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RESEARCH ARTICLE

A COMPARATIVE STUDY BETWEEN PRIMARY RESECTION AND ANASTOMOSIS AND STAGED PROCEDURE IN LEFT COLON OBSTRUCTION

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ABSTRACT

Introduction: The management of left colonic obstruction is a real clinical challenge for surgeons. The resection with on table lavage and anastomosis is the cornerstone of surgical management of large gut obstruction.

Methodology: Among the left colonic obstructions, 40 samples included in this non-randomized, longitudinal study in a prospective case series design which satisfy the criteria.

Results: Almost 80% cases of acute large gut obstruction occurred between 51 to 80 years of age. It was observed that 10% patients were from higher class, 32.5% from middle class and 57.5% from lower class. The incidence of complication was 28.6% in resection and anastomosis group (4/16) and 66.7% in staged resection group (6/9). All the cases of volvulus in this study had occurred in sigmoid colon, whereas carcinoma had more or less uniform distribution across the left colon.

Discussion: The male female ratio of left colonic obstruction in this study was 3:2. The mechanical bowel preparation offer no significant benefit as a preoperative measure in current practice. In spite of risk of spillage and contamination, colonic decompression offers some better result.

Conclusion: The left colonic obstruction is a surgical emergency and volvulus principally affects lower socio economic groups. Despite controversies and lack of unanimity in opinion, planned selection of single stage surgery offers better outcome than staged surgical procedures and surgeons should be careful for selecting and planning for these cases.

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INTRODUCTION

Large gut obstruction constitutes a common worldwide problem with varied etiologies. Left colon obstruction constitutes the majority of cases of large gut obstruction and there are multiple reasons for that, which are mostly mechanical, inflammatory or neoplastic. Colonic volvulus constitutes an important cause of left colonic obstruction. Although it is quite rare in the US (5%) it constitutes to nearly half of the cases of left colon obstruction in Russia. Colonic volvulus is also very common in India, Iran, and some parts of Africa. Sigmoid volvulus forms the majority of cases of left colonic obstruction. (Sabiston's Textbook of Surgery, 18th ed) Whatever may be the cause, the management of left colonic obstruction is a surgical challenge. (Deen Kl Madoff *et al*., 1998) Diagnosis of the cases and further management has to be initiated on the basis of sound clinical judgment limited radiological investigations. During exploration having ascertained the site and nature of obstruction the surgeon is left with two options. Earlier surgeons used to carry out a proximal diverting enterostomy followed by reconstruction later on. However in recent times there is a trend toward resection on table lavage and primary anastomosis constitute the operation

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of choice for most patients with acute obstruction of the left colon. (Stewart *et al*., 1993)

The decision making depends on the several factors like the site of obstruction, the nature of underlying pathology, the degree of peritoneal contamination, the age and general condition of the patient. The single stage procedure offers the patients the benefits as there is no stoma related morbidity by virtue of single operation with single hospitalization and shorter hospital stay. The staged procedures have many disadvantages which increases morbidity. In developing countries like India, specialized stoma care is available in only selected centers. Also in staged procedures the patient requires multiple admissions. Therefore with technical precision one can offer comparable outcome of single stage definitive surgery to multistage surgical procedures in management of left colonic obstruction. There has been a controversy over optimal operative methods for left colonic obstruction in between primary resection anastomosis & staged procedures. The present study is therefore an attempts to evaluate difference in terms of postoperative morbidity and mortality. This study is based on the cases admitted with left colonic obstruction in the Department of General Surgery in a tertiary medical college and hospital for the period of one year.

The specific objectives of the study are

1. To compare the development of postoperative complication like anastomotic leak, fistula formation, intra-abdominal collection, wound complication and lung complication.
2. To compare total duration of hospital stay.
3. To compare postoperative mortality from 30 days of operation.

MATERIALS AND METHODS

The study area was the Department of General Surgery of a tertiary medical college and hospital. All patients with colonic obstruction presented, subsequently, only those patients who are found to have left colonic obstruction by investigation and laparotomy included in this study for a year and sample size was forty (n=40). The study design is non-randomized, longitudinal study in a prospective case series design. The parameter studied was pre-operative clinical study, mean operative time, operative technique, post operative morbidities, post operative mortalities, total duration of hospital stay. The study tools were clinical assessment, basic laboratory examination. The investigation must be done to be eligible for this study were, blood for routine examination, ESR, blood sugar, urea, creatinine, serum albumin estimation, radiological examinations including straight X-ray abdomen, X-ray chest PA view and colonoscopy when feasible.

