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A Clinico-Morphological Study of Intestinal Obstruction Cases with Radiological Co-relation

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Abstract: ***Introduction: Intestinal obstruction is a frequent surgical emergency. Effective management depends upon early and accurate diagnosis. If the diagnosis is unclear than essential laboratory test is needed .in recent years, radiological imaging methods have been used frequently in diagnosis to improve diagnostic accuracy, histopathological examination of resected intestine is expected to provide the definite evidence of the underlying etiology- guiding a better health care planning for preventive measures. Aims and objectives: To determine the frequency of intestinal obstruction and to find its etiology with the help of various investigations modalities. To study the role of specific severity indicators and their importance in early diagnosis and management. Material and methods: A two-year prospective observational study was conducted in Subharti medical college Meerut, for patients with clinical manifestation of intestinal obstruction. 60 patients were taken and their severity scores were calculated based on which further management was planned. Results: Mean age of patients in our series was 46.9 years. In our study pain abdomen was present in 95% patients followed by - obstipation (55%) and vomiting (38.3%). Abdominal distension was the most predominant physical finding (88.3%) followed by tenderness (78.3%) and guarding (33.3%) on CT the most common site of obstruction with surgical correlation was ileum. The commonest cause of intestinal obstruction in adults in this study series was adhesions in 21.7% cases. The most common surgery performed was exploratory laparotomy with resection anastomosis in 16 (40%) of operated cases. 87 % patients having a score less than 3 were managed conservatively, 100% having a score of 3 or more where operated on. Conclusion: This study tries to use a severity scoring system to help identify the ideal time to intervene in a case of intestinal obstruction. Most of the severity indicators have been found to be useful.***

Keywords: adhesions, intestine, obstruction, resection and anastomosis, scores

1. Introduction

Intestinal obstruction is a frequent surgical emergency. Effective management depends upon early and accurate diagnosis. [1] from 3 to 20% of emergency surgical admissions and as many as 25 to 35% of admissions for acute abdominal disorders involve intestinal obstruction, out of which small bowel obstruction accounts for 12-16%.[2]death due to acute intestinal obstruction is decreasing with better understanding of pathophysiology, improvement in diagnostic techniques, fluid and electrolyte correction, much potent anti-microbial and knowledge of intensive care.[3]if the diagnosis is unclear than essential laboratory test are needed including serum electrolytes, blood urea, S. Creatinine, CBC, serum lactate level, LDH, urinalysis, PT/INR and CRP.[4]

In recent years, radiological imaging methods have been used frequently in diagnosis to improve diagnostic accuracy. Studies have shown that CT imaging has a sensitivity and specificity greater than 95% in the diagnosis [5, 6] The diagnostic accuracy of USG is not satisfactory and varies according to the person, and CT, although having high diagnostic accuracy, exposes the patient to radiation. Also, histopathological examination of resected intestine is expected to provide the definite evidence of the underlying aetiology- guiding a better health care planning for preventive measures.

In the present study we wish to determine the role of different clinico morphological and radiological modalities in the diagnostic evaluation of intestinal obstruction.

2. Material and Methods

This was a prospective observational study, conducted for a period of 2 years with a sample size of 60, in the department of surgery at Subharti hospital, Meerut.

The study population included all patients above 18 years admitted to surgical wards with a provisional diagnosis of intestinal obstruction. Necessary consent was taken from the patient and relative.

Patient details

History

Clinical examination-General examination: - by noting points on the proforma. Systemic examination: - emphasis on abdominal examination. In abdominal examination, special relevance given to palpatory finding of guarding. A provisional diagnosis of intestinal obstruction made.

