

REFERENCES

1. Beigelman R, Izaguirre AM, Robles M, Grana DR, Ambrosio G, Milei J. Are kinking and coiling of carotid artery congenital or acquired? *Angiology*. 2017;61:107–12. <http://dx.doi.org/10.1177/0003319709336417>.
2. Iwai-Takano M, Watanabe T, Ohira T. Common carotid artery kinking is a predictor of cardiovascular events: a long-term follow-up study using carotid ultrasonography. *Echocardiography*. 2019;36:2227–33. <http://dx.doi.org/10.1111/echo.14536>.
3. So YK, Kim MJ, Kim S, Son YI. Lateral lymph node metastasis in papillary thyroid carcinoma: a systematic review and meta-analysis for prevalence, risk factors, and location. *Int J Surg*. 2018;50:94–103. <http://dx.doi.org/10.1016/j.ijssu.2017.12.029>.
4. Gong Y, Yang J, Yan S, Su A, Liu F, Gong R, et al. Pattern of and clinicopathologic risk factors for lateral lymph node metastases in papillary thyroid carcinoma patients with lateral cervical lymphadenopathy. *Medicine (United States)*. 2018;97:36. <http://dx.doi.org/10.1097/MD.00000000000012263>.
5. Del Corso L, Moruzzo D, Conte B, Agelli M, Romanelli AM, Pastine F, et al. Tortuosity, kinking, and coiling of the carotid artery: expression of atherosclerosis or aging? *Angiology*. 1998;49:361–71. <http://dx.doi.org/10.1177/000331979804900505>.
6. Martins HFG, Mayer A, Batista P, Soares F, Almeida V, Pedro AJ, et al. Morphological changes of the internal carotid artery: prevalence and characteristics. A clinical and ultrasonographic study in a series of 19 804 patients over 25 years old. *Eur J Neurol*. 2018;25:171–7. <http://dx.doi.org/10.1111/ene.13491>.
7. Aleksić M, Schütz G, Gerth S, Mulch J. Surgical approach to kinking and coiling of the internal carotid artery. *J Cardiovasc Surg*. 2004;45:43–8.
8. Koskas F, Bahnini A, Walden R, Kieffer E. Stenotic coiling and kinking of the internal carotid artery. *Ann Vasc Surg*. 1993;7:530–40. <http://dx.doi.org/10.1007/BF02000147>.
9. Hao JH, Zhang LY, Lin K, Liu WD, Zhang SG, Wang JY, et al. Surgical revascularization of symptomatic kinking of the internal carotid artery. *Vasc Endovascular Surg*. 2016;50:470–4. <http://dx.doi.org/10.1177/1538574416671246>.

Gonzalo Botella Casas^{ab}, Norberto Cassinello Fernández^{ac}, Leticia Pérez Santiago^a, Raquel Alfonso Ballester^a, Joaquín Ortega Serrano^{ac}

^aUnidad de Cirugía Endocrina, Servicio de Cirugía General, Hospital Clínico Universitario de Valencia, Valencia, Spain

^bServicio de Cirugía Maxilofacial, Hospital Clínico Universitario de Valencia, Valencia, Spain

^cDepartamento de Cirugía, Facultat de Medicina, Universitat de València, Valencia, Spain

*Corresponding author.

E-mail address: gonzalobotellacasas@gmail.com (G. Botella Casas).

<http://dx.doi.org/10.1016/j.cireng.2022.06.035>
2173-5077/

© 2021 AEC. Published by Elsevier España, S.L.U. All rights reserved.

Unusual gastric band migration causing multiple perforations on the jejunum

Migración de banda gástrica causando múltiples perforaciones en el yeyuno



Laparoscopic adjustable gastric banding (LAGB) is one of the three most common procedures performed worldwide for treating morbid obesity, with a global reported incidence of 12.1% of all bariatric procedures. However, incidence of different techniques are variable among countries¹ LAGB has the advantage of being the least invasive, with the fastest insertion, adjustable restriction, reversibility, and anatomy preservation.² However, extensive studies on LAGB have reported a complication rate of up to 30–40%, including slippage, port dysfunction, band erosion, food intolerance, bowel obstruction, and band migration to the gastrointestinal tract, with or without perforation, being this last one, extremely rare with only a few cases reported in the literature.³ The objective of this letter is to present a female patient who presented with a gastric band migration into the jejunum.

