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Giant symptomatic gastric lipoma: A case report and literature review

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ABSTRACT

INTRODUCTION: Lipomas are uncommon tumors of the gastrointestinal tract; gastric lipomas account for <1% of all gastric tumors encountered (Nickloes and Sutphin [1]). Giant gastric lipomas, defined as ≥ 10 cm, are exceedingly rare with only 6 cases reported since 1980 (Cappell et al., Termos et al., Singh et al., Ramaraj et al., Rao et al., Priyadarshi et al., Neto et al. [3–9]). We hereby present a case of a giant gastric lipoma that became symptomatic seven years after its initial identification and was excised preserving gastric continuity.

CASE PRESENTATION: Our patient is a 58-year-old African American male with a 3 cm gastric mass incidentally found on CT in 2010. In September of 2017, the patient presented with severe epigastric pain, nausea, and vomiting. Abdominal CT scan revealed an increase in size of the patient's gastric lesion to $7.2 \times 10.3 \times 7.3$ cm. He underwent an exploratory laparotomy with transverse anterior gastrotomy and primary closure. Pathologic examination revealed a 12 cm submucosal, well-circumscribed, non-encapsulated mass comprised of mature adipose tissue without atypia or mitotic figures, consistent with lipoma.

DISCUSSION: The majority of gastric lipomas are asymptomatic, identified on CT scan as round/ovoid masses with low attenuation and homogenous appearance, measuring -80 to -120 Hounsfield units. These findings are nearly pathognomonic. Due to the benign nature of gastric lipomas, circumferential excision with a clear margin of normal tissue is adequate for symptomatic resection. This is the second report of giant gastric lipoma excised with continuity preserving partial gastrectomy, avoiding gastrojejunostomy complications.

CONCLUSION: Fatty tumors are rare in the gastrointestinal tract, yet lipomas must be on the differential when masses are found with Hounsfield units similar to peripheral fat.

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1. Introduction

Lipomas are uncommon tumors of the gastrointestinal tract with gastric lipomas accounting for less than 1% of all gastric tumors encountered [1]. As these lesions are typically asymptomatic [2], they have the potential to grow unnoticed until they reach a size, ≥ 10 cm, when they are classified as giant gastric lipomas at which time they become symptomatic and necessitate management. Giant gastric lipomas are exceedingly rare, with 6 cases reported in the literature since 1980 [3–9].

We hereby present a case of giant gastric lipoma that became symptomatic seven years after initial identification. This work has been reported in line with the SCARE criteria [10].

2. Presentation of case

Our patient is a 58-year-old African American male with a medical history significant for hypertension and a 3 cm gastric mass incidentally found on CT performed in 2010 during hospitalization for symptomatic renal calculi. Five years later, in 2015, he experienced an episode of abdominal pain for which he had a repeat CT abdomen and esophagogastro-duodenoscopy (EGD). These showed a 9.9×5 cm subepithelial mass with central umbilication, located in the fundus of the stomach; biopsy showed necrotic fatty tissues that were CD-117 negative on immunohistochemistry. Surgery was recommended in 2015 and the patient declined as his symptoms were mild and intermittent.

