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EVALUATION OF THE OUTCOME OF VARIOUS OPERATIVE PROCEDURES IN ACUTE SIGMOID VOLVULUS – OUR EXPERIENCE.

General Surgery

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ABSTRACT

Volvulus is a condition in which a segment of the intestine twists on its own mesenteric axis and results in partial or complete obstruction. Increase in the intraluminal pressure of the bowel along with compromised blood supply leads to gangrene and perforation if unrelieved immediately. Sigmoid volvulus accounts for 2-3% of all intestinal obstructions. Even though it effects both sexes, males are more effected. Treatment differs based on the mode of presentation of volvulus. Relief of intestinal obstruction and resection of gangrenous sigmoid colon are the two main considerations. It is a surgical emergency condition and laparotomy is performed in all patients. Treatment can be divided into resection and non-resection procedures. Primary resection with end-to-end anastomosis is gold standard treatment for sigmoid volvulus. Sigmoid volvulus is more commonly seen in males when compared to females with high incidences in old aged around 5th and 6th decade of life. Procedures such as Sigmoidopexy are done in non-gangrenous and viable bowel conditions, while procedures such as resection and end-to-end anastomosis and Hartmann's procedures are done in cases with gangrene bowel, but carry a risk of mortality.

KEYWORDS

Sigmoid Volvulus, Sigmoidopexy, Resection and Anastamosis, Hartmann's procedure.

INTRODUCTION

Volvulus is a condition which is encountered uncommonly in the gastro-intestinal tract in which colon is most involved. Of the entire colon the sigmoid colon is the most frequent part occurring volvulus. Volvulus can also be seen in caecum, ascending colon, transverse colon and rarely in stomach. Sigmoid volvulus develops due to elongation of sigmoid loop, with stretching of sigmoid mesocolon.

Clinical presentation of sigmoid volvulus includes abdominal distension, constipation associated with colicky abdominal pain. The diagnosis is confirmed by abdominal plain X-ray which typically shows massive colonic distension with or without small bowel obstruction.

The cause of volvulus of sigmoid colon is not known clearly. A long congenital sigmoid with a short mesenteric base, high fiber diet, mega colon, chronic constipation, drugs like anticholinergics, anti-parkinson agents, sedatives are some of the believed primary predisposing factors.

The goal in sigmoid volvulus is de-rotation of the acute torsion and in case of any signs of strangulation and gangrenous sigmoid loop, emergency laparotomy. The surgical procedures performed in these cases are de-rotation and fixation of the sigmoid (Sigmoidopexy), Hartmann's procedure and Primary resection and anastomosis.

The aim of this study is to study the clinical course and also the manifestations of sigmoid volvulus, various types of surgical procedures performed, to study the outcome in terms of post operative wound infection, anastomotic leaks and death rates following the various methods of treatment.

METHODOLOGY

This retrospective observational study was performed in a tertiary care hospital in North Andhra Pradesh from 2019 to 2021 where the source of information was patient's case records and information related to the demographic characteristics, radiological investigations, surgical procedures performed, treatment response and course of recovery or death. These were recorded.

All patients with a definitive diagnosis of sigmoid volvulus were included in this study and patients with missing data in the records were excluded. Patients with rectal tube placement were considered unless they had developed symptoms of peritonitis.

Surgical procedures done fell into three categories: Sigmoidopexy, Primary resection with end-to-end anastomosis, and Hartmann's procedures which were compared in this study. These patients were followed-up for post operative period complications, duration of hospital stay and mortality rates.

Finally, obtained data was analysed using descriptive statistics as frequency and percentage for the qualitative variables. Chi-square and Fischer's exact test are used for determining association between qualitative variables. SPSS statistical software was used for the data analysis.

RESULTS

Nineteen (67.85%) males and nine (32.14%) females in the age group of range 26 – 83 (mean = 57.79 ± 14.48) years were studied.

