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Mechanical Small Bowel Obstruction in AL-Samawa Teaching Hospital (Causes and Management)

Abbas Khudhair Hadi Al-Bawi
Al-Hussein Teaching Hospital, Samawah, Al-Muthanna, Iraq
(Specialist surgeon)

Annotation: Objective: To assess the line of management in the mechanical small bowel obstruction, this a prospective study conducted at AL-Samawa Teaching Hospital over a period of eighteen month (first Of July2018- 30* of December 2019) involving 80 cases of mechanical small bowel obstruction.

Aim of the study: The objective of this study is to evaluate the etiology of intestinal obstruction.

Patients and methods: An 80 patient admitted to the surgical ward were included. The patients were divided into the following groups according to our management: -

Group A managed by early surgery (36 patients).

- Group B managed by conservative treatment (44 patients).

Further division of group B into: -

- BI-successful conservative treatment in 28 patients.
- BII- in 16 patients, when delayed surgery was needed.

Results: The mean period for a successful conservative treatment was the initial 31.3 hours after admission. Period of hospitalization was shorter in the conservative group in comparison to the operative group.

The morbidity rate was obviously higher in the operative group especially when the operations involved opening of bowel lumen.

The mortality rate was increased with the age, patient's medical condition and the state of the bowel involved by the obstruction, level of obstruction time of presentation.

Introduction

Mechanical bowel obstruction is arrest or serious impairment of the passage of intestinal contents caused by a mechanical blockage.'

Small bowel obstruction remains a frequently encountered problem in abdominal surgery.(2.3.4.5)

The causes of mechanical bowel obstruction vary in different countries and various reports have indicated that the incidence for each cause have changed over the years.

Thus, although the most common cause of small bowel obstruction in the western countries is adhesive bands 78, external hernia is still the most common etiological factor responsible for small bowel obstruction in most of Africa and Middle East countries:(9.10.11.12)

In modern - day surgery, post - operative adhesions remained an important impact to patients, surgeons, and health system. 13

After laparotomy, almost 95% of patients are shown to have adhesions at subsequent surgery14

Adhesions are internal "scars" that form after trauma through complex processes, involving injured tissues and peritoneum. For most patient adhesion formation has little effects.

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Some patients however have clinical consequences and intestinal obstruction is the most severe consequences of adhesion. 13

Prompt recognition of the need for operative intervention when clinically indicated remains the cornerstone of the modern-day surgical management of acute intestinal obstruction 2-15.16.17.18.

Balanced against this surgical approach must be an appreciation of the significant morbidity and mortality associated with surgically managed small bowel obstruction and the simple fact that a large number of obstructions might very well resolve with non-operative management 19

- So an accurate and early recognition to the

presence of intestinal strangulated obstruction (ischemia) in patient with mechanical bowel obstruction is important to allow safe non-operative management of selected patients 16

World wars led to a better understanding of the pathophysiologic aspects of intestinal obstruction and in turn to the concept of the rapid correction of the patient's physiologic deficits before early surgical intervention. The result was a decrease in the mortality from intestinal obstruction from 50% to about 16%in most recently reported series 20.53

Today, although the pathophysiologic aspect of intestinal obstruction is better understood, the mortality and morbidity rates associated with strangulation obstruction are still high 21.22.23.25.51

Patients and methods

A prospective study conducted on 80 patient who were admitted at AL-HILLA teaching hospital over a period of eighteen month (first of July 2008-30** of December 2009).

The diagnosis of small bowel obstruction was achieved clinically assisted by the radiological evidences.

Special forms included information about history, physical finding, laboratory results, radiological findings and treatment modalities were used in the study (Fig.4)

Eighty patients were included in our study (43female 37 male) with age ranging from 6-87 years with a mean of 47.71 year.

The patients were divided into:

Group A Those subjected to emergency surgery after initial period of resuscitation (36 patients).

Group B Those received initial conservative treatment (44 patients). Group B further subdivided into:

Group B1: Successful conservative treatment (28 patients)

Group B2: Delayed surgery was done due to failure of conservative treatment (16 patients).

Finally the data were expressed by number of patients (%).

Results

Sex distribution of the cases enrolled in the study revealed a slight female predominance 43 patients (53.75%). (Table 1)

Sex	Male	37(46.25%)
	Female	43(53.75%)
Age(year)	Range	6-87y.
	Mean	47.71y.

According to the obstruction type, patients were divided into two major subdivisions: (1) simple obstruction; involved 62 patients (77.5%). (2) Strangulated obstruction; involved 18 patients (22.5).

Obstruction type	Simple 62(77.5%)
	Strangulated 18(22.5%)

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Table (III) obstruction type

Age distribution revealed that 52 patients aged between (31-60y.), were the most commonly involved age group by the obstruction, while patients below 10y. Were the least group involved by the obstruction. As shown in table 2.

Age(years)	No.	(%)	Male	Female
<10y	3	3.75	1	2
11-22y	5	6.25	3	2
21-30y	9	11.25	3	6
31-40y	13	16.25	7	6
41-50y	18	22.50	11	7
51-60y	21	26.25	8	13
61y+	11	13.75	4	7
Total	80	100	37	43

Table 2 age and sex distribution

The study revealed that adhesion was the most common cause of small bowel obstruction (43 patients, 53.75%), followed by hernias which involved 22 patients (27.5%), inflammatory bowel diseases (tuberculosis and crohn's disease) 6 patients (7.5%), tumors were encountered in 5 patients (6.25%), and finally intussusceptions 4 patients (5%).

