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Faecal Fistula Following Single Layer non Absorbable Suture Technique in Sigmoid Volvulus Surgery

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Abstract

Background: *A volvulus is a rotation of a loop of bowel usually on its mesenteric axis, most commonly occurring in the sigmoid colon in the adult. Since its description in 1836 by Von Rokitansky[1] volvulus of sigmoid colon has remained a formidable disease fraught with innumerable complications and responsible for many death despite advances in surgical treatment, mortality rate have remained distressingly high. Compression of the blood vessels in the twisted pedicle compromises the blood supply to the loop and this, added to the effect of distension, leads to a high risk of strangulation and the danger of gangrene of the affected loop of large bowel necessitating immediate surgical intervention.*

But with improvement in preoperative care, early surgical intervention with better suturing technique, post operative care and timely management of complication like faecal fistula reduces morbidity and mortality.

Aims: *This prospective observational study has been deviced to evaluate effectiveness of single layer non absrable suture technique in sigmoid volvulus surgery to reduce post operative complication like faecal fistula and its management.*

Materials and Methods

Type of study: *Hospital based observational prospective study.*

Out of total 198 patients diagnosed case of sigmoid volvulus,132 patients underwent resection of volvulus segment with end to end colo colic, single layer anastomosis with nonabsorbable suture (silk 2-0), from November 2015 to October 2017 in the department of general and laparoscopic surgery of V.S.S. medical college and hospital, Burla, Sambalpur, Odisha with best possible available resources. With prior approval from VIMSAR ethical committee.

Result: *In this series a total number of 74 gangrenous volvulus, 103 cases of non-gangrenous, 5 compound volvulus and 2 cases of perforated sigmoid volvulus were studied. All of them (183 cases) had undergone operations. The 5 types of operations done are as follows.*

- *Resection of sigmoid colon volvulus and end to end colo colic anastomosis with interrupted single layer non absorbable suture(silk 2-0) (RA)*
- *Hartman's operation (HP)*
- *Paul mickulicz operation*
- *Modified (lateral) mesocoloplasty.*
- *HP with ileo-transverse anastomosis*

Out of 102 cases of viable bowel resection and anastomosis, 6 patients (5.88%) developed faecal fistula. Out of 30 cases of gangrenous bowel resection anastomosis, 2 (6.66%) developed faecal fistula. Overall development in 8 cases (6.06%) out of 132.

Faecal fistula developed in 8 cases after resection and anastomosis. Mean day of detection of fistula was 8.5% day. Maximum no. of fistula developed on 8th day i.e. 3.

All the 8 cases of fistula were of low output i.e. less than 500 ml for 24 hours out of which 3 patietns had output < 100ml and rest 5 patitns had output > 100ml. all patients with output < 100 ml were treated conservatively and out of 5 patients with output > 100ml, 4 were treated conservatively and 1 underwent re-laparotomy due to presence of features of diffuse peritonitis.

Conclusion: *Resection of the sigmoid colon volvulus with end to end anastomosis with single layer non-absorbable suture (silk 2-0) may be considered as the treatment of choice as it offers the following advantages.*

i. *It has got a low mortality rate as compared to any other method of treatment.*
ii. *It reduces the rate of anastomotic leak and formation of faecal fistula.*
iii. *In our country specially where there is always an acute shortage of hospital beds and most of the poor patients do not agree for the second selective operation, immediate curative measures should be the treatment of choice.*

Keywords: *sigmoid colon volvulus, RA (resection and anastomosis), faecal fistula.*

Introduction

A volvulus is a rotation of a loop of bowel usually on its mesenteric axis, most commonly occurring in the sigmoid colon in the adult. Lt represents a good example of closed loop obstruction allowing entry of some intestinal content from more proximal bowel, so that rapidly increasing distension of the loop occurs which may lead to abdominal compartment syndrome and respiratory compromise. Compression of the blood vessels in the twisted pedicle compromises the blood supply to the loop and this, added to the effect of distension, leads to a high risk of strangulation and the danger of gangrene of the affected loop of large bowel necessitating immediate surgical intervention.