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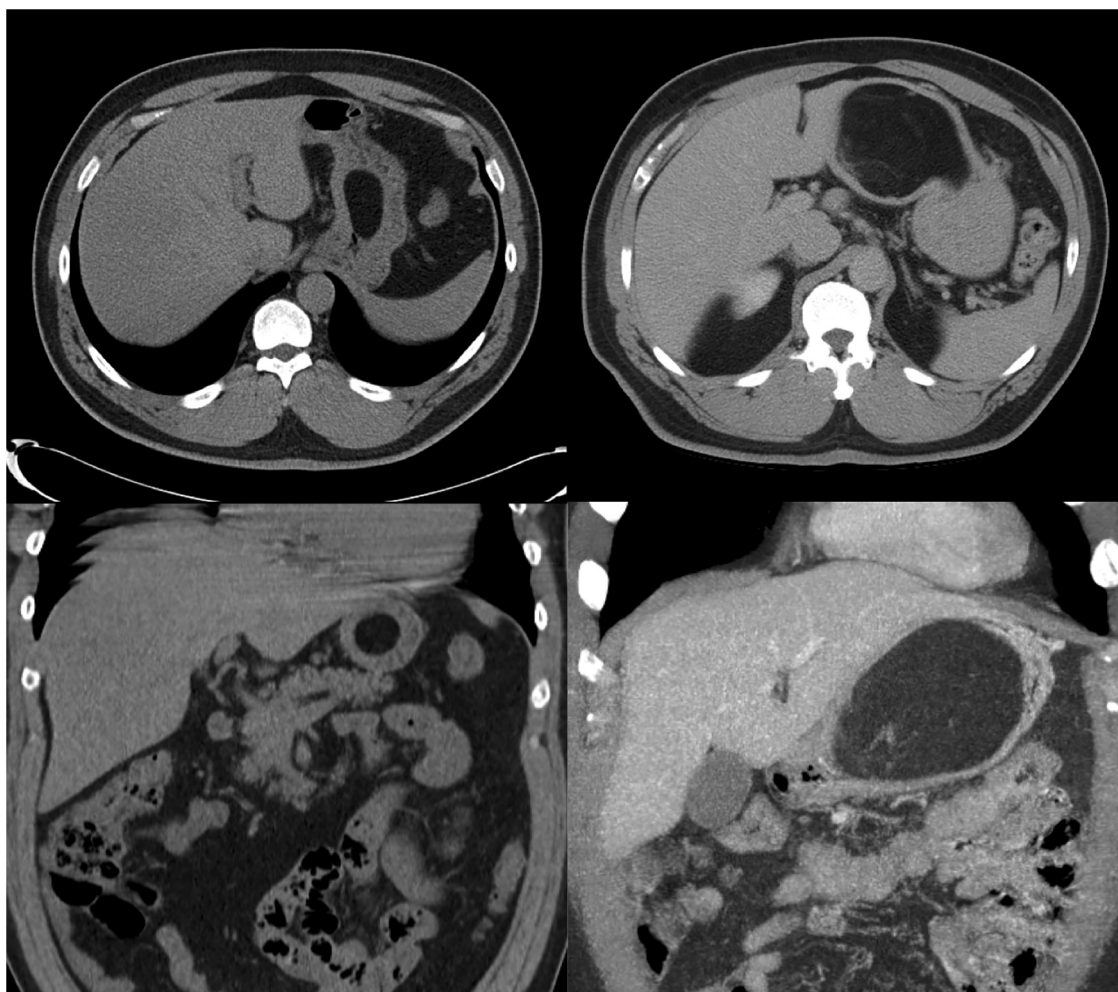


Fig. 1. CT images demonstrating interval increase in size from 2010 (Left) to 2017 (Right) of large, low-attenuation gastric mass.

In September of 2017, the patient presented to the hospital emergency room with severe epigastric pain, nausea, and vomiting. He also endorsed anorexia, alternating bowel habits, and dark stool. He was hemodynamically stable and afebrile. On physical examination, his abdomen was soft and non-distended with mild tenderness in the epigastrium.

Abdominal CT scan revealed interval increase in size of the patient's gastric lesion from 3 cm in 2010 to $7.2 \times 10.3 \times 7.3$ cm. The mass measured predominately fat density with surrounding fat stranding and a posterior ill-defined soft tissue component [Fig. 1].

Upon admission, the patient underwent EGD with endoscopic ultrasound (EUS) and biopsy. The EGD revealed a large, submucosal, non-circumferential mass with no bleeding. However, stigmata of recent bleeding (ulcer) was found in the fundus [Fig. 2]. EUS revealed an oval intramural/subepithelial, isoechoic lesion in the fundus likely originating from the submucosa measuring 50 mm in thickness and 90 mm in diameter with well-defined outer endosonographic borders. Fine needle aspiration and biopsy were performed. The fine needle aspiration consisted of benign gastric and squamous epithelium only while the biopsy showed small fragments of mature adipose tissue and gastric epithelium.

The patient underwent an exploratory laparotomy and a 6 cm transverse anterior gastrotomy was made, through which the mass was clearly visible and everted. A linear stapler was fired below the mass to excise it with another stapler load used to repair the gastrotomy. The staple line was buttressed by over-sewing and an omental patch was fixed on it using an absorbable suture. The tumor

was soft and fleshy, measuring approximately 12 cm in its greatest dimension [Fig. 3A,B].

Pathologic examination revealed a 12 cm submucosal well circumscribed, non-encapsulated mass comprised of mature adipose tissue without atypia or mitotic figures, consistent with lipoma [Fig. 4A,B]. Immunohistochemical stain for MDM2 was negative [Fig. 4B]. Fluorescence in situ hybridization for MDM2 (12q15) gene amplification was also negative. The overlying gastric mucosa showed acute and chronic inflammation and was negative for *Helicobacter Pylori* immunostain. The patient had an uneventful post-operative hospital course and was discharged on post-operative day 5. At three week follow-up he was tolerating a regular diet with no complications. He will return to clinic in one year for a final follow-up visit.