Hematological investigations eg Complete Blood Count (CBC), Prothrombin Time and International Normalized Ratio (PT/INR)

Total leukocyte count (TLC)

The normal leukocyte count taken as between 4000 cumm to 11, 000 cumm. Any value above 11, 000 cumm on admission is considered significant

C-reactive protein
It is an acute phase protein. Values of 10mg/l and above on admission considered significant ***Radiological investigations*** - chest X-ray PA view and X-ray abdomen erect. X-ray showing multiple air fluid levels on abdomen erect film are highly suggestive of intestinal obstruction. USG abdomen and pelvis: to point out any specific etiology, amount of fluid collection, peristalsis and dilatation of bowel loops. More than 500 ml of intraperitoneal fluid is highly relevant. CT Scan abdomen and pelvis with double contrast: carried out in cases of diagnostic dilemma or when further details of a pathological condition are required. A reduction of CT bowel wall contrast enhancement is considered significant. Any other special investigation will be done if required.

Histopathological examination of the tissue specimen of resection/biopsy for the patients who underwent surgery.

Follow up of non-surgical methods as nasogastric decompression with Ryles tube etc.

All the recorded variables were tabulated and analysed.

After collection of complete data based on specific clinical, biological and radiological severity indicators, scoring was done as follows:

- Specific severity indicators: - (one point each)
- Continuous pain in abdomen > 4 days
- Abdominal guarding
- TLC >11000 cells / cumm (on admission)
- CRP >or = 10 mg/l5
- USG abdomen and pelvis for free intraperitoneal fluid exceeding 500 ml and/or CT Abdomen showing reduction of computed tomography bowel wall contrast enhancement.

Most of the patients with a score > or = 3 undergone explorations and those <3 managed conservatively.

3. Results

The present study was conducted in the department of surgery of Subharti Medical College Meerut. A total of 60 people were included in the final analysis

Demographic
Out of 60 patients in our study, majority i.e. 13 (21.7%) patients were found in the age group of 18-28 years. Mean age of patients in our series was 46.9 years. It was 45.16 years in male patients and 49.91 years in female patients. About 63.3% (n=38) were male patients and remaining 36.7% (n=22) were female. Male to female ratio was 1.7:1. (Table 1, 2)

Table 1: Age-wise distribution of patients

Age group	Frequency	Percentage
18 to 28	13	21.7%
29 to 39	12	20%
40 to 50	10	16.7%
51 to 61	11	18.3%
62 to 72	8	13.3%
>73	6	10%
Total	60	100%

Table 2: Sex-wise distribution of patients

Gender	Frequency	Percentage
Male	38	63.3%
Female	22	36.7%
Total	60	100%

Clinical findings
The magnitude of patients that previously underwent a major abdominal surgery was 9 (15%), while 51 (85%) patients had no previous abdominal surgery. (table3)

Table 3: History of previous abdominal surgery in patients

History of surgery	Frequency	Percentage
No	51	85%
Yes	9	15%
Total	60	100%

Majority of the patients presented with pain abdomen i.e. 57 (95%), followed by - constipation (55%) and vomiting (38.3%), while anorexia was present in 15 (25%) patients and 10 (16.7%) cases had complaint of fever. (table3)

Table 3: Symptom distribution of patients

Symptoms	Frequency	Percentage
Pain Abdomen	39	65%
Vomiting	23	38.3%
Fever	10	16.7%
Obstipation	33	55%
Anorexia	15	25%

On examination, distension was the most predominant physical finding (88.3%) followed by tenderness (78.3%) and guarding (33.3%). Palpable mass was found in 5 cases (8.3%) whereas pallor and icterus was present in 5 (8.3%) and 3 (5%) cases respectively. Among the 5 patients with palpable mass all were patients of obstructed hernias and no other palpable mass were found in other aetiologies. In 50 (83.33%) patients bowel sound were present, while absent in remaining 10 (16.67%) cases majority 52 (86.6%) of the patients had normal digital rectal examination, while dre was abnormal in 8 (13.3%) patients. Out of these 8 patients 4 patients had fecolith impaction, 3 had ballooning of rectum and in 1 there was finger stained with blood and mucus. (Table4)