This variety of intestinal obstruction is although uncommon in English speaking countries, it still remains a major health problem in parts of Russia, Iran & Africa. In Ethiopia, sigmoid volvulus represents 54% of all intestinal obstruction. It is a fairly common cause of intestinal obstruction in India and more so in the western part of Odisha where people mostly take large amount of residual diet.

In practice of scientific medicine recognition and management of sigmoid volvulus has undergone a revolutionary change from the early work of Rokitansky[1] to later work of Bruusgaard[2]. Golligher[3] and Ballantyne[4] etc. the several forms of treatment as rectal tube or endoscopic decompression, operative detorsion, operation like secondary resection and anastomosis, Hartmann's operation, Paul Mickulicz's exteriorization do not comply to the mounting problems in the Indian hospitals and also they add financial burden to the Indian patients, hence the primary resection and anastomosis remains as the operation of choice in developing countries like India.

In spite of modern surgical facilities & advancement in management of cases, the mortality rate has remained unequivocally high. Amongst the complications that occur after resection and anastomosis suture-line dehiscence leading to faecal fistula is a common complication which increases the morbidity of the patients and may cause death in some cases.

Aims and Objectives

The present work is undertaken with the following aims.

- Type of patients affected (age, sex, socioeconomic status, dietary habits)
- Clinical presentation (duration of symptoms, general condition, per abdominal and digital rectal examination)
- Management (Resuscitation, Investigation & Operation)

- Resection of gangrenous volvulus segment and end to end single layer anastomosis with non-absorbable suture (silk 2-0).
- Management of complications with special reference to faecal fistula to reduce morbidity and mortality.

Materials and Methods

The study was carried out in the Department of General and laparoscopic Surgery, V.S.S. Medical College & Hospital, Burla, Odisha over the period from November 2015 to October 2017.

All the patients were selected randomly, and as per the proforma, all the patients were interviewed for detailed clinical history and examined. They were then subjected to routine blood, urine and radiological investigations like plain x ray of abdomen and pelvis in all cases.

Inclusion Criteria

1) All clinically n radiologically diagnosed case of sigmoid volvulus, which were managed surgically with resection of sigmoid volvulus and end to end colo colic single layer anastomosis.
2) patients those develop faecal fistula following single layer anastomosis with silk 2-0 with Informed consent of all patients.
3) Institutional ethical committee clearance in all group

Exclusion Criteria

The patients with following conditions were excluded from the study:

1) Inconclusive diagnosed case of sigmoid colon vovulus.
2) Faecal fistula following other causes of colo colic anastomosis
3) Without proper consent and ethical approval.

Observation

A total of 491 cases of intestinal obstruction were admitted to this hospital from November 2015 to October 2017. Out of which 198 cases were volvulus of the sigmoid colon comprising of an incidence of 40.33 percent. The incidence has been tabulated as follows.

Table-1 Incidence of volvulus of sigmoid colon

Causes of intestinal obstruction	No. of cases	Percentage
Volvulus of sigmoid colon	198	40.33
Other	293	59.67
Total	491	100

198 cases of sigmoid colon volvulus were admitted during this period of observation, out of which gangrenous volvulus were 74 in number comprising an incidence of 37.38% and non gangrenous were 102 comprising an incidence of 51.51%. 5 cases were of compound volvulus comprising of 2.52% and 2 cases were found to be perforated sigmoid volvulus comprising of 1.01%. rest 15 cases were not operated either due to pre-operative death, LAMA or conservative t/t/. the incidence has been tabulated below.

Table No. 2 Incidence of Gangrenous and non gangrenous volvulus of sigmoid colon

Volvulus	No. of cases	Percentage
Gangrenous	74	37.38
Non-gangrenous	102	51.51
Compound volvulus	5	2.52
Perforated volvulus	2	1.01
Not Operated	15	7.58
Total	198	100

Incidence in different age and sex

The incidence of volvulus of sigmoid colon in different age groups has been noted. The incidence in relation to the sex was also observed according to each age group. The incidence according to the age and sex has been tabulated below.