Patients fulfilling the said definition were included in the study. The exclusion criterions are gangrenous colon, moribund patient. Low pre-operative albumin level (<3gm/dl), peritoneal contamination and associated co-morbidities. The cases were studied with a suitable proforma maintaining the records of detailed history, clinical examination, and ancillary investigation as far as possible to reach a pre operative diagnosis of acute large gut obstruction. Resuscitation and simultaneous evolution of the patients were done to reach at an operative decision to suit each case according to its merit. After preliminary preoperative resuscitation the said 40 patients were undergone laparotomy under general anaesthesia through mid line incision. At laparotomy after the site and macroscopic pathological nature of obstruction being ascertained, the resection of affected segment of large gut with primary anastomosis were performed wherever possible depending on the pathology, site of obstruction, condition of gut wall, vascularity, level of fecal contamination, intra-operative hemodynamic stability and general condition of the patient.

According to preoperative hemodynamic condition of patients, in some cases on table colonic lavage was done by clearing the large gut with normal saline via a Foley's catheter introduced in caecum either through an enterotomy in terminal iileum or through the appendiceal stump and the effluent being collected in a bowel by using the redundant loop connected to proposed upper limit of resection. Primary anastomosis was done In a meticulous single layer mucosa inverting technique by using 3-0 delayed absorbable suture material preferably of braided coated polygycolic acid material in interrupted fashion. Drains were placed in all cases.

Proximal loop colostomy by using sigmoid colon or transverse colon according to level of obstruction or proximal end colostomy with distal mucus fistula or proximal end colostomy with Hartmann's pouch were performed where primary anastomosis may not be possible according to criteria stated earlier. All wound were irrigated before closure and abdomen was closed in mass fashion by using No.1 polypropelene. Thorough postoperative monitoring of the vitals with particular importance to water and electrolyte imbalance and correction of hemoglobin and serum albumin level as well as prevention and management of early complications were done published or photographed.

RESULTS

In the present study 40 cases were studied. The age of the patient ranges from11 years to 90 years. The most affected age group in this study was 61-70 years of age group (35%). Almost 80% cases of acute large gut obstruction occurred between 51 to 80 years of age. 24 out cases were male(60%) and rest (40%) were female. In 25 cases of volvulus 14 cases were male (56%) and 11 were female (46%). In 10 cases of carcinoma 7 cases were male (70%) and 3 cases were female (30%). In the present study it was observed that 10% patients were from higher class, 32.5% from middle class and 57.5% from lower class. Among 25 cases of volvulus 18 cases 72% were from lower class 6 cases 25% from middle class and only 1 case 4% from higher class whereas among 10 cases of carcinoma, only 1 case 10% was from lower class, 6 cases 60% were from middle class and 3 cases 30% from higher class. So, higher incidence of volvulus occurred in lower socioeconomic group and that of carcinoma in middle to higher socioeconomic group. In the present study it was observed that 15% patients had addiction of tobacco chewing 37.5% was smokers and 12.5% were alcoholic. 35% patients had no addiction. 9 (22.5%) out of 25 cases of volvulus had no addiction whereas 2 cases (20%) out of 10 cases of carcinoma were addicted either to chewing tobacco or smoking.

Table 1. Correlation between presenting complaints and underlying pathology

Clinical features	Pathology			Total Outcome	Percentage
	Volvulus	Carcinoma	Others		
Abdominal distension	22	10	3	35	87.5%
Abdominal colic	15	4	4	23	57.5%
Vomiting	10	2	3	15	37.5%
Loss of weight	0	4	3	7	17.5%
Lump abdomen	0	4	1	5	12.5%
Haematochezia	0	6	0	6	15%

Table 2. Incidence of different intra operative parameters with relation to mortality outcome

Intra operative Parameters		Pathology			Outcome In terms of mortality	Percentage of mortality
		Volvuluns	carcinoma	others		
Gangrene	A	7	0	0	4	55.55%
	B	6	0	0	1	33.33%
Perforation	A	0	0	0	NA	NA
	B	0	0	0	NA	NA
Fecal	A	0	0	0	0	0%
Contamination	B	3	0	0	1	33.33%
Intra operative	A	12	6	4	3	12%
Decompression	B	6	4	0	3	30%
Intra operative	A	1	1	0	2	100
Hypotension	B	2	3	0	3	60

A= where single stage surgery was done
B=where single stage surgery was not done

Table 3. Incidence of different postoperative complications in relation to mortality outrcome