Table 4: Descriptive analysis of signs in study population (N=60)

Sign	Frequency	Percentage
Pallor	5	8.3%
Icterus	3	5%
Palpable mass	5	8.3%
Distension	46	76.7%
Guarding	20	33.3%
Tenderness	47	78.3%

Correlation between haematological investigations and treatment

In our study 42 patients had leucocytosis and 18 patients had normal leukocyte count. Out of 42 people with leucocytosis 35 (83.3%) underwent surgery while 7 (16.7%) were managed conservatively. Out of 18 patients with normal tlc 13 (72.2%) patients were managed conservatively while 5 (27.8%) patients required surgery. The difference in the proportion of conservative and surgical between tlc was statistically significant (p value <0.001). (table5)

Table 5: Descriptive analysis of management and TLC (N=60)

TLC	Conservative	Surgery	Total	P value
≤11000/cumm	13 (72.2%)	5 (27.8%)	18	<0.001
>11000/cumm	7 (16.7%)	35 (83.3%)	42	
Total	20 (33.3%)	40 (66.7%)	60	

Out of 60 patients, 53 (88.33%) patients had positive CRP value while 7 (11.66%) patients had CRP value ≤10mg/l. Of the 53 patients with positive CRP value, 40 (75.5%) underwent surgery while 13 (24.5%) patients were managed conservatively. All patients having CRP value ≤10mg/l were managed conservatively. The difference in the proportion of conservative and surgical between CRP was statistically significant (p value <0.001). (table6)

Table 6: Descriptive analysis of Management and CRP (N=60)

CRP	Conservative	Surgery	Total	P value
≤10Mg/L	7 (100%)	0 (%)	7	<0.001
>10Mg/L	13 (24.5%)	40 (75.5%)	53	
Total	20 (33.3%)	40 (66.7%)	60	

Table 7: Descriptive analysis of 2 main blood Investigation included in scoring

Investigation	Mean	S.D	T	P value
TLC				
≤11000/cumm	8.29	2.09	4.16	0.001
>11000/cumm	16.02	7.73		
CRP				
≤10Mg/L	6.59	3.22	8.15	0.001
>10Mg/L	32.99	8.43		

Table-7 shows the two main blood investigations i.e. total leukocyte count and C-reactive protein, carried out in this study. The mean value and standard deviation of these investigations were calculated. The P value of both the data was statistically significant.

Correlation between radiological investigations and treatment

X-rays of 25 (41.6%) patients were suggestive of dilated bowel loops, 18 (30%) patients had multiple air fluid levels while x-ray was inconclusive in 17 (28.3%) of the patients.

Out of 60 patients, 51 patients had got their USG done of which 39 (76.4%) patients were found to have dilated bowel loops/ sluggish peristalsis. USG was inconclusive in 6 (11.76%) patients, abdominal wall defect was observed in 5 (9.8%) while in 1 (1.9%) patient intussusception was the major finding.

CECT was done in 46 patients of whom obstruction and its site was found in 30 (65.2%) patients while in 16 (34.7%) patients it was inconclusive. Most common site for obstruction was ileum i.e. 18 (60%), second most common sites being jejunum with 5 (16.6%) cases, ileocolic junction accounts for 4 (13.3%) cases, while in 1 (3.3%) patient each caecum, ascending colon and sigmoid colon were the sites of obstruction. Ct reports of only 9 (19.6%) patients were suggestive of reduced bowel wall contrast enhancement of which cases were of mesenteric ischemia, 1 was closed loop obstruction and 1 was iliocaecocolic intussusception with vascular compromise. All these findings are consistent with that of intraoperative findings and hence cect can be labelled as a good modality of investigation. (table-8)

Parameter	Conservative	Surgery	Total
USG (free fluid >500ml)			
No	15 (53.6)	12 (46.4%)	27 (53%)
Yes	4 (17.4%)	20 (82.6%)	24 (47%)
CECT (reduced bowel wall contrast enhancement)			
Absent	15 (40.5%)	22 (59.4%)	37 (80.4)
Present	0 (0%)	9 (100%)	9 (19.6%)

