Sigmoid Volvulus: An Update

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1. Introduction

“If he doesn’t evacuate for a twist in the bowel and the phlegm does not find a way out then it shall rot in the belly” Ebers papyrus

A disease that was well recognized from ancient days; the name ‘Volvulus’ originates from the Latin (volvere: to twist). Sigmoid volvulus is an acute surgical emergency and the earliest description of this condition dates back to 1500 BC in the Ebers Papyrus which is one of the two oldest preserved medical documents anywhere. The disease is frequently reported in the ‘volvulus belt’ which includes countries in the Middle East, Africa, the Indian subcontinent, Turkey and South America where it accounts for almost half of all large bowel obstructions. It is the third leading cause of large bowel obstruction in North America and is frequently recognized as a cause of acute abdomen in the elderly and institutionalized patients in the USA and UK. (1) (2)

2. Anatomy of sigmoid colon

Extending from the iliac fossa to the third sacral segment and connecting the descending colon with the rectum the sigmoid colon is characterized by its mobility because of its mesentery. (3) The root of the sigmoid mesocolon is intimately related to the left ureter and the division of the left common iliac artery.

The sigmoid colon is supplied by multiple sigmoid arteries which are branches of the inferior mesenteric artery. The sigmoid arteries divide into ascending and descending branches. The superior branch of the superior sigmoid artery anastomoses with the descending branch of the left colic artery forming part of the marginal artery of the colon. The inferior mesenteric vein drains blood from the descending colon and sigmoid colon. It drains into the portal vein after merging with the splenic vein.

The lymphatic vessels drain into the epicolic and paracolic lymph nodes, then to intermediate colic nodes and finally to the inferior mesenteric lymph nodes. Lymph from the left colic flexure may drain to superior mesenteric lymph nodes. The sympathetic nerve supply is from the superior hypogastric plexus while parasympathetic innervation is from the pelvic splanchnic nerves.

3. Pathology

The anatomical characteristics described earlier facilitate twisting of the sigmoid colon around its narrow base on an unusually long mesentery. The degree of twisting can vary from 90 degree to 360 degree and can occur in an anticlockwise direction or clockwise direction. Complete rotation will result in a closed loop obstruction leading to trapping of intestinal contents within the loop and compromise in vascular inflow and outflow. If the obstruction persists it results in massive loss of fluid both into the lumen and subsequently the peritoneum as well. In later stages the massively distended bowel together with extravasated fluid can cause abdominal compartment syndrome or the bowel may undergo necrosis with leakage of contents into the abdominal cavity resulting in florid peritonitis. The distension can also lead to severe compromise in respiratory function.

Hughes refers to two distinct entities of sigmoid volvulus. (4) The first is a thickened wall with marked distal hypertrophy of the sigmoid colon and the proximal rectum with the taenia becoming inconspicuous towards the distal part of the sigmoid colon. In this variant the sigmoid arteries are also markedly engorged with fibrosis of the mesentery of the sigmoid colon. These changes, in his opinion, prevent the development of gangrene until a late stage. The second type has a colonic wall of normal caliber, but with a long mesentery.

Sigmoid volvulus, although a disease of adults, occasionally presents in children. Predisposing conditions in children are intestinal malrotation, omphalomesenteric abnormalities, Hirschsprung’s disease and anal stenosis. (5) There are suggestions of a link between motility disorders of diabetes mellitus and sigmoid volvulus (6). Furuya et al. from Teikyo University school of Medicine, Japan found no relation between a functional disorder of bowel movement and elongation of the bowel in
sigmoid volvulus and number of ganglion cells in Meissner’s plexus (7). Shangen Van Leewen found normal patterns of intramural ganglion cells in his series. (8)

4. Aetiology
The aetiology has been attributed to a high fibre diet in certain populations, although it also occurs in elderly patients on low-residue diet especially those excessively using laxatives. A retrospective study from Baragwanath Hospital in South Africa showed a decrease in the number of admissions for sigmoid volvulus over a period of 30 years. (9) This was felt to be due to a changing trend among the local urban black population in adopting western food and beverages. The peculiar anatomy in black Africans is highlighted in a study by Madiba et al. from Durban. (10) They concluded that the sigmoid colon was most redundant in blacks (90%) compared to Indians and whites. A racial trend is observed by Ballantyne in his series - 67% of cases in blacks as opposed to 33% whites. (11) A high risk is noticed among patients with Parkinsonism, multiple sclerosis and spinal cord diseases. A high prevalence among inmates of psychiatric institutes, Bedford syndrome, is attributed to the effect of psychotropic medication on the motility of the gut. Other contributory factors include the presence of adhesive bands, high altitude, megacolon, pregnancy and Chaga’s disease. Volvulus is more common in males, possibly because the large volume of the female pelvis facilitates spontaneous untwisting.