Discussion

Lipomas are slow-growing, benign, fatty tumors enclosed by a thin fibrous capsule and are the most commonly encountered soft-tissue tumors in general. They are derived from mesenchymal origin and develop in virtually all organs throughout the body, including the gastrointestinal tract where they present as submucosal fatty tumors. The most common gastrointestinal tract locations for lipoma are the colon, ileum and jejunum [11]. Fatty lesions found in the gastrointestinal tract can be simple lipomas or have mixed histology representing angioliipoma or fibrolipoma, both of which are also benign. Other fatty tumors include lipoblastoma which occurs exclusively in infants/children, hibernomas comprised of brown fat, atypical lipomatous tumors which are low-

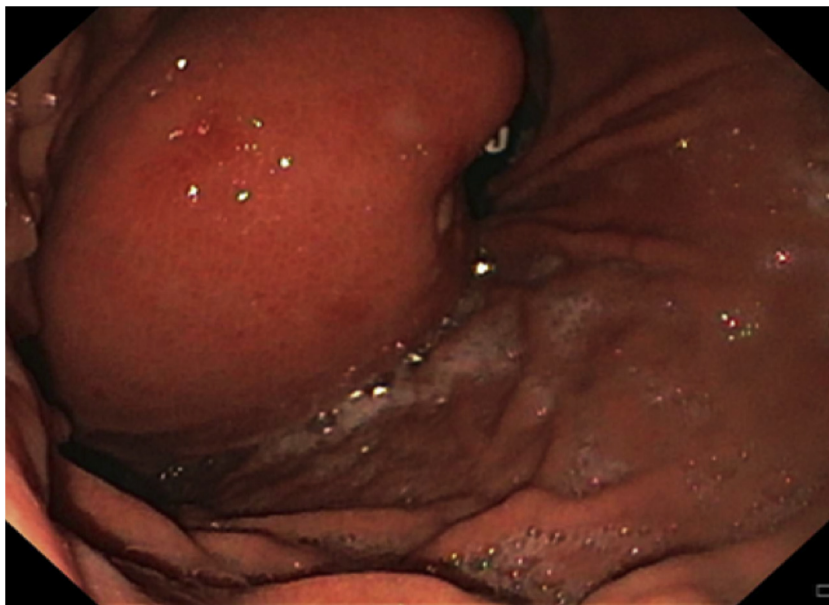


Fig. 2. EGD image from 2017.

