Abstract:

INTRODUCTION Ileosigmoid knotting, is also known as compound volvulus or double volvulus. Ileosigmoid knotting is a rare cause of intestinal obstruction that rapidly progresses to gangrene of the ileum as well as the sigmoid colon. Preoperative diagnosis is difficult because of its infrequency and atypical radiographic findings. CASE REPORT We also will be discussing a case 70 years old gentleman who presented to casualty, Preoperatively a diagnosis of Intestinal obstruction with Peritonitis was made and opened. Intra operatively there was Dilated and gangrenous sigmoid colon with a twist volvulus Ileum which was also dilated and gangrenous. On further exploration, ileum was found to be twisted around the sigmoid colon to form a knot, Transverse colon was found to be pulled down. An INTRA OP DIAGNOSIS of Ileo sigmoid knotting was made. CONCLUSION In ileosigmoid knotting there is closed loop obstruction of the small bowel, with rapid gangrene of the involved loops. Treatment of the ileosigmoid knotting is different from the sigmoid volvulus. More conservative management, such as endoscopic or hydrostatic reduction, often alleviates problems associated with a sigmoid volvulus, but not in ileosigmoid knotting. 

Keyword: Ileo sigmoid knotting, intestinal obstruction, double volvulus

INTRODUCTION

Ileosigmoid knotting, is also known as compound volvulus or double volvulus. Parker is credited with having described the first patient with Ileosigmoid knotting in 1845.[1] Ileosigmoid knotting is a rare cause of intestinal obstruction that rapidly progresses to gangrene of the ileum as well as the sigmoid colon. 3 types are there. It predominantly seen in males (80.2%) with a mean age of 40 yrs.[1] Clinical features of the disease such as vomiting suggest small bowel obstruction, the radiographic findings are that of colonic distension, which is uncommon in small bowel obstruction. A double loop of dilated sigmoid shadow and
multiple air fluid levels in the small intestine is seen. Pre-operative diagnosis is difficult because of its infrequency and atypical radiographic findings. After hemodynamic stabilization, laprotomy should not be delayed.

**CASE REPORT**

70 year old gentleman was admitted in the emergency room with complaints of diffuse lower abdominal pain for two weeks with intensity increasing for last three days, associated with abdominal distention & bile stained vomiting for 3 days, fever & hematemesis for one day. Patient had a surgery for right sided inguinal hernia 15 years back with no other co morbid conditions. He was an alcoholic. On examination patient was conscious, oriented, febrile, dehydrated, dyspnoeic, Pale with cold peripheries. His Vitals: Pulse was 120/min & blood pressure of 100/60 mm Hg. On systemic examination Per Abdomen: Distended, Diffuse tenderness, guarding, rigidity was present and bowel sounds were absent. Scar of previous hernia surgery present, Hernial orifices and renal angle free. B/l hydrocele present, Digital rectal examination – Rectum empty, no fecal stain and melena. CVS-normal, RS – tachypnoeic, CNS – NFND. **Diagnostic studies** - Hb – 10.8, TC – 12,000, DC – P80, L20, Platelet – 2 lack, Blood sugar – 110, Blood urea – 78, Creatinine – 1.4. Na-145, K-3, Cl-98, HCo3-25. X-Ray abdomen: Hazy, No air under the diaphragm, Dilated large bowel loop noted. Plain CT abdomen – Scout film:

Both small and large bowels were dilated, Free fluid present in peritoneal cavity.

A **diagnosis** of Intestinal obstruction with Peritonitis was made. An Emergency laparotomy and proceed after immediate resuscitation with IV fluids, Ryle's tube, Foley's and Antibiotics. The patient was assessed under PSIV and taken up for laparotomy and proceed. Intraoperatively on opening there was Brownish peritoneal fluid 1.5 L with Dilated and gangrenous sigmoid colon with a twist volvulus ileum dilated and gangrenous. On further exploration, ileum was found to be twisted around the sigmoid colon to form a knot, Transverse colon was found to be pulled down. Caecum, ascending colon and descending colon, rectum was normal. Rest of small bowel, stomach, liver, spleen normal. **INTRA OP DIAGNOSIS** of Ileo sigmoid knotting was made.
PROCEDURE DONE: Derotation of the twisted segment of sigmoid colon and separation from gangrenous ileum, Resection of gangrenous sigmoid colon and gangrenous segment of ileum-10cm from ileo caecal junction to 100cm proximally and thorough peritoneal lavage given. Proximal ileostomy & Distal descending colon mucous fistula made. Closure of distal rectal stump and distal ileal end was done.