Table 1: Sex Distribution Of The Cases

Sex	Number	Percentage
Male	19	67.86%
Female	9	32.14%

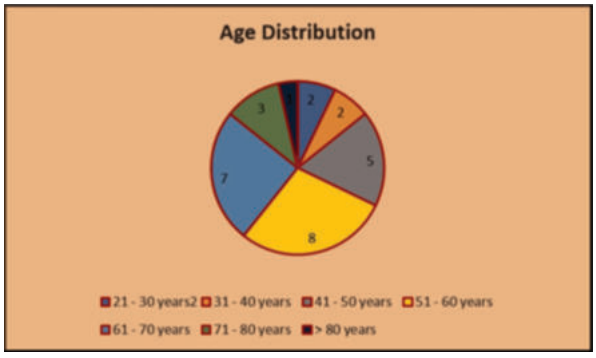

Figure:1 Age Distribution

The mean duration of the symptoms prior to the admission was 4.21 ± 0.88 (1 – 5) days for the total study group, 4.16 ± 0.96 days for males and 4.33 ± 0.71 for women.

In 1 (3.57%) case, the predisposing cause was found to be usage of anti-Parkinsons drugs. No predisposing factors were detected in the remaining 27 (96.43%) cases.

Recurrent sigmoid volvulus was seen in 1 case (3.57%) of the 28 patients who had previously underwent sigmoidopexy.

An array of surgical procedures was performed based on the patient's condition and surgeon preference. If no symptoms of peritonitis, shock or gangrenous sigmoid was found, de-rotation with sigmoidopexy was performed. In case of peritonitis or gangrenous sigmoid primary resection with anastomosis or Hartmann's procedure was performed depending upon the condition of the patient.

Of the total 28 cases, 5 (17.86%) underwent sigmoidopexy, 14 (50%) underwent primary sigmoid resection and end-to-end anastomosis, and 9 (32.14%) underwent Hartmann's procedure.

13 (46.42%) of the 28 patients who underwent surgical procedures developed wound infection, of which 1 (7.69%) underwent sigmoidopexy, 11 (84.62%) underwent primary sigmoid resection and end-to-end anastomosis, and 1 (7.69%) underwent Hartmann's procedure.

Table 2: Probability Table For Surgical Procedures Performed For 28 Patients And Wound Infection (p-value Of The Fisher's Exact Test) [at P = 0.05]

Procedure	No. of Cases	Wound Infection	p-Value
Sigmoidopexy	5	1	0.6448
Primary sigmoid resection and end-to-end anastomosis	14	11	0.0447*
Hartmann's Procedure	9	1	0.1286
Total cases	28	13	

13 (46.42%) of the 28 patients who underwent surgical procedures developed anastomotic leaks, of which 12 (92.3%) underwent Primary sigmoid resection and end-to-end anastomosis, and 1 (7.69%) underwent Hartmann's procedure.

Table 3: Probability table for surgical procedures performed for 28 patients and anastomotic leaks (p-Value of the Fisher's exact test) [at p = 0.05]

Procedure	No. of Cases	Anastomotic leak	p-Value
Sigmoidopexy	5	0	0.1596
Primary sigmoid resection and end-to-end anastomosis	14	12	0.0135*
Hartmann's Procedure	9	1	0.1286
Total cases	28	13	

6 (21.43%) of the 28 patients who underwent various surgical procedures died due to various causes like anastomotic leak and sepsis of which all of them belong to the primary resection and end-to-end anastomosis group.

Table 4: Probability table for surgical procedures performed for 28 patients and deaths (p-Value of the Fisher's exact test) [at p = 0.05]

Procedure	No. of Cases	Deaths	p-Value
Sigmoidopexy	5	0	0.5585
Primary sigmoid resection and end-to-end anastomosis	14	6	0.0311*
Hartmann's Procedure	9	0	0.1622
Total cases	28	6	

The mean duration of stay among the 28 cases who underwent various surgical procedures was 14.93 ± 1.25 days (12 – 17 days) for the entire group, 12.8 ± 0.84 days (12 – 14 days) for the sigmoidopexy group, 15.71 ± 0.61 days (15 – 17 days) for the primary resection and end-to-end anastomosis group, and 15.11 ± 0.78 days (14 – 16 days) for the Hartmann's group. The t-test showed that there is a significant difference between mean hospital stay of sigmoidopexyand primary resection and end-to-end anastomosis (t-value is -8.33481, the p-value is < 0.00001 and significant at p< 0.05) and between the mean hospital stay of sigmoidopexy with Hartmann's procedure (t-value is -5.17633, the p-value is 0.000231 and significant at p < 0.05). And also, the t-test showed that there is no significant difference between the mean hospital duration of primary resection and end-to-end anastomosis and Hartmann's procedure (t-value is 2.07234, the p-value is 0.050736 and not significant at p < 0.05).

