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Case Report

Spleen Wandering and Axial Torsion following Nissen Fundoplication: A Case Report

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Abstract:

Wandering spleen and its axial torsion is a very rare entity that presents with abdominal pain. Splenic torsion might be related to the division of the long vascular pedicle of spleen, or to its weight in portal hypertension. Splenic torsion and infarction following Nissen fundoplication is a rare long-term but potentially life-threatening complication. We report the case of a 17-year-old female who presented to emergency room by severe agonizing incapacitating left hypochondrial pain. She had been suffering from indolent abdominal pain for 4 months that alternated with attacks of severe pain, the pain recurred more frequently and increased in intensity during the past week prior to her presentation. There was no vomiting, fever or any other symptoms, and she was vitally stable except for tachycardia. Her medical history was remarkable, with 3 previous surgical interventions. She underwent an appendectomy, an exploratory laparotomy for intestinal obstruction and laparoscopic Nissen fundoplication. A thorough examination of the patient, and computed tomography (CT) scan of her abdomen showed torsion of the spleen. Exploratory laparotomy, revealed a midline positioned spleen of dusky discoloration. Repositioning did not achieve improvement in spleen color and splenectomy were performed. The patient was discharged without any incidents or complications. Splenic torsion is a rare complication of Nissen fundoplication surgery, that is life-threatening. A high index of suspicion is necessary for diagnosis. While exploratory laparotomy is the golden diagnostic standard, Doppler of splenic vein and CT abdomen are valuable. The indolent pain alternating with episodic more severe nature of the pain might be related to the rate and direction of splenic vessels axial torsion (twisting and untwisting), i.e. rate of partial compression and relief of compression of the blood flow in the long vascular pedicle of spleen until it reaches complete torsion and complete obstruction. Early diagnosis is essential to prevent splenic infarction and morbidity. Exploratory laparotomy was lifesaving in our reported case.

Keywords: wandering spleen; Nissen Fundoplication; splenic torsion; bariatric surgeries; splenectomy

Abbreviations: GERD: Gastroesophageal reflux disease

Introduction

Gastroesophageal reflux disease (GERD), is a multifactorial world-wide disease with different worldwide prevalence. It usually presents with heartburn, regurgitation, dysphagia and upper abdominal or chest pain (*1*). Management of GERD includes lifestyle modifications, antacids, proton-pump inhibitors and procedural therapies as Nissen-fundoplication (*2*). Nissen-fundoplication is considered the standard surgical treatment with high effectiveness, it is resorted to PPI-unresponsive GERD patients who develop side effects or complications from PPI therapy; provided that objective evidence of reflux as the cause of ongoing symptoms has been obtained. For this purpose, impedance-pH monitoring is regarded as the diagnostic gold standard (*3*). Nissen-fundoplication complications include post-operative dysphagia which is

managed by division of the short gastric vessels whenever deemed necessary in order to adequately mobilize the oesophagus and to make the fundoplication tension-free (*4*). However, this may predispose to another side effect of acquired laxity of the gastrosplenic ligament containing the short gastric vessels which are divided through the procedure. This leads to increase in mobility of the spleen and predispose to its axial torsion (*5*). We report an 18-year-old female who presented with severe left hypochondrial pain for about 7 days that lead ultimately to the diagnosis of a case of splenic torsion and exploratory laparotomy for splenectomy.

Case Presentation

A 17-year-old presented to the emergency department complaining of severe left hypochondrial pain that has been lasting for about 7 days. She had been suffering from indolent abdominal pain for 4 months that alternated with attacks of severe pain prior to her presentation. The attacks recurred more frequently and increased in intensity during the past week prior to her admission. She reported undergoing uneventful open appendectomy 4 years ago, uneventful laparoscopic Nissen fundoplication 7 months, followed by exploratory laparotomy 4 months later for suspicion of intestinal obstruction, that revealed internal hernia of small bowel through a defect in the falciform ligament at the Nissen fundoplication site, with no immediate post-operative reported side effects. At presentation she suffered from agonizing incapacitating left loin pain. There was no vomiting, no fever or any other symptoms, and she was vitally stable except for tachycardia. Her physical examination confirmed the localization of the pain in the left hypochondrium and not pelvic. There was no guarding or rigidity. Complete blood count, C- reactive protein, liver function tests and kidney function tests were all within normal range. She underwent urgent computed tomography (CT) scan of her abdomen that showed torsion of the spleen with mal-positioned laterally rotated hilum, that was compared to a previous 7 months older pre-operative CT scan that showed a normal in size and shape spleen with no focal lesions detected in these scans. Wandering spleen was suspected. An exploratory laparotomy was performed. It revealed a midline positioned spleen of dusky discoloration. Repositioning did not achieve improvement in spleen color and splenectomy were performed. During the exploratory laparotomy we observed that all the short gastric vessels that are located within the gastrosplenic ligament were divided most probably for more mobility of the esophagus and to create a tension free fundoplication (*7*). She underwent uneventful recovery and was advised pneumococcal vaccination.