POST OP PERIOD: Uneventful treated with antibiotics and analgesics Ileostomy functioning on day1, Orals started on day6. DTs were removed on day 8 and 10. There was a Small lower midline wound gape whicutured.

DISCUSSION: Ileosigmoid knotting (ISK) is a rare cause of intestinal obstruction that rapidly progresses to gangrene of the ileum as well as the sigmoid colon. Preoperative diagnosis
is difficult because of its infrequency and atypical radiographic findings. ISK is more common in African, Asian, and middle east countries. [1, 2, 3] In this condition, the ileum wraps around the base of the sigmoid colon and forms a knot. The condition is serious, generally progressing rapidly to gangrene. It is predominantly seen in males (80.2%) with a mean age of 40 yrs. [1, 5] The pathophysiology of ISK was described by Shepherd in 1967: “The sigmoid colon full of feces and gas falls on the small intestine loops, which trying to free themselves from this weight, enter into the tunnel formed between the sigmoid and the small bowel mesentery and from there around the sigmoid colon, strangling it and committing suicide by incarceration.” A loop of small intestine is compressed between the distended and twisted sigmoid colon and the anterior or posterior abdominal wall. The resulting obstruction and irritation of the bowel causes increased peristalsis, and subsequently leads to a rotation around the sigmoid loop with knot formation. Both loops then distend further, increasing the tightness of the knot leading to gangrene of one or both segments. [4, 6] Predisposing factors are: A long small bowel mesentery and freely mobile small bowel, A long sigmoid colon on a narrow pedicle, Ingestion of a high bulk diet in the presence of an empty small bowel. [5] Another anatomical factor is the presence of a relaxed anterior abdominal wall, which allows for the bowel torsion. The consumption of a high bulk diet in the presence of an empty small bowel can predispose patients to ISK; therefore, the incidence is high among Muslims who eat a single daily meal during the Ramadan fast. [6] Secondary causative factors are: late pregnancy, Transmesenteric herniation, Meckel diverticulitis with a band, Ileocaecal intussusceptions, & Floating caecum.

ISK – 4 TYPES

TYPE I – the ileum (active component) wraps itself around the sigmoid colon (passive component) in a clockwise or anti-clockwise direction (type A when clockwise and Type B when anticlockwise) TYPE II – the sigmoid colon (active component) wraps itself around a loop of ileum (passive component) in a clockwise or anticlockwise direction. TYPE III- the ileocaecal segment (active component) wraps itself around the sigmoid colon (passive component) TYPE IV- undetermined or indefinite type. When it is difficult to determine the active or passive component, it remains undetermined or indefinite type. Type I and II can be classified into subtypes of A & B depending on whether the torsion is clockwise or counter clockwise, respectively. The most common type of ISK reported is TYPE I ISK (53.9 – 57.5%). The direction of torsion is clockwise in 60.9 – 63.2% of cases. The torsion is 360 degree in 52.9%. In 2009, using some preoperative
and operative criteria that are correlated with mortality, a new classification was described for surgically treated ISK performed by Atamanalp et al. Age over 60 years, existence of an associated disease (chronic obstructive pulmonary disease, cardiac failure, coronary disease, and diabetes mellitus), and the presence of shock were also significantly correlated with mortality. However, no correlation was determined between the mortality rate and the criteria used in the ISK classification of Alver et al. [6][7] In the new classification, the patients with ISK are classified as follows: Class 1, patients with no risk factor (advanced age, associated disease); Class 2, those with no shock or bowel gangrene but other risk factors mentioned above; Class 3, those with shock; Class 4, those with ileum or sigmoid colon gangrene; Class 5, those with both shock and ileum or sigmoid colon gangrene; Class 6, those with both ileum and sigmoid colon gangrene. Depending on the presence of other risk factors, Class 2, 3, and 4 were further divided into subgroups of a and b. [6][7]

**CLINICAL PRESENTATION**

Patient will present with abdominal pain, Abdominal distension, Nausea and vomiting, rebound tenderness, and Shock, features suggestive of acute intestinal obstruction.