5. Presentation
In all series, males predominate. Patients tend to be younger in developing countries as opposed to developed countries where the average age is 62 to 72 years. (2) (12) Classically, the patient presents with obstipation, marked abdominal distention, nausea and vomiting. Vomiting, preceding or coinciding with the onset of abdominal signs, may be a predictor of increased morbidity and mortality. (13) In delayed presentation the patient may present with features of shock. The time of presentation may vary and children tend to present late. Atamanalap et al. in their series of 859 patients report that the mean symptom period for pediatric age group was significantly longer and consequently children had higher rates of bowel gangrene (14). They also mention that diagnosis is more difficult in children and the elderly. In a child presenting with features of large bowel obstruction with bloody mucoid discharge the possibility of sigmoid volvulus should be entertained in the differential diagnosis. (15) Generalized abdominal tenderness and peritonitis point towards the presence of an underlying gangrenous segment in sigmoid volvulus.

6. Investigations & Initial Management
Plain X ray of the abdomen often reveal a hugely dilated and rotated sigmoid colon which has been described in many ways (bird beak, coffee bean or omega loop), along with a cut off in the colon and multiple air fluid levels. Two conditions that can mimic the radiographic appearance of sigmoid volvulus are pseudo-obstruction and caecal volvulus. Presence of air in the rectum, in the absence of rectal examination, will point towards the diagnosis of a pseudo-obstruction. A single air fluid level as opposed to multiple levels is more in favor of a caecal volvulus. (16) In doubtful cases a CT scan or MRI may be performed, which will show characteristic whorls, representing the twist in the mesentery. (17) In the vast majority of patients, clinical examination with X-ray finding alone is sufficient to make a diagnosis of sigmoid volvulus.

The management of volvulus starts with an evaluation of the general condition of the patient. Patients who present with evidence of gangrene or perforation should undergo rapid resuscitation with fluids and broad spectrum antibiotics initially, followed by emergency surgery. A nasogastric tube for decompression and urinary catheter to monitor urine output should be placed in all patients. A central line may be of value in assisting fluid therapy in elderly patients with co-morbidities. Patients with gangrene will often need blood transfusion.

7. Non-operative Intervention.
7.1. Sigmoidoscopic or colonoscopic detorsion

Depending on the general condition of the patient and the facilities available, rigid or flexible sigmoidoscopy or colonoscopy is preferred as the first modality of intervention. Sigmoidoscopic untwisting should be avoided if gangrene is suspected as evidenced by generalized peritonitis or shock. Visualization of devitalized mucosa or blood stained fluid are indications for immediate abandoning of sigmoidoscopic detorsion. The complications of sigmoidoscopy include perforation and reperfusion syndrome from untwisting of a gangrenous segment. In those cases where there is a short history and no obvious signs of gangrene or perforation, on clinical or radiological examination, endoscopic decompression can be attempted. Turan et al. in their series of 81 patients with sigmoid volvulus, all of whom were subjected to detorsion, report that the success rate of detorsion is much higher with colonoscopy compared to rigid sigmoidoscope; 60% as opposed to 42%. Oren et al. in a retrospective analysis of 827 patients noticed a success rate of 78.1 and 78.7 respectively for rigid and flexible sigmoidoscopy. The above authors also noticed a complication rate of 2.6 percent and 2.4 percent with 0.9 and 0.5 percent mortality from perforation while carrying out the procedures. Both groups recommend the use of a flexible scope rather than the rigid one to increase the success rate and decrease complications. Colonoscopy will facilitate better visualization of mucosa thereby helping to identify areas suspicious of necrosis. It will also help to assess the presence of any concomitant pathology in the segment proximal to the area of the twist.

Death from perforation and peritonitis are not unusual complications of barium enema. The use of this modality should be restricted and should not be resorted to if facilities for sigmoidoscopy or colonoscopy are available, or if doubts as to the viability of the gut persist. Water soluble contrast can be used if available.

