

Gastric Cancer after Laparoscopic Adjustable Gastric Banding: A Case Series

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Abstract

Background: The association between bariatric procedures and adenocarcinoma of the distal esophagus and stomach is not fully understood. While reflux esophagitis and subsequent Barrett's esophagus may increase rates of gastric tumors, weight loss may have a protective role. Only a few case reports of gastric cancer following gastric banding have been reported.

Objective: We report three patients who were diagnosed with esophago-gastric adenocarcinoma following laparoscopic adjustable gastric banding surgery.

Methods: A retrospective review of the medical records of 3 patients who were diagnosed with gastric adenocarcinoma following LAGB.

Results: All patients underwent workup that was initiated due to long standing complaints of persisting nausea and vomiting followed by intermittent epigastric pain. One patient was diagnosed by upper endoscopy with the tumor located at the gastro-esophageal junction. The second patient was found to have a gastric body lesion during laparoscopic removal of his gastric band and the pathology was confirmed by upper endoscopy and biopsies the following day. A third patient presented with an antral mass. All patients had localized lesions with regional lymphadenopathy and eventually underwent a gastrectomy with lymph node dissection.

Conclusion: Since epigastric pain, nausea, weight loss, and vomiting are common complaints in bariatric surgery patients, these complaints often do not elicit further investigation. This may result in delayed workup and diagnosis of gastric malignancies. Clinicians must be aware of these entities, and consider routine gastroscopy in this patient population.

Keywords: Laparoscopic adjustable gastric band; Gastric cancer; Bariatric surgery; Endoscopy after bariatric surgery

Introduction

As of 2014 there are 600 million obese adults according to the world health organization, representing 13% of the adult population [1].

Bariatric surgery is currently the most effective treatment for morbid obesity, achieving significant long-standing weight loss and improvement or remission of obesity related co-morbidities [2].

As the morbidly obese population is increasing annually worldwide, so does the number of procedures performed, with 468,609 operations reported in 2013 [3]. These massive numbers are interpreted to a very high safety profile with low complication rates and a mortality risk of 0.3% [4-6].

Obesity is considered to be a major risk factor for the development of several cancers, including colon, breast, endometrium, kidney and esophagus [7]. Bariatric surgery has been shown to decrease the risk of these cancers and therefore decrease cancer mortality [8,9].

But as longer follow up is reported, there have also been few reports of esophago-gastric cancers following bariatric procedures [10].

Chronic reflux, exposure of small bowel mucosa to gastric secretions and chronic irritation of a foreign body can all be considered as contributors to malignancy [11].

Are these procedures a two-edged sword? Do they protect from cancer by reducing weight and obesity related morbidity, but should sometimes be considered as a risk factor?

We report 3 cases of gastric cancer diagnosed in patients carrying longstanding adjustable gastric bands, along with review of the current literature on these rare cases, in an effort to answer this question.

Case 1

A 75-year-old morbidly obese female, with diabetes mellitus, hypertension and hyperlipidemia. Family history of malignancies consists of two siblings with adenocarcinoma of stomach, one with melanoma, and one with breast cancer.

In 1999 she underwent laparoscopic adjustable gastric banding. Her pre-operative weight was 117 kg, and her BMI was 45.7 kg/m². She did not undergo an endoscopic evaluation prior to her surgery. She lost 10 kg following the procedure and gained her weight back within 10 months. She was then lost to follow, with no significant weight change and no gastrointestinal symptoms.

Thirteen years later she presented with dysphagia. She was planned for band removal, but due to uncontrolled hypertension the surgery was delayed, and again she was lost to follow. No endoscopic imaging was performed at that time.

In November 2015 she was admitted due to chest pain and hiccups with resolution of her symptoms following band deflation. At that time she reported a 12 kg weight loss that was attributed to a successful diet. She was referred for endoscopic evaluation. The gastrodeudonoscopy showed external pressure from her known gastric band. Proximal to that an area with inflamed, infiltrated and erythematous mucosa was biopsied and revealed adenocarcinoma. Endoscopic ultrasound evaluation suggested a T2N0 tumor.

She underwent an uneventful proximal gastrectomy. Final pathology was ulcerated adenocarcinoma, T1N1M0, and she is currently under adjuvant chemotherapy treatment.

