Case Report

Mini laparotomy for candy cane syndrome at the jejunojejunostomy after a second Roux Y Gastric bypass with multiple surgical history: a case report

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Background: Candy cane syndrome (CCS) is a rare and underreported complication, seldom occurring after bariatric surgeries, especially, the Roux-en-Y gastric bypass (RYGB) type. It refers to an excessively long-blind end of the alimentary limb, usually at the gastrojejunal (GJ) junction, and to a lesser extent, can occur at the jejunojejunal (JJ) junction, that may cause symptoms including abdominal pain, regurgitation, nausea, vomiting and reflux. However, its diagnosis can be challenging and misleading.

Case Description: A 34-year-old woman with a multiple past surgical history presented with small bowel obstruction (SBO) symptoms following a second gastric bypass surgery. An esophagogastroduodenoscopy (EGD) was inconclusive, then a computed tomography (CT) scan was done, which reported intussusception. The patient underwent laparoscopy, which revealed an anastomosis with an extra 14 cm of single-loop bowel near the JJ junction rather than intussusception, leading to a diagnostic laparoscopy followed by a mini-laparotomy procedure. Adhesiolysis followed by a resection of the elongated blind end was done, hence, the diagnosis of CCS was established. The patient tolerated the surgery with a complete resolution of her symptoms; no subsequent complications were reported.

Conclusions: The frequency of RYGB surgery and the number of past surgeries a patient might have undergone might correlate independently with the risk of developing CCS.

Keywords: Candy cane syndrome (CCS); intussusception; middle east; risk factors; case report

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Introduction

With the advances in metabolic surgeries and the increasing prevalence of obesity globally, in addition to the proven advantages of preventing health issues, more surgeries are being performed and are advancing worldwide. Candy cane syndrome (CCS) is a rare complication that has been reported in bariatric patients following Roux-en-Y gastric bypass (RYGB). It typically occurs when there is an excessive length of the roux limb proximal to the gastrojejunostomy, which makes it possible for food particles to lodge and reside in the redundant blind limb. The presentation can be vague, with non-specific symptoms including abdominal pain, nausea, and vomiting. Symptoms suggestive of CCS have been reported as early as 3 months to as late as 11 years (1,2). Most remain undiagnosed as the course of the disease is poorly described.

A series of cases regarding CCS in the USA have been reported and successfully managed. All patients presented with non-specific symptoms of small-bowel obstruction (SBO), and tenderness in the epigastric region was consistent on physical examination, the cause of which was negative on pre-operative investigations with esophagogastroduodenoscopy (EGD), computed tomography (CT), or an upper gastrointestinal (GI) study. The cases were managed by resecting the excessive redundancy of the long blind jejunal loop of gastrojejunostomy anastomosis using the Endo GIA Tri-Stapler device. After the procedure, patients were tolerating their diet, completely asymptomatic and pain-free (3).

Although CCS is a well-described entity after laparoscopic-gastric bypass (LGB), often occurring near the gastrojejunal (GJ) junction and causing vague symptoms, it can manifest near the jejunojejunal (JJ) junction, leading to a more severe and acute presentation such as SBO (4).

A research study aimed at evaluating the sensitivity of perioperative diagnostic methods for CCS, in addition to perioperative outcomes and symptom resolution post candy cane resection surgery that was conducted in the United Kingdom. It revised 28 cases of CCS between 2010 and 2017. Among these cases, abdominal pain presenting in (86%), regurgitation/vomiting (43%), suboptimal weight loss (36%), and acid reflux (21%). A total of 73% of patients were found to have complete or partial symptom resolution post CCS surgical revision, while 25% of the cases were found to have further perioperative complications. The utmost success rate was documented in the regurgitation/vomiting subgroup. In terms of CCS size, compared to the pain-free cases, patients who presented with abdominal pain were revealed to have a higher size (4.2 *vs.* 2 cm). The perioperative tests that examined and delivered a precise diagnosis include barium contrast swallow (63%), upper GI endoscopies (50%), and computer tomographies (29%). CCS can be detected using more than one diagnostic tool and should be used when investigating post-RYGB patients with abdominal symptoms (5).

In this report, we present a patient, who had undergone multiple surgeries in the past, with CCS following a second attempt of gastric bypass surgery, which was mistakenly CT-diagnosed as intussusception. The leading point to diagnose and treat CCS was intussusception. We present this case in accordance with the CARE reporting checklist (available at https://acr.amegroups.com/article/view/10.21037/acr-23-62/rc).