Correlation between severity score and management

Out of 60 patients in our study, 37 (61.6%) patients had severity scoring ≥3 and 23 (38.3%) with score <3. Of 23 people with severity score <3, 20 (87%) were managed conservatively and 3 (13%) underwent surgery. The data was statistically significant (p value <0.001) (table9)

Table 9: Correlation between severity score and management

Severity score	Conservative	Surgery	Total	P value
<3	20 (87%)	3 (13%)	23 (38.3%)	<0.001
≥3	0 (0%)	37 (100%)	37 (61.6%)	
Total	20 (33.3%)	40 (66.7%)	60	

Etiological factors their severity score, management and complications

Out 0f 60 patients, 13 patients had adhesions of which 7 patients were managed conservatively and 6 patients underwent surgery. All patients with mesenteric ischemia (n=8) and stricture non TB (n=8) underwent surgery. Koch's abdomen was found in 4 cases of which 3 were conservatively managed and 1 patient underwent surgery. 5 cases of obstructed hernia, 2 cases each of - appendicular aetiology, malignancy and intussusception, and 1 case of meckel's diverticulum all underwent surgery.

While 5 cases of paralytic ileus, 2 cases of SAIO with***u***raemia and 1 case each of SAIO with DM, SAIO with spinal trauma, pseudo obstruction wasmanaged conservatively.

Out of 23 people with severity score <3, 20 (87%) were managed conservatively and 3 (13%) underwent surgery. Also we can see that all the cases which were managed conservatively have score <3.

Out of 37 people with ≥3 severity score, all 37 (100%) underwent surgery. The data was statistically significant (P value <0.001).In cases with bands and adhesions 7 (53.8%) out of 13 scored <3 while other 6 (46.1%) scored >=3

All cases of obstructed hernia (5), mesenteric ischemia (8) and peritonitis (5) scored >=3.

In kochs abdomen 3 out of 4 (75%) scored <3 also (28.5%) non-TB strictures i.e.2 out of 7 scored <3. (table10)

In majority 41 (68.3%) of the patients there were no complication noted followed by Others (11.7%). Wound infection was present in 4 (6.7%) cases while burst abdomen and bowel fistula accounts for 1 (1.7%) each.

Death occurred in 6 (10%) cases.

Table 10: Etiological factors their severity score, management and complications

Etiology	Management		Severity score		Complications		Total
	Conservative	Surgery	<3	≥3	Absent	Present	
Bands / adhesions	7	6	7	6	8	5	13
Mesenteric ischemia	0	8	0	8	4	4	8
Stricture (non-TB)	0	8	2	6	4	4	8
Koch"s abdomen	3	1	3	1	3	1	4
Hernia (obstruction / strangulation)	0	5	0	5	4	1	5
Meckel's	0	1	0	1	1	0	1
Appendicular perforation	0	2	0	2	1	1	2
Intussusception	0	2	0	3	1	1	2
Malignancy	0	2	1	1	2	0	2
Peritonitis	0	5	0	5	3	2	5
Paralytic ileus	5	0	5	0	5	0	5
SAIO with uremia	2	0	2	0	2	0	2
SAIO with DM	1	0	1	0	1	0	1
SAIOwith spinal trauma	1	0	1	0	1	0	1
Pseudo obstruction	1	0	1	0	1	0	1
Total	20	40	23	37	41	19	60

Out of 60 patients, 40 patients were operated and specimens of 37 patients were sent for histopathological examination. Among these 37 patient's majority of the patients were found to have acute on chronic enteritis i.e.18 (48.6%) patients followed by 5 (13.5%) patients each of enterocolitis with perforation peritonitis and enterocolitis with gangrene. Jejunitis was a feature in 3 (8.1%) cases, while there were 2 (5.4%) cases each with primary adenocarcinoma and metastatic adenocarcinoma i.e. Pseudomyxoma peritonii. There was also 1 (2.7%) patient each of meckel"s diverticulitis and sub mucosal lipoma of jejunum. (table11)