Table No. 3 Incidence in different age and sex

Age group in year	Sex		Total no. of cases	Percentage
	Male	Female		
Less than 20	2	5	7	3.54
20-30	8	9	17	8.59
31-40	13	12	25	12.62
41-50	34	30	64	32.82
51-60	30	16	46	22.22
61-70	17	16	33	16.67
>71	4	2	6	3.54
Total	108	90	198	100

The maximum incidence of volvulus of sigmoid colon was recorded between ages of 41-50 years. Next common age group was between 51 to 60 years. As regards sex incidence, the male female ratio was found to be 1.2:1.

Socio economic status

In the present study the socio-economic status was noted by asking the patients during history taking. The socio-economic status was divided into three classical groups; upper, middle and lower on the basis of income, occupation and education. The number of cases in each group has been tabulated as follows.

Table No 4 Incidence in different income groups.

Different income groups	No. of cases	Percentage
Lower	178	89.9
Middle	15	7.6
Higher	5	2.5
Total	198	100

It was observed that the volvulus of sigmoid colon was most common in the lower income group i.e. 178 cases (89.9%). The next common incidence was found in the middle income group i.e. 15 (7.6%) and the lowest incidence was noted in the upper income group i.e. 5 (2.5%)

Dietary Habits

In this present series of cases the dietary habit was noted in each case. The dietary habits were divided into three categories such as vegetarian, non-vegetarian and mixed diet and the number of cases as regards the dietary habits and their percentage was noted as follows.

Table no. 5 Incidence in different dietary habits

Dietary habits	No. of cases	Percentage
Vegetarian	39	19.70
Non-vegetarian	20	10.10
Mixed diet	139	70.20
Total	198	100

From the above data it was obvious that volvulus of sigmoid colon was most common among those who used to take mixed died i.e. 70.20%. the next commonly effected persons were those who used to take vegetarian diet i.e. 19.70% and it was least common in those who were taking non-vegetarian food i.e. 10.10% which were of low residue.

Presenting Symptoms

The different presenting symptoms observed in this series comprising of 198 cases as tabulated below.

Table no. 6 Presenting symptoms

Presenting symptoms	No. of cases	Percentage
Pain	168	84.84
Distension	179	90.40
Constipation	144	72.72
Vomiting	37	21.76

The various symptoms were pain, distension, constipation, vomiting.

Pain: 168 (84.84%) patients complained of pain which was either colicky or diffuse in nature. In acute type, the pain was diffuse in nature and the patients presented earlier. In subacute type the pain was either of colicky type or mild cramps.

Distension: Maximum number of patients 179 (90.40%) complained of varying degree of distension of abdomen. Often the distension was more marked on the peripheral site of abdomen and in few cases the distension was of central abdomen type.

Constipation: in 144 cases (72.72%) constipation either in the form of obstipation or simple constipation was found. They gave the history of irregular bowel habits for a long period with a habit of straining at stool.

Vomiting: it was present in 37 (21.76%) cases.

Presenting Signs

General examination of the Patient: The general appearance of the patients was those of large gut obstruction. The patients were presented with anxious look, shrunken eyes and in some respiratory embarrassment. In patients with shock, the general appearance was pallor face with moist, cold, clammy skin.

Tongue: In almost all cases the tongue was dry and coated due to dehydration.

The various other signs which were seen in this series were localized tenderness, generalized tenderness, rebound tenderness, visible peristalsis, tympany, abnormal bowel sound, dehydration, empty rectum, ballooning of rectum, rectal tenderness. They are tabulated as follows.

Table No.7 Presenting Signs

Presenting signs	No. of cases	Percentage
Localized tenderness	30	15.1
Generalised tenderness	79	39.9
Rebound tenderness	15	7.5
Tympanic note	175	88.38
Dehydration	174	87.87
Empty rectum	159	80.30
Ballooning of rectum	27	13.63

The tenderness over the abdomen was found either as localized, generalized or rebound tenderness. Localized tenderness was present in 30 (15.1%) cases mostly over the peripheral side of abdomen. Generalized tenderness was found in 79 (39.9%) cases and rebound tenderness in 15 (7.5%) cases. rebound tenderness found out to be associated with peritonitis during laparotomy. Tympani notes was found on percussion on 175 (88.88%) cases due to distended sigmoid colon filed with gas. Dehydration was observed in 174 (87.87%). On per rectal examination the rectum was found to be empty in 159 (80.30%) cases and ballooning in 27 (13.63%) cases.