Highlight box

Key findings

- Even though the candy cane syndrome (CCS) risk is often increased following a Roux-en-Y gastric bypass (RYGB), the risk is not diminished after a successful procedure, but rather might independently correlate with the number of RYGB surgeries and the patient's past surgical history.

What is known and what is new?

- It is known that CCS is a complication following RYGB.
- CCS can be mistakenly computed tomography-diagnosed as intussusception.

What is the implication, and what should change now?

- The diagnosis of CCS shouldn't be eliminated after a complication-free RYGB but should be considered each time a patient might need to have another gastric bypass surgery.
- Failure to confirm the diagnosis of intussusception should be a leading point to think about CCS as a differential diagnosis.

Case presentation

A 34-year-old female, known case of bronchial asthma and trigeminal neuralgia on medications, and without any other medical or genetic conditions. Clinically, the patient presented with nausea, vomiting, food intolerance, acid reflux, appetite loss, and abdominal pain for 1 month, which was associated with intermittent fever and chills, night sweats, shortness of breath, palpations, fatigue, dizziness, and generalized body pain. The patient was admitted for further evaluation and management. The patient

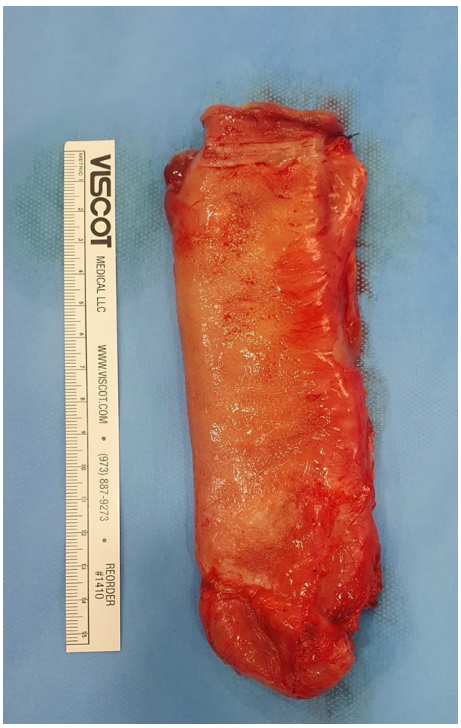


Figure 1 A gross section showing a 14 cm in length blind-end extra-bowel loop following a mini-laparotomy procedure.

had a significant past surgical history: fistulotomy, right hepatectomy without the middle hepatic vein (for donation), ultrasound-guided biopsy of the right sub-phrenic collection, and an excision of a subcutaneous nodule in the abdominal wall. All her past surgeries were successfully completed without any significant subsequent significant complications. On examination, there was tenderness at the epigastric area and the groin with mild abdominal distension. An EGD was done following the second gastric bypass surgery with the impression of a lax gastroesophageal junction, healed GJ ulceration with mild fundal erythema. Then, a CT scan was performed, which raised the possibility of intussusception. Based on CT findings, the surgeon proceeded with a diagnostic laparoscopy, where extensive adhesions were discovered, thus, adhesiolysis was performed. During the adhesiolysis process, a blind-end extra-bowel loop was seen near the JJ anastomosis surrounded by a large number of adhesions, this obligated the surgeon to perform a mini-laparotomy, where a blind-loop of 14 cm was resected (*Figure 1*), the anastomosis was resolved, and a complete resolution of symptoms have occurred. The specimen was sent to histopathology lab for further evaluation (*Figure 2*). *Table 1* compares pre-operative and post-operative laboratory findings. Ultrasound and CT scans were done pre-operatively (*Figures 3-5*).

