

Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

## International Journal of Surgery Case Reports

journal homepage: [www.casereports.com](http://www.casereports.com)

## Rare complication post sleeve gastrectomy: Acute irreducible paraesophageal hernia

Osamah Al-Sanea<sup>a</sup>, Ahmed Al-garzaie<sup>a</sup>, Mohamad Dernaika<sup>b</sup>, Johnny Haddad<sup>a,\*</sup><sup>a</sup> Bariatric and Metabolic Surgery Department, Somna Care, Procare Riaya Hospital, Al Khobar, Saudi Arabia<sup>b</sup> Gastroenterology Department, Somna Care, Procare Riaya Hospital, Al Khobar, Saudi Arabia

## ARTICLE INFO

## Article history:

Received 19 December 2014

Received in revised form 17 January 2015

Accepted 25 January 2015

Available online 28 January 2015

## Keywords:

Sleeve gastrectomy

Intrathoracic migration

Fixation of the sleeve

Gastrophrenic membrane

## ABSTRACT

**INTRODUCTION:** Laparoscopic sleeve gastrectomy has been accepted as a standalone effective bariatric procedure. With the increase in the number of cases done worldwide, we are witnessing the emergence of new unexpected complications.

**PRESENTATION:** A seemingly straight forward sleeve gastrectomy was complicated by acute post-operative vomiting which was diagnosed as an acute intra thoracic migration of part of the new sleeve. Surgical repair was done, with reduction and fixation of the stomach. Patient was subsequently relieved of his symptoms and discharged.

**DISCUSSION:** This is a rare complication of a relatively well studied operation. Faced with severe post operative repeated vomiting, clinical suspicion and correct use of all para-clinical tools should help delineate the cause.

**CONCLUSION:** We report this case hoping to expand the existing literature on the topic and to highlight the potential role of gastrophrenic membrane dissection in the occurrence of such complication.

© 2015 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

In many parts of the world vertical sleeve gastrectomy has become the most commonly performed operation in the treatment of morbid obesity, it surpassed gastric bypass in 2013 in many areas of the world [1].

As the number of sleeves performed yearly increased and as the experience grew so did new complications and new dilemmas in managing them.

Early postoperative sleeve gastrectomy complications are well described in the literature; they include staple line leaks, bleeding, infection and abscess formation, trocar site hernia, intestinal occlusion [2–4].

We describe the case of an acute postoperative sleeved herniation through the esophageal hiatus and its subsequent management.

## 2. Presentation of case

A 23 year old male patient suffering from morbid obesity body mass index BMI = 39 presented to our international center of

excellence in bariatric and metabolic surgery. Bariatric surgery was discussed with him and a choice of laparoscopic sleeve gastrectomy was reached.

A detailed history was taken from the patient, revealing no significant comorbidities, no gastro-esophageal reflux disease (GERD) nor any atypical reflux symptoms. Patient has no past surgical history, he has a family history of obesity, diabetes mellitus and hypertension.

He has been progressively suffering from an increase of his weight with many failed dietary regimens, at the time of our interrogation he admits to a distorted self image, poor social integration as well as a significant limitation of his physical activity and a fear of aggravation of his condition in the future.

His preoperative workup including a general preoperative laboratory exams was completely normal. He underwent a laparoscopic sleeve gastrectomy, our standard technique involves the use of 3 trocars and proceeding with the usual dissection until complete visualization of the left Crus, with complete liberation and exposure of the posterior fundus which is sleeved with the last staplers. At the time of the operation no hiatal hernia was noted nor any hiatal defect, we calibrate our stapling over a 36 French orogastric tube starting at almost 2 cm from the pylorus. No perioperative leak test is done, no drainage was left in place, patient is kept nil per mouth on the day of the operation and was given the usual postoperative anti-emetics and painkillers.

Patient had 2 episodes of post-operative non-bloody vomiting consisting mainly of gastric secretions, treated conservatively while

\* Corresponding author at: Somna Care, Bariatric and Metabolic Surgery Department, Saudi Arabia. Tel.: +966 542883239.

E-mail address: [Johnny.haddad@gmail.com](mailto:Johnny.haddad@gmail.com) (J. Haddad).