A 50-year-old female patient was admitted to the hospital with abdominal pain in the epigastric region, nausea, and vomiting after a one-month history of colicky abdominal pain in the same region. The patient had a medical history of LAGB insertion 19 years ago, with the last follow-up 10 years ago. Her body mass index (BMI) at the moment of the band placement was 55 kg/m². Her current BMI is 40 kg/m². The patient lost 45 kg of body weight, for a total weight loss of 31%. The patient was hemodynamically stable and afebrile. Physical examination showed abdominal distension with reduced bowel movements to auscultation accompanied by diffuse abdominal tenderness to superficial and deep palpation, with a tympanic colonic margin to percussion.

CT was performed, revealing an obstruction of the small bowel due to an intra-jejunal location of the LAGB, and no free

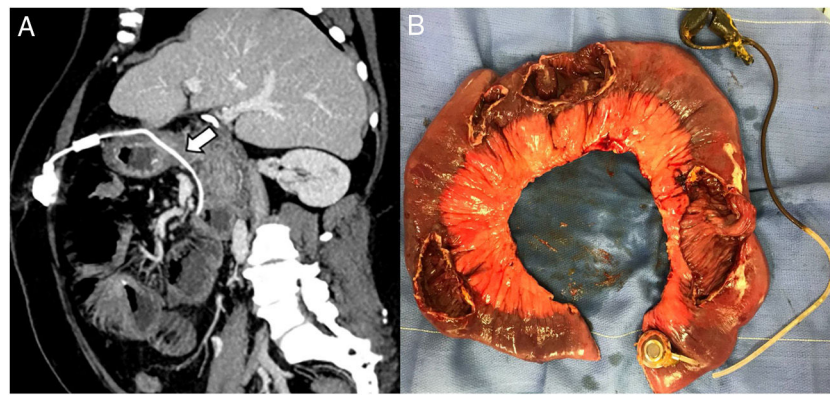


Fig. 1 – (A) CT scan of the abdomen and pelvis showing the gastric tube within the intestinal lumen (straight arrow). (B) Four long perforations at the proximal jejunum.

fluid in the abdominal cavity was observed (Fig. 1a). The patient underwent an exploratory laparotomy, signs of dilation of the small bowel became apparent. An intraluminal gastric band (SAGB: Swedish Adjustable Gastric Banding,

Obtech, Ethicon Endosurgery, Stockholm, Sweden, developed by Hallberg and Forsell) was found in the small bowel at 40 cm from the Treitz ligament, and four more perforations were found in the proximal jejunum (Fig. 1b). The connection tubing

Table 1 – Reported cases of LAGB migration to the small bowel.

No	Reference	Sex/age	GB type/history of GB placement	Presentation/image study	Anatomic region of GB migration	Procedure
1	Taskin et al., ⁹ 2001	F/56	Kuzmak ®/4 yrs	Signs of high small bowel obstruction/X-ray, CT	4th portion-duodenum	Laparotomy + duodenorrhaphy
2	Bueter et al., ⁴ 2006	M/65	SAGB ®/1 yr	Abdominal pain, emesis/X-ray, CT	Jejunum	Laparoscopy + gastrorrhaphy + jejunorrhaphy
3	Lantsberg et al., ⁷ 2008	F/58	NA/5 yrs	Abdominal pain and vomiting/X-ray, CT	Proximal jejunum	Laparoscopy + enterotomy + jejunorrhaphy
4	Egbeare et al., ¹⁰ 2008	M/49	SAGB ®/3 months	Abdominal pain and vomiting/X-ray, CT	Distal jejunum,	
5	Offodile et al., ¹¹ 2010	M/30	LapBand ®/2 yrs	Laparotomy + band retrieved retrogradely + IR + PA	2nd portion-duodenum	Endoscopic extraction
6	Shah et al., ¹² 2011	F/45	Kuzmak ®/15 yrs	Abdominal pain, nausea and emesis/CT	Proximal jejunum	
7	Bassam et al., ¹³ 2012	F/54	NA/8 yrs	Laparotomy + jejunorrhaphy	Distal ileum	Extracted per rectum
8	Salar et al. ¹⁴ 2013	F/46	NA/5 yrs	Abdominal pain and distension/X-ray, CT	Proximal jejunum	Laparoscopy + enterotomy + jejunorrhaphy
9	Sapalidis et al., ⁵ 2013	M/44	LapBand ®/4 yrs	Abdominal pain, emesis, fever/X-ray, CT	Proximal jejunum	
10	Creedon et al., ² 2014	F/41	NA/3 yrs	Asymptomatic/Endoscopy	Proximal jejunum	Laparoscopy + enterotomy + jejunorrhaphy
11	Aguirre et al., ¹⁵ 2015	F/51	NA/1 yr	Laparotomy + IR + PA	Mid-ileum	
12	Abeysekera et al., ³ 2017	F/43	NA/15 yrs	RUQ pain, nausea/HIDA scan, CT	Mid-ileum	Laparotomy + IR + PA
13	Lemaire et al., ⁸ 2017	F/42	NA/10 yrs	Abdominal pain and distension, nausea vomiting, obstipation/X-ray, CT	Proximal jejunum	Laparoscopy + enterotomy + jejunorrhaphy