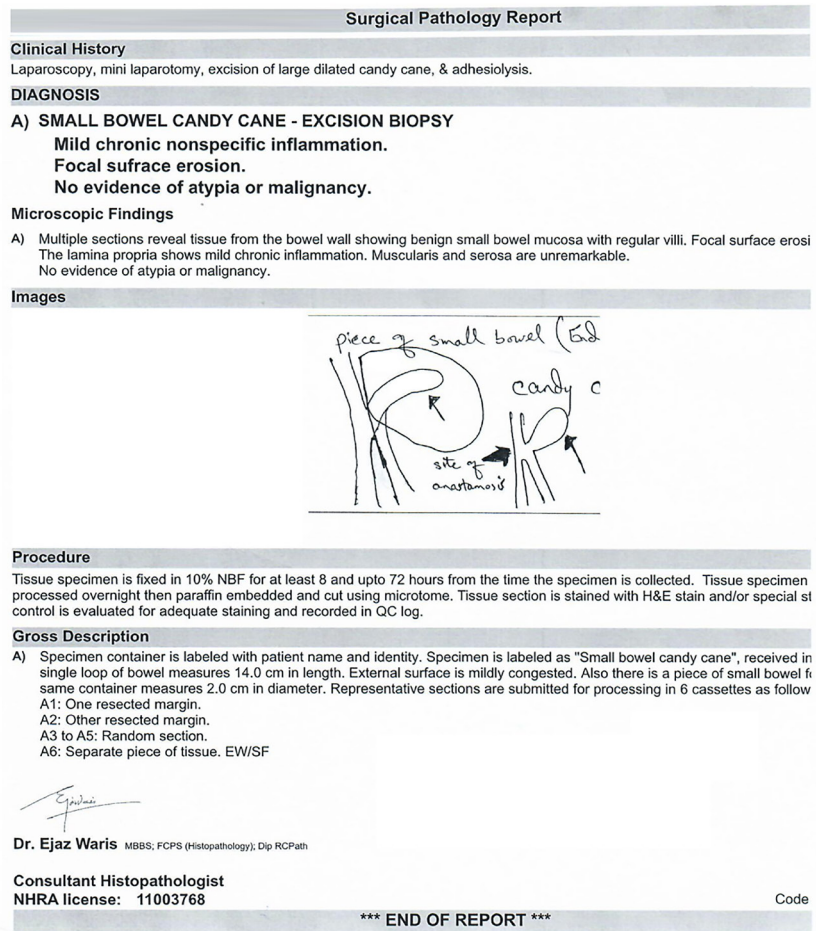
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

Discussion

As illustrated in the under-reported CCS cases worldwide, patients usually present non-specific GI symptoms (6) along with a typical location; the GJ junction (4). This case is different as obstruction took place at an unusual location; the JJ junction. Additionally, the patient had her first gastric bypass surgery successfully without any subsequent complications for four years. Although the patient had multiple surgeries done before and after her first mini-gastric bypass surgery, CCS was only found incidentally after the second gastric bypass surgery. The EGD was inconclusive and the CT scan preceding the excision of the blind loop reported the impression of an intussusception, based on which the surgeon operated, but rather incidentally discovered the CCS. This case highlights that the risk of CCS is still apparent even after a previous successful gastric bypass surgery. Furthermore, CCS appears to mimic intussusception findings on CT scan reports, which can be misleading to surgeons. Finally, this is the first reported case of CCS in Bahrain, and the second in Gulf-Cooperation Council (GCC) countries, which encourages the need for further studies between possible epidemiological risk factors and CCS in the Middle East region.

Conclusions

Even though CCS risk is often increased following a RYGB, the risk is not diminished after a successful procedure. The risk might as well independently correlate with the number of RYGB surgeries and the past surgical history a patient had undergone.



Surgical Pathology Report

Clinical History

Laparoscopy, mini laparotomy, excision of large dilated candy cane, & adhesiolysis.

DIAGNOSIS

A) SMALL BOWEL CANDY CANE - EXCISION BIOPSY
Mild chronic nonspecific inflammation.
Focal sufrace erosion.
No evidence of atypia or malignancy.

Microscopic Findings

A) Multiple sections reveal tissue from the bowel wall showing benign small bowel mucosa with regular villi. Focal surface erosi
The lamina propria shows mild chronic inflammation. Muscularis and serosa are unremarkable.
No evidence of atypia or malignancy.

Images

Procedure

Tissue specimen is fixed in 10% NBF for at least 8 and upto 72 hours from the time the specimen is collected. Tissue specimen processed overnight then paraffin embedded and cut using microtome. Tissue section is stained with H&E stain and/or special st control is evaluated for adequate staining and recorded in QC log.

Gross Description

A) Specimen container is labeled with patient name and identity. Specimen is labeled as "Small bowel candy cane", received in single loop of bowel measures 14.0 cm in length. External surface is mildly congested. Also there is a piece of small bowel fe same container measures 2.0 cm in diameter. Representative sections are submitted for processing in 6 cassettes as follow
A1: One resected margin.
A2: Other resected margin.
A3 to A5: Random section.
A6: Separate piece of tissue. EW/SF

Dr. Ejaz Waris MBBS; FCPS (Histopathology); Dip RCPath

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*** END OF REPORT ***

Figure 2 Microscopic findings: revealed benign small-bowel mucosa with regular villi. Focal-surface erosions. Mild inflammation of lamina propria, muscularis layer and the serosa was unremarkable. There was no evidence of atypia or malignancy. Macroscopic findings: a 14-cm-long single-loop bowel was resected. A final diagnosis of candy cane syndrome has been established.