Table 11: Descriptive analysis of histopathology of study population (N=40)

HPE	Frequency	Percentage
Acute on chronic inflammation	26	65%
Acute on chronic inflammation with gangrenous changes	8	16%
Malignancy	4	8%
Meckel's diverticulum	1	2%
Submucosal lipoma	1	2%
Total	40	100%

The majority of the patients were conservative i.e. 20 (33.3%) cases followed by exploratory laparotomy with Ressection Anastomosis 19 (31.7%) and Exploratory laparotomy with stoma 12 (20%). Hernia repair was done in 5 (8.3%) cases while exploratory laparotomy with adhesiolysis and appendectomy accouns for 2 (3.3%) cases each.The mean hospital stay was 8.95 ± 4.29 in conservative and it was 13.58 ± 5.94 in surgical group

4. Discussion

The present prospective observational study was carried out in our institute. 60 patients above 18 years admitted to the surgical wards with a provisional diagnosis of intestinal obstruction were taken for this study.

Age incidence

Our study showed peak incidence in the age group of 18-28 years (21.7%) which is younger than the previous studies by *Tiwari SJ et al.* [3]which showed peak incidence in the age group 51-61 of 25%. also a study by Cole GJ et al [7]showed peak incidence in age group 31-40 years (18%)

In our study Mean age of patients in our series was 46.9 years. Which is comparable to those recorded by fareez et al[8] whose study showed mean age of 50 years

Sex Incidence

Among the study population male patients were 38 (63.3%) remaining 22 (36.7%) were female patients. Male to female ratio is 1.7:1 which is comparable with the study by Osuigwe AN et al, [9] in which male to female ratio was 2:1. This is variable with the study conducted by Adhikari S et al, [10] in which male to female radio was 4:1.

Clinical features

In our study the majority of the patients presented with pain abdomen ≥4days i.e. 65% of the study patients followed by Obstipation in 55% cases, and Vomiting was present in 38.3 cases.

Majority of patients in our study presented with Abdominal tenderness78.3% followed by Distension in 76.7% of the study population.

A similar study was conducted by *Adhikari S et al*, [10]which revealed that 72% patients presented with pain abdomen followed by vomiting in 91%, distension in 93% and constipation in 82% cases.

However, in our study Abdominal pain was present only in 65% cases as we considered pain of at least 4 days' duration in our scoring. Most common physical findings noted in our study was tenderness in 78.3% anddistension in 76.7%

cases. Abdominal lump was present in 8.3% cases out of 60. Lump was mainly seen in cases of, tuberculosis and hernias. DRE was done and found to be normal in 86.6% cases so nothing significant could be revealed. Bowel sounds were absent in 10 out of 60 patients in present study.

The finding of guarding on abdominal palpation cannot be ignored. Localized tenderness indicates impending or established ischemia. The development of peritonism or peritonitis indicates impending or overt infarction and/or perforation. In our study all 20 patients with guarding were operated which is comparable with study conducted by *Tiwari SJ et al.*[3]in which 16 out of 17 patients with guarding were operated.

It has been rightly said that any patient with surgical scar on abdomen and cramp abdominal pain must be considered to have mechanical small bowel obstruction unless proved otherwise.[11] In our study previous operative scar was present in 9 (15%) of 60 patients. out of these 9 patients 4 patients had post-operative adhesions as a cause of their small bowel obstruction, while 2 cases were of obstructed incisional hernia and 1 case each of paralytic ileus, mesenteric ischemia and intussusception. History of surgery for previous small bowel obstruction was present in 3 of 9 patients (33%), pelvic surgery for gynae /obstetrical reasons accounts for 3 out of 9 cases (33.3) while 2 cases had surgical history of open cholecystectomy and 1 was post-operative case of liver laceration. so out of 13 patients with adhesion obstruction 9 (69.2%) patients had no prior history of any abdominal surgery. This is variable from a three-year retrospective study conducted on 289 patients with small bowel obstruction by *Mucha Jr*. [12]who noted history of previous operation in 144 of 154 (93.50%) patients with adhesive small bowel obstruction. History of prior colon surgery (24%) and previous small bowel obstruction (17%) were most common in their experience.