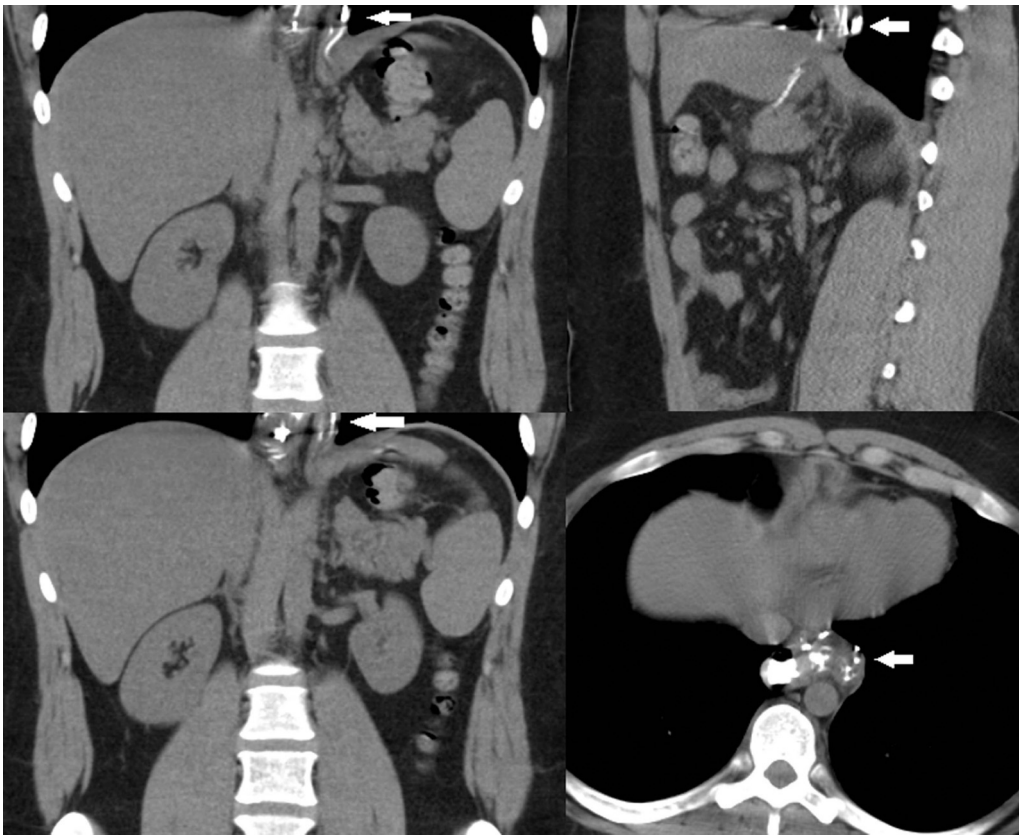


Fig. 1. Abdominal CT scan showing possible intra-thoracic staple line (white arrow).

in the recovery room. He felt unwell since then and vomited twice at night moderate amounts.

On the first post-operative day he was noxious and vomited roughly 100 ml every couple of hours and it was clear saliva so he was not started on the usual bariatric protocol and was kept nil by mouth. He complained of moderate incisional pain, his vitals signs were all within normal range. Physical examination was unremarkable. Patient was reassured, and advised to walk until patient's nausea resolved. The review of the surgical video gave no indication of narrowing or angulation to suggest obstruction and patient reassured that the condition will resolve spontaneously.

Patient failed to improve over the next 2 days and a gastrograffin swallow was scheduled for the next day and the limited gastrograffin study showed an obstructed sleeve at the hiatus. An abdomino-pelvic computed tomography showed an intact staple line, with moderate edema at the gastroesophageal junction, no extravasation of any contrast material, a normal looking sleeve with no rotation, and was reported as normal as some contrast passed but the very limited lower thoracic cuts, showed a staple line possibly migrated into the thorax which were missed by the general radiologist as shown in Fig. 1. A gastroscopy was scheduled for the next day though up till now patient had less vomiting, just a

