z., Kataria, R., Modayil, R., Ehrlich, A.C., Schey, R., Parkman, H.P., & Stavropoulos, S.N. (2018, February 22). Gastric Per Oral Endoscopic Myotomy (G-POEM) for the Treatment of Refractory Gastroparesis: Early Experience. *Digestive Diseases and Sciences*, *63*(9), 2405-2412.

Mohan, B.P., Chandan, S., Jha, L.K., Khan, S.R., Kotagiri, R., Kassab, L.L., Ravikumar, N.P.G., Bhogal, N., Chandan, O.C., Bhat, I., Hewlett, A.T., Jacques, J., Ponnada, S., Asokkumar, R., & Adler, D.G. (2020, August). Clinical efficacy of gastric per-oral endoscopic myotomy (G-POEM) in the treatment of refractory gastroparesis and predictors of outcomes: A systematic review and meta-analysis using surgical pyloroplasty as a comparator group. *Surgical endoscopy*, *34*(8), 3352-3367.

Navas, C.M., Patel, N.K., & Lacy, B.E. (2017, July 18). Gastroparesis: Medical and Therapeutic Advances. *Digestive Diseases and Sciences*, *62*(9), 2231-2240.

Pyloroplasty. *AORN Journal* (2019). *109*(2), P10-P12.

Revicki DA, Rentz AM, Dubois D, Kahrilas P, Stanghellini V, Talley NJ, Tack J. Gastroparesis Cardinal Symptom Index (GCSI): development and validation of a patient reported assessment of severity of gastroparesis symptoms. Qual Life Res. 2004 May;13(4):833-44.

Rodriguez, J.H., Haskins, I.N., Strong, A.T., Plescia, R.L., Allemang, M.T., Butler, R.S., Cline, M.S., El-Hayek, K., Ponsky, J.L., & Kroh, M.D. (2017, May 31). Per oral endoscopic pyloromyotomy for refractory gastroparesis: Initial results from a single institution. *Surgical Endoscopy*, *31*(12), 5381-5388.

Shada, A.L., Dunst, C.M., Pescarus, R., Speer, E.A., Cassera, M., Reavis, K.M., & Swanstrom, L.L. (2016, April). Laparoscopic pyloroplasty is a safe and effective first-line surgical therapy for refractory gastroparesis. *Surgical endoscopy*, *30*(4), 1326-32.

Strong, A.T., Landreneau, J.P., Cline, M., Kroh, M.D., Rodriguez, J.H., Ponsky, J.L., & El-Hayek, K. (2019, February 26). Per-Oral Pyloromyotomy (POP) for Medically Refractory Post-Surgical Gastroparesis. *Journal of Gastrointestinal Surgery*, *23*(6), 1095-1103.

Zoll, B., Jehangir, A., Edwards, M.A., Petrov, R., Hughes, W., Malik, Z., & Parkman, H.P. (2019, September 11). Surgical Treatment for Refractory Gastroparesis: Stimulator, Pyloric Surgery, or Both?. *Journal of Gastrointestinal Surgery*, *24*(10), 2204-2211.

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.