



## Case report

## Splenic flexure volvulus, a rare etiology of colonic obstruction: Case report

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## ABSTRACT

**Introduction:** Splenic flexure volvulus (SFV) occurs as a result of twisting or torsion of a redundant colon around its mesentery. The SFV can be divided into primary and secondary types.

**Presentation of case:** An 82-year-old woman with a previous history of Parkinson's disease, diabetes mellitus and hypertension presented with a primary complaint of obstipation and progressive abdominal pain. Abdomen was grossly distended and tympanic with generalized tenderness. The rectum was empty on digital rectal examination. Complete blood count showed leukocytosis and neutrophilia. Plain abdominal X-rays showed distended cecum and ascending colon without any air in the gut distal to the splenic flexure. Regarding her unstable condition even after fluid resuscitation, she was transferred to the operating room. SFV was found and the standard left hemicolectomy was performed and bowel continuity was established with primary anastomosis of remained colonic ends. Postoperative period was uneventful.

**Discussion:** The splenic flexure is strictly attached to the adjacent organs so its volvulus is rare. Most cases of adult SFV have an underlying disease associated with chronic constipation. Diagnosis of volvulus is suspected based on the history, clinical exam, and imaging. The initial and urgent treatment of SFV, if there are no signs of ischemia or perforation, may be conservative with endoscopic detorsion. Gangrenous bowel should not be detorted and should be resected with primary anastomosis or a diverting stoma.

**Conclusion:** SFV should be considered as a possible diagnosis of chronic constipation which might be diagnosed with plain abdominal X-ray in non emergent condition. Special attention should be given to the medication history of the patient as the anticholinergic agents propagate normal peristalsis.

## 1. Introduction

Typically, volvulus occurs in the sigmoid colon or caecum. However, it can occur in any part of the colon where the colon is mobile and not fixed to the retroperitoneum, or the mesentery is elongated [1]. Splenic flexure volvulus (SFV) is a rare condition of colonic obstruction and is the least common site of the colon to develop volvulus, comprising 2% of colonic volvulus [2].

SFV was first reported in 1953 by Glazer and Adlersberg et al. [3]. Given the fact that, less than 100 cases have been reported in the literature, this diagnosis is rarely considered as a differential diagnosis for large bowel obstruction. Thus, the diagnosis might be obscured and may not be made until the time of laparotomy.

This condition can be categorized into primary and secondary. In both scenarios, absence or laxity of phrenicocolic, gastrocolic and

splenicocolic ligaments or mobilization of descending colon from retroperitoneal attachments leads to hypermobility of splenic flexure and its torsion around its mesentery [4].

Here we will discuss the presentation, diagnosis and subsequent management of SFV in an 82-year-old patient.

## 2. Case presentation

An 82-year-old bedridden woman with a previous history of Parkinson's disease presented to the emergency department of Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran, with a primary complaint of seven-day history of obstipation and progressive abdominal pain. At the presentation, she had heart rate, blood pressure and axillary temperature of 105 beats/min, 98/65 mmHg and 38.2 °C, respectively. Physical examination revealed moderate

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dehydration. Abdomen was without any sign of previous surgery scar but was grossly distended and tympanic without any sign of involuntary guarding. The rectum was empty on digital rectal examination.

Complete blood count showed an elevation of white cell count ( $15.4 \times 1000/\mu\text{L}$ ) and absolute neutrophils count with normal hemoglobin level. Serum electrolytes was unremarkable unless for low serum level of potassium (3.3 mmol/L, normal range 3.5–5.1).

Plain abdominal X-rays showed fecal-filled caecum and ascending colon with a sharp cut-off at the distal transverse colon, without any air in the gut distal to the splenic flexure (Fig. 1).

She also suffered from diabetes mellitus type 2, hypertension and ischemic heart disease thus she had very restricted physical capacity so we decided to perform a Computed Tomography (CT) scan of abdomen and pelvis to confirm the diagnosis of SFV prior to conduct invasive surgical approach. CT Scan showed an abrupt colon collapse and transition zone in the splenic flexure with a characteristic whirl sign at the site of twist of the mesentery (Fig. 2). Meanwhile she was not responding to fluid replacement therapy suitably as she had very low urinary output after 2 L of normal saline administered. On the otherside, her general condition along with abdominal physical examination did not get better so we decided not to postpone surgical treatment to try colonoscopic detortion. The patient was transferred to the operating room.