Radiological sign

In 198 cases plain x-ray of abdomen was taken both in supine and erect posture. In 161 (81.31%) patients 'Bent inner tube' sign or 'Friemann-Dahl Sign' was seen suggesting excessively distended loop of sigmoid colon in 20 (10.10%) cases the x-ray was characterless, except massive colonic distension. In 17 (8.58%) cases the straight x-ray was inconclusive.

Management

In this series a total number of 74 gangrenous volvulus, 103 cases of non-gangrenous, 5 compound volvulus and 2 cases of perforated sigmoid volvulus were studied. All of them (183 cases) had undergone operations. The 5 types of operations done are as follows.

- Resection of sigmoid volvulus with single layer end to end colo colic anastomosis (RA)
- Hartman's operation (HP)
- Paul Mickulicz operation
- Modified (Lateral) mesocoloplasty.
- HP with ileo-transverse anastomosis

The number of patient treated by different methods are tabulated below.

Table No. 8 Number of patients treated by different methods.

Operative procedure	No. of cases				Total	Percentage
	NG	G	CV	PSV		
Resection of sigmoid volvulus with end to end colo colic anastomosis (RA)	101	30		1	132	72.13
			2			
Hartman's operation (HP)		43		1	44	24.06
HP with ileo-transverse anastomosis			3		5	2.73
Paul Mickulicz operation		1			1	0.55
Modified (Lateral mesocolopalasty	1				1	0.55
Total	102	74	5	2	183	100

Majority number of cases treated by primary resection and end to end anastomosis 132 (72.13%).

Post Operative Management

Post operatively all the patients were given broad spectrum antibiotic i.e. Metronidazole I.V. and third genn. Cephalosporin along with nasogastric aspiration, I.V. fluid, blood transfusion, Analgesics and sedative.

Post Operative Complications

Various complications were observed after resection and anstomosis. Some of them were immediate and a few were late complications. The complications which were noted during post-operative period were shock, peritonitis, paralytic ileus, wound sepsis, anastomotic leak, burst abdomen, chest complications like bronchitis, intestinal obstruction, urinary complications like urethritis, cystitis.

Complications observed after resection and anastomosis are tabulated as follows.

Table No. 9 Incidence of various post operative complications after resection and anastomosis (Total cases 132)

Complications	Non- Ganrenous		Gangrenous		Total	
	No.	(%)	No	(%)	No.	(%)
Shock	7	23.3	9	8.82	16	12.1
Peritonitis	0	0	1	0.98	1	0.75
Paralytic ileus	3	10	5	4,90	8	6,06
Wound infection	6	20	7	6.86	13	9.84
Faecal fistula	2	6.66	6	5.88	8	6.06
Wound dehiscense	0	0	1	0.98	1	0.75
Chest complication	2	6.66	8	7.84	10	7.75
Small bowel obstruction	0	0	1	0.98	1	0.75

Anastomotic leak (Faecal fistula): Out of 102 cases of viable bowel resection and anastomosis, 6 patients (5.88%) developed faecal fistula. Out of 30 cases of gangrenous bowel resection anastomosis, 2 (6.66%) developed faecal fistula. Over all development in 8 cases (6.06%) out of 132.

Table No. 10 Day of detection of fecal fistula after resection and anastomosis

Day of detection	Gangrenous	Non-gangrenous	Total
7^{th}		2	2
8^{th}	1	2	3
9^{th}		1	1
10^{th}	1		1
11^{th}		1	1
Total	2	6	8

Faecal fistula developed in 8 cases after primary resection and anastomosis. Mean day of detection of fistula was 8.5% day. Maximum no. of fistula developed on 8^{th} day i.e. 3.