LAGB: laparoscopic adjustable gastric band; GB: gastric band; CT: computed tomography; IR: intestinal resection; PA: primary anastomosis.

was cut, and the band was manually extracted from the jejunum. An incision was made over the location of the subcutaneous port where the port was removed. An intestinal resection of 90 cm was completed, followed by stapled side-to-side anastomosis using GIA 60 blue (Covidien, Mansfield, Massachusetts, USA). The patient had a satisfactory immediate postoperative outcome, referring only modest pain during the first post-surgical hours. Oral intake was reintroduced on the fourth day without complications. She was discharged home on the seventh postoperative day.

Erosion of the band into the gastric lumen and migration of the band out of the stomach are rare long-term complications after a gastric band placement, with an incidence of 1–14.4% on the former and less than 1% on the latter.⁴ Many theories have been suggested, being the primary one the pressure applied to the gastric wall. Two types of pressures are described, external and internal. The first one is applied either through overfilling of the band or too much gastric tissue insertion during the band placement. The second one is applied as a consequence of large food boluses early after operation.⁵ Another etiology for this complication to occur is proposed by Meir et al.⁶ They hypothesized that band erosion might occur more often in a laparoscopic approach because of the impossibility of using the fingers to form the retro gastric tunnel essential to place the band, causing a minuscule perforation damaging the gastric serosa; thus, resulting in a local inflammatory response with likely migration of the band. Another suggested causing factor is a rejection response against the gastric band material.⁵ Table 1 displays all gastric band migrations, to our knowledge, reported on the literature.

When a patient who has previously undergone LAGB insertion seeks treatment for abdominal pain, the physician should strongly consider band-related complications. Symptoms of band migration include weight regain, abdominal pain, nausea, and vomiting. An abdominal X-ray should be the first image study to perform to assess the normal gastric band position. However, CT should be considered to visualize the exact position of the band.²

The diagnosis of gastric band migration is generally made during the first three years of follow-up. Contrary to our patient, where migration of the band occurred 19 years after the LAGB initial placement. Jejunal obstruction, followed by intragastric band migration, is highly rare.⁷ Perforation of the jejunal wall might occur by persistent ischemic pressure ulceration.⁸ In our case, following erosion through the gastric wall into the lumen, the band traveled into the duodenum and then to the jejunum. As gastric erosion was slow and re-epithelialized, no signs of perforation were present at first, but the constant pressure of the band into the intestinal wall ended up perforating several segments of the jejunum. We hypothesized the band was found proximal to some perforations because the band might have moved along the gastrointestinal tract due to peristalsis. Reporting of this case will inform and alert current and future general surgeons of this LAGB complication.

Ethical considerations

This research didn't involve any animal experiments or human subjects.

This research has the approval of the ethics committee of Tecnológico de Monterrey institution, and it complies with the valid normative of bioethical research regulations.

Written informed consent was obtained from the patients for publication of this case series and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Funding

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

Conflicts of interest

The authors declare that they have no conflict of interest.

