

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case report

Left renal vein compression complicating intragastric balloon insertion [☆]

Meriem Boui, Dr^{a,*}, Hammoune Nabil, Dr^a, Slioui Badr, Dr^a, BenElhend Salah, Dr^a, Zouaki Zakaria, Dr^a, Bellasri Salah, Dr^a, Atmane Mehdi, Dr^a, Mouhsine Abdelilah, Dr^a, Akka Rachid, Dr^b, Raissi Abderrahim, Dr^c

^a Department of Radiology, Avicenne Military Hospital, Marrakech, Morocco

^b Department of Gastroenterology, Avicenne Military Hospital, Marrakech, Morocco

^c Department of Hematology, Avicenne Military Hospital, Marrakech, Morocco

ARTICLE INFO

Article history:

Received 30 June 2021

Revised 17 August 2021

Accepted 20 August 2021

ABSTRACT

Obesity is a real public health problem and is of growing concern. People are resorting to surgical or endoscopic means to fight against overweight and obesity. In recent years, there has been a marked increase in the use of these means and in particular the insertion of a gastric balloon which seems to present less risk than surgical methods. Renal complications from intragastric balloon placement are extremely rare. We report here the case of compression of the left renal vein revealed by lumbar pain and hematuria in an overweight 39-year-old woman who benefited from the balloon gastric placement one month before symptoms. The scanner made the diagnosis and showed a good evolution after the withdrawal of the balloon.

© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Obesity is a real public health problem, on a constant rise. Hygiene-dietetic measures and medical treatment are helpful and are the first choice of treatment for patients with severe or morbid obesity. Bariatric surgery is usually the most efficient treatment for patients with massive and complicated obesity. However, some severe obesities do not respond to medical therapy, for this category endoscopic procedure seems to be

an attractive alternative; safer and less invasive than bariatric surgery, endowed with multiples advantages such as; the possibility of being repeated, it is associated with fewer complications, and can be performed on an outpatient basis. Intra-gastric balloon is the most used endoscopic technique, typically implanted for 6 months, then retrieved endoscopically and could be responsible for weight loss of 8%-15%. Side effects are usually vomiting, abdominal pain and intestinal occlusion [1–3]. Only few studies reported renal complications [4,5].

[☆] Competing interests: We testify that the content of the manuscript is original. We confirm that this manuscript has not been published elsewhere and is not under consideration by another journal. There are no conflicts of interest to disclose. Thank you for your consideration of this manuscript.

* Corresponding author.

E-mail address: Bouimeriemrx@gmail.com (M. Boui).

<https://doi.org/10.1016/j.radcr.2021.08.054>

1930-0433/© 2021 The Authors. Published by Elsevier Inc. on behalf of University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

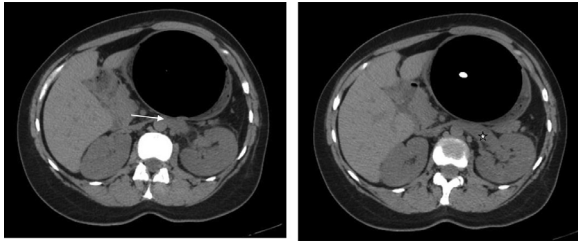


Fig. 1 – Non-contrast abdominal CT scan showing (A) the intragastric balloon compressing the left renal vein (white arrow), (B) Dilated left renal vein (star)

Imaging such as CT scan and MRI, play a key role in the diagnosis of severe complications of IGB. We report the case of an intragastric balloon compressing the left renal vein in 39-Years old woman two months following insertion of an intragastric balloon (IGB).

Case report

A 39-year-old woman admitted to the emergency room for left-flank pain evolving for 10 days associated with macroscopic hematuria. She had a history of obesity and have had an intragastric balloon introduced endoscopically (a Heliosphere Newtech IGB filled with air), 2 months ago, she had no immediate post-procedure complications except for a few episodes of nausea and vomiting. The clinical examination found only an abdominal distension without any other anomaly.

The blood test was normal including blood count and renal function. Dip a urine and urinalysis revealed red urine, with elevated blood cells and normal range of white cells. At the time of the examination, she had a body weight of 87 kg (BMI 31.5 kg/m²), representing an 8% loss of her pre-IGB body weight. A non-contrast computed tomography (CT) of the abdomen (stone protocol) was performed to eliminate kidney stones, but instead it showed an IGB filled with air compressing the left renal vein (Fig. 1 and 2). Abdominal CT with intravenous contrast provided the confirmation by showing a dilated left renal vein measuring 15,9 mm (Fig. 3). Otherwise, the other intra-abdominal organs were normal. The IGB was quickly removed under endoscopy. The gastric lining was intact with no evidence of ulcers, perforation, bleeding or trauma (Fig. 4). The balloon was deflated and removed successfully. The patient was kept under observation 48 hours. Urine culture was negative.