Undue force and blind probing should be avoided at all costs. Apex of the volvulus is identified as a spiralling of the mucosa with accompanying edema. If reduction is successful an 18 F rectal tube is left and the patient is prepared for elective surgery. There is no hard and fast rule as to the length of time a flatus tube should be left before proceeding to surgery and it is reasonable to wait until the patient is fully optimized for the surgery. Since the chances of recurrence following detorsion alone is very high, all patients should undergo a definitive procedure in the index admission unless they have severe comorbidities precluding surgical intervention.

7.2. Percutaneous endoscopic colostomy

Crisp was the first to perform percutaneous deflation in cadavers using trocars in the latter part of 20th century. Percutaneous endoscopic colostomy is a mode of intervention which has been proposed for a subset of patients who are not candidates for any form of operative intervention. However Madiba and Thompson in their review strongly discourage this practice citing the possibility of peritoneal contamination and consequent disastrous outcome for the patient. Two recent articles confirm their fear, citing significant morbidity from the procedure arising from tube migration and subsequent peritonitis. In patients with prima facie evidence of gangrene or perforation, non-operative intervention is to be avoided and emergency surgery following aggressive resuscitation and stabilization is indicated.

8. Operative Management

Definitive surgery for sigmoid volvulus was first proposed by Atherton in 1883. In one of the earliest reports on this pathology, appearing in the Lancet in 1896, Lt. Col Maitland reports on three cases of sigmoid volvulus from Madras, India. He addressed the then ongoing controversy of doing ‘lumbar colotomy’ as opposed to an ‘inguinal colotomy’ as the procedure of choice. A median laparotomy was
deemed unnecessary in those days. Today primary resection with anastomosis is the gold standard for
the management of volvulus, but its safety in emergency surgery for the management of gangrenous
volvulus remains controversial.

8.1. Emergency
8.1.1. Resection and primary anastomosis (RPA) vs Hartmann’s Procedure
First reported by Dean and Murray in 1952, RPA is currently considered to be the gold standard for
management of sigmoid volvulus. However its use alone in emergency surgery in the presence of a
gangrenous bowel is contentious. Hughes in his article appearing in the early 60’s claims that sigmoid
volvulus offers a unique pathology for exercising resection and primary anastomosis on the left colon
and sites two important reasons.(4) He mentions that the wall of the distal part of the colon is
hypertrophied which allows excellent anchorage for the sutures. Furthermore the risk of spillage is
minimal as the proximal part of the bowel hardly contains any constipated faeces, probably from a short
period of evacuation prior to complete obstruction. Raveenthiran found no significant differences in
outcome with regard to mortality, anastomotic leak, length of hospital stay and wound infection in a
comparison between two groups of patients, 27 with gangrenous and 30 with viable bowel all of whom
underwent emergency RPA without any colonic lavage. (23) De and Ghosh from India supported RPA
without colonic lavage in their series based on 197 patients with gangrenous or non-gangrenous bowel
who underwent operation for sigmoid volvulus. (27) The overall mortality rate from this series was an
impressive 1.01%. Oren et al. also recommend resection and primary anastomosis for gangrenous
volvulus in stable patients. (20)

Bhatnagar et al. report that in 26% of their patients the line of demarcation was not clear as it was
extending further to the area of constriction. (12) This might lead to an error in judgment by the
operating surgeon jeopardizing the integrity of the anastomosis, risking a poor outcome. In such
situations a Hartmann’s procedure is clearly warranted. Here, the gangrenous part is resected while the
proximal end is brought out as an end stoma and the distal end is closed. Bhatnagar noted that the
incidence of post operative small bowel obstruction was higher in this group of patients.

Akcan et al. in their retrospective analysis of 136 patients compared the outcome between RPA and
Hartmann’s in patients with gangrenous and perforated colon and reported anastomotic dehiscence rates
of 30% in 10 patients with gangrene and perforation who underwent RPA. (28) Contrary to the findings
of Raveenthiran, they reported a higher mortality rate in this group compared to patients who had had
Hartmann’s procedure. They do recommend RPA in emergency situations if there is viable bowel.