DISCUSSION

Sigmoid volvulus is a major cause of colonic obstruction and is very common among Asia, Africa, Middle East, South America, Russia, and Eastern Europe. It constitutes 3 – 5% of all colonic obstructions. In our study out of 94 cases of colonic obstruction in the study period 28 (27.79%) cases of sigmoid volvulus were identified.

It is one of the life-threatening surgical emergencies and an important differential diagnoses of large bowel intestinal obstruction. Present study was conducted at tertiary hospital in North Andhra Pradesh in general surgery department for a period of 2 years. Age, gender, symptoms, surgical treatment procedures used, post operative complications and mortality were analysed.

There is a higher prevalence of sigmoid volvulus in men in comparison to women. In our study 67.86% were men and 32.14% were women. According to various reports this higher prevalence is seen in developing countries, while in developed countries the prevalence is of equal proportion between men and women or there is slightly higher prevalence among men. The wider pelvis of the female is believed to help the bowel to de-rotate and reduce the prevalence of sigmoid volvulus. Jain, B. L series[1] had a high number of males. Sankaran[2] reports the the male to female ratio to be 5:1. Anderson DA[3] reports of a male to female ratio of 9:1. Only Strurzaker H. G et[4] al reported a male to female ratio of 1:2 which is in opposite to many reported reviews. In our study males are more affected when compared to females with the ratio of 2.1:1

In western countries, sigmoid volvulus mostly occurs in the age of 70 and 80, while in developing countries the age of occurrence is between 40 and 60 years. Khanna AK et al[5] reported a mean age occurrence of 51 years. G Jumbi[6] et al described a mean occurrence age of 48 years, while Akhtar Munir et al[7] reported a mean age of 63 years in their study. El Bushra Ahmed Doumi[8] studied 22 patients diagnosed with volvulus and reported a mean occurrence age of 59.7 years. De et al. and Rajsiddharth et al[9] reported a mean occurrence age of 45.06 and 55.5 years. Dean, O. G[10] reported that the patients age ranging between 4 – 80 years with the average of 55 years in his study. In our study the mean age of occurrence was 57.79 ± 14.48 years. 13 (46.43%) of cases are between the ages of 40 and 60 years, while 24 (85.71%) of cases are above 40 years of age.

Abdominal pain occasionally colicky, abdominal distension, and constipation are the common presenting symptoms. Abdominal distension is the most common sign in all cases followed by constipation in 24 (85.71%) patients, and pain abdomen in 22 (78.57%) cases. Vomiting is seen in only 9 (32.14%) of cases. Illness et

al[11]. records that in their series of 45 cases all their patients had abdominal distension and obstipation, 33 (73.33%) patients complained of constipation, 17 patients (37.78%) with pain abdomen and 11 (24.44%) had vomiting. In our study the mean time of presentation to the surgery department is 4.2 ± 0.88 days (1 – 5 days).

Various surgical procedures were described with both resection and non-resection of the sigmoid bowel ranging from detorsion and fixation of the sigmoid, primary resection and end-to-end anastomosis, double barrel colostomy (Paul Mikulicz's procedure, Hartmann's procedure, subtotal colectomy, and mesosigmoidoplasty. Different surgical options for sigmoid volvulus which had been performed in our institution were compared with each other.

In our study of 28 patients sigmoidopexy was done in 17.8% and primary resection and anastomosis in 50% and Hartmann's was done in 23% of patients.

