



CORPUS PUBLISHERS

# Corpus Journal of Case Reports (CJCR)

ISSN: 2833-4388

Volume 3 Issue 3, 2022

## Article Information

Received date : August 23, 2022

Published date: October 14, 2022

## \*Corresponding author

Alejandro Weber Sánchez MD, Vialidad de la Barranca s/n C410, Valle de las Palmas, Huixquilucan, 52763, Estado de México, México. Telephone No: 52469527,  
E-mail: awebersanchez@gmail.com

## Keywords

Intestinal Obstruction, Gastric Pacemaker, Gastroparesis, Gastroesophageal Reflux, Implantable Stimulation Electrodes, Lead, Laparoscopy, Laparoscopic Surgery.

Distributed under Creative Commons CC-BY 4.0

Case Report

# Mechanical Small Bowel Obstruction Due to Gastroesophageal Pacemaker Lead, Solved by Assisted Laparoscopy - Case Report and Literature Review

Alejandro Weber Sánchez<sup>1\*</sup>, Pablo Weber Alvarez<sup>2</sup>, Rafael Carbo Romano<sup>1</sup>

<sup>1</sup>Department of General Surgery, Hospital Ángeles Lomas, México

<sup>2</sup>General physician, Hospital Ángeles Lomas, México

## Abstract

The use of implanted medical devices such as gastric pacers to treat a great variety of diseases, has gained ground over time. Even though these devices are useful as in cases of gastroparesis, gastroesophageal reflux or morbid obesity, they have risks and complications that can be life threatening. Extrinsic intestinal obstruction may be caused by the lead of an abdominally implanted pacemaker, and should be considered in patients with suggestive signs and symptoms of bowel obstruction and treated promptly to avoid further damage. We present the case of a 76-year-old patient with bowel obstruction caused by the lead of a gastric pacemaker solved by laparoscopic surgery.

## Introduction

Mechanical small bowel obstruction may be a life-threatening condition, mainly in cases when blood-supply is compromised, and gangrene and peritonitis may supervene. Attention must be paid particularly in unusual cases, in which symptoms may be confused by those of the underlying disease, and may lead to a delay in diagnosis and treatment [1,2]. Although a very rare condition, extrinsic intestinal obstruction in adults may be caused by the lead of an abdominally implanted pacemaker, and should be considered in these patients with suggestive signs and symptoms. The objective of this paper is to report a case of intestinal small bowel obstruction caused by the lead of a gastric pacemaker, solved by laparoscopic surgery.

## Case Report

A 76-year-old female was admitted to the emergency room, with a 12-hour history of sudden onset of severe abdominal pain. Relevant medical history revealed Gastroesophageal Reflux (GERD), laparoscopic appendectomy, and a gastric pacemaker implanted 4 months before, to control GERD symptoms. The pain was diffuse, associated with distension, constipation, failure to pass flatus, and bilious vomiting. She was dehydrated and had severe abdominal tenderness on palpation, worse in the right iliac fossa, with positive rebound sign, and high-pitched bowel sounds. Her blood tests had no relevant results. A contrast-enhanced CT of the abdomen showed distention of small bowel loops, with a transition zone at the distal ileum, caused by the lead of a generator pacemaker encircling the bowel loop. The generator was located subcutaneously at the left abdominal wall, and distal pacemaker tips were placed on the esophageal wall at the level of the lower esophageal sphincter. From this anatomical site, the wire descended, encircled the distal ileum forming a complete loop around it, and then ascended again to connect with the pacemaker (Figures 1-2).

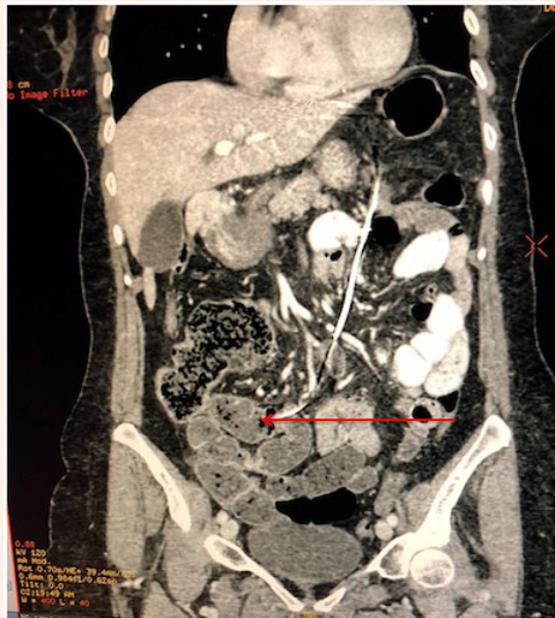


Figure 1: CT scan showing a distention of small bowel loops caused by the gastric pacemaker showed by the arrow