In a study from the Cleveland Clinic Foundation comparing the outcome of resection and primary
anastomosis with closure of Hartmann’s procedure in patients with diverticulitis, the authors conclude
that the reversal of this procedure is associated with significant adverse effect as compared to RPA. (29)

Many authors have stressed the impact of the experience of the operating surgeon in the outcome of
resection and primary anastomosis. (23) (28) (30) (31) Oettle, commenting in the South African Journal
of Surgery, clearly states, “Any unit that wishes to follow a resectional policy will have to accept that its
consultants need to come out at night to do the operation.” (32)

Few randomised controlled trials are available and while this makes concrete conclusions difficult,
resection and primary anastomosis seems to be justified in the hands of an experienced surgeon as an
option in a hemodynamically stable patient where a tension free anastomosis is achievable.
Difficulty in finding a clear line of demarcation or the presence of skip lesions, severe fecal soiling,
inability to achieve a tension free anastomosis, haemodynamic instability, lack of experience on the part
of the operating surgeon to perform a meticulous anastomosis, should all prompt the surgeon to proceed
with a Hartmann’s procedure rather than a primary anastomosis. To conclude, Hartmann’s procedure
despite its share of complications is still to be considered as a valuable procedure which should be exercised in appropriate scenarios.

8.1.2. RPA: the role of on-table lavage
Initially introduced by Irvin and Goligher, mechanical bowel preparation was once the sine qua non of colon surgery, but has come under close scrutiny these days. The idea of intraoperative lavage is to clean the bowel of any solid faecal matter, in emergency cases precluding preoperative bowel preparation, thereby decreasing chances of contamination and also allowing a better environment for healing of anastomosis. On table lavage definitely increases operating time. There is a risk of spillage and contamination. It has hence been considered as a cumbersome procedure by many. Volumes of up to 5 L may be necessary for a satisfactory lavage and this may cause considerable fluid shift with electrolyte abnormalities. (33) A large meta-analysis by Slim et al. looking at seven RCTs drew the conclusion that pre-operative mechanical bowel preparation can indeed be detrimental to the anastomosis. (34) Since there is a shift away from mechanical bowel preparation in elective surgery; the present data also questions the validity of on-table lavage in emergency settings. Zorcolo et al. in their series of 323 patients who underwent procedures for left sided bowel pathology notices no outcome benefit in the small percentage that had colonic lavage. (35)

Sule et al. from Nigeria report a very low rate of anastomotic leak in the absence of colonic lavage where primary anastomosis was undertaken in emergency settings. (30) Irabor from Nigeria reports a series of 17 patients all of whom underwent emergency RPA without preoperative detorsion or colonic lavage. None of the patients had gangrenous segments. He reported no deaths in his series. (36) Patriti et al. from Italy retrospectively looked at 44 patients (29 with obstruction and 15 with perforation) who underwent one stage resection for colonic malignancy, without colonic lavage and concludes that the procedure is safe. (37) Thus a growing number of reports - although retrospective in nature - are highly suggestive that intraoperative colonic lavage does not have a significant impact on the ultimate outcome of an anastomosis.

8.1.3. Role of colostomy
Colostomy has been considered to be a relatively simple technical procedure and is often performed in elective and emergency surgery. However the reported rates of post operative complications vary in literature. In a series from India, based on 146 paediatric patients who underwent colostomies Chandramouli et al reported a complication rate of 11.6% early complications and 69.8% stomal complications. (38)

Bhatnagar et al. in their series of 76 patients with gangrenous sigmoid volvulus noticed that the addition of a diversion colostomy in primary anastomosis did not improve survival. (12) Oren reported the highest complication rate in the stoma group and further noticed an incidence of 2.6 % of colostomy perforation. (20) In many Third World countries the availability of colostomy bags is restricted, and may be unaffordable for the majority. A colostomy is also a social taboo in certain societies. Considering the above factors and that many patients cannot come for regular follow up, in the African environment in particular, the use of a colostomy should be avoided if at all possible. Afsar recommends an exteriorized colon anastomosis as an alternative to colostomy. (39) Certainly with more and more reports supporting primary anastomosis in emergency settings without any proximal diversion, exteriorised colon anastomosis or the use of protective colostomy in primary anastomosis hardly seems to be justified. (23)

8.1.4. Paul Mickulicz procedure
The gangrenous part is resected and both ends are brought out as separate stomas. There are reports of vascular compromise and gangrene of the stoma due to traction on the exteriorized segment. (12)
When the distal area of resection is close to the rectum, as is often the case, it may warrant extensive mobilization of the rectum which can add to time and morbidity from this procedure. This procedure is no longer recommended.