Postoperative complications		Pathology			Total	Mortality	Percentage
		Volvulus	Carcinoma	Others			
Co-morbid	A	9	2	1	12	3	25%
Conditions Like RTI, UTI etc	B	6	3	0	9	3	33.33%
Anastomotic leakage	A	3	1		4	3	75%
	B	NA	NA	NA	NA	NA	NA
Intra peritoneal abscess	A	2	1	2	5	3	60%
	B	3	0	0	3	2	66.67%
Wound infection	A	3	1	3	7	3	42.85%
	B	7	0	0	7	2	28.57%

A=where single stage surgery was done
B=where single stage surgery was not done

Table 4. Percentage of total mortality in relation to various pathology

Pathology		Total case	Mortality	Percentage
Volvulus	A	14	3	21.42%
	B	11	3	27.27%
Carcinoma	A	6	2	33.33%
	B	4	1	25%
Others	A	4	1	25%
	B	1	0	0%
Total		40	10	25%

A=where single stage surgery was done
B=where single stage surgery was not done

In the present study it was observed that 27.5% cases came with features of complete obstruction for < 24 hours duration 55% for 24-48 hours duration and 17.5% for > 48 hours duration. Among the 11 cases, coming with features of complete obstruction for < 24 hours 1 died. So mortality I first group was 10%. Likewise in 2nd group (24-48 hours duration of complete obstruction) was 22 cases and that of last group (>48 hours duration of complete obstruction) was 7 cases. In the present study out of 25 cases of sigmoid volvulous, 14 cases were undergone resection with primary anastomosis with mortality (21.42%) and 11cases were undergone staged procedure with 3 mortality (27.27%) after first staged operation.

In case of carcinoma the percentage is 33.33% and 25% out of fatal 40 cases of left sided obstruction single stage procedure was performed in 24 cases with 6 mortality (25%) and staged procedure was undertaken in 16 cases with 4 mortality (25%) after first stage of operation, so outcome of single surgery was comparable to staged procedure. The outcome of second operation in case of staged procedures was considered only in terms of mortality in this study. In case of volvulus; 10 out of 11 cases staged procedure were undergone second staged surgery with 2 mortality (20%) and in cases of carcinoma only 3 patients out of 4 cases staged procedure were undergone second staged surgery with 1 mortality. This result being added to previous one, the original outcome would stand highly

against staged procedure. There was no clinical anastomotic leak in patient undergoing primary anastomosis. However second surgery for patient undergoing colorectal reconnection conferred added morbidity for patient who had a Hurtsmann's procedure. We conclude that resection ontable lavage & primary anastomosis is safe in the management of left sided colonic obstruction & in most cases is the treatment of choice. The incidence of complication was 28.6% in resection and anastomosis group (4/16) and 66.7% in staged resection group (6/9). Hospital stay was 15(9-45) in staged procedure patient and 8 (6-20) in resection & primary anastomosis group. There was one case (7.1) of anastomotic dehiscence in resection & primary anastomosis group and two cases (22.2%) in staged resection group. (de Aguilar-Nascimento *et al*., 2002) Emergency subtotal colectomy achieves in one staged relief of bowel obstruction and tumor resection by encompassing massively distended and faecal loaded colon with ischemic lesion and serosal tear on the cecum, ensure restoration of gut contiguity via a safe ileocolic anastomosis and removes occasional lesion proximal to the index cancer.

Fig. 1. Dilated loop of sigmoid colon in a malignant obstruction at recto-sigmoid junction