Table No. 11 Fistula output

Intraoperative Pathology	Fistula outpur	
	<100 ml	>100 ml
Gangrenous	1	1
Non gangrenous	2	4
Total	3	5

All the 8 cases of fistula were of low output i.e. less than 500 ml for 24 hours out of which 3 patietns had output < 100ml and rest 5 patitns had output > 100ml. all patients with output < 100 ml were treated conservatively and out of 5 patients with output > 100ml, 4 were treated conservatively and 1 underwent re-laparotomy due to presence of features of diffuse peritonitis.

Table No. 12 Management of Faecal Fistula

No. of cases	Management	
	Colostomy bag fitting	Re-exploration
Gangrenous (2)	2	
Non gangrenous (6)	5	1
Total (8)	7	1

Management of faecal fistula

Out of the 8 colo-cutaneous fistulae, after PRA, 7 patients were treated conservatively. As soon as fistula was identified the patients were resuscitated with IV fluids and intravenous antibiotics were started for control of sepsis, colostomy bags were fitted in each case and proper skin care was taken during the period of spontaneous healing. All 7 patients were orally fed during the illness and any imbalance of electrolyte was observed. All patients were cured and discharged within 2 weeks of development of fistula.

In 1 cases initially treated conservatively, decision was taken to reexplore due to development of peritonitis. Toileting of abdomen with normal saline was done and proximal temporary transverse loop colostomy was done. Post-operatively IV antibiotic was given with IV fluids and the oral diet was gradually resumed. Patient was cured and discharged after 1 month.

Hospital stay

The duration of hospital stay in relation to the operations done are noted below in the Table No. 14.

Table No. 13 Hospital stay of cases after operation.

Operative procedure	Gangrenous		Non gangrenous		Total
	< 2 weeks	>2 weeks	< 2 weeks	>2 weeks	
Resection and anastomosis	24	6	88	14	132
Hartmann's procedure	37	6	0	1	44

The hospital stay is prolonged in more number of gangrenous cases (16.43%) as compared to non-gangrenous cases (14.56).

Table No. 14 Mortality after resection and anastomosis

No. of cases	No. of deaths	% of death
Gangrenous (30)	2	6.66
Non-ganrenous (102)	8	7.84
Total (132)	10	7.57

Death occurred in 10 cases (7.57%) out of total 132 cases who underwent resection and anstomosis.

Discussion

Incidence of Volvulus of Sigmoid Colon

In this series the incidence is 40.33% of intestinal obstruction. Mishra S.B.[16] (1986) recorded a similar incidence i.e. 33.33% in his series.

Incidence in Different Age and Sex

In this series maximum numbers of cases were seen between the age group of 41 to 50 years. The second common age group of presentation was between 51 to 60 years.

The male, female ratio in this series was 1.2:1. Our finding in this series is in accordance with that of G.J. Aanold and Francis[20] (1973)

Socio-Economic Status

In this series the maximum number of patients (89.9%) were of lower socio-economic status.

Our finding in this series is in accordance with that of Sinha[18] (1969) and Mishra S.B.[16] (1986)

Dietary Habit

In this series maximum of cases (70.2%) found to be having mixed diet their staple food. Major part of the food was carbohydrate rich in roughage. This type of diet increases peristalsis which triggers the mechanism of torsion. Sinha (1969), Chakrabarty P.B [26] (1979) and Mishra S.B.[16] (1986) are of the similar view.

Presenting Symptoms

Pain: In this series 168 patients complained of pain constituting 84.84% of total 198 cases. the pain was severe colicky and diffuse type in acute fulminating variety and mild or crampy in subacute progressive type.

Hinshaw and Carter[50] (1957), Bowers and Hill Crages 51 (1959), Gupta and Vaidya40 (1969) and Anderson J.R.39 (1981) reported pain as the presenting symptom in all of their cases.

G.J. Arnold[20] (1973) observed crampy abdominal pain in 52.4% of cases. Mishra S.B[16]. (1986)

observed that all cases presented with lower abdominal pain.

Distension: In this series distension was complained of by 179 patients constituting 90.4% of total cases of 198. The distension was marked by the patients gradually.

Our study is in accordance of G.J. Arnold[20] (1973). In his study of 99 patients, he observed abdominal distension as the most common initial complain in 87.4% of the patients.