8.2. Elective Surgery
8.2.1. RPA
Elective resection following sigmoidoscopic resection and resuscitation of the patient has a better outcome compared to emergency surgery. Ballantyne states that recurrence is least with resections involving just the omega loop and that extensive dissection is unnecessary. Considering that this is a benign pathology the inferior mesenteric artery should be divided at the most accessible point. (11) For the reasons mentioned above, RPA is the gold standard for the management of sigmoid volvulus in the elective situation.

8.2.2. Mesosigmoidoplasty
The procedure was originally proposed by Tiwari and Prasad in 1976. It involves a longitudinal incision from the root of the sigmoid mesocolon raising flaps which are then transversely sutured. In effect this corrects the narrow base which acts as the pivot. A lower complication rate is predicted, as there is no anastomosis involved. It is contraindicated if there is gangrenous bowel. Subrahmaniam reported a series of 126 patients with two recurrences in a mean follow-up of 8 years. (21) There is however a serious lack of published data confirming the outcome represented in his studies.

Arain and Oettle report a retrospective study over a period of seven years. (40) They report a total of 20 patients; 18 patients had acute onset of symptoms. Sigmoidoscopic detorsion was attempted in all but 2 patients, who presented with evidence of ischaemia. Detorsion was successful in 75 percent. The unit’s policy was to attempt mesosigmoidoplasty in all cases with viable bowel. Mesosigmoidoplasty was feasible in 8 patients and one recurrence was noticed. Primary resection and anastomosis was undertaken in the remaining. Despite the presence of viable bowel, mesosigmoidoplasty was possible in less than half the cases and may carry a high failure rate. The median follow up period in this study was 4 years.

Bach et al. describe a modified mesosigmoidoplasty using a similar incision with preservation of the first branch of the sigmoid artery and the uppermost vascular arcade. (41) All other vessels crossing the line of dissection are divided. Continuous longitudinal suturing is performed approximating both the leaves of the mesocolon. A major drawback of the procedure is that it does not correct the narrow base.

It is very important that the peritoneal incisions be continued in an inverted T, with the cross-bar of the T extending upwards along the descending colon, and downwards on either side of the upper rectum, in order to widen the base. If this is not done, the now-flattened loop will still be able to rotate on its narrow pedicle.

8.2.3. Detorsion with sigmoidopexy
The colon is detorted and the serosa is sutured to the peritoneal wall with inturrupted stitches or by gortex banding. The procedure can be time consuming and the results are often equivalent to detorsion, with high rate of recurrence. The procedure is not recommended. (2) (11) (22) (42)

9. Complications
The mortality rate for emergency surgery is significantly higher than in elective settings. (2) (22) (43) In a report from the USA there was a 24 percent mortality for emergency surgery as opposed to 6 percent for elective cases. (2) They also identified age of the patient and co-morbidities as risk factors of mortality. The mean age of the patients in this series was 70.
According to most reports mortality rates are higher in the presence of gangrenous colon in comparison with viable colon at the time of emergency surgery. (20) (28) However Raveenthiran reports a striking 3.5 percent mortality in his patients undergoing RPA for gangrenous volvulus with no diversion or colonic lavage. Of note is the fact that in this series all surgeons were of senior staff rank. In a comparison between patients who underwent RPA for gangrenous bowel with those who had viable bowel, the difference in mortality, length of hospital stay and rate of anastomotic leak were not statistically significant. (23).

Recurrence, after conservative detorsion without surgery, is noted to be associated with a high mortality rate, in the range of 20-30%. (1) (2) (11) (44) Bhatnagar and colleagues observed that old age and preoperative shock are not independent risk factors for anastomotic failure, but a failed anastomosis itself carried a significant fatality. (12) Their study identified three important risk factors for mortality: age more than 60 years, presence of shock on admission and recurrent volvulus. They also supported previous conclusions of other studies that patients developing gangrene in recurrent volvulus suffer significant mortality. It was also highlighted that patients with ileosigmoid knotting with gangrenous colon have a significantly higher mortality rate as opposed to those without knotting.

Raveentheran found a higher incidence of wound infection in patients with gangrenous segment undergoing RPA in his series. (23) It is important to note that very often, patients with short duration of the symptoms will present earlier with complications like peritonitis or perforation. This inverse relationship between onset of complications and duration of symptoms in the adult patient has been highlighted by different authors. (12) (23)

The literature is unanimous that the presence of cardiac, renal, or respiratory co-morbidities has a significant impact on the morbidity and mortality of patients undergoing surgery for sigmoid volvulus.