Case 2

A 39-year-old morbidly obese male, with no co-morbidities and no family history of malignancies, underwent an LAGB in 1998 with a BMI 40.7 kg/m². His BMI decreased to 28.4 kg/m² after losing 40 kg. He then regained most of his weight back and stabilized at 115 kg – a BMI of 38.

He presented to the bariatric clinic 18 years later due to heartburn, regurgitation, epigastric pain and occasional vomiting following meals. No weight change was noticed during the previous year. His band was completely deflated at that time.

An upper GI swallow study revealed a slipped band with dilation of the distal esophagus and a large gastric pouch. He was referred for laparoscopic band removal without further evaluation.

During surgical removal of the band a firm mass was noticed on the lesser curvature. A gastrodeudonoscopy was performed the following day, and a 5 mm ulcer in the angulus was biopsied. Pathology showed Adenocarcinoma. Endoscopic ultrasound suggested a T2-3N1 tumor, and after neoadjuvant therapy he underwent total gastrectomy. Final pathology was poorly differentiated adenocarcinoma, T3N2M0, and he is currently under adjuvant therapy.

Case 3

A 59-year-old female, with no co-morbidities and no family history of malignancies, underwent an LAGB in 2005 with a BMI of 35 kg/m². Her BMI decreased to 23.3 kg/m² after losing 32 kg. Upon her diagnosis she weighed 73 kg reflecting a BMI of 26.2 kg/m².

She presented 12 years later due to abdominal distention, epigastric pain and occasional vomiting which she attributed to her gastric band. No weight change was noticed.

A gastrodeudonoscopy was performed revealing an ulcerated lesion in the antrum which was biopsied. Pathology showed poorly differentiated signet ring cell adenocarcinoma. Endoscopic ultrasound suggested a T3N0-1 tumor, and after neoadjuvant therapy she was referred to a sub-total gastrectomy. Final pathology was poorly differentiated adenocarcinoma, T4aN0, and she is currently under adjuvant therapy.

Results

Only 22 cases of esophago-gastric cancers following bariatric surgery have been reported thus far. This is a very small number compared to the millions of bariatric procedures performed, even when considering poor follow-up and under-reporting.

Different tumors in different locations at different time intervals after different procedures were observed (Table 1).

Gender distribution was mostly female (14, 66.7%)-similar to that seen in the general population undergoing bariatric surgery. Mean age at diagnosis was 55 years (range 37-75 years) and the mean time interval after bariatric surgery was 9 years (range 0.5-26 years).

Nine cancer cases (43%) were reported following gastric bypass, 6 (29%) following VBG and SRVG, 5 (24%) after LAGB, and one patient (5%) underwent both a GBP and a LAGB.

Eight carcinomas were found in the gastric pouch (38%), the second most common site being the excluded stomach in gastric bypass.

There were 18 adenocarcinomas, 2 lymphomas and 1 gastrointestinal stromal tumor (GIST).

Only 5 cases (24%) had a prior endoscopy-all of which were negative.

Out of the ten cases with a reported BMI at the time of diagnosis, 50% were obese with a BMI>30.

References	Age	Sex	BMI pre-op	BMI at diagnosis	Procedure	Site	Interval after surgery	Prior endoscopy	Stage
Zirak et al. [12]	52	f			SRVG	Pouch	2	Normal	T1N0M0
Papakonstantinou et al. [13]	46	m	49	23.6	VBG	Pylorus	6	no	T?N1M?
Khitin et al. [14]	57	f			GBP	Excluded stomach	22	n/a	n/a
Jain et al. [15]	67	f	57		VBG	Pouch	15	no	T2N2M0
Hackert et al. [16]	62	f	47	29.2	LAGB	Pouch	10	no	T4N2M1
Escalona et al. [17]	51	f	42	27	GBP	Excluded stomach	8	no	T4N2