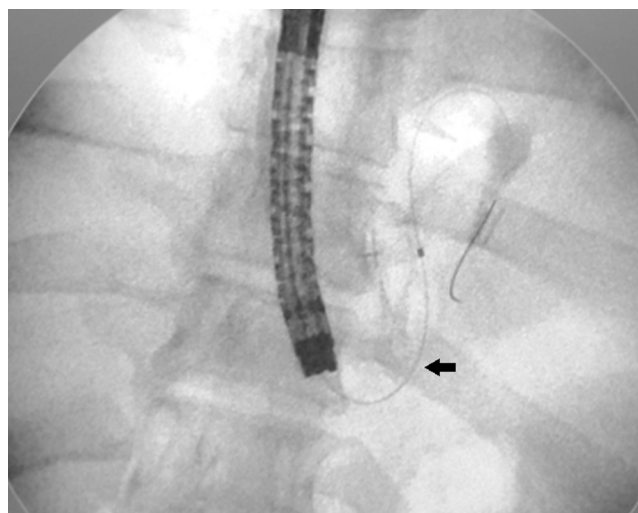
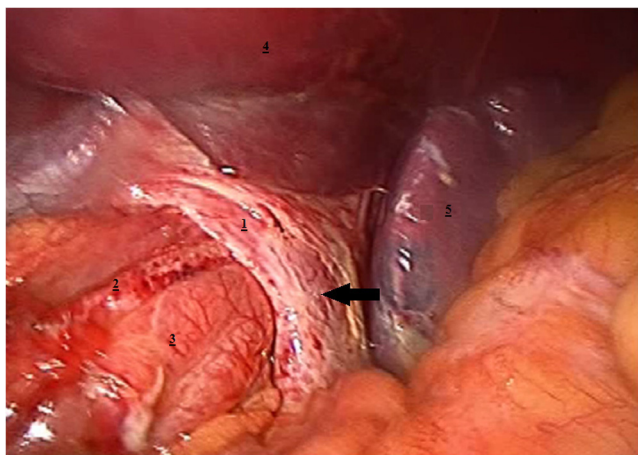


Fig. 2. Gastroscopy showing the catheter inside the stomach in an intrathoracic position (black arrow).



**Fig. 3.** Intraoperative still image showing the herniated stomach left anterolateral to the esophagus through the crus (black arrow). (1) Anterior hiatal opening. (2) Staple line. (3) Stomach herniating into the thorax through the anterior hiatus. (4) Liver. (5) Spleen.

constant sensation of fullness and nausea and absence of flatus as well as a dull deflated abdomen.

Gentle without insufflation gastroscopy was done on the 4th operative day, with an impossibility of passage of the scope through the gastroesophageal junction, only a catheter could be passed, delineating a mid stomach portion that is intra-thoracic (Fig. 2). A diagnosis of acute para-esophageal intrathoracic migration of the sleeve was the most probable at this point.

A diagnostic laparoscopy was done through the same trocar sites. After lifting the liver to expose the gastro-esophageal junction, the mid part of the stomach had herniated left anterolateral to the esophagus (Fig. 3) underneath the phrenoesophageal ligament and the anterior portion of the left crus. With gentle traction through a very small hiatus the stomach was reduced inside the abdomen, visual inspection showed an edematous stomach with good color and no compromise of the staple line.

The fundus was fixed to the left crus with non absorbable stitches to reduce the chance of recurrence. The antrum was fixed with a single stitch to the base of the falciform ligament for extra security since no clear defect was noted and the thought was to reduce mobility of the long sleeve (Fig. 4). Postoperatively, the patient was started on the usual bariatric clinical pathway which he tolerated well and was discharged the day after. Patient was seen

several times in the clinic and he had the usual post sleeve outcome in weight loss and progress in diet.