10. Special Considerations
10.1. Recurrence following resection is mentioned in the literature though the number of cases is very small. Concomitant megacolon or megarectum are recognized as causes for the same. When such conditions are suspected after initial reduction of the volvulus, fluoroscopy may be used to assess the length of non motile segment. Segmental colectomy or subtotal colectomy may be undertaken in such situations to include the entire non motile segment. (45) (46)

10.2. Laparoscopic Surgery for Sigmoid Volvulus
Laparoscopic surgery is feasible in cases where initial deflation of the volvulus has been accomplished so as to facilitate placement of ports. Ballantyne et al describes two techniques for laparoscopic repair, a side-to-side functional end-to-end anastomosis, and an end-to-end anastomosis which he recommends specifically in patients with little scarring of the sigmoid mesentery. (11) With more and more trained laparoscopic surgeons there has been a growing enthusiasm for trying laparoscopic surgery in the place of conventional surgery. At present very little data is actually available and they are all short series. Liang et al. in their series from Taiwan looked at 14 patients including one who was graded as ASA 3 preoperatively, all of whom underwent sigmoid colectomy and primary anastomosis. (47) Protective ileostomy was used in one case. Terry et al. reported another series of 9 patients of whom four were ASA 3 status, with successful rectosigmoidectomy and no diversion. (48) Both reported wound infection and myocardial infarction among the major post operative complications. All patients had undergone successful colonoscopic decompression prior to operation. Mehendale et al reported laparoscopic extraperitonealisation and sigmoidopexy of recurrent sigmoid volvulus in two patients. However their follow up period was very short. (49) The available data is too scanty to make any strong recommendations.
10.3. Hirschsprung’s Disease and Hollow Visceral Myopathy

As mentioned earlier sigmoid volvulus in children can manifest as a complication of Hirschsprung’s disease (HD) although reported numbers are very few. There is a preponderance among boys, in accordance with the fact HD is more common among males. (50) In the above article from Ankara, Turkey the authors recommend that children presenting with sigmoid volvulus should be suspected of having Hirschsprung’s disease. Tan et al. report for the first time a case of adult HD presenting as sigmoid volvulus. (51) The line of resection should include the entire aganglionic segment and frozen section histology should be employed in this decision making. This will often entail an extensive procedure like sub-total colectomy. The authors also recommend a J-pouch with ileo-anal pull through.

Hollow visceral myopathy was originally described by Katz as ‘pseudo Hirschsprung’s disease’ in 1966 from South Africa.(52) It is a disease that presents with classical features of intestinal obstruction with partial or total megacolon. It can also either present with a true volvulus or mimic volvulus in radiological and clinical appearance. Degenerative changes of the smooth muscles of the muscularis propria are seen and the disease may even proceed to generalized smooth muscle myopathy. Proximal extension of the megacolon may occur with involvement of small bowel duodenum and the stomach. An autosomal dominant inheritance pattern of variable trait is noticed. Conservative measures like wash outs and purgation should be used in the absence of a volvulus. Apart from the immediate relief, surgery offers no cure and may even worsen the situation from occurrence of post operative adhesions. Hence operative intervention may be reserved for extreme situations like respiratory compromise from the massive distension. The entire specimen should be sent for pathological exam to confirm the diagnosis.

10.4. Pregnancy and Sigmoid Volvulus

This is an extremely rare condition with very few cases reported. In a case report by Alshawi from Saudi Arabia, a conservative approach is recommended for the first trimester, using endoscopic derotation. (5) For recurrent cases an operation is undertaken in the second trimester when the chances of abortion are the least. In patients who are in the third trimester again a conservative mode of management is advised which may include repeated attempts at derotation for recurrent volvulus. When the pregnancy reaches term elective caesarian and definitive surgery for volvulus can be undertaken simultaneously.

10.5. Diabetes and Sigmoid volvulus

Chronic constipation is a well recognized predisposing factor for colonic volvulus. Autonomic dysfunction can manifest from diabetic neuropathy. Raveenthiran from India noticed fivefold more diabetics in his patients presenting with volvulus than in the general population. (6) He reported 100% prevalence of constipation among diabetics in his series. He further concluded that the high rate of constipation in the diabetic will probably trigger the pathology and called for a large size prospective trial.