Trincado et al. [18]	52	f	45		LAGB and GBP	Pouch	5	no	T3N1M0
De Roover et al. [19]	66	m	44		GBP	Excluded stomach	3	no	Lymphoma – DLBCL
De Roover et al. [19]	47	f			VBG	Antrum	12	no	GIST - High risk No mets
Corsini et al. [20]	57	m			GBP	Excluded stomach	4	Normal	Non -resectable
Babor and Booth [21]	61	f			Loop GBP	Pouch	26	no	T3N0
Harper et al. [22]	45	f	48		GBP	excluded stomach	1	no	End stage (carcinomatosis)
Chebib et al. [23]	60	m	36	55	VBG	Pouch	15	no	T2bN1M0
Watkins et al. [24]	44	m	51	23	GBP	Excluded stomach	16	Normal	Grade1-2/3, n0
Sun et al. [25]	65	m			GBP	Pouch	5	no	T?N?M1
Stroh et al. [26]	65	f	46	36	LAGB	Pouch	2.5	Normal	End stage
Belhaj et al. [27]	54	f			SRVG	Pylorus	10	no	T2bN1
Orlando et al. [10]	37	f	40	37	LAGB	Lesser curve	0.5	Normal	T1N0
Courtney et al. [28]	56	f	36	27	GBP		0.75	no	Lymphoma
Meron Eldar	75	f	46	41	LAGB	G-E junction	16	no	T1N1M0
Meron Eldar	39	m	41	38	LAGB	Angulus	18	no	T2-3N1M0
Meron Eldar	59	f			LAGB	Antrum	12	no	T4aN0

Table 1: Upper gastro-intestinal malignancies reported following bariatric surgery.

Discussion

Bariatric surgery has been shown to decrease incidence and mortality from several cancers, but whether these patients are at greater risk to develop esophago-gastric is still undetermined [8,9].

Upper GI malignancies following bariatric surgery are extremely rare, and the diagnosis of these pathologies in this patient population is challenging. Reviewing the literature, only a few cases of gastric carcinoma were discovered at an early stage. This may be contributed to the fact that symptoms of gastric cancer-including weight loss, dysphagia, reflux, early satiety epigastric pain/discomfort-may all mimic post-bariatric surgery complaints, which can delay the diagnosis and treatment of these patients. Furthermore, diagnosis may be difficult because of limited access to the excluded stomach in some of these procedures (eg GBP).

Patients after distal gastrectomy for peptic ulcer disease are at an increased risk for gastric stump cancer, usually decades after their primary surgery [29,30]. But reports thus far have not shown that gastric bypass patients share this increased cancer risk, probably because of the small size and low acid production of the gastric pouch, together with the routine use of proton pump inhibitors following surgery.

Nevertheless, several mechanisms should be kept in mind as contributing factors to the development of cancer in these patients. Patients after bariatric surgery, particularly restrictive surgeries (LAGB, SRVG, LSG) commonly suffer from chronic reflux resulting in

chronic inflammation of the distal esophagus, which may lead to a pre-malignant condition such as Barrett's esophagus.

Frequent exposure of the esophagus to bile acids in patients undergoing single anastomosis gastric bypass is another potential mechanism which may increase cancer incidence, and has been a critical part in the debate regarding this specific bariatric procedure.

Long standing irritation of a foreign body like the adjustable gastric band (in LAGB) or the silastic ring (in SRVG) can also contribute to chronic inflammation, metaplasia and dysplasia.

The 3 new cases presented in this report both occurred nearly 2 decades after a foreign body (Gastric band) was inserted, raising the thought that chronic irritation and inflammation could have played a role in the development of malignancy, yet 9 of the other cases reviewed (43%) occurred within 5 years of the bariatric procedure, making it more difficult to "blame" the operation.

This case series has several limitations. The retrospective nature of this study is often subject to biases in data collection that could limit the validity of our results. Presenting a case series is another limitation as we have no control group for comparison to validate our observations.

Finally, due to the scarce literature on the topic – the literature review was non-systematic.

Conclusion

As longer follow up is available for bariatric surgery patients, more reports of these tumors are expected, but the numbers are probably not significant enough to conclude at this time that bariatric surgery should be considered as a risk factor for upper GI malignancy.

Nonetheless, it is crucial for the following physician to keep a high index of suspicion for these pathologies and be liberal in referring symptomatic patients for endoscopy and CT scans when necessary.

Further investigation should be performed to better define the long term risk of bariatric surgeries for cancer, and if there is an increased risk – to identify the contributing mechanisms.

Conflict of Interest Disclosure

The authors declare that they have no conflict of interest.

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