Table 1 Pre- and post-operative laboratory results

Lab variable	Pre-operative result	Post-operative result
WBC, 10^6/μL	7.21	6.59
RBC, 10^6/μL	3.8	4.1
Hemoglobin, g/dL	10.9	10.6
PLT, 10^3/μL	248	249
Na, mmol/L	139	140
K, mmol/L	4.5	4.8
Cl, mmol/L	102	102
HCO_3, mmol/L	28	28
Urea, mmol/L	4.5	5.6
Creatinine, μmol/L	44	51

WBC, white-blood cell; RBC, red-blood cell; PLT, platelets.

REPORT

U/S ABDOMEN AND PELVIS

ABDOMINAL AND PELVIC ULTRASOUND

Normal echogenicity of the liver with normal outline. No focal lesion or biliary dilation. The gallbladder is remove. CBD is normal with no stones or wall thickening.

The Pancreases normal with no foal lesion or adenopathy no duct dilations. The portal and hepatic veins are patent with normal direction of flow. The spleen is normal in outline and size. It measures 8.0 cm.

Both kidneys are normal in outline and size with no hydronephrosis or masses. The right kidney measures 10.74 cm and the left measures 10.16 cm.

The urinary bladder is normal in outline with no wall thickening or stones. Small Amount of free fluid in the left iliac fossa. Moderage dilated large bowel loops associated with edema of small bowel mesentery with mild hyperemia. there is a small collection 2.0x1.0 cm with edema in the Para umbilical area at the site of surgery . no recurrent hernia. Small and large bowel loops are normal. The uterus and both ovaries are normal.

Impression:

Finding of seroma in the surgical wound. Mesenteric peritonitis. Advice CT scan abdomen and pelvis.

Figure 3 Pre-operative ultrasound: abdominal and pelvic ultrasound shows seroma in the surgical wound, with mesenteric peritonitis. CBD, common bile ducts.

REPORT

CT SCAN ABDOMINAL AND PELVIC

Oral and IV (100 ml Omnipaque) triple phase contrast enhanced CT scan of the abdomen and pelvis done and showed the following.

Evidence of right hepatic lobectomy with hypertrophy of the left lobe. No focal lesion or biliary dilations. Normal enhancement pattern. No biliary dilations. The portal vein is dilated with multiple mesenteric venous collateral no thrombosis . The hepatic veins are patent with normal caliber. The GB is surgically removed.

Normal density and enhancement of the pancreas with no focal lesion or duct dilations, There are no peripancreatic adenopathy or collections. The body tail uncinate process are visualized and are normal. The SMV and SMA are patent . Partial filling defect in the lower part of the SMV could represent a thrombus . The splenic vein and portal confluence are patent with moderate dilations likely related to post liver donation surgery changes. There are mild varicose veins. The spleen show normal outline and size with no focal lesion or calcifications. No collection in the pre splenic space or in the lesser sac.

Figure 4 Pre-operative CT-scan shows post-liver donation and bariatric surgery gastrectomy with post-surgical changes. Small-bowel intussusception (*Figure 5*) with peritonitis and partial small-bowel obstructions. Possible partial thrombosis of superior mesenteric vein. Pelvic congestion syndrome with left side tubo-ovarian abscess. GB, gallbladder; SMV, superior mesenteric vein; SMA, superior mesenteric artery.

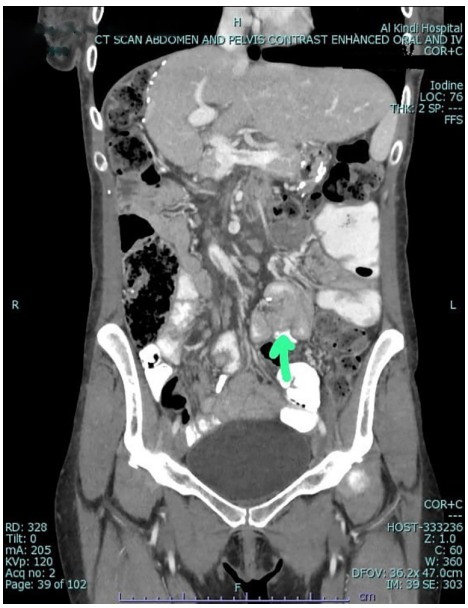

Figure 5 Pre-operative computed tomography scan. The green arrow marks the site of suspected intussusception.

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Footnote

Reporting Checklist: The authors have completed the CARE reporting checklist. Available at https://acr.amegroups.com/article/view/10.21037/acr-23-62/rc

Peer Review File: Available at https://acr.amegroups.com/article/view/10.21037/acr-23-62/prf

Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at https://acr.amegroups.com/article/view/10.21037/acr-23-62/coif). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the editorial office of this journal.

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