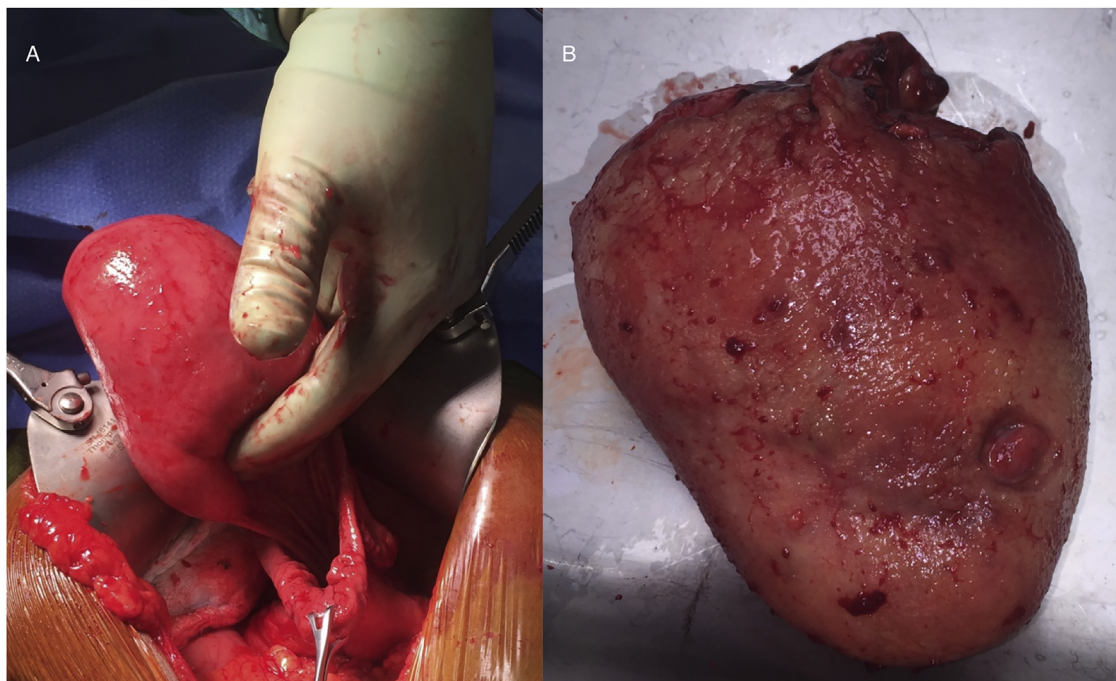


Fig. 3. A. Eversion of gastric mass through gastrotomy. B. Excised gastric mass.

grade sarcomas with a high local recurrence rate but little to no metastatic potential, and liposarcomas which may be more locally aggressive with more potential for distant metastasis [1].

Benign tumors of the stomach are rare, constituting only 5–10% of all stomach tumors, with gastric lipomas accounting for only 1–3% of all benign gastric tumors and <5% of all gastrointestinal lipomas [2,12]. Gastric lipomas are solitary benign tumors of the stomach, typically arising from the submucosa (95%) and most commonly in the antrum of the stomach (75%). Of note, our patient's tumor arose from the submucosa of the fundus. These tumors tend to occur in individuals aged 40–50 years [2]. Giant gastric lipomas have been described in 6 cases reported in the worldwide English literature since 1980 [4]. There are no known risk factors

for the development of gastric lipoma but lipomas in general have been observed to occur at a higher rate in obese individuals and to expand during periods of rapid weight gain. Conversely, lipomas do not regress in size during periods of weight loss. Lipomas also occur more frequently in diabetic patients and those greater than 45 years of age [13]. Our patient was a non-obese, non-diabetic male whose gastric lipoma was initially identified at the age of 51.

The majority of gastric lipomas are asymptomatic. If symptomatic, upper gastrointestinal bleeding secondary to mucosal ulceration (50–60%) or obstructive symptoms are most common [1]. On physical examination, these lesions can present as a fullness in the epigastrium, as a distinct mass, or with a normal examination [11]. Asymptomatic gastric lipomas may be identified on CT scan-

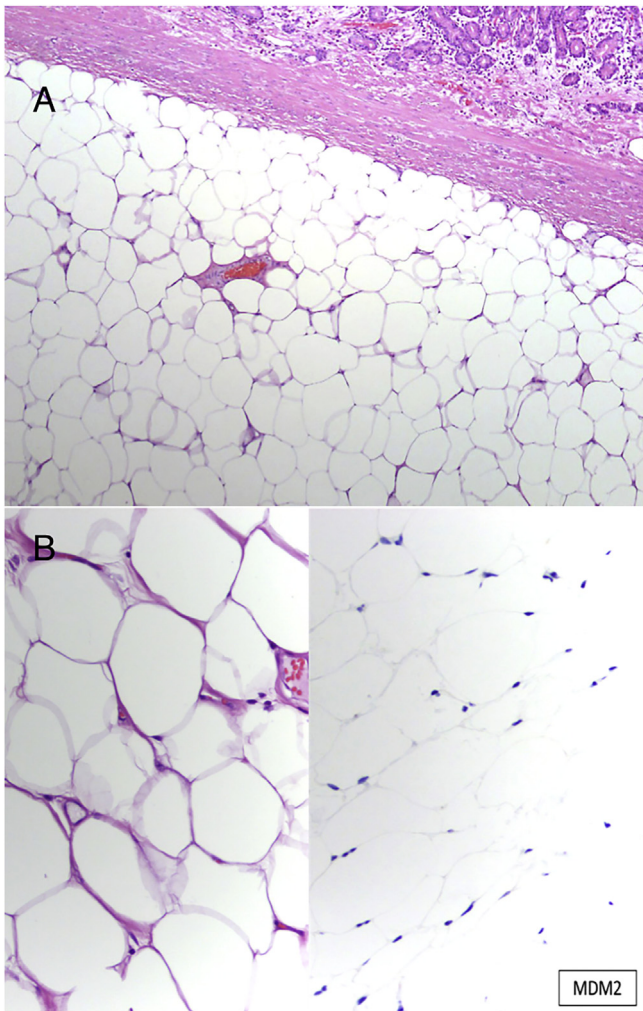


Fig. 4. A. Submucosal gastric lipoma (H&E stain, 100×). B. Adipocytes without cytology atypia, necrosis or increased mitotic activity (Left, H&E, 400×). Adipocytes negative for MDM2 (Right, Immunostain, 200×).