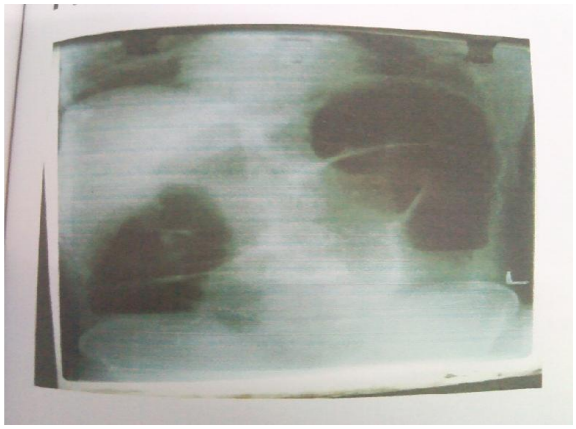

Fig. 2. Dilated loop of sigmoid colon in a case of sigmoid colon volvulus

Fig. 3. Specimen of sigmoid and descending colon

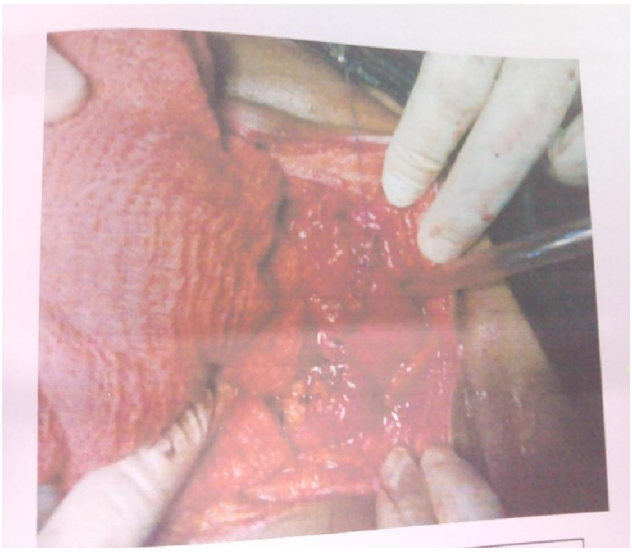

Fig. 4. Single layer left colonic anastomosis

In this study it was observed that 7.5% cases were presented with pulse rate < 80/min, 47.5% with 80-100/min and 45% with>100/min. Among 3 cases, presenting with pulse rate<80 min all (100%) survived. Among 19 cases of second group (pulse rate 80-100min) 2 cases (1.11%) died and among 16 cases of third group (pulse rate> 100/min) 6 cases 37.5% died. Overall among 10 casualties 2 cases were for second group and 6 cases (56.67%) were from third group. It was also observed that 20% cases were presented with MABP of >90 mmHg. 55% cases with 80-90 mmHg and 25% cases with <80 mmHg. Among the 8 cases of first group (MABP >90 mmHg) mortality was 0%. In the second stage group (MABP 80-90 mmHg), among 22 cases 5 cases (23.81%) died. In the last group among 5 cases (50%) died. It was also observed that 87.5% cases were presented with abdominal distension, 57.5% with abdominal colic, 37.5% with vomiting, 17.5% with loss of weight, 12.5% with lump in abdomen and 15% with haemotochezia. It was observed that among the left colonic obstruction, descending colon comprises 10% of cases, sigmoid

colon 82.5% of cases and rectum 7.5% of cases. All the cases of volvulus in this study had occurred in sigmoid colon whereas carcinoma had more or less uniform distribution across the left colon (Table 1). Further among the 62.5% cases presenting with large gut obstruction were due to volvulus and esectable and unresectable carcinoma comprises 20% and 5% of total cases respectively, 7.5% cases (n=3) were due to tuberculosis. The varied outcome in terms of mortality with different intra operative parameters has been noted. The mortality was 55.55% in cases of single stage anastomosis in the presence of gangrenous bowel and 100% in single stage anastomosis done in presence of intra operative hypotension. It was observed that mortality rates from both, single stage surgery and staged surgical procedure were equal (25%). In staged procedure, loop colostomy is the most common (56.25%). It has also been observed that mortality rate had been 23.01% among the cases in which the operation had been done within 2 hours. The mortality rate is 11.11% where the operation lasted for 2-3 hours and about 55.55% where sugery lasted for more than three hours. Among the 17 cases where postoperative haemoglobin level is more than 10gm%, 12 cases had underwent single stage surgery with mortality rate 16.67% (n=2) whereas the 5 cases with staged surgical procedure one patient had died. The 23 cases with postoperative haemoglobin level less than 10gm%, single stage surgery was undertaken in 12 cases with mortality rate is 25% (n=3) and in 11 cases where staged surgical procedure was under taken mortality rate is 36.46% (n=4) (Table 2). The varied outcome in terms of mortality with different postoperative complication in respect to single stage surgery and staged surgical procedure has been observed. Three out of four of anastomotic leakage patients had died which signifies high mortality rate (75%). Among the five patients who underwent single stage surgery complicated by intra peritoneal abscess, 60% have died (n=-3). (Table 3) The different mortality rate in different pathology of large gut obstruction with different surgical procedures has been noted. With single stage surgical procedure the mortality rates are 21.42%, 33.33% and 25% respectively with volvuluns. carcinoma and other group. Whereas in staged surgical procedure the mortality rates are 27.27% and 25% in volvuluns and carcinoma respectively and overall mortality rate is as high as 25% (Table 4).