Wilson and Dunavant41 (1965), String[19] (1971) and R. Manoharan et al[23] (1987) were in similar view.

Constipation: Out of 198 cases 144 cases complained of constipation either in the form of obstipation or simple constipation constituting 72.72%.

Irregular bowel habits was found by the workers like G.J. Arnold[20] (1973) in 27% cases, S.H. Elmasri[42] (1976) in 71.5% of cases, D.L. Mossesan[43] (1976) in 95% of cases.

In the rest of their cases the bowel habit was otherwise normal. This shows the prevalence of the disease in people with irregular bowel habits. Mishra S.B. (1986) noticed absolute constipation in 90% cases.

Vomiting: Out of 198 cases 37 complained of vomiting constituting 21.76% of total.

Gupta and Vaidya[40] (1969) reported that in 35% of cases vomiting was an associated symptom in sigmoid volvulus.

Mishra S.B. [16] (1986) observed vomiting in 40% of his cases.

Clinical Signs

Patients were received with features of shock, dehydration, respiratory distress and with signs of peripheral circulatory failure in gangrenous volvulus. Similar features were noted by A.W. Wilkinson and Wangensten[46] (1942). Besides the following signs were observed in all the cases.

Pulse and blood pressure: Aird[48] (1958) and Berry [47] (1961) observed low systolic pressure with signs of peripheral circulatory failure in gangrenous and high systolic pressure in those with viable colon. Similar picture was found in present series.

Tenderness and rebound tenderness: Localized tenderness was found in 15.1% of total cases, which was mostly on the periphery of the abdomen. Generalised tenderness over the abdomen was found in 39.9% of total cases and rebound tenderness over 7.5% cases.

Tympanic note (Distended sigmoid colon loop): It was due to air filled distended sigmoid loop. Typmany was noted in 178 cases (88.38% of total cases) in this series.

It was due to vomiting and third space loss caused by obstruction and more marked in gangrenous volvulus.

Digital Rectal Finding

Empty rectum: In 159 (80.30%) cases in this series the rectum was empty on digital rectal examination. It may be due to obstruction just proximal to the rectum and patients usually presents after 24 hours of attack.

Ballooning of rectum: in 27 cases (13.63%) in this series the rectum was ballooned. The rectal wall could not be palpated unless the finger was bent. It suggested that proximally there was obstruction to the bowel. Mishra S.B.[16] (1986) reported ballooning of rectum in majority of his cases.

Radiological Findings

In 198 cases plain X ray of abdomen was taken both in supine and erect posture. In 161 (81.31%) patients 'coffee bean sign' or 'Friemann-Dahl sign' was seen suggesting excessively distended loop of sigmoid colon. In 20 (10.10%) cases the X-ray was characterless, except massive colonic distension. In 17 (8.58)% cases the straight x-ray was inconclusive.

Hinshaw and Carter[50] (1959) observed that a large circular dilated loop funing from pelvis exihibting a 'Bent inner tube' effect was most characteristic. Marked distension increased thickness of bowel wall and loss of haustral markings are other important radiological findings.

Bailey[52](1987) described the radiological sign as 'Friemann Dahl Sign' i.e. three dense lines

converging towards obstruction which is very often present.

Sring and Decosse[19] (1971) reported that simple plain x-ray was diagnostic in 76% of cases.

Management

All the cases have been managed by operations. Pre-operative resuscitation and nasogastric aspiration was done routinely and pre-operative antibiotic started before operation.

Resection andanastomosis

Resection and anastomosis was carried out in 30 cases of gangrenous and 102 cases of non-gangrenous volvulus, in total 132 cases comprising 72.13% of total 183 cases who underwent operation. Wide acceptance of this procedure is due to the factor that it obviates the need for second operation. Patients with good general condition or after resuscitation if in shock were selected for this operation. Primary resection and end to end single layer anastomosis gave good result both in non-gangrenous and gangrenous bowel.

As far as the operation technique is concerned anastomosis in the colon is to be done by oblique resection of colon so that the vascularity of the antimesenteric border is not hampered. This procedure was followed by Aird[48] (1958) and was followed in this series also.