ning as round or ovoid masses with low attenuation, homogenous appearance, measuring between –80 to –120 Hounsfield units. These findings are nearly pathognomonic. If there is presence of linear strands of soft-tissue attenuation, this may represent associated ulcer and fibrovascular septa but should raise liposarcoma on the differential [11]. Fluoroscopic exam will reveal a compressible mass with or without central mucosal ulceration [15]. On MRI, lipomas exhibit a high signal intensity of T1-weighted images [13]. Our patient developed gastrointestinal bleeding, epigastric pain, episodic emesis, a normal physical exam and evidence of gastric lipoma on CT scan.

On EGD these lesions appear as soft, sharply defined, submucosal masses, often yellow in color as opposed to the surrounding pink mucosa. Three signs have been described that help to identify

lipomas on endoscopic examination: 1) tenting sign – overlying mucosa is easily retracted with the biopsy forceps; 2) cushion sign – forceps produce a soft, cushioning indentation when applied to the lipoma; 3) naked fat sign – fat protrudes through the overlying mucosa after multiple biopsies are performed [11,12]. Standard biopsies are often non-diagnostic due to the submucosal nature of the mass. The addition of endoscopic ultrasonography allows for the identification of gastric lipoma as a homogeneous, hyperechoic lesion in the typical location of Layer 3, submucosal [14]. Our patient’s endoscopic examinations were positive for the tenting sign, the cushion sign, and for anatomic location in the submucosa.

Grossly, gastric lipomas are sharply demarcated masses with a surrounding thick, fibrous capsule and a yellow, round, greasy cut surface [12]. On final histopathologic examination, lipomas appear very similar to surrounding fat as they are composed of mature fat cells that may vary slightly in size and shape and tend to be slightly larger than surrounding fat. The nuclei are regular, there is an absence of nuclear hyperchromasia, and they lack cytologic atypia. Both benign and malignant fatty tumors stain positively for vimentin and S-100 protein [13].

Lipomas are completely benign although there is a risk of local recurrence, less than 5%. [13] Recurrence occurs most frequently if there is inadequate excision of the fibrous capsule. This holds true for gastric lipoma [1]. Malignant degeneration has not been reported [12]. Due to the benign nature of gastric lipomas, circumferential excision with a clear margin of normal tissue is adequate for symptomatic resection. Endoscopic submucosal dissection, snare polypectomy, band ligation or un-roofing are endoscopic options for resection of lesions < 2 cm. Additionally, limited procedures such as tumor enucleation, partial resection or other endoscopic and minimally invasive procedures may be possible with an accurate preoperative diagnosis. However, these procedures are not possible for giant gastric lipoma such as was seen in our patient, due to size [14].

There have only been 6 prior case reports of giant gastric lipomas reported in the English literature [Table 1]. Five of these cases were excised in a manner that involved interrupting gastric continuity. Our patient’s case is only the second report of giant gastric lipoma excised with a continuity preserving partial gastrectomy. Due to the endophytic nature of our patient’s lipoma, gastrotomy with eversion was necessary in order to perform a continuity preserving partial gastrectomy. Through the preservation of gastric continuity via gastrotomy and primary closure, complications associated with gastrojejunostomy are avoided.

Conclusion

Fatty tumors are rare in the gastrointestinal tract, and gastrointestinal lipomas must be on the differential when masses are found with Hounsfield units similar to those of peripheral fat. This case shows progression in size and symptomatology, albeit over a prolonged period of 7 years, of a patient with an incidentally identified giant gastric lipoma.

Table 1
Giant gastric lipomas, ≥10 cm in largest dimension, reported in the English literature since 1980.

Authors	Size	Type of Excision	Endophytic/Exophytic
Singh et al. [5]	18 × 10 × 10 cm	Subtotal gastrectomy with gastrojejunostomy	Not Reported
Ramaraj et al. [6]	15 × 14 cm	Subtotal gastrectomy with gastrojejunostomy	Not Reported
Rao et al. [7]	15 × 12 cm	Partial gastrectomy	Not Reported
Priyadarshi et al. [8]	14 × 11 × 5 cm	Distal gastrectomy, Billroth I	Not Reported
Cappell et al. [3]	13.4 × 8.4 × 8.2 cm	Subtotal gastrectomy with partial duodenectomy and Billroth II reconstruction	Not Reported
Neto et al. [9]	12 × 8 × 6 cm	Subtotal gastrectomy with D1 lymphadenectomy and Roux-en-Y reconstruction	Not Reported

Synopsis

The aim of this study was to report on a rare case of symptomatic gastric lipoma with review of limited similar published cases.