**COMPLICATIONS** - Generalized peritonitis, Sepsis, dehydration, Shock, High mortality -48% [1, 6, 7]

**DIAGNOSIS**

Despite the critical condition, preoperative diagnosis is not easy. The diagnostic difficulty is partly caused by the unfamiliarity of this rare entity and the confusing and self-contradictory features of the disease. While clinical features of fluid levels, WHIRL SIGN, created by twisted intestine and sigmoid mesocolon in the small intestine, [5,10]

**DIAGNOSTIC TRIAD**

Clinical picture of small bowel obstruction. Radiographic evidence of predominantly large bowel obstruction. Inability to insert a sigmoidoscope. Radiographically, ISK is often mistaken for simple sigmoid volvulus. However, unlike sigmoid volvulus, attempts to deflate the distended colon using a sigmoidoscope or flatus tube, often fails in ISK. [6,10] This is because ileum tightly envelops the base of sigmoid colon, defying any such attempt. THE X-ray abdomen shows double loop of dilated sigmoid shadow and multiple air fluid levels in the small intestine. [5,10]
ileosigmoid knot. Medial deviation of the caecum and descending colon. [9,11]

**Treatment:**
Initial management of patients with ISK consists of a rapid and prompt resuscitation to correct uid, electrolyte and acid base imbalances with central venous pressure (CVP) monitoring, nasogastric decompression, parenteral feeding, and appropriate use of antibiotics. After resuscitation, an emergency laparotomy is necessary. [6]

**PROCEDURE TO BE DONE**
If both ileum and sigmoid viable:
Detorsion of both loops. The knot may be undone by sigmoid enterotomy and traction of sigmoid loop. This procedure may also be selected when sigmoid colon alone is viable.

Ileal gangrene and sigmoid viable
Sigmoid detorsion with ileal resection, followed by primary anastomosis or end ileostomy. Sigmoid gangrene and ileum viable.
Ileal detorsion with sigmoid resection with primary ileostomy or colostomy.

Both ileum and sigmoid gangrene
Ileal and sigmoid resection followed by:
Primary anastomosis of both ileum and colon.
Primary anastomosis of ileum with colostomy.
Primary anastomosis of colon with ileostomy.
Primary anastomosis of the small bowel is preferable. But if the terminal ileum is gangrenous to within 10 cm of the ileocaecal valve, an end to end anastomosis should not be attempted. The distal stump should be closed and end to side ileocaecostomy should be performed. Resection of the sigmoid colon is often advised in all instances even when viable. Recurrent volvulus or repeat knotting due to redundancy of the loop may cause gangrene after surgery. Avoiding colostomy is always welcome as it reduces the morbidity and the cost of health care. [1,3,6,7]

**Prognosis:** ISK has a grave prognosis. The mean mortality rate is 6.88% in non-gangrenous and 20-100% in gangrenous cases. The morbidity rate is also high. The most common cause of death is shock. The presence of advanced age, associated medical problems, shock, bowel gangrene or perforation increases the mortality rate. [1,6,7,8,12]

**Special Circumstances:**
Ileosigmoid Knotting in Children:
ISK is not common in children. The youngest case reported in the literature is a two-week-old child. Vomiting and diarrhea are more common in these cases, diagnosis is generally more difficult and mortality is higher. [6, 13]

Ileosigmoid Knotting in Elderly People:
Like Sigmoid volvulus, ISK may be preceded by inactivity and pseudo-mega colon, and owing to psychiatric problems and chronic illnesses, the diagnosis is often difficult. Advanced age and associated co-morbidities in elderly patients increase the mortality rate. [6,12]

Ileosigmoid Knotting in Pregnancy:
The obvious displacement of the bowel is a predisposing risk factor for ISK. Normal pregnancy complaints may cloud the clinical picture. Additionally, efforts to avoid the radiological evaluation may contribute to a diagnostic delay. The mortality rate is high according to the normal population. [6]

**Conclusion**
In ileosigmoid knotting there is closed loop obstruction of the small bowel, with rapid gangrene of the involved loops. Treatment of the ileosigmoid knotting is different from the sigmoid volvulus. More conservative management, such as endoscopic or hydrostatic reduction, often alleviates problems associated with a sigmoid volvulus, but not in ileosigmoid knotting.
Even though it is a rare case, we should keep in mind it is one of the causes for acute intestinal obstruction, which is having high morbidity and mortality.

**Reference:**
10. I H Mallick, M C Winslet, Ileosigmoid knot, Colorectal disease-wiley online Library.