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Case Report

A Salvage Journey from True Transverse Colon Volvulus, a Rare Cause of Large Bowel Obstruction: a Case Report

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Abstract:

Background: *In brief, the colonic volvulus has the rarest presentation in transverse colon due its anatomical idiosyncrasy and obvious superiority with other portions of the colon. However, transverse colon volvulus presents with symptoms and signs indicative of obstruction in the large bowel. Typically, this condition is diagnosed during surgery. Ironically, it is a surgical emergency that can compromise the gut viability as well as patient's life.*

Case presentation: *We present a unique case of transverse colon volvulus in a 46-year-old male patient with no notable medical or surgical history. Patients presented with all the symptoms of long-standing bowel obstruction and was resuscitated and operated to honour every moment of gut viability. This colonic volvulus is notified in only a few cases reported literature, we hereby report this case for meticulous understanding.*

Conclusion: *Transverse colon volvulus is exceedingly uncommon but crucially fatal in surgical scenarios. Delaying surgery any longer would have jeopardized this patient's survival. When confronted with symptoms of large bowel obstruction, transverse colon volvulus should be included in the list of potential diagnoses. Prompt diagnosis and intervention significantly enhance the patient's outcome. Given its rarity, a heightened level of suspicion and awareness are essential for accurate diagnosis.*

Keywords: Volvulus, Transverse colon, TTCV, Distension, Radiology.

Introduction:

Colonic volvulus ranks as the third most prevalent cause of colonic obstruction globally, trailing behind colorectal cancer and complex sigmoid diverticulitis. Among the various types of colonic volvulus, involvement of the transverse colon stands out as the most uncommon.[1] A general surgeon or gastrointestinal surgery specialist possesses a thorough understanding of

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volvulus, but encountering this condition specifically in the transverse colon is a less frequent occurrence for them. Consequently, delving into such cases may evoke a sense of intrigue and perhaps a touch of drama as they navigate through the complexities of the surgical abdomen. For cases, like Chilaiditi Syndrome, If mistaken for pneumoperitoneum, surgeons may be mis-leaded to unnecessary surgical intervention.[2] A ***volvulus*** refers to the intricate twisting or axial rotational movement of a segment of the bowel around its mesentery. When this rotation is complete, it can create a closed loop obstruction, leading to ischemia due to vascular blockage.[3] Transverse colon volvulus stands as a rare culprit behind intestinal obstruction. This condition demands immediate surgical attention, as it carries the grave risks of bowel infarction, peritonitis, grave sufferings and even mortality.[4]

Case Report:

A 46-year-old non-diabetic non-hypertensive male unemployed slum-dwelling male individual from very low socioeconomic ground from Dhaka was admitted in the Department of Surgery of Shaheed Suhrawardy Medical College Hospital during the Eid-ul-Fitr festival vacation with one and a half months history of gradual abdominal distension that rather followed abdominal pain for last three weeks. Patient also added the history of non-bilious copious vomiting of digested food products and sometimes watery vomiting for last one week along with complete cessation of passing of stool and flatus for same duration. He further added of shortness of breath for last couple of days with colicky abdominal pain during the period of admission. The patient had no notable medical history of prior abdominal surgeries, trauma, or chronic constipation. Furthermore, he had not experienced a similar presentation in the past.

On examination; our patient was conscious, alert and anxious, positioned supine. He exhibited mild dyspnoea, sunken eyes, mildly anaemic and dry mouth. His blood pressure measured 90/60 mmHg, and his pulse rate was 102 beats per minute. Notably, there was no evidence of conjunctival pallor or jaundice. His body temperature registered at 100°F, and he had a respiratory rate of 16-20 breaths per minute. Oxygen saturation (SpO2) levels were recorded at 90% while breathing room air. His abdomen markedly distended, exhibiting no movement with respiration and a shiny appearance throughout (Image 1). The umbilical slit was nearly obliterated due to the pronounced abdominal swelling. Peristaltic movements were conspicuously absent. Upon palpation, the abdomen felt extremely tense and tender, accompanied by signs of guarding and rebound tenderness. Bowel sounds were notably absent upon auscultation. A digital rectal examination (DRE) confirmed an empty rectum, with no palpable masses within or adjacent to the lumen. Examination of the chest reveals breath sounds were notably low over the lower right lung field, while vesicular breath sounds were evident on the left, with no additional sounds detected. Heart sounds were within normal limits, devoid of any added sounds. There was some hyperinflation on the lower right side, coupled with diminished expansion. The apex beat was located at the sixth intercostal space along the left anterior axillary line. Percussion of the lower right chest yielded a hyper-resonant note, contrasting with the normal resonance observed on the left.