With regards to history of previous operative surgery in our study of patients with adhesion obstruction, history of previous operation for small bowel obstruction and pelvic surgeries were most common. *Tanhipat et al*[13] in their review of 321 patients with adhesive small bowel obstruction found appendectomy, usually for ruptured appendicitis as most common surgery preceeding obstruction in their patients (34.2%).

Laboratory investigation

In our study Total leukocyte count and C-reactive protein were given emphasis. A TLC of more than 11, 000 per cumm and a CRP of 10 mg/l or more was considered significant. Patients with bowel ischaemia often have marked leucocytosis. In our study, out of 42 people with leukocytosis 35 (83.3%) underwent surgery while 7 (16.7%) were conservatively managed. This is comparable to a study by *Tiwari SJ et al.* [3]who concluded that out of 21 patients having leucocytosis, 15 (71.4%) underwent surgery.

Salem et al, [14]reviewed the diagnostic value of CRP in true surgical patients with acute abdominal pain in the emergency department. They concluded that CRP alone is not useful in differentiating between surgical causes of acute abdomen or other self-limiting condition. which is variable from our study as most of the patients with a positive CRP value were operated on i.e. Out of 53 people having positive CRP values, 40 (75.5%) underwent surgery and 13 (24.5%) were conservatively managed.

Radiology

X-ray

The erect Abdomen X-ray helps us in the diagnosis of intestinal obstruction as well as in differentiating the small bowel from large bowel obstruction. Multiple air fluid levels can be seen in small bowel obstruction whereas only gas shadows are seen in large bowel obstruction until the ileocecal valve is competent. In our study 54 out of 60 (90%) cases show multiple air fluid level on x-ray and 86.4% x-rays were suggestive of small bowel obstruction. This is comparable with a study conducted by *Taneja et al.*

Ultrasonography

In our study 24 patients on USG had free intraperitoneal fluid exceeding 500ml and 21 (87.5%) of them were operated. also 84.31% of cases showed small intestinal obstruction which is consistent with x-ray finding. .it was also observed in our study that to and fro peristalsis was absent in 48.3% cases out of which 58.1%cases were operated. In another study *M Ogata et al.*[15] reported that an akinetic, dilated loop of bowel observed on real-time USG has a high sensitivity (90%) and specificity (93%) for the recognition of strangulation; the positive predictive value was 73%. The presence of free peritoneal fluid was also sensitive for strangulation.

CT scan abdomen and pelvis

In our study a total of 51 patients got their CECT done out of which reduced bowel wall contrast enhancement was present in 12 patients, and all of them underwent surgery. Also level of obstruction in small intestine was 88.2% out of which 66.7% were operated. *Sheedy et al.*[16] in his study noted that with CT, sensitivity was 15% and specificity 94% for identifying bowel ischemia prospectively in patients with small bowel obstruction.

Etiology

The cause of intestinal obstruction differs in different geographical locations. In present study of 60 cases Majority of the cases were due to Bands / adhesions (21.7%) followed by Mesenteric ischemia (13.3%) and Stricture (non-TB) (11.6%), hernia (obstruction/strangulation) and peritonitis constitutes (8.3%) each, while Koch's abdomen was present in (6.7%) cases, (5%) cases were of intussusception, whereas malignancy and appendicular etiology were present in (3.3) each.