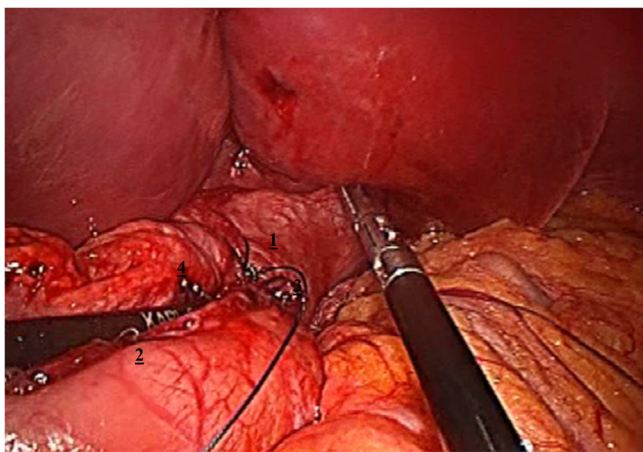
### 3. Discussion

Herniation of the gastric pouch after Roux-en-Y gastric bypass has been described in the literature occurring eight years [5]. A literature review showed two similar case of acute intra-thoracic sleeve migration, the first one is reported in the form of an abstract during the 2014 obesity week of the American society for metabolic and bariatric surgery in Boston by Dr Steve Chang. The other one comes from Jerusalem in a paper on the utility of routine postoperative upper gastrointestinal studies [6]. In Dr Chang's case, the patient, a 60 year old female had a hiatal hernia defect which was closed and the stomach was tacked to the omentum. In the Second case from Jerusalem the patient had a hiatal hernia through which the stomach incarcerated and the treatment involved a re-exploration and placement of the patient on total parenteral nutrition suggesting a more complicated postoperative course. Our patient had no hiatal hernia defect and the repair involved like in the first case, reduction and fixation of the stomach as well as early postoperative discharge.

In a recent three dimensional computed tomography study [7] intra-thoracic migration could be detected between 1 and 10 months postoperatively and in 10 of the 27 patients, with four of these 10 patients complaining of persistent regurgitation, no cases of acute post operative vomiting was described in this study.

During most sleeve gastrectomies the phrenoesophageal membrane is regularly dissected and the left crus is clearly visualized allowing us to liberate the posterior fundus which if left behind can be a source of failure to lose weight as well as to repair a potential big hiatus [8], the angle of His is also dissected and all of this could potentially damage the high pressure zone of the lower esophageal sphincter as described by Klaus [5,9,10] leading to GERD. In our particular case, we have performed the visualisation of the esophagus and angle of His and the lateral aspect of the phrenoesophageal ligament was incised below the fat pad. We are not sure if that was the reason for the migration but it could potentially create potential defect for the sleeve to enter through into the thorax if appropriate pressure was exerted over the area

Laparoscopy in itself with the low number of adhesions it induces, can lead to a reduced fixation of the sleeved stomach and potentially increase the risk of herniation [5]. Obesity increases abdominal pressure which also leads to disruption of the esophago-



**Fig. 4.** Intraoperative view showing the final fixation of the reduced sleeve stomach. (1) Anterior hiatus. (2) Reduced sleeved stomach. (3) Thread fixing the reduced stomach to the left anterolateral crus. (4) Hemostatic staple line clips now visible in the abdomen after reduction of the stomach.

gastric junction and promote development of a preoperative hiatal hernia [11] but this was not seen in our patient.

Intractable vomiting has been described as an etiology of diaphragmatic tears and paraesophageal hernia especially in pregnant patients suffering from hyperemesis gravidarum [12]. We believe this was the precipitating event in our patient.

According to Bauman et al. a sleeve has a 33 percent chance of intrathoracic migration, moreover our patient had early postoperative vomiting, all these factors might explain the occurrence of this rare complication much earlier than ever reported in the literature.

Repair of the symptomatic herniated sleeve has been well described in the literature and is relatively straight forward as long as the basic rules are respected [5,13].

#### 4. Conclusion

Our case highlights the need to broaden our differential diagnosis concerning early post laparoscopic sleeve gastrectomy intractable vomiting to include post sleeve hiatal hernia with a potential risk of strangulation. Emphasis should be on including thoracic cuts in the CT scan which will diagnose the presence of surgical staples inside the thorax. Since no hiatal hernia was noted in our patient, a contributing role of the phrenoesophageal membrane dissection is to be considered as a cause for disrupting the hiatal barrier allowing herniation of the sleeved stomach in the setting of direct postoperative vomiting. Acute symptomatic intrathoracic sleeve migration although rare must be added to the list of possible complications of the sleeve gastrectomy. Multidisciplinary cooperation will lead to an early diagnosis and proper understanding of the new hiatal anatomy as well as advanced surgical skill will render the management both safe and effective.