Figure 1: A 46-year-old make presented with huge abdominal distension for 1 month.

Laboratory investigations shows; Plain X-ray abdomen of the patient in erect posture revealing grossly dilated loops of transverse colon that is also causing some elevation effect over the right hemidiaphragm, though no Chilaiditi sign2 could be seen. Multiple air fluid levels are also noticed. Some loops of centrally placed small gut was also found to be notably distended with air

and fluid (Image 2). As simultaneous resuscitation and clinical evaluation was running in our General Surgery Ward. His sodium was 134 mmol/L, potassium 3.5 mmol/L, plasma ECO2 37.4 mmol/L, chloride 99 mmol/L, serum creatinine 0.76 mg/dL, WBC count 11,500 per cmm, ESR 41 and hemoglobin concentration 10.8 gm/dL. Blood grouping done. A CT abdomen was advised but patient failed to follow due financial inability and lack of insurance coverage.

Figure 2: Plain x-ray abdomen in erect posture and in AP view notifying hugely distended transverse colon and multiple gas distended bowel loops.

Concurrent clinical assessment and resuscitative measures were initiated as the patient showed signs of progressing towards hypovolemic shock. Oxygen therapy was initiated through nasal prongs at a flow rate of 6.0 liters per minute to improve oxygenation. After getting access to two wide-bore intravenous cannulas, fluid resuscitation was commenced with the administration of both normal saline and Hartman's electrolyte-rich solution. Given the severity of dehydration, an initial bolus of 20 ml/kg was administered, followed by maintenance fluids as per the 4:2:1 rule. The adequacy of resuscitation was assessed based on a urine output of at least 1 ml/kg/hour over a 4-hour period. The patient was kept nil per oral to rest the gastrointestinal tract. A nasogastric tube was inserted to alleviate gastric distension and decompress the stomach and upper portion of small gut. A Foley's bi-channel urinary catheter was placed to closely monitor urine output. An output of at least 1 ml/kg/hour was deemed satisfactory. In this instance, 480 ml of urine was collected over the 4-hour preoperative period. Third generation cephalosporin, anti-emetics, proton pump inhibitor, paracetamol was started in due causes.

An emergency decision was taken to proceed with an exploratory laparotomy. The patient was prepared in accordance with our hospital's protocols before undergoing the procedure. During surgery, intraoperative findings revealed a 360-degree counterclockwise rotation of the transverse colon, forming a markedly distended and viable closed loop (Image 3). This condition caused an upward shift of the right hemidiaphragm and a slight leftward displacement of the liver. Additionally, the ascending colon appeared severely distended with multiple adhesions, while the descending and sigmoid colon were collapsed. Some segments of the ileum were also found to be distended (Image 4).

All other abdominal organs appeared normal without any signs of ascites or neoplastic growth. Intraoperatively, the patient experienced hemodynamic instability, evidenced by a pulse rate escalation to 170-195 beats per minute, a dropping blood pressure resulting in a mean arterial pressure between 50-60 mmHg, and a decline in oxygen saturation below 85%. This situation mandated a shift to damage control surgery. The transverse colon was carefully derotated, and a decompressive loop ileostomy was created approximately 15 cm from the ileocecal junction. The whole gut was decompressed of 5.0 liters of colonic content. The abdominal cavity was irrigated with 0.9% normal saline before closure in layers, with drain tubes left in place. The reversal of anesthesia proceeded without complications.

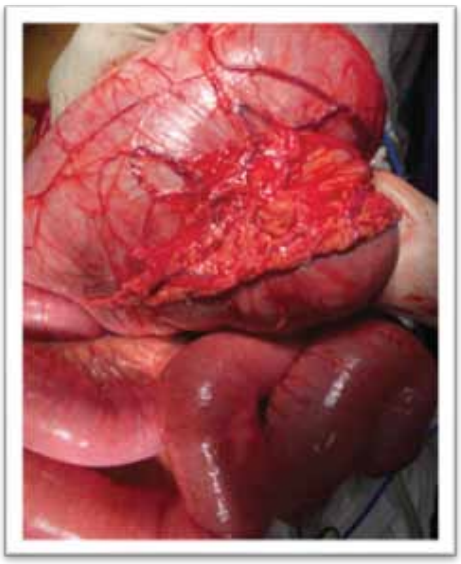

Figure 3: Operating surgeon holding the true transverse colon volvulus in his hands

Figure 4: Distended bowel loops of ascending colon and ileum.