In another study *Khan JS et al.*[17]observed that the most common etiology of bowel obstruction was adhesion (49%), followed by internal hernia (34%), malignancy (17%), intussusception (6%), mesenteric ischemia (2%), and Koch's abdomen (1%).

Management based on severity scoring system

Every subject was given a score based on various parameters of the study. Whether the patient was conservatively managed or operated on was further analyzed by using the

scoring system. Maximum score was 5 and minimum 0. Score of 3 or more was significant. In our study 23 (38.33%) cases out of 60 had a score less than 3 while in 37 cases (61.66%) severity score was more than 3. In cases with < 3 severity score, 20 (87%) were managed conservatively and 3 (13%) underwent surgery. Also we can say that all the cases which were managed conservatively have score <3. Out of 37 people with ≥3 severity score, all 37 (100%) underwent surgery. This is comparable with a study by *Tiwari SJ et al.*[3]who concluded *24* patients (66.66%) having a score less than 3 were managed conservatively, while 23 patients (95.83 %) having a score of 3 or more where operated on. A similar study was conducted by university hospital, Geneva titled "prospective multicenter validation of a clinic radiological score for predicting the severity of strangulated small bowel occlusion". Six variables correlated with small bowel resection and were given one point each towards the clinical score. The risk of intestinal ischemia was 6 per cent in patients with a score of 1 or less, whereas 21 of 29 patients with a score of three or more underwent small bowel resection. A positive score of 3 or more had a sensitivity of 67.7 per cent and specificity 90.8 per cent. This allows early identification of strangulated SBO.

Surgical management

The surgical management for the present study group includes release of adhesions, resection and anastomosis for many cases of bowel strangulation where the viability of the bowel was doubtful and for ischemic bowel, malignancy, strictures, release of constricting agents like band, hernia repair and appendectomy.

In our study a total of 40 patients were operated out of which Resection and anastomosis was performed in 19 (31.7%)patients, in 12 (20%) patients stoma was made, hernia repair in 5 (8.3%), adhesiolysis was done in 2 (3.3%) cases while in remaining 2 (3.3%) appendectomy was done. This is at par with study by *Tiwari SJ etal.*[3]which revealed Resection anastomosis was performed in 16 patients, adhesiolysis in 5, stoma creation in 5 and band release in 4, out of the 60 patients.

Complications

Postoperative complications commonly occur in obstruction patients. Wound infection, burst abdomen, bowel fistula and death due to respiratory tract infection, septicemiaetc. are a few common complications encountered. In the present study of 60 cases, complications like death occurred in 6 (10%) patients, wound infection in 4 (6.7%), burst abdomen in 1 (1.75%) and bowel fistula in 1 (1.7%) In a study *Adhikari S et al.* [10] showed 7.35% mortality out of 367 cases. Another study by *Sufian Matsu Moto et al* [18]19% mortality out of 171 patients was noted.

5. Conclusion

Bowel obstruction continues to be one of the most common abdominal problems faced by general surgeons. Irrespective of the cause, it remains a major cause of morbidity and mortality. Success in the treatment of intestinal obstruction depends largely upon early diagnosis, skillful management and treating the pathological effects of the obstruction just as much as the cause itself. Early recognition and aggressive treatment are crucial in preventing irreversible ischemia and transmural necrosis and thereby in decreasing mortality and long-term morbidity.

The evaluation of patients with suspected bowel obstruction endeavors not only to confirm the diagnosis but also to determine the need for and timing of surgery. Certain severity indicators and scoring systems can help to optimize this timing of surgery and prevent mortality.

This study tries to use a severity scoring system to help identify the ideal time to intervene in a case of intestinal obstruction. Most of the severity indicators have been found to be useful. Despite multiple recent advances in diagnostic imaging and marked advances in our treatment armamentarium, intestinal obstruction will continue to occur.

Hence, our search for such severity markers is necessary to prevent delay in operative intervention and thus prevent mortality and improve outcome of patients.

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