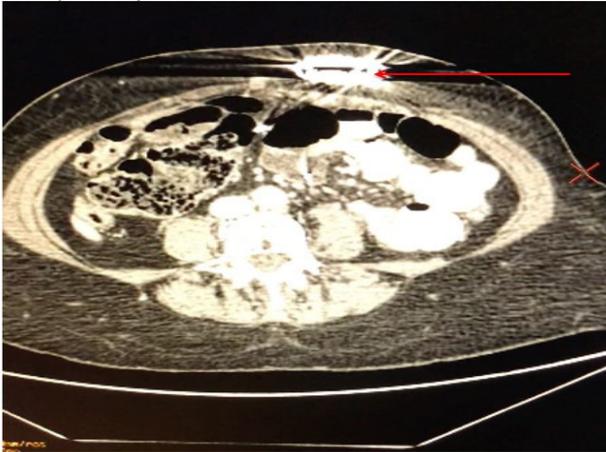


Figure 2: Axial CT scan showing the subcutaneous pacemaker



Figure 3: Laparoscopic view of the pacemaker lead encircling the distal ileum.



Figure 4: Pacemaker generator in place, with reconnected electrodes and normal passage of bowel contents to the colon

After initial treatment with intravenous fluids, an emergency laparoscopy was performed. Small bowel loops distention was found, in addition to many adhesions. After adhesiolysis was performed, we followed all the way down the lead of the pacemaker and found it firmly attached to the mesentery by thick fibrous tissue, encircling the distal ileum, proximal to the ileocecal valve, causing a stricture at this point (Figure 3). We assisted the procedure making a small midline incision, to manually undo the loop of the wire from around the intestine, disconnecting it from the pacemaker generator which was exteriorized from its subcutaneous pocket. Once the ileum was free, the free cable was tunneled in the greater omentum, all the way, from the esophageal tips to the abdominal wall, fixing it with sutures to prevent further obstructions, and reconnecting the electrodes again to the generator, as the patient asked us, if possible, to leave the device in place (Figure 4). The postoperative course was uneventful, and the patient could be discharged at the fourth postoperative day. There was no recurrence of symptoms on subsequent follow-up.

## Discussion

Among all the possible etiologies of acute abdomen, one of the most frequent is bowel obstruction. A potentially life-threatening condition, that constitutes 20-30% of all surgical emergencies. Considering this high incidence, it is essential for the surgeon to know all the possible causes of bowel obstruction; functional, organic, or mechanical, as well as the ones caused by foreign devices, to quickly make an accurate diagnosis and treatment [1,2].

Novel devices like the gastric pacemaker, used for the treatment of motility digestive disorders, such as chronic nausea and vomiting associated with gastroparesis, morbid obesity, and other conditions, such as Gastroesophageal Reflux Disease (GERD), are currently being evaluated [3-8]. The system consists of a battery-powered neurostimulator implanted beneath the skin, in the anterior abdominal wall, which delivers controlled electrical pulses by means of a lead, with two distal electrode tips implanted on the stomach or the esophageal wall. The device is placed usually via a minimal access surgical technique. In patients with GERD, as the case reported here, electrical stimulation of the lower esophageal sphincter with the pacer, is intended to increase resting lower esophageal sphincter pressure, as a therapy to control abnormal gastroesophageal reflux [9-13]. But there are inherent risks and complications associated with the device, such as infection, bleeding, displacement, and lead entanglement; gastric, esophageal, or intestinal erosion or perforation, among others. Bielefeld, analyzed the adverse events of these devices, recorded in the Manufacturer and User Device Experience (MAUDE) registry, reported to the FDA, from 2001 to 2015. Perioperative complications are quite rare, mainly hematoma after surgery, and most complications occur during the first 2 years after surgery [14].

The blockage of the intestinal content by these devices are very unusual, and can be originated by post-surgical adhesions, typical of the procedure, or cause an internal hernia due to the electrode cables. This possibility has been reported and seen in cases of morbid obese patients, treated with an adjustable gastric band, and are related to redundant connection tubes in the abdominal cavity [15]. Also, intestinal occlusion might be due to the position of the lead and the power device. Thus, it is important during surgery, to minimize the intra-abdominal free length of the leads, positioning the device in the left upper quadrant if possible. Any of these situations may require emergency surgery to avoid further complications. Other implants in the abdominal cavity may also cause a block of the intestinal content. Gomez et al. reported a rare case of intestinal obstruction, caused by peritoneal migration of an abdominally implanted epicardial pacemaker of a 10-year-old child, nine years after the pacemaker was implanted because of congenital complete heart block and complex congenital heart disease, when she was 2-weeks-old [16]. But, as far as we know, there is only another case similar to the one we report here, informed by Lederhuber et al. of a small bowel obstruction and strangulation, secondary to the gastric stimulator electrodes. Emergency laparotomy, revealed small bowel strangulation by the gastric stimulator electrodes, which needed intestinal resection [17].

