Obstructing Clots at Jejunojejunal Anastomosis Following Roux-en-Y Gastric Bypass: A Single Institution Study

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Introduction

- Gastric bypass surgery is still superior to sleeve gastrectomy for patients with super-obesity (BMI > 50), diabetes, reflux, and for patients with obesity refractory to sleeve gastrectomy or gastric banding.
- While small bowel obstruction can occur any time after a gastric bypass, the differential diagnosis in the early post-operative period includes narrowing at the jejunostomy, internal hernia, adhesions, and (less commonly) obstruction at the jejunojejunostomy due to clot.[1]
- Complete obstruction of the JJ anastomosis by clot will result in dilation of the gastric remnant, which can perforate. The diagnosis must therefore be considered and addressed expeditiously.
- There is as of yet a lack of data on the contemporary management of this complication. Previously published series are either very small or management was predominantly with open surgery.
- We present a series of 10 patient of Roux-en-Y gastric bypass procedures done over an 8-year period, who presented in the early post-operative period with hematemesis or symptoms of a bowel obstruction, and who were diagnosed with an obstructing clot at the jejunojejunostomy due to a staple line bleed.

Methods

- Our local MBSAQIP database was queried for reoperation within 30 days. All patients met the criteria set by the National Institute of Health Consensus for surgical management of morbid obesity.[3]
- We reviewed each case for patients who returned to the operating room for bowel obstruction or bleeding. We then reviewed the operative notes, and found 10 patients who were diagnosed with an obstructing clot at the jejunojejunostomy.
- A retrospective chart review was used to collect pertinent pre-operative clinical parameters, the technique used during the reoperation, and 30-day outcomes.
- Dilated gastric remnants were defined by their description in radiologists' reports of CT.
- Hematocrit (Hct) drop was calculated using the difference between the pre-op Hct and the Hct drawn closest to the time of re-operation.
- Symptoms were abstracted from the chart review, and from looking at both physicians' and nurses' notes.

Results

	Year	Age/ Gender	BMI	Comorbidities	Hct Drop	Symptoms	Time to re-op (days)	Stomach Decompressed First	Type(s) of approach	LOS (days)	Abscess
1	2012	37/F	41	GERD	7.8	N, AP, E	2	No	Clot Milked through	6	No
2	2015	30/F	40.8	None	13	N, AP, H	2	No	Enterotomies	10, 3	Yes
3	2015	47/M	42.1	DM II, OSA	4.5	N, AP	2	No	Enterotomies	4	No
4	2016	57/F	39.2	HLD, HTN, OSA	17.2	AP, H, F	3	No	JJ excised, G-tube	26	Yes
5	2016	25/F	53.2	None	14.5	N, AP, S	1	No	JJ excised	6	No
6	2017	39/F	46.6	HTN, OSA, GERD	19.5	N, H	3	No	Clot Milked Through/ JJ excised	6, 5	Yes
7	2018	26/F	48.0	None	13	N, H	1	Yes	Enterotomies/JJ excised, G-tube	5	No
8	2019	31/F	53	OSA, CKD, GERD, PTC	1.6	N, AP	2	Yes	Enterotomies	7	No
9	2019	53/F	44	DM II, GERD, OSA, HTN	10.5	N, AP, E	2	Yes	Enterotomies/JJ Excised, G-tube	14	Yes
10	2019	33/F	51.5	GERD, DM II, OSA	9.1	N, AP, E	1	No	Enterotomies	5	No

BMI = body mass index, Hct = Hematocrit, GERD = gastroesophageal reflux disease, DM II = Type II Diabetes Mellitus, OSA = Obstructive Sleep Apnea, HTN = Hypertension, CKD = chronic kidney disease, PTC = pseudotumor cerebri, N = Nausea, AP = Abdominal Pain, H = Hematemesis, F = Fever, S = Syncope, E = Emesis