Laparotomy via low midline incision revealed a SFV. The leno-colic and phreno-colic ligaments were absent and the proximal descending colon was intraperitoneal. The patient had a closed loop obstruction, one end at the torted splenic flexure and the other end at the level of competent ileo-cecal valve. The splenic flexure was not frankly gangrenous however it was not quiet healthy either, so it was resected along with transverse colon to perform standard left hemicolectomy. Also the proximal end of transverse colon was primarily anastomosed to the distal of descending colon applying two layers of interrupted vicryl sutures. Postoperative period was uneventful. She was discharged as she could tolerate enteral feeding and defecation was established. Pathology report of the colon was consistent with infarcted bowel. The patient's condition remained normal during 6 weeks follow up at the outpatient clinic. This study has been reported in line with the SCARE 2020 criteria [5].



Fig. 1. Supine abdominal Xray representing dilated transvers colon.



Fig. 2. Abdominal computed tomography scan representing distended transverse colon and whirlpool sign of volvulus at the splenic flexure.

### 3. Discussion

Colonic volvulus occurs as a result of twisting or torsion of a redundant colon around its mesentery in an axial rotation resulting in obstruction. The most common cause of nonmalignant large bowel obstruction is colonic volvulus accounting for 11% to 15% of cases [6]. SFV accounts for about less than 2% of colonic volvulus. The paucity of data on this subject prevents definite determination of prevalence, female/male dominance and age distribution. Nevertheless, female predominance, and a median age of 53 years have been reported. The SFV is more common in regions of Africa, Southern Asia and South America [7].

The fact that the splenic flexure is strictly attached to the adjacent organs has made SFV a rare condition, hard to diagnose, and delayed to treat which may compromise the outcome. The SFV can be divided into primary and secondary types. The primary SFV is characterized by recurrent signs and symptoms of colonic obstruction or abdominal pain in a patient without a previous history of abdominal surgery. In some cases, the primary SFV has been associated with congenital anomalies including congenital bands, wandering spleen, the Triad syndrome and Chilaiditi syndrome [7]. Also, motility disorders, including chronic idiopathic intestinal pseudo-obstruction syndrome, increase the length and width of the transverse colon and its mesentery gradually in time [8]. An enlarged mesentery of the transverse colon rotates in a clockwise direction and presses the distal part of the splenic flexure. Chronic constipation is a known risk factor in developing SFV. In fact, most cases of adult SFV have an underlying disease associated with chronic constipation [9]. Our patient had the history of prolonged constipation which was not resolved regardless of different laxative drugs used. The secondary SFV which accounts for two-thirds of SFV cases, results from the disruption of natural ligaments and mobilization of the splenic flexure or formation of adhesion bands during a previous surgery. Thus, these factors act as the axis of splenic flexure rotation and predispose the patient to form a SFV [10].

An interesting finding about psychological profile of patients with SFV is that nearly all of these patients have a history of taking anti-psychotic medication for different reasons including mental retardation, cerebral palsy and psychotic disorders. It shows that the sedentary lifestyle and taking medications with known effects on gastrointestinal motility puts these patients at greater risk of developing SFV [11]. In our case, she suffered from advanced Parkinson's disease and she took trihexyphenidyl and biperiden.

Risk factors for volvulus include a congenitally unfixed colon

(absence of phrenocolic ligaments), advanced age, congenital bands, hyperperistalsis, chronic constipation, idiopathic megacolon, neurologic and psychiatric disease or previous surgery. Patients are commonly on psychiatric medications, have longstanding constipation issues, history of laxative abuse, diabetes or have had previous abdominal surgery [12].

The clinical presentation of splenic flexure volvulus is usually acute large bowel obstruction with associated features such as abdominal pain, nausea, vomiting, constipation, and distension. They may have a palpable mass in the abdomen and an empty rectal vault [8,9].