10.6 Ileosigmoid Knotting or Compound Volvulus

As the name implies this is characterized by twisting of the small bowel around a redundant sigmoid colon. The anatomic factors that predispose are the presence of a long small intestinal mesentery and a sigmoid colon with a narrow base. The small bowel twists around the base of the sigmoid colon. The disease is more common in males. Raveenthiran mentions that the term ileosigmoid knotting is inappropriate as often there is no true knot.(54) Apart from the anatomic characteristics, dietary factors, internal herniation and Meckels diverticulum are also mentioned under aetiology.(55) (56) Diagnosis on the basis of X rays alone is difficult since the radiological findings are often atypical.(57) Raveenthiran proposes a clinical triad - small bowel obstruction, radiographic evidence of large bowel obstruction and inability to do a sigmoidoscopic examination - in the diagnosis of this condition and reports a 71 % accuracy in diagnosis.(54) A classification for compound volvulus proposed by Alver et al. is as follows:(55)
• Type 1. Ileum revolves around the sigmoid colon
• Type 2. Sigmoid colon revolves around the ileum
• Type 3. Ileoceleal portion revolves around the sigmoid colon and
• Undetermined. Inability to identify an active and passive component.

Type 1 and 2 are further classified into A and B based on the clockwise or anticlockwise nature of rotation. The knot may be untied in all conditions except when there is frank gangrene of both small and large bowel. Primary resection and anastomosis is recommended if feasible. Mallick and Winslet noted a sharp decline in post operative mortality associated with compound volvulus from 0-73.6% before 1990 to 0-47% after 1990. (56) They attributed this mainly to an improvement in the anesthetic technique and availability of ICU support.

11. Conclusions

• Volvulus of the sigmoid colon is a major cause of intestinal obstruction in both developing and developed countries and is more common in the male sex.
• The initial management consists of non-operative decompression using sigmoidoscope, preferably flexible, followed by elective surgery in the index admission in all candidates fit for surgery.
• Patients in whom gangrene or perforation is suspected should initially undergo rapid fluid resuscitation with appropriate monitoring. Broad spectrum antibiotics should be instituted as early as possible.
• Resection with primary anastomosis is the gold standard and the experience of the surgeon is crucial to its success in the patient undergoing emergency surgery.
• Hartmann’s procedure, while certainly useful, should be reserved for special situations - hemodynamically unstable patient, absence of a clear line of demarcation for the distal part, severe peritoneal contamination, inability to perform a tension free anastomosis, lack of adequate experience in the part of operating surgeon.
• In sigmoid volvulus arising from Hirchsprung’s disease or megacolon an extensive resection involving the aganglionic segment is indicated to avoid a recurrence
• Compound volvulus the knot may safely be untied in all cases, except when there is gangrene of both the involved loops

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12. References

1. Richard M. Devine, M.D., F.A.C.S. Mayo Clinic Rochester, Minnesota Colonic Volvulus
   the department of veterans affairs medical centre Dis Colon Rectum 2000;43:414-418
   http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78250
4. Hughes L.E  FRCS,FRACS ,Royal Brisbane Hospital, Australia The Medical Journal of
Australia, The Place of immediate resection in the management of sigmoid volvulus Feb 1968 Page 268-273

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78251

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78252

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78254

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http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78256


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http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78261

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78262


18. MADIBA T E, THOMSON S R University of Kwazulu Natal Durban, South Africa The management of sigmoid volvulus JR.Coll.Surg.Edinb., 45, April 2000, 74-80
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78263

19. Turan M, Sen M, Karadayi K, Koyuncu A, Topcu O, Yildirim C,Duman M. University Faculty of

http://www.ptolemy.ca/members/current/Sigmoid/
Medicine Siras Turkey Our sigmoid colon volvulus experience and benefits of colonoscope in detortion process. Rev Esp Enferm Dig 2004; 96: 32-3
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78264

20. Oren D, Atamanalp S S, Aydilini B, Yildirgan M I, M.D., I Bazoglu M, Polat K Y N, O’nbaz O School of Medicine, Erzurum Turkey An Algorithm for the Management of Sigmoid Colon Volvulus and the Safety of Primary Resection: Experience with 827 Cases http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78260