Results from Previous Studies

Author	Year	# of cases	JJ technique	Symptoms	Time to diagnosis	Technique at re-operation	LOS	Complications	Type of Report
Helling	2005	2	1 Stapled 1 Hand sewn	Nausea tachycardia	4 days	Enterotomy	Unk	Death (1/2)	Correspondence
Awais	2005	5	Stapled, white	Nausea Impending doom	2 days	JJ excised, G-tube	9.8 days	Respiratory insufficiency (1/5)	Focus of paper
Spaw	2005	1	Triple stapled, white	Emesis Abdominal pain	1 day	Enterotomy	4 days	None	Case Report
Nelson	2006	1	Stapled	Not mentioned	Unk	Milked through	Unk	None	Described in a larger series
Peeters	2009	1	Stapled, white	Nausea Abdominal pain Impending doom	3 days	Enterotomy	8 days	None	Case Report
Lewis	2009	1	Tripled Stapled	Nausea Tachycardia	Unk	Observation	Unk	None	Described in a larger series
Mala	2013	5	Stapled, white	Nausea Abdominal pain Emesis	3.6 days	Enterotomy G-tube		Abscesses Pancreatitis Bleeding Wound dehiscence	Focus of paper
Marks	2013	3	Triple stapled, white	Unk	Unk	Unk	Unk	Perforation (1/3)	Described in a larger series/ change of technique
Shimizu	2013	2	Stapled	Nausea Abdominal pain	5 days	Enterotomy, G-tube Endoscopy	8 days	None	Described in a larger series
Pazouki	2014	2	Stapled, white	Nausea	5 days	Enterotomy Milking of clot	Unk	Unk	Focus of Paper
Green	2016	1	Stapled, white	Nausea Emesis Abdominal pain	2 days	Enterotomy	7 days	None	Focus of Paper
Soricelli	2017	1	Stapled	Nausea	1 day	Enterotomy	8 days	Pneumonia	Case Report/Video
Khoraki	2018	1	Stapled	Unk	Unk	Enterotomy	Unk	Unk	Described in a larger series
Vasas	2019	1	Unk	Emesis	3 days	Jejunal bypass G-tube	14 days	Respiratory insufficiency	Case Report/Video

CT Images

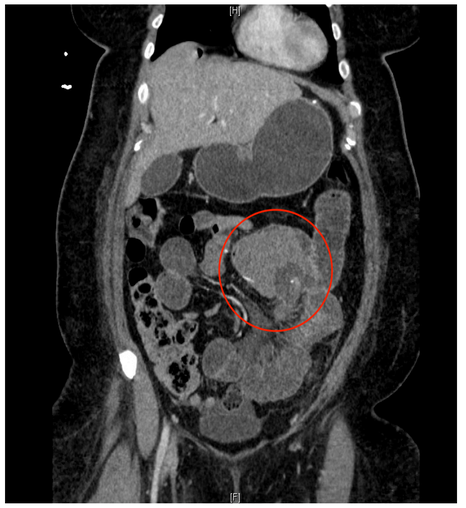


Figure 1. A coronal image depicting the dilated remnant stomach with intraluminal clot at the JJ, circled in red.

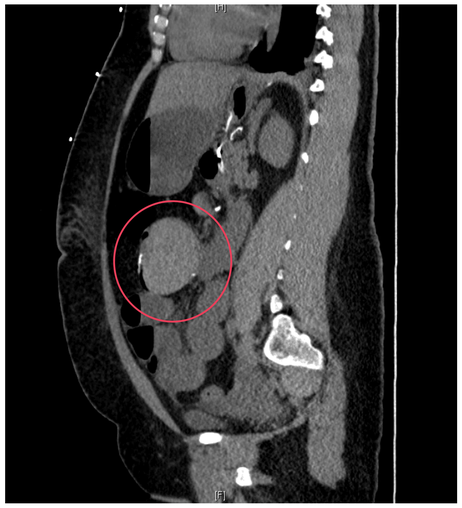
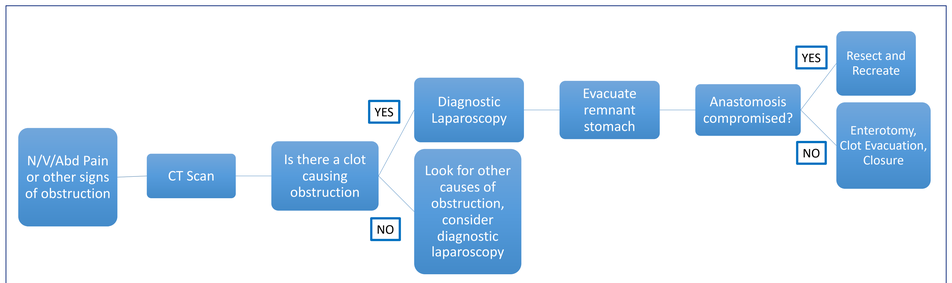


Figure 2. A sagittal image depicting the dilated remnant stomach with intraluminal clot at the JJ, circled in red.

Clinical Decision Making Flowchart



Conclusions

Despite the relatively low rate of obstructing clots at the JJ, without rapid recognition and re-operation, there is a significant risk for serious complication such as further bleeding, potential disruption of staple lines, and spillage during the corrective procedure. Typical presenting symptoms will include nausea and abdominal pain, which help differentiate it from a bleed at the gastrojejunal anastomosis or an intraperitoneal bleed. Diagnosis is commonly made with CT scan. Decompression of a dilated remnant stomach before addressing the clot is paramount to preventing intraperitoneal spillage, which can lead to abscess formation and an increased length of stay. Enterotomy creation and removal of clot is recommended without fear of continued bleeding.

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