Sigmoidopexy is an effective surgical technique in a viable colon. In this procedure it is observed that mortality and morbidity is nil. The major problem associated with this surgical procedure is recurrence as noted by Shepherd[12], Anderson and Lee[13]. Hence this is the surgical procedure that can be done safely in elderly debilitated patients. In our study sigmoidopexy was performed in 5 (17.86%) cases in which wound infection is seen in 1 case with no significant morbidity and morbidity.

Primary resection and end to end anastomosis though recommended in several studies, has a high risk of anastomotic leakage. In our study 14 (50%) out of 28 cases have undergone primary sigmoid resection and anastomosis. In our study primary resection and end-to-end anastomosis had showed high wound infection rate (39.29%, p = 0.0447), aanastomotic leak (42.86%, p = 0.0135) and high mortality (21.43%, p = 0.0311) due to extension of gangrene beyond the anastamotic site. Hence this cannot be safely done in non- viable and gangrenous colon where chances of leak are high. Post operative anastamotic leaks were initially managed conservatively and patient needed re-laparotomy. All cases of primary resection with end-to-end anastomosis have been done with unprepared bowel in emergency setup.

Díaz-Plasenciaet al[14]subjected 56.9% of patients for primary resection and anastomosis treatment and found an 87% cure rate and 13% mortality. People's J.B et al [15] subjected 47.5% of patients to primary resection and anastomosis of which 73.7% were cured and had 26.3 % mortality. In Díaz-Plasencia J[16], Rebaza iparraguirre Hstudy 42% of patients underwent primary resection and anastomosis of which 67% were cured and 33% died. In our present study 50% of cases were subjected to primary resection and anastomosis of which 65.3% patients survived and 42.8% mortality.

Table 5: Cure and Mortality rates of various studies

Study	No. of Cases undergone Primary resection and anastomosis	Percentage	Cured (%)	Died (%)
Diaz-Plasencia et al	69	56.9%	60 (86.96%)	9 (13.04%)
People's J.B et al	19	47.5%	14 (73.68%)	5 (26.31%)
Diaz-Plasencia Rebaza iparraguirre H	21	42%	14 (66.67%)	7 (33.33%)
Present study	14	50%	8 (57.14%)	6 (42.86%)

If gangrenous bowel is noticed intraoperatively, the most appropriate method would be the resection of gangrenous bowel and end colostomy – Hartmann's procedure. In our study Hartmann"s procedure was performed in 9 (32.14%) cases. One patient showed wound infection (3.58%, p = 0.1286) which was not significant. one patient showed stump leak (3.58%, p = 0.1286) which was not significant. There were no deaths in the Hartmann's procedure group, though when done for gangrenous colon, has its own significant morbidity rate.

Our study showed that there is a significant difference between the mean hospital stay between sigmoidopexy and primary resection and end-to-end anastomosis (t-value is -8.33481, the p-value is < 0.00001 and significant at p < 0.05) and between the mean hospital stay of sigmoidopexy with Hartmann's procedure (t-value is -5.17633, the p-value is 0.000231 and significant at p < 0.05). And also, that there is no much significant difference between the mean hospital duration of primary resection and end-to-end anastomosis and Hartmann's procedure (t-value is 2.07234, the p-value is 0.050736 and not significant at p < 0.05).

In procedures which are associated with anastomosis shows high morbidity and mortality in contrast to those without anastamotic procedures.

CONCLUSION

Sigmoid volvulus commonly seen in males when compared to females and incidence is high in elderly with mean age of 57.79 ± 14.48 years. Early preoperative diagnosis both by clinical and also radiologically by X-ray abdomen helps in management of sigmoid volvulus. Sigmoidopexy is an effective surgical technique in a viable colon, but runs the risk of recurrence. Procedures such as resection of sigmoid and end-to- end anastomosis morbidity and mortality is high. In viable and healthy sigmoid colon, resection with end-to-end anastomosis is still the Surgery of choice. Hartmann's procedure is most effective procedure which was carried out in non- viable and gangrenous bowel especially when other co-morbid conditions exist. Duration of hospital stay is less for sigmoidopexy when compared with primary resection and anastomosis and Hartmann's procedures. There is no much difference in duration of hospital stay for both primary resection and end-to-end anastomosis and Hartmann's procedures groups.

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