Diagnosis of volvulus is suspected given the history of presentation, clinical exam, and imaging. A plain abdominal X-ray may be enough to diagnose a volvulus, as classic radiographic findings may be present. Four radiographic features have been pointed out as characteristics of a volvulus of the splenic flexure: a) a markedly dilated, air-filled colon with an abrupt termination at the anatomic splenic flexure; b) two widely separated air-fluid levels, one in the transverse colon and the other in the cecum; c) an empty descending and sigmoid colon; and d) a characteristic beak at the anatomic splenic flexure at a barium enema examination [13]. Characteristic whirl sign at the site of the twist in the mesentery is another finding in CT Scan (Fig. 2). Combination of the coffee bean and whirl sign features on CT scan have the greatest sensitivity and specificity for the diagnosis. The location of the CT scan whirl sign, in particular, is a highly accurate indicator in discriminating the segment of colon involved by the volvulus [14].

As it happens in sigmoid colon volvulus, the initial and urgent treatment of SFV, if there are no signs of ischemia or perforation, may be conservative with endoscopic detorsion [12]. Nevertheless, due to the high rate of recurrence, the definitive treatment, as presented in our case, is surgery. Similar to sigmoid or caecal volvulus, gangrenous bowel should not be detorted and should be resected with primary anastomosis or a diverting stoma [11]. Viable bowel can potentially be detorted and fixed, but previous studies have shown a high rate of mortality and complications with simple detorsion. Primary anastomosis or creation of a stoma should be dictated by patient-related factors, the feasibility of anastomosis, and concern for risks of an anastomosis versus a stoma [1].

In most cases, SFV occurs as a non-acute and non-specific recurrent abdominal pain with distension and vomiting; however, acute onset abdominal pain with rapid development to colonic ischemic signs and gangrene with subsequent peritonitis is rare [7].

The management of SFV is almost the same as sigmoid colon volvulus, which consists of emergent surgery in case of clinical signs and symptoms of peritonitis after adequate resuscitation. In the time of emergent surgery, primary anastomosis should be avoided if gangrenous, perforated bowel, or peritoneal soiling is present [15]. In such cases, exteriorization of the proximal and distal colon in the form of an end colostomy and mucous fistula is advised. However, in the absence of these manifestations, endoscopic detorsion is warranted in primary SFV. In these cases, elective resection of the volvulus site is mandatory in order to prevent recurrent disease. Colopexy has been introduced as a less invasive option in high risk or elderly patients with a reasonable recurrence rate. Inoue et al. used laparoscopic colopexy in an infant with primary SFV and claimed that laparoscopic colopexy to be the procedure of choice, particularly for low-recurrence risk cases without underlying constipation [16]. In our case, we did not use laparoscopic approach as we assumed we might encounter overt peritonitis which is out of our laparoscopic skills.

#### 4. Conclusion

Volvulus of the splenic flexure is a rare cause of large-bowel obstruction, with predisposing factors including congenitally unfixed colon (absence of phrenocolic ligaments), advanced age, congenital bands, hyperperistalsis, chronic constipation, idiopathic megacolon, neurologic and psychiatric disease or previous surgery. CT scan is typically used for diagnosis, showing the characteristic appearance of

markedly dilated, air-filled colon with an abrupt termination at the anatomic splenic flexure. The medication history of drugs interfering with gastrointestinal motility can be a guide for timely diagnosis.

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#### Ethical approval

Ethical committee of Tehran University of Medical Sciences approved study protocols.

#### Consent

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#### Author contribution

Amirsina Sharifi. M. D.: Critical review, Writing the paper, Supervision.

Seyed Mohsen Ahmadi Tafti. M. D.: Conception and Design of the study.

Mohammadreza Keramati. M. D.: Data collection and/or processing, Writing the paper.

Alireza Kazemeini. M. D.: Analysis and/or interpretation.

Behnam Behboudi. M. D.: Data collection and/or processing, Writing the paper.

#### Research registration (for case reports detailing a new surgical technique or new equipment/technology)

None.

#### Guarantor

Behnam Behboudi. M. D.

#### Declaration of competing interest

All authors declare that there is no conflict of interest to disclose.

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