Discussion:

Significant variations in the prevalence of volvulus are observed across different geographical and epidemiological contexts.[5] In Africa, intestinal volvulus ranks as the second most common cause of intestinal obstruction and has witnessed an upward trend over the past four decades.[6] However, the true transverse colon volvulus (TTCV) remains relatively uncommon compared to sigmoid and cecal volvulus.[5-8] A comprehensive review of 306 colonic volvulus cases from the 1960s revealed that merely 4% involved the transverse colon.[5]

The acute fulminant type presents abruptly with severe abdominal pain, vomiting, minimal distension, rebound tenderness, and rapid clinical deterioration. In contrast, the subacute variant is characterized by pronounced abdominal distension, mild abdominal pain without rebound tenderness, nausea, or vomiting, i.e, so we now know that the ***Transverse colon volvulus*** can manifest as either acute fulminant or subacute progressive.[9-12] The leukocyte count typically remains normal or slightly elevated in the early stages due to the absence of ischemia.[8,12] Our patient exhibited a subacute presentation with a normal leukocyte count, explaining the lack of gangrene and the relatively gradual clinical progression.

Physiological factors encompass chronic constipation from various etiologies, a high-fiber diet, and megacolon secondary to Hirschsprung's disease.[5,7,10] Mechanical factors generally entail some form of distal colonic obstruction, be it from adhesions, neoplasms, strictures, or sigmoid volvulus.[4,6] Our patient had no history of neoplasms, prior surgeries, or sigmoid volvulus.

The anatomical configuration of a short transverse mesocolon and broad points of hepatic and splenic flexure fixation typically safeguards against transverse colon twisting. However, congenital, mechanical, and physiological factors can disrupt these protective relationships, leading to transverse colon volvulus.[6] Redundancy, absence of fixation, or visceral anomalies, including Chilaiditi syndrome, are congenital factors linked to volvulus.[4,6,8,10] In our patient, an elongated and redundant transverse colon was observed, which was dilated and exerting pressure on the right diaphragm. Nonetheless, the colon was firmly anchored at the hepatic and splenic flexures.

The mortality rate for volvulus is higher in cases presenting with gangrenous bowels.[9] Thus, timely diagnosis and interventions are imperative. Although our patient did not exhibit gangrene, the delay in presentation underscores the importance of early detection.

Preoperative diagnosis of transverse colon volvulus is seldom achieved; more commonly, it is identified intraoperatively.[8-11] Unlike sigmoid and cecal volvulus, transverse colon volvulus lacks distinct radiographic features. Some experts propose that the presence of proximal colon distension, coupled with an empty distal bowel and dual-fluid levels in the epigastrium on X-ray, may hint towards the diagnosis.[6,10,11] Interestingly, our hospital has not encountered cases of transverse colon volvulus in the past seven years.

While computed tomography (CT) scans offer invaluable insights into large bowel obstructions[14], point-of-care ultrasound (POCUS) serves as a non-invasive, radiation-free bedside diagnostic tool, aiding in prompt decision-making and guiding subsequent interventions.[15] Unfortunately, due to time constraints, POCUS was not feasible for our patient. Consequently, the initial surgical approach adopted was *damage control surgery*, involving the derotation of the viable transverse volvulus and the creation of a decompressive loop ileostomy, Due to intraoperative hemodynamic instability, we did ileostomy and planned a definitive laparotomy once the patient's critical condition had optimized.

Conclusion:

Transverse colon volvulus, though rare, poses a grave risk in surgical settings, often proving fatal. Any delay in surgery could have had dire consequences for this patient's survival. Swift diagnosis and intervention greatly improve patient outcomes. Due to its infrequency, maintaining a high level of suspicion and awareness is paramount for accurate diagnosis.

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Conflict of interest: There is no conflict of interests.

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