Successful Endoscopic Pyloric Therapy in a Patient with Gastroparesis and Normal 3 cpm Gastric Myoelectrical Activity after Multiple Failed Surgeries

Fadi Chanaa, MD; Kenneth Koch, MD
Section on Gastroenterology and Hepatology, Department of Internal Medicine,
Wake Forest University School of Medicine, Winston-Salem, NC

INTRODUCTION

- Patients with chronic nausea and vomiting due to gastroparesis are difficult to treat.
- Gastric peristalsis is paced by interstitial cells of Cajal (ICC) that generate normal 3 cycle per minute (cpm) gastric myoelectrical activity (GMA).[1]
- Depletion of ICCs diminishes normal 3 cpm GMA , causes gastric dysthymias, and delays gastric emptying in many patients. Others have normal 3cpm GMA.[2]
- Superior mesenteric artery syndrome (SMAS) is a rare cause of gastric obstruction and delayed emptying due to extrinsic compression of the duodenum by SMA.[3]
- Median Arcuate Ligament Syndrome (MALS) is an uncommon disorder, presumably causing abdominal pain by compression of the celiac artery by MAL.[3]
- In this patient with gastroparesis and 3 cpm GMA, endoscopic treatment of pyloric neuromuscular dysfunction was successful after operations for MALS and SMAS had failed.

CASE PRESENTATION

- A 21 year old female with history of POTS, Ehlers-Danlos, SMAS, MALS, IBS-C, and gastroparesis presented with nausea, vomiting, early satiety, and post-prandial abdominal pain.
- Patient was seen at multiple medical institutions.
- Medications including metoclopramide, erythromycin, and domperidone failed to relieve her symptoms.
- Cholecystectomy, duodenojejunostomy for SMAS, and median arcuate ligament release for MALS also failed to control symptoms.
- During this time, she lost 35 pounds, failed enteral nutrition, and required IV fluids and total parental nutrition.
- She was referred to Wake Forest Gastrointestinal Motility Clinic for further evaluation.

DIAGNOSTIC ASSESSMENT

Upper Endoscopy	• Normal with patent duodenojejunal anastomosis.
Solid-Phase Gastric Emptying Test	• 25% retention at 4 hours (normal 0-9%).
Electrogastrogram (EGG)	• Normal 3 cpm GMA (Figure 1 and 2).
EndoFLIP	• Pyloric distensibility index (DI) was 8.2 (Normal >10).

FIGURE 1. ECG signal shows normal 3 cpm GMA at baseline and periods 1-3 after water load.

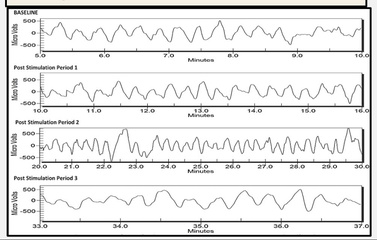
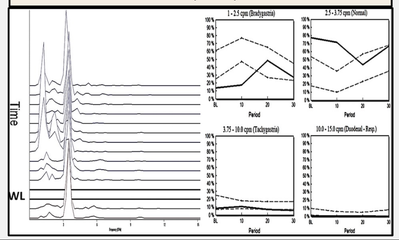


FIGURE 2. Spectral Analysis shows 3 cpm peaks before and after water load (WL).

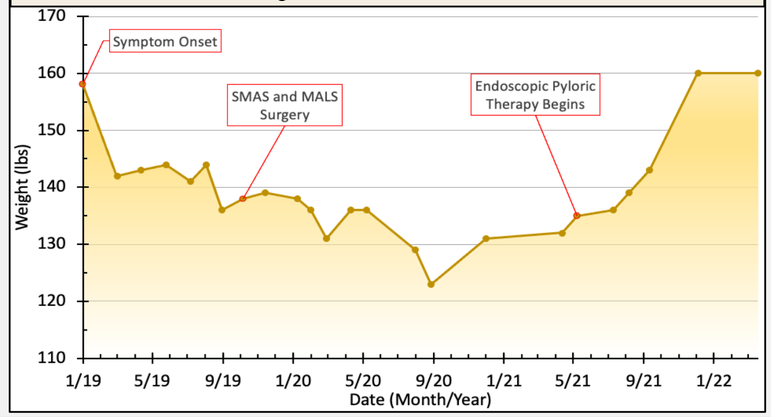


INTERVENTION AND OUTCOME

ENDOSCOPIC PYLORIC THERAPY	IMPROVEMENT OF SYMPTOMS
• Botulinum Toxin Injections (200 U) • Balloon Dilations	• Tolerated normal diet • Discontinued IV fluids, TPN, and enteral feeding. • Gained 25 lbs

INTERVENTION AND OUTCOME

FIGURE 3. Patient's weight over the course of her illness.



DISCUSSION

- In this patient, GP with 3 cpm GMA subtype was identified and led to successful endoscopic therapy for pyloric neuromuscular dysfunction.
- Presence of 3 cpm GMA is found in 35% of patients with gastroparesis and indicates normal number of ICCs.[2] Botulinum toxin or balloon dilation improves symptoms in 78% of these patients.[4]
- Studies show that symptoms may not improve in 2/3 of patients after duodenojejunostomy for SMAS. MALS is a rare cause of gastroparesis (4 cases).[5-7]
- This case represents successful endoscopic pyloric therapy in a patient with gastroparesis and normal 3 cpm GMA, a subtype to be considered before surgeries for SMAS or MALS.

REFERENCES

1. O'Grady G, Angeli TR, Du P, et al. Abnormal initiation and conduction of slow-wave activity in gastroparesis, defined by high-resolution electrical mapping. *Gastroenterology.* 2012;143(3):589-598 e583.
2. Wellington J, Scott B, Kundu S, Stuart P, Koch KL. Effect of endoscopic pyloric therapies for patients with nausea and vomiting and functional obstructive gastroparesis. *Auton Neurosci.* 2017;202:56-61.
3. Cienfuegos JA, Hurtado-Pardo L, Valenti V, et al. Minimally Invasive Surgical Approach for the Treatment of Superior Mesenteric Artery Syndrome: Long-Term Outcomes. *World J Surg.* 2020;44(6):1798-1806.
4. Koch KL, Van Natta M, Parkman HP, et al. Effect of liquid and solid test meals on symptoms and gastric myoelectrical activity in patients with gastroparesis and functional dyspepsia. *Neurogastroenterol Motil.* 2022:e14376.
5. Chang J, Boules M, Rodriguez J, Walsh M, Rosenthal R, Kroh M. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome: intermediate follow-up results and a review of the literature. *Surg Endosc.* 2017;31(3):1180-1185.
6. Trinidad-Hernandez M, Keith P, Habib I, White JV. Reversible gastroparesis: functional documentation of celiac axis compression syndrome and postoperative improvement. *Am Surg.* 2006;72(4):339-344.
7. Balaban DH, Chen J, Lin Z, Tribble CG, McCallum RW. Median arcuate ligament syndrome: a possible cause of idiopathic gastroparesis. *Am J Gastroenterol.* 1997;92(3):519-523.