#### Conflict of interest

The authors declare that there is no conflict of interest.

#### Funding

None.

#### Ethical approval

None.

#### Author contributions

Osamah Al-Sanea: main author.

Ahmed Al-garzaie: literature review.

Mohamad Dernaika: provided expertise in the field of gastroenterology.

Johnny Haddad: patient contact and correction of the manuscript.

#### Consent

“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 Editor-in-Chief of this journal on request”.

#### Guarantor

Dr Osama Al-Sanea – I confirm all authors have seen and agreed with the contents of the manuscript and confirm the work has not been submitted or published previously, and will not be submitted for publication elsewhere in whole or in part.

#### References

- [1] N. Bradley Reames, F. Jonathan Finks, Daniel Bacal, et al., Changes in bariatric surgery procedure use in Michigan 2006–2013, *JAMA* 9 (2014) 959–961.
- [2] A.A. Gumbs, M. Gagner, D. Dakin, et al., Sleeve gastrectomy for morbid obesity, *Obes. Surg.* 17 (2007) 962–969.
- [3] M.F. Márquez, M.F. Ayza, R.B. Lozano, et al., Gastric leak after laparoscopic sleeve gastrectomy, *Obes. Surg.* 20 (2010) 1306–1311.
- [4] X. Shi, S. Karmali, A.M. Sharma, D.W. Birch, *Obes. Surg.* 8 (August) (2010) 1171–1177.
- [5] A. Iannelli, R. Kassir, A.S. Schneck, F. Martini, J. Gugenheim, Hiatal hernia of the Roux-en-Y gastric bypass pouch 8 years after surgery, *J. Obes. Surg.* (September) (2014) 1494–1496.
- [6] I. Mizrahi, A. Tabak, R. Grinbaum, N. Beglaibter, A. Eid, N. Simanovsky, N. Hiller, The utility of routine postoperative upper gastrointestinal swallow studies following laparoscopic sleeve gastrectomy, *Obes. Surg.* 24 (September 9)) (2014) 1415–1419.
- [7] T. Baumann, J. Grueneberger, G. Pache, S. Kuesters, G. Marjanovic, B. Kulemann, et al., Three-dimensional stomach analysis with computed tomography after laparoscopic sleeve gastrectomy: sleeve dilation and thoracic migration, *Surg. Endosc.* 25 (7) (2011) 2323–2329.
- [8] R. Kassir, O. Tiffet, P. Blanc, I. Ben Amor, Gugenheim sleeve gastrectomy. A point of technique, *J. Int. J. Surg.* 12 (October (12)) (2014) 1450–1451.
- [9] A. Klaus, H. Weiss, Is preoperative manometry in restrictive bariatric procedures necessary? *Obes. Surg.* 18 (2008) 1039–1042.
- [10] I. Braghetto, E. Lanzarini, O. Korn, H. Valladares, J.C. Molina, A. Henriquez, Manometric changes of the lower esophageal sphincter after sleeve gastrectomy in obese patients, *Obes. Surg.* 20 (3) (2010) 357–362.
- [11] S.K. Dutta, M. Arora, A. Kireet, H. Bashandy, A. Gandsas, Upper gastrointestinal symptoms and associated disorders in morbidly obese patients: a prospective study, *Dig. Dis. Sci.* 54 (6) (2009) 1243–1246.
- [12] L. Schwentner, C. Wulff, R. Kreienberg, et al., Exacerbation of a maternal hiatus hernia in early pregnancy presenting with symptoms of hyperemesis gravidarum: case report and review of the literature, *Arch. Gynecol. Obstet.* 3 (March) (2011) 409–414.
- [13] R. Kassir, T. Debs, I. Ben Amor, O. Tiffet, P. Blanc, J. Caldwell, A. Iannelli, Gugenheim management of complications following bariatric surgery: summary, *J. Int. J. Surg.* 12 (November (12)) (2014) 1462–1464.

#### Open Access

This article is published Open Access at [sciedirect.com](http://sciedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.