REFERENCES

- Himpens J, Ramos A, Welbourn R, Dixon J, Frøp F, Kinsman ER, et al. The IFSO Global Registry Report 2018; 2018. <https://www.ifso.com/pdf/4th-ifso-global-registry-report-last-2018.pdf>.
- Creedon L, Leeder P, Awan A. Laparoscopic adjustable gastric band erosion and migration into the proximal jejunum. *Surg Obes Relat Dis*. 2014;10:e19–21. <http://dx.doi.org/10.1016/j.soard.2013.06.013>.
- Abeysekera A, Lee J, Ghosh S, Hacking C. Migration of eroded laparoscopic adjustable gastric band causing small bowel obstruction and perforation. *BMJ Case Rep*. 2017;2017:1–3. <http://dx.doi.org/10.1136/bcr-2017-219954>.
- Bueter M, Thalheimer A, Meyer D, Fein M. Band erosion and passage, causing small bowel obstruction. *Obes Surg*. 2006;16:1679–82. <http://dx.doi.org/10.1381/096089206779319446>.
- Sapalidis K, Liavas L, Panteli N, et al. Intrajejunal migration of adjustable gastric band: a case report. *Curr Heal Sci J*. 2013;39:118–11820.
- Meir E, Van Baden M. Adjustable silicone gastric banding and band erosion: personal experience and hypotheses. *Obes Surg*. 1999;9:191–3. <http://dx.doi.org/10.1381/096089299765553485>.
- Lantsberg L, Kirshtein B, Leytzin A, Makarov V. Jejunal obstruction caused by migrated gastric band. *Obes Surg*. 2008;18:225–7. <http://dx.doi.org/10.1007/s11695-007-9380-z>.
- Lemaire J, Dewit O, Navez B. Management of a jejunal obstruction caused by the migration of a laparoscopic adjustable gastric banding. A case report. *Int J Surg Case Rep*. 2017;30:6–8. <http://dx.doi.org/10.1016/j.ijscr.2016.11.026>.
- Taskin M, Zengin K, Unal E. Intraluminal duodenal obstruction by a gastric band following erosion. *Obes Surg*. 2001;11:90–2. <http://dx.doi.org/10.1381/096089201321454178>.
- Egbeare DM, Myers AF, Lawrance RJ. Small bowel obstruction secondary to intragastric erosion and migration of a gastric band. *J Gastrointest Surg*. 2008;12:983–4. <http://dx.doi.org/10.1007/s11605-007-0304-y>.
- Offodile AC, Okafor P, Shaikh SN, Lautz D, Thompson CC. Duodenal obstruction due to erosion and migration of an

- adjustable gastric band: a novel endoscopic approach to management. *Surg Obes Relat Dis.* 2010;6:206-8. <http://dx.doi.org/10.1016/j.soard.2009.12.003>.
12. Shah KG, Molmenti EP, Nicastro J. Gastric band erosion and intraluminal migration leading to biliary and small bowel obstruction: case report and discussion. *Surg Obes Relat Dis.* 2011;7:117-8. <http://dx.doi.org/10.1016/j.soard.2010.01.008>.
 13. Bassam A. Unusual gastric band migration outcome: distal small bowel obstruction and coming out per-rectum. *Pan Afr Med J.* 2012;13:1-8.
 14. Salar O, Waraich N, Singh R, Awan A. Gastric band erosion, infection and migration causing jejunal obstruction. *BMJ Case Rep.* Published online 2013:2012-13. [doi:10.1136/bcr-2012-007737](https://doi.org/10.1136/bcr-2012-007737).
 15. Aguirre R, Ferna R, Villara C, et al. Migracion y perforacion de una banda gastrica en el intestino delgado. *Cir Esp.* 2014;3:601-3.

Mauricio Gonzalez-Urquijo*, Ilse Frias-Molina,
Eduardo Lozano-González, Javier Rojas-Mendez

*Tecnológico de Monterrey, Escuela de Medicina y Ciencias de la Salud,
Dr. Ignacio Morones Prieto O 3000, Monterrey, Nuevo León 64710,
Mexico*

*Corresponding author.

E-mail address: mauriciogzzu@gmail.com
(M. Gonzalez-Urquijo).

<http://dx.doi.org/10.1016/j.cireng.2022.08>
2173-5077/

© 2021 AEC. Published by Elsevier España, S.L.U. All rights reserved.