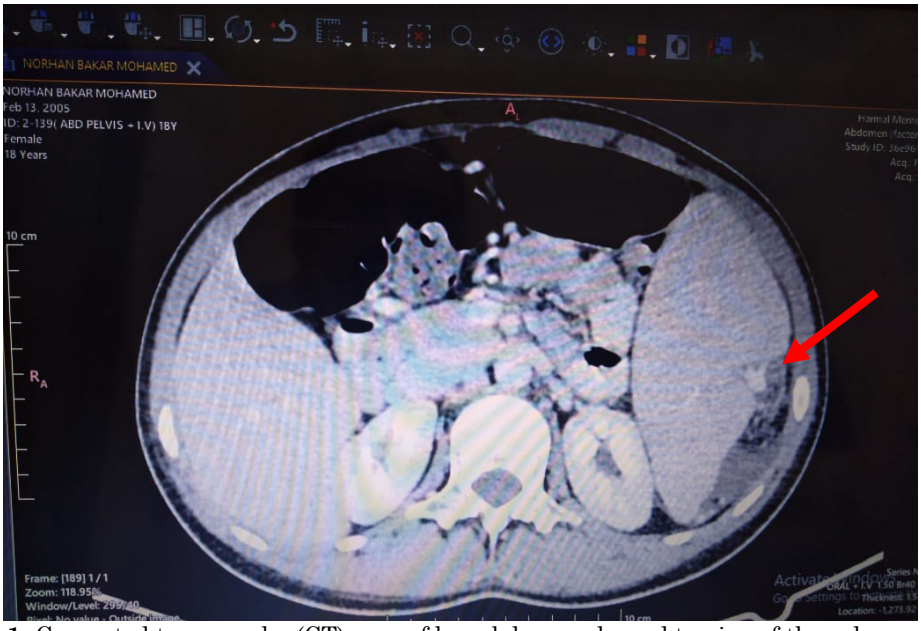

Figure 1. Computed tomography (CT) scan of her abdomen showed torsion of the spleen with mal-positioned rotated hilum

Discussion

The spleen is intraperitoneally located in the left upper quadrant, except for its hilum where the splenic artery and vein pass are retroperitoneal. Ectopic ('wandering') spleen refers to the

displacement of the spleen from its normal anatomical location to another region in the abdominal cavity or pelvis. It is considered rare and has an incidence rate of less than 0.2%. The spleen is suspended in its position by eight ligaments and its mobility depends on the laxity of them and the length of the splenic vessels (*6*). One of these is the gastrosplenic ligament which is the main concern here as it contains the short gastric vessels that are divided during Nissen fundoplication procedures as well as bariatric surgeries as sleeve gastrectomy (*7*). Disconnection of these vessels during the Nissen fundoplication procedure is thought to improve the efficacy of the procedure and reduce post-operative complications as dysphagia and bloating by creating a tension-free total fundoplication around the esophagus (*8*). These short gastric vessels are also divided routinely during the sleeve gastrectomy procedure in order to enter the lesser sac to have better mobilization (*9*). However, this might induce weakness of the splenic ligaments leading to its migration from its normal anatomical position predisposing to splenic wondering followed by more probability of splenic torsion (*5*). A quick flow through the previous literature proved that the division of these vessels during laparoscopic Nissen fundoplication had no benefit at both short and long term follow ups, besides it adds to the complexity of the procedure and predisposes to a higher incidence of post operative complications as wandering spleen and splenic torsion as well as longer hospital stay post procedure (*10*). Another systematic review and meta-analysis study concluded that there were no differences regarding the clinical outcome following laparoscopic Nissen fundoplication whether the short gastric vessels are divided. However, it is not possible to exclude many potentially important clinical differences and further studies are needed (*11*). It was also documented in a case of sleeve gastrectomy that presented with splenic torsion requiring laparoscopic splenectomy where a conclusion was made that division of short gastric vessels might induce weakness of the splenic ligaments predisposing to torsion besides the significant weight loss after the procedure might contribute to the weakness of the peritoneal attachments and subsequently cause detachment of the spleen (wandering spleen) predisposing as well to torsion (*12*). Bariatric sleeve surgeries might as well cause predisposition to malrotation of the stomach, as it is no longer supported through its attachment to the colon or the spleen after dissecting the gastrocolic and gastrosplenic ligaments which will eventually cause gastric volvulus that will present by the triad of nausea without vomiting, inability to pass the nasogastric tube and epigastric pain. Nevertheless, this is a very rare complication (*13*). It can be avoided through omentopexy to try to recreate the normal anatomical alignment and decrease the incidence of post-operative volvulus (*14*).

In other situations where wandering spleen is recognized accidentally on imaging, splenopexy is managed electively, either open or laparoscopic (*15*). Yet, this possibility was discarded in our case as she had 3 underwent previous laparotomies, the spleen color did not improve substantially and we feared post-operative ischemic splenic infarction.

Wandering spleen is an emergency. Splenic infarction is associated with a mortality rate of 5% to 34% (*16*). The outcome of splenic infarction relies on factors promoting twisting or untwisting, high index of suspicion and prompt CT imaging. The axial torsion may simply twist and untwist (*17*), or twist causing splenic venous outflow obstruction followed by splenic congestion and a heavier spleen that further increase the axial torsion and lead to splenic infarct. Most of the splenic infarcts are clinically silent, hence the diagnosis of wandering spleen and splenic infarction relies on high index of suspicion and prompt CT imaging.

Conclusion

We conclude that further studies are needed to demonstrate the risk-benefit ratio of dividing the short gastric vessels in laparoscopic Nissen fundoplication procedure. It is advised to educate patients about the possibility of splenic torsion following these procedures even if the risk was minimal and to report any left hypochondrial pain post procedure. High index of suspicion and prompt imaging are imperative to avoid un-necessary splenectomy, morbidity and mortality in subjects with wandering spleen.

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CONFLICT OF INTEREST

The authors declare no conflict of interest in connection with the reported study. Authors declare veracity of information.

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