Conflicts of interest

The authors report no conflict of interest

Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors

Ethical approval

As a case report, this student is exempt from ethical approval at the University of Miami Miller School of Medicine.

Consent

Informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the consent is available for review by the Editor-in-Chief of this journal on request

Author contribution

Julia R Amundson – data collection and writing the paper, final approval.

David Straus – data collection, data analysis/interpretation, writing the paper, final approval.

Basem Azab – study concept/design, writing the paper, final approval.

Sandy Liu – data analysis/interpretation, writing the paper, final approval.

Monica T Garcia Buitrago – data analysis/interpretation, writing the paper, final approval.

Danny Yakoub – study concept/design, writing the paper, final approval.

Registration of research studies

N/A.

Guarantor

Danny Yakoub.

Provenance and peer review

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References

- [1] T.A. Nickloes, D.D. Sutphin, Lipomas: background, pathophysiology and etiology, *Medscape* (2017), Retrieved 12/15/2017 from <https://emedicine.medscape.com/article/191233>.
- [2] P. Goh, J.E. Lenzi, Benin tumors of the stomach and duodenum, in: *Surgical Treatment: Evidence-based and Problem-oriented*, Zuckschwerdt Publishers, Munich, 2001.
- [3] M.S. Cappell, C.E. Stevens, M. Amin, Systematic review of giant gastric lipomas reported since 1980 and report of two new cases in a review of 117110 esophagogastroduodenoscopies, *World J. Gastroenterol.* 14 (23(30)) (2017) 5619–5633, August.
- [4] S. Termos, O. Reslan, O. Alqabandi, et al., Giant gastric lipoma presenting as GI bleed: enucleation or resection? *Int. J. Surg. Case Rep.* 41 (2017) 39–42.
- [5] K. Singh, K. Venkateshwarlu, A.K. Malik, B. Nagi, R.V. Yadav, Giant gastric lipoma presenting with fever and melena, *Indian J. Gastroenterol.* 6 (July (3)) (1987) 181–182.
- [6] R. Ramaraj, S.A. Robert, G. Clarke, G. Williams, G.A. Thomas, A rare case of iron deficiency, *Eur. J. Gastroenterol. Hepatol* 24 (January (1)) (2012) 82–83.
- [7] C. Rao, S.S. Rana, A. Lal, et al., Large gastric lipoma presenting with GI bleeding, *Gastrintest. Endosc.* 177 (March (3)) (2013) 512–513.
- [8] R.N. Priyadarshi, U. Anand, M.K. Pandey, B. Chaudhary, R. Kumar, Giant gastric lipoma presenting as gastric outlet obstruction – a case report, *J. Clin. Diagn. Res.* 9 (October (10)) (2015) PD03–4.
- [9] F.A. Neto, M.C.F. Ferreira, L.C.N. Bertoncello, et al., Gastric lipoma presenting as a giant bulging mass in an oligosymptomatic patient: a case report, *J. Med. Case Rep.* 6 (2012) 317.
- [10] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, for the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* (2016).
- [11] A.J. Taylor, E.T. Stewart, W.J. Dodds, Gastrointestinal lipomas: a radiologic and pathologic review, *Am. J. Roentgenol.* 155 (December (6)) (1990) 1205–1210.
- [12] M.M. Hamdane, E.B. Brahim, M.B. Salah, N. Haouas, A. Bouhafa, A. Chedley-Debbiche, Giant gastric lipoma mimicking well-differentiate liposarcoma, *Gastroenterol. Hepatol. Bed Bench* 5 (January (1)) (2012) 60–63 [Medline].
- [13] J.R. Goldblum, A.L. Folpe, S.W. Weiss, Benign Lipomatous Tumors, *Enzinger and Weiss's Soft Tissue Tumors*, 2018, pp. 443–483, Chapter 14.
- [14] M. Nasa, A. Choksey, A. Phadke, P. Sawant, Gastric lipoma: an unusual case of dyspeptic symptoms, *BMJ Case Rep.* doi (2016), <http://dx.doi.org/10.1136/bcr-2016-215297>.
- [15] W.M. Thompson, A.I. Kende, A.D. Levy, Imaging characteristics of gastric lipomas in 16 adults and pediatric patients, *Am. J. Roentgenol.* 181 (2003) 891–985.

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