In the case we report here, the problem was solved without intestinal resection by laparoscopy, although a small incision of 6 cm was made to assist the procedure, with the advantages of the minimally invasive surgery in this elder patient, and is the only reported case solved this way. As in the case reported by Lederhuber, it could be expected that these patients may present repeatedly with vague symptoms, such as mild abdominal discomfort and bloating, and may be considered gastroparesis-related, before a severe emergency manifest. But the patients can also present in circulatory shock due to peritonitis with underlying small bowel obstruction. In these cases, the surgeon must promptly identify the problem and decide if emergency surgery



is needed, to avoid severe complications such as intestinal strangulation. Whenever possible, laparoscopy should be preferred for its benefits. Conversion to laparotomy, or make a small incision to assist the procedure, could be done at any time if considered safe for the patient.

### Conclusion

Gastric stimulators are not totally risk-free. Repeated or sudden presentation of symptoms of abdominal pain or intestinal occlusion, in a patient with a gastric pacemaker device, must raise suspicion of unusual complications and prompt treatment must be established. Laparoscopy could be a useful tool to solve these rare cases.

### Conflict of Interest

The authors of this publication declare that there is no conflict of interest.

### Author's Contribution

Study concepts, manuscript writing and critical revision: Dr. Luis Alejandro Weber Sánchez: Principal researcher

**Manuscript writing:** Dr. Pablo Weber Alvarez

**Data acquisition:** Dr. Rafael Carbó Romano

### Funding

This study was not supported by any institution or company.

### Consent

Informed consent was obtained from the patient for publication of this case report and any accompanying images.

### References

1. Jones N, Hetzel D, Harkness C, Vanderkwaak T, Galvin S, et al. (1922) The causes of acute intestinal obstruction. *The Lancet* 199(5154): 1158.
2. Amboldi M, Mezzabotta M, Zanotti M, Amboldi A, Morandi E (2009) Unusual causes of acute intestinal obstruction in adults. *Int Surg* 94(2): 99-110.
3. Abell T, McCallum R, Hocking M, Koch K, Abrahamsson H, et al. (2003) Gastric electrical stimulation for medically refractory gastroparesis. *Gastroenterology* 125(2): 421-428.
4. Camilleri M, Parkman HP, Shafi MA, Abell TL, Gerson L, et al. (2013) Clinical Guideline: Management of Gastroparesis. *Am J Gastroenterol* 108: 18-37.
5. Hasler WL (2009) Methods of gastric electrical stimulation and pacing: a review of their benefits and mechanisms of action in gastroparesis and obesity. *Neurogastroenterol Motil* 21(3): 229-243.
6. Lin Z, Forster J, Sarosiek I, McCallum RW (2003) Treatment of gastroparesis with electrical stimulation. *Dig Dis Sci* 48(5): 837-848.
7. Mizrahi M, Ben Ya'acov A, Ilan Y (2012) Gastric stimulation for weight loss. *World J Gastroenterol* 18(29): 2309-2319.
8. Voeller GR (2006) Gastric electrical stimulation: a novel treatment for gastroparesis. *JLS* 10: 131.
9. Villalobos TG (2016) Cirugía esófago gástrica. *Rev Gastroenterol Mex* 8: 35-37.
10. Stephan D, Attwood S, Labenz J, Willeke F (2018) EndoStim® treatment-a new minimally invasive technology in antireflux surgery. *Chirurg* 89(10): 785-792.
11. Rodríguez L, Rodríguez P, Neto MG, Ayala JC, Saba J, et al. (2012) Short-term electrical stimulation of the lower esophageal sphincter increases sphincter pressure in patients with gastroesophageal reflux disease. *Neurogastroenterol Motil* 24(5): 446-e213.
12. Rodríguez L, Rodríguez P, Gómez B, Ayala JC, Saba J, et al. (2013) Electrical stimulation therapy of the lower esophageal sphincter is successful in treating GERD: final results of open-label prospective trial. *Surg Endosc* 27(4): 1083-1092.
13. Rodríguez L, Rodríguez P, Gómez B, Ayala JC, Oxenberg D, et al. (2015) Two-year results of intermittent electrical stimulation of the lower esophageal sphincter treatment of gastroesophageal reflux disease. *Surgery* 157(3): 556-567.
14. Bielefeldt K (2017) Adverse events of gastric electrical stimulators recorded in the manufacturer and user device experience (MAUDE) registry. *Auton Neurosci* 202: 40-44.
15. Avendaño HV, López JM (2016) Hernia interna por tubo de conexión de banda gástrica a 10 años de su colocación. *Rev Mex Cir Endoscop* 17(4): 204-207.
16. Gomez C, Dick M 2nd, Hernandez R, Coran AG, Crowley D, et al. (1995) Peritoneal migration of an abdominally implanted epicardial pacemaker: a cause of intestinal obstruction. *Pacing Clin Electrophysiol* 18: 2231-2232.
17. Lederhuber H, Axer S, Ihle C (2015) Case report: rare case of mechanical bowel obstruction due to strangulation by gastric stimulator electrodes. *BMC Surg* 15: 35.