DISCUSSION

The three fourth (75%) of cases of left colonic obstruction belongs to geriatric age group and majority of volvulus had been seen in this age group. So the left colonic obstruction is the principal clinical presentation of elderly. Overall 60% cases of left colonic obstruction were found to be male, rest were 40% female. So, male female ratio of left colonic obstruction in this study was 3:2. This ratio was more or less equally applicable for both cases of volvulus and carcinoma. Tuberculosis, as a cause of left colonic obstruction showed equal sex distribution. In the present study the large gut obstruction predominantly seen in males.

Overall 40% cases were Hindu and 60% were Muslim. In case of volvulus the ratio between Hindu and Muslim was 1:1. 66, whereas in case of carcinoma, the ratio was 1:1. Two cases of tubercular obstruction and case of duplication cyst were seen in Muslim. Volvulus mainly affects patients from lower socioeconomic group, whereas carcinoma affected middle to higher socio-economic group. Maximum cases of tubercular obstruction (2 out of 3) came from lower socio-economic group. Lower socio-economic group consume higher fiber diet and volvulus is common in this group. In other studies, it has been found that carcinoma usually affects middle to higher economic group with high fat consumption. Comparison came in cases of left sided colonic obstruction; one staged primary resection and anastomosis is preferred choice for low risk patients. (Emergency management of malignant acute left sided colonic obstruction, 2008) Most of left colonic obstruction is an emergency condition and as the duration of obstruction increases, there is rise in mortality with adverse postoperative outcome. The findings of this study showed close relation to the said parameter as we observed higher mortality in the groups of patients presented with higher pulse rate (>100/min). Mean arterial blood pressure (MABP) at presentation is more informative about the homodynamic condition of the patients than pulse rate at presentation and therefore a good prognostic indicator. (Maher *et al*., 1996) Patients with left colonic obstruction were presented with absolute constipation, abdominal distension, colicky abdominal pain and vomiting. Abdominal distension has been seen in 87.5% cases. History of abdominal colic from the onset of obstruction at presentation has been seen in 57.5% cases. Vomiting had occurred only 37.5% cases and weight loss has been seen in 17.5% cases. In this study, the most common site of obstruction was sigmoid colon (82.5%) which is quite high in comparison to previous studies. Primary resection and anastomosis is the mainstay of surgical management of left colonic obstruction. (de Aguilar-Nascimento *et al*., 2002) In the present study left colonic obstruction had undergone resection with primary anastomosis without any diversion, resulting in fair result and thus reaffirmed the satisfying gold standard procedure. It is quite a safe procedure which has operative mortality rate as low as with elective surgery. (Arnault *et al*., 1994) Preoperative bowel decompressions have played a major role in tilting the practice toward primary anastomosis. But it has some disadvantage as it takes about 10 minutes to 20 minutes more time and it is also associated with increased risk of spillage and contamination. In spite of this disadvantage colonic decompression offers some better result. Recent trial, meta-analysis and other emerging data from medical literature suggest that MBP (mechanical bowel preparation) offer no benefit as a preoperative measure and question its place in current surgical problem. (Arnault JP, Bergamaschi, 1994) Furthermore MBP is a time consuming expensive procedure and causes severe discomfort to patient more importantly the application of MBP has been associated with serious complication in both healthy patient and patient with existing cardiac and renal disease. (Matsou *et al*., 2011) Narayansingh *et al*. 1999 advocate early decompression before mesentery being divided and gut resected to allow improved vascularity and tone to the collapsed bowel thus increasing anastomotic secuirity and they conclude that emergency surgery on the obstructed left colon can be carried out safely after decompression alone without intra operative colonic lavage. (Narayansingh *et al*., 1999).

Recently, single stage resection with primary anastomosis in left colonic obstruction has been shown to have good results. (Lee *et al*., 2001)

Conclusion

Left colonic obstruction constitutes a common emergency condition affecting mainly older age group. Volvulus is the most common cause of large gut obstruction in the developing countries, then comes carcinoma and lastly tuberculosis. Volvulus mainly affects lower socio-economic group consuming high fiber diet. But in developed countries volvulus is relatively rare ranking behind cancer & diverticulitis. Surgeon should be aware of the controversies and consensus in it management. Careful selection of cases with left sided obstruction, depending on meticulous assessment of preoperative vitals and technical precision offer better outcome with single definitive surgery than staged surgical procedure.

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