In all cases anastomosis was done by single layer extra-mucosal non-absorbable suture(silk 2-0)

Goligher[3] (1975) thought, it was better to give interrupted absorbable or non-absorbable suture in the seromuscular layer to ensure more vascularity.

Drapnas[59] (1961), Dean and Murray13 (1952) obtained good results by performing primary resection and anastomosis.

D.L. Mossesan[43] (1976) advises that all cases in emergency should be operated by the method of primary resection and anastomosis.

G.A. Khouryet al[35] (1977) is in favour of primary resection and anastomosis for both gangrenous and non-gangrenous gut.

P.B. Chakrabartyet al[26] (1973) are of the view that if there is no extensive gangrene and disparity between the cut ends, end to end anastomosis can be done. The operative time is not more than that of the colostomy and the mortality rate is not unduly high.

Post Operative Management

Post operatively all the patients were kept under nasogastric aspiration, I.V. fluid, blood transf-usion (if required) and broad spectrum antibiotics like I.V. Metronidazole, third generation cephalosporin or piperacillintazobactum

Post operative complication

Anastomotic leak (Faecal Fistula) – Faecal Fiatula developed in 8 cases (6.06%). Out of the 132 cases which underwent RA, it developed in 2 gangrenous cases (6.66% of 30 gangrenous bowel anastomosis) and 6 nongangenous case (5.88% of 102 nongangrenous bowel anastomosis). This series shows that there is no significant difference in the incidence of development of fecal fistula after RA in gangrenous or non gangrenous sigmoid volvulus.

The overall development of faecal fistula was due to ischaemia of the bowel and poor general condition of the patient.

This series is in accordance with Coban SW et al[71] (2008), they observed Anastomotic leakage in 3 patient out of 47 patients with a rate of 6.3%.

Raveenthiran V[64]. (2004) Cade records of 57 consecutive patients with acute sigmoid volvulus were reviewed: there were 27 with gangrenous colon (group V). All of them had undergone emergency resection and primary anastomosis without on-table lavage or caecostomy. Mean hospital stay (16 vs. 3%) did not differ significantly between the groups.

Although in our series the incidence of fecal fistula is less as compared to the study by Raveenthiran, but the difference of incidence of fecal fistula in our study between both groups (gangrenous and non gangrenous) was not significant which is in accordance with the study by Raveenthiran.

Hughes [57] (1959), Bowers[51] (1959), Goligher[3] (1975), Bhatnager B.N.S[68] (1977), reported this as a common complication in their series.

In this series all the 8 cases of fistula were of low output i.e. less than 500 ml for 24 hours out of which 3 patients had output<100ml and rest 5 patients had output>100ml. All patients with output<100ml were treated conservatively and out of 5 patients with output >100ml, 4 were treated conservatively and 1 underwent re-laprotomy due to presence of features of diffuse peritonitis.

No mortality was observed after development of fecal fistula. All patients were cured and discharged after 1 month.

In contrast to our study, Mishra, S.B.[16] (1986) from the same institution reported in his series 6.4% mortality due to faecal fistula in primary resection and anastomosis done for both gangrenous and nongangrenous bowel.

Summary

- In this study "Faecal fistula following single layered Non absorbable suture technique in sigmoid volvulus surgery" 198 cases of volvulus of sigmoid colon admitted during November 2015 to October 2017 in VIMSAR, Burla were analyzed with a special reference to primary resection and anastomosis.
- Average age of attack was between 41 to 50 years.
- Ratio of male to female was 1.2:1.
- 178(89.9%) patients were from low socio-economic status
- All the patients were treated surgically. Resection of sigmoid volvulus and end to end colo colic anastomosis with single layer non absorbableinturupted suture (silk 2-0) was done in 132 cases (72.13%), Paul Mickulicz operation 1 (0.55%) case, lateral Mesocoloplasty in 1 (0.55%)cases, Hartman's operation in 44 (24.04%)cases, PRA with ileo-transverse anastomosis in 2 cases (1.10%) The incidence of sigmoid volvulus was 40.33% of total intestinal obstruction admitted to this hospital.
- Faecal fistula, which was most important complication was found only in 2 cases of gangrenous volvulus and 6 case of non-gangrenous volvuls after primary resection and anastomosis. One of the patient of faecal fistula who developed peritonitis underwent re-laparotomy. Other 7 were treated conservatively and were cured.
- The hospital stay was prolonged in gangrenous cases (16.43%) as compared to non-gangrenous cases (14.56%).
- The mortality rate following primary resection and anastomosis was 7.57%. Overall mortality was 12.02% in this series. Death was more marked in gangrenous cases 18.91% as compared to non gangrenous cases-7.84%.