1 month after balloon removal an abdominal CT scan with contrast was performed and showed permeable renal vessels of normal caliber (Fig. 5).

Discussion

Obesity is clearly a growing worldwide problem. According to the World Health Organization “in 2016 more than 1.9 billion



Fig. 2 – CT scout view demonstrating the balloon filled with air in the gastric area

adults, 18 years and older, were overweight. Of these over 650 million were obese” [6].

There are different management options available to these patients, ranging from lifestyle, dietary changes, gastric banding, bariatric surgery and IGB. Endoscopic insertion of IGB was firstly described in the beginning of the 1980s; The first results had been published in 1982 [7]. It has been used as it provides a less invasive and potentially safer option for short-term weight loss.

Insertion of IGB is a procedure that consists on the insertion of an elastic intragastric balloon to increase the sense of satiety, reduce oral intake and induce weight loss. It's a non-invasive, reversible procedure. The introduction on the balloon is done under endoscopic control, it's indicated in the treatment of morbid obesity in addition to dietary measures or as a first step in superobese patients before subsequent bariatric surgery [8,9].

The BIG is usually removed 6 months after placement, regardless of effectiveness and weight result.

The most common symptoms after a BIG insertion are harmless and non-specific such as vomiting, nausea, cramps, and mild abdominal pain in 10%-90% of cases, depending on the series, usually during the first week [10,11]. More serious complications such as peptic ulceration, pancreatitis, gastric dilations, gastric perforation and esophageal perforation are described more rarely [12–14].

Other serious complications have been reported: a case of cardiac arrest complicated by a vegetative state a few hours after the insertion of the BIG has been reported by Cubattoli et al. [15]. Totté et al. [16] reported two gastric perforations as a complication of insertion of IGB for weight reduction in a series of 126 patients.

Multiples cases of BIG migration following its rupture have been described [10,17,18] causing occlusions of the small in-

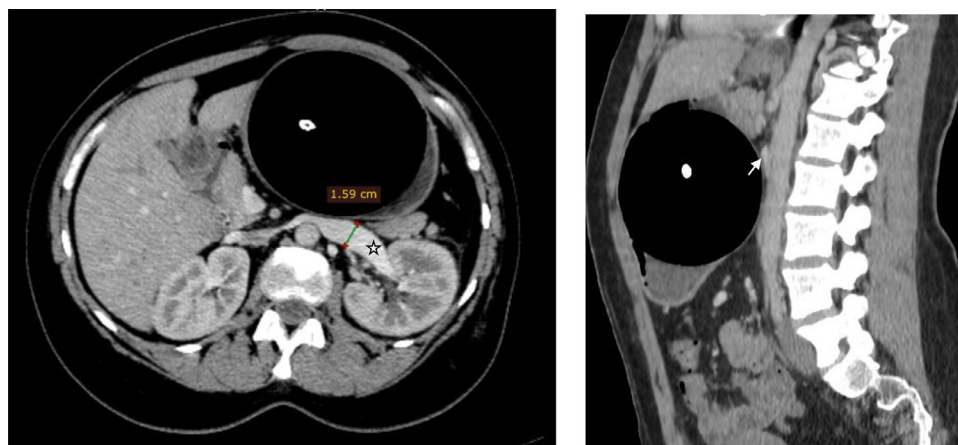


Fig. 3 – Contrast-enhanced abdominal CT scan showing a dilated left renal vein measuring 15.9 mm (star) ahead its compression by the intragastric balloon (arrow)



Fig. 4 – Endoscopic view of intragastric balloon before the removal



Fig. 5 – Contrast-enhanced abdominal CT scan 1 mo after balloon removal showing a permeable left renal vein of normal caliber

testine or of the colon [18], and required endoscopic and surgical extraction.

Other serious and rare complications have been reported like pancreatitis and renal injury [4,5,12]. We report an unusual case of renal complication of IGB ruled out by CT scan.

Emad S. Aljahdli et al. [4] Described a case of ischemic renal injury as a complication of intragastric balloon insertion, that occurred 40 days after insertion of an Orbera IGB filled with 600 ml normal saline mixed with methylene blue.

In our case, the IGB was a Heliosphere filled with air and the left renal compression didn't lead to renal ischemia.

Milone et al. [5] reported an acute renal failure and metabolic acidosis 5 days after IGB insertion due to vomiting and dehydration. Other cases of acute renal failure were reported, including two diabetic patients that developed it within two weeks after IGB insertion. In these cases, it was attributed to vomiting, dehydration, and metformin administration.

Imaging plays a key role in the diagnosis of serious complications such as pancreatitis, occlusions of the small intestine, ischemic renal injury, duodenal migration of the balloon [19,20].