21. Subrahmanyam M, MS., Dr.Vaishampayan Memorial Medical College, Maharashrta, India Mesosigmoidoplasty as a definitive procedure for Sigmoid volvulus BJIS 1992; 79:683-684
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78265

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78266


24. Baraza W, Brown S, Mc Alindon M, Hurlstone P University of Sheffield UK Prospective analysis of percutaneous endoscopic colostomy at a tertiary referral centre BJIS 2007 ;94 ;1415-1420
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78267

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78268


27. Utpal De, Shibajyoti Ghosh Bankura Sammalani Medical College, Bankura, west Bengal, India Single stage primary anastomosis without colonic lavage for the left sided colonic obstruction due to acute sigmoid volvulous: A prospective study of one hundred and ninetyseven cases ANZ J. Surg. 2003;73: 390–392
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78270

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78271

29. N Aydin MD, F H. Remzi, MD , P P. Tekkis MD, V W. Fazio MD, Cleveland Clinical Foundation, Cleveland ,Ohio , St.Mary’s Hospital, Imperial College of Medicine , London Hartmann’s Reversal Is Associated With High Postoperative Adverse Events Dis Colon Rectum 2005; 48: 2117–2126
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78272


http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78273

34. Slim K, Vicaut E, Panis Y, Chipponi J.Hospital F Widal, Paris and Hospital Lariboisiere Paris
Meta – analysis of randomized clinical trials of colorectal surgery with or without mechanical bowel preparation  BJS 2004; 91:1125-1130
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78274

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78275


37. Patriti A, Contine A, Carbone E, Gulla N,Donini A, One stage Surgery without colonic lavage in emergency surgery of the left colon University of Perugia ,Italy Colorectal Diseases 7,332-338, 2005 http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78276

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78277

39. Sami K Asfar, Hilal M Al-Sayer, Talib H Jum Kuwait Medical University, Kuwait Exteriorized colon anastomosis for unprepared bowel: An alternative to routine colostomy World J Gastroenterol2007 June 21; 13(23): 3215-3220
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78278

40. Arain AJ Oettle GJ Helen Joseph Hospital South Africa Mesosigmoidoplasty as the definitive operation for sigmoid volvulus and the role of resection and primary anastamosis South African Journal of Surgery SAJS 2002; 40:29

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78279

42. Ag’auog’lu N. (Mustafa N. A.)*, Yücel Y, Türkyılmaz Acta chir belg S 2005. Surgical Treatment of the Sigmoid Volvulus 105, 365-368

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78280

44. Timothy String S,MD DeCosse J,MD University Hospital Cleveland , Veterans Hospital Cleveland Ohio Sigmoid Volvulus An Examination of the mortality The American Journal Of Surgery Vol 121 March 1971
http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78283

http://simplelink.library.utoronto.ca.myaccess.library.utoronto.ca/url.cfm/78284

46. Strom P R,MD Stone H H, MD, Fabian T C,MD Emory University School of Medicine Atlanta, GAColonic Atony in association with Sigmoid Volvulus Its role in recurrence of obstructive symptoms Southern Medical Journal Aug 1982 Vol 75 ,No 8


48. T. Cartwright-Terry, S. Phillips, G. L. Greenslade and A. R. Dixon North Bristol NHS Trust, Frenchay Hospital, Bristol, UK. Laparoscopy in the management of closed loop sigmoid volvulus Colorectal Disease, 10, 370–372
49. Mehendale V G, MS MNAMS, Chaudhari N C, MS, DNB, Mulchandani M H, MS, Seth VC Gandhi & MA Vora General Hospital, Mumbai, India. Laparoscopic Sigmoidopexy by Extraperitonealization of Sigmoid Colon for Sigmoid Volvulus: Surgical Laparoscopic endoscopic and percutaneous technique. Vol 13, No 4, 283-285


52. Isaacson C Oettle G Hollow visceral Myopathy Helen Joseph Hospital South Africa. Modern surgery in Africa 1988 284-286


54. Olcay Alver MD, Dukaraya Oren, MD, Beret Apaydin, MD, Rafet Yigitbasi, MD, Yilmaz Ersan, MD Istanbul, Turkey. Internal Herniation concurrent with ileosigmoid knotting or sigmoid volvulus: Presentation of 12 patients Surgery 2005 Vol 137. Number (3) 372-376

55. I.H. Mallick, M.C. Winslet University College of Medical School London, UK. Ileosigmoid knotting Colorectal Disease, 6, 220-225


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