Conclusion

Volvulus of sigmoid colon is fairly a common condition in our country.The clinical picture. Age, and sex distribution is uniformly similar all over the world.

Important contributory factors are long sigmoid colon with narrow mesentry, high residual and irregular dietary habit. Other less important factor arechronic constipation, previous abdominal surgery and repeated pregnancy.

Primary resection of the sigmoid colon volvulus with end to endcolocolic anastomosis with inturrupted, single layer anastomosis with non-absorbable suture (silk 2-0)may be considered as the treatment of choice as it offers the following advantages.

i. Has got a low mortality rateas compared to any other method of treatment.
ii. It reduces the rate of anastomotic leak (faecal fistula) formation .
iii. In our country specially where there is always an acute shortage of hospital beds and most of the poor patients do not agree for the second selective operation, immediate curative measures should be the treatment of choice.

Bibliography

1. S.A. shoop, J.M. sackier: laparoscopic cecopexy for cecal volvulus. Surg. Endosc. 1993; vol. 7, Pg 450-454.
2. Lawrence H. Bennister, alimentary system, Gray's Anatomy 38th edition. Harcourt publisher, Churchill Livingstone. 2000; P.1777.
3. Richard S. Snell Clinical Anatomy 7th edition 2004; p.206-216.
4. Susan standing, Grays anatomy 40th edition Pg 1141-1146.
5. Metheney David and Nichois, H.E. volvulus of the sigmoid. Surg. Gynec. And obst. 1943; 76: 239-46
6. Sankaran V. volvulus. In south India. Jr surg. 1962; 24: 784-90
7. Anderson D.A. volvulus. IndJr surg. 1954; 16: 25.
8. Perlmann.: (Arch. F Klin, Chir, 137; 245, 1925) quoted by maingot, R. 1955.
9. William. F. Ganong. Review of medical physiology 21st edition, Lange medical publications. 2003: 512-515.
10. Guyton and hall: textbook of medical physiology 10th edi. Published by Elsevier, India. 2003;762-769.
11. Von Rokitansky: A manual of pathologic Anatomy, London Sydenham society, 1849.p56.
12. Dean O. Gilbert, Murray, J. warren.: volvulus of the sigmoid colon. Ann. Of surg. 1952; 135: No.6, 830-838.
13. Pool, R.M, and David, w. Dunavant: volvulus of the sigmoid colon Ann surg. 1951; 133: No. 5, 719-25.
14. S.N. Tambaku: primary resection of sigmoid for an acute sigmoid volvulus. Ind. Jr. S., 34: 5, May, 1972.
15. Mishra, S.B., sahu, KP: .primary resection and anastomosis for volvulus of sigmoid colon. Jr. Ind. Med. Asso. 84I: 9, 256, 1986.
16. Madiba TE & Thomson SR (2002) the management of cecal volvulus. Dis colon rectum 45: 264-267.
17. Kerry RL, ransom HK. Volvulus of the colon. Arch surg. 1969 Aug; 99(2): 215-222.
18. Ballantyne GH. Volvulus of the splenic flexure: of a case and review of the literature. Dis colon rectum 1981; 24: 630-632.
19. Heis HA. Et al: sigmoid volvulus in the Middle East. World J surg. 2008 Mar,32(3):459-64.
20. Sinha R.S:. A clinical appraisal of volvulus of the pelvic colon with special reference to aetiology and treatment Br. Jr surg. 56, 383-40,1969.