CT scanning is a technique of choice for the diagnosis of small-bowel obstruction, gastric perforation, renal vein compression,

Ultrasound is useful in the control of the left renal vein after the removal of the IGB [21]

Conclusion

BIG is an endoscopic technique for treating obesity as an alternative to or in preparation for bariatric surgery.

This technique exposes multiple complications, as illustrated by this case of compression of the left renal vein diagnosed by a CT scan.

REFERENCES

- [1] Tsesmeli N, Coumaros D. Review of endoscopic devices for weight reduction: old and new balloons and implantable prostheses. *Endoscopy* 2009;41(12):1082–9.

- [2] Cohen J, Chahine E, Zana SK, Moller C-C, Jarboui S, Chouillard E. Occlusion du grêle par migration d'un ballon intragastrique: à propos de deux cas. *Obésité* 2011;6(3):142–5.
- [3] Eynden FV, Urbain P. Small intestine gastric balloon impaction treated by laparoscopic surgery. *Obesity surgery* 2001;11(5):646–8.
- [4] Aljahdli ES. Ischemic Renal Injury Complicating Intra-gastric Balloon Insertion. *ACG case reports journal* 2018;5.
- [5] Milone M, Maietta P, Bianco P, Pisapia A, Gaudio D, Coretti G, et al. An early onset of acute renal failure in a young woman with obesity and infertility who underwent gastric balloon positioning. A case report. *Il Giornale di chirurgia* 2014;35(3–4):73.
- [6] Obesity and overweight [Internet]. [cité 22 juin 2021]. Disponible sur: <https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight>
- [7] Nieben OG, Harboe H. Intra-gastric balloon as an artificial bezoar for treatment of obesity. *The Lancet* 1982;319(8265):198–9.
- [8] Weiner R, Gutberlet H, Bockhorn H. Preparation of extremely obese patients for laparoscopic gastric banding by gastric balloon therapy. *Obesity Surgery* 1999;9(3):261–4.
- [9] De Waele B b Reynaert H, Urbain D, Willems G. Intra-gastric balloons for preoperative weight reduction. *Obesity Surgery* 2000;10(1):58–60.
- [10] Mion F, Poncet G, Benatre V, Roman S, Napoléon B, Laville M. Place du ballon intragastrique dans la prise en charge de l'obésité. *Hépatogastro & Oncologie Digestive* 2008;15(1):43–8.
- [11] Kannan RY, Nutt MR. Are intra-gastric adjustable balloon system safe? A case series. *International journal of surgery case reports* 2013;4(10):936–8.
- [12] Gore N, Ravindran P, Chan DL, Das K, Cosman PH. Pancreatitis from intra-gastric balloon insertion: case report and literature review. *International journal of surgery case reports* 2018;45:79–82.
- [13] Pretolesi F, Redaelli G, Papagni L, Derchi LE. Intra-gastric balloon for morbid obesity causing chronic gastric dilatation. *European radiology* 2001;11(4):588–9.
- [14] Genco A, Bruni T, Doldi SB, Forestieri P, Marino M, Busetto L, et al. BioEnterics intra-gastric balloon: the Italian experience with 2,515 patients. *Obesity surgery* 2005;15(8):1161–4.
- [15] Cubattoli L, Barneschi C, Mastrocinque E, Bonucci P, Giomarelli PP. Cardiac arrest after intra-gastric balloon insertion in a super-obese patient. *Obesity surgery* 2009;19(2):253–6.
- [16] ETotté E, Hendrickx L, Pauwels M, Van Hee R. Weight reduction by means of intra-gastric device: experience with the bioenterics intra-gastric balloon. *Obesity Surgery* 2001;11(4):519–23.
- [17] Eynden FV, Urbain P. Small intestine gastric balloon impaction treated by laparoscopic surgery. *Obesity surgery* 2001;11(5):646–8.
- [18] Kim WY, Kirkpatrick UJ, Moody AP, Wake PN. Large bowel impaction by the BioEnterics Intra-gastric Balloon (BIB) necessitating surgical intervention. *Annals of the Royal College of Surgeons of England* 2000;82(3):202.
- [19] Balthazar EJ, Ranson JH, Naidich DP, Megibow AJ, Caccavale R, Cooper MM. Acute pancreatitis: prognostic value of CT. *Radiology* 1985;156(3):767–72.
- [20] Di Saverio S, Massoni CB, Boschi S, Biscardi A, Tugnoli G, Masetti M, et al. Complete small-bowel obstruction from a migrated intra-gastric balloon: emergency laparoscopy for retrieval via enterotomy and intra-corporeal repair. *Obesity surgery* 2014;24(10):1830–2.
- [21] Hangge PT, Gupta N, Khurana A, Quencer KB, Albadawi H, Alzubaidi SJ, et al. Degree of left renal vein compression predicts nutcracker syndrome. *Journal of clinical medicine* 2018;7(5):107.