The incidence of strangulation was obviously higher than with hernias (40.9%), in comparison to (14%) in patients with adhesive bowel obstruction group (Table 4).

Etiology of obstruction	**No. of cases**		**simple Obst.**		**strangulated** Obst.	
	No.	**(%)**	**No.**	**(%)**	**No.**	(%)
Adhesions	**43**	**53.75**	**37**	**86.00**	**6**	14
Hernias **Inguinal** **Para umbilical** **incisional**	**22** **11** **7** **4**	**27.5**	**13**	**59.1**	**9**	40.9
Inflammatory Disease	**6**	**7.5**	**6**	**9.67**	**0**	
Tumors **2ndary Metastasis** **Lymphoma**	**5** **4** **1**	**6.25**	**5**	**8.06**	**0**	
Intussusceptions	**4**	**5**	**1.61**	**1**	**3**	16.66
Total	**80**		**62**		**18**	

Table (IV) The etiology of small bowel obstruction.

In adhesive bowel obstruction category, we divided the patients according to the site of the initial abdominal operations into three major subdivisions:-

1-Mid and hind gut related surgery (small intestine, Abdominal wall, appendix, rectum and colon), involved 20 patients (46.5%).

2-Female reproductive tract related surgery, involved 12 patients (27.9%).

3-Foregut and other abdominal organs (stomach, gall bladder, pancreas, kidneys, urinary bladder, and hernias), involved 11 patients (25.6%). (Table. V)

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Site of initial open surgery	No.	(%)
Mid-gut and hind-gut operations	20	46.5
Female reproductive tract operation	12	27.9
Foregut or other abdominal operation	11	25.6

Table 5 Prior abdominal operations in adhesion obstruction.

The study revealed that 25 patients (58.1%) had only one hospital admission after the initial surgery due to adhesive bowel obstruction, 15 patients (34.8%) had two-five hospital admissions, and 3 patients (7.1%) had more than six admissions. (Table. VI)

Hospital admissions	No.	(%)
One hospital admissions	25	58.1
Two-five hospital admission	15	34.8
Six admissions +	3	7.1

Table 6 readmission rates due to adhesion obstruction.

Our study revealed that abdominal pain was the most common presenting symptoms. In simple obstruction ,colicky abdominal pain (88,7%) and bilious vomiting(70,69%) were more predominant symptoms, while constant abdominal pain (44,44%)and feculent vomiting (44,44%)were commonly encountered with strangulated obstruction.

Presenting symptoms	Simple obst. No. %		Strangulated obst. No. %	
Abdominal pain Colicky…. Constant….	 55 4	 88.7 6.4	 10 8	 55.6 44.4
Vomiting Bilious….. Feculent…..	 44 5	70.96 8.06	 6 8	 33.33 44.44
Distention	33	53.2	10	55.55
Constipation	48	77.41	15	83.33

Table VII:- Distribution of cases in respect to the presenting symptoms.

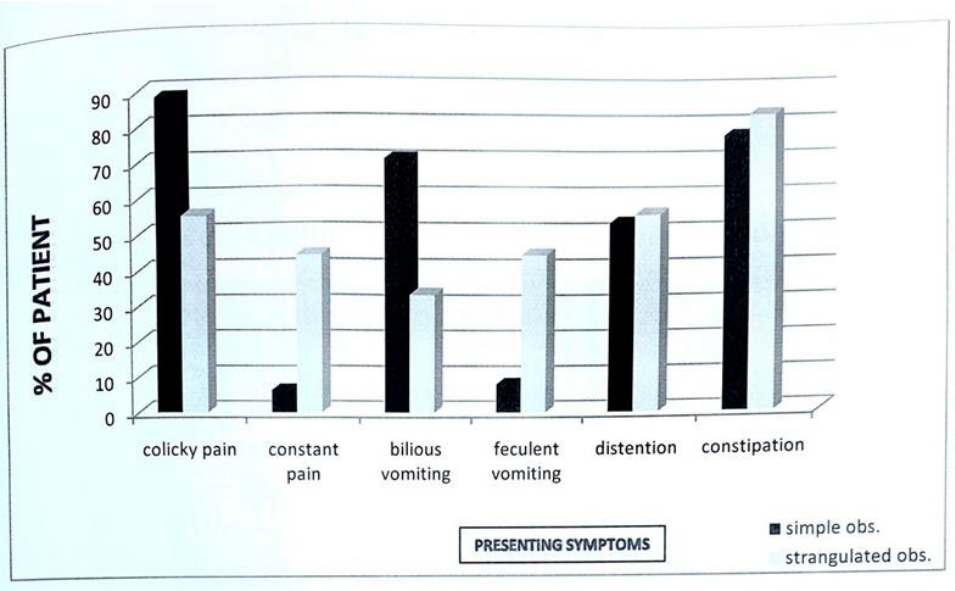

Fig.2 – Bar chart for the presenting symptoms

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analysis of the presenting physical signs revealed the presence of statistically significant correlation between strangulation obstruction and both of temperature > 38c, and rigidity. (Table VII and fig II) Tachycardia, absent bowel sound and peritoneal signs other than rigidity were commoner in strangulation obstruction.

Physical signs	Simple obst. No. %	Strangulated obst. No. %
Temp >38C.. Unknown	15 24.1 6	7 38.3 2
Tachycardia >110	13 20.9 3	4 22.22 1
Peritoneal signs Tenderness localized Generalized Rigidity	 37 59.6 0 1 1.6	 12 66.66 3 4.8 6 33.33
Bowel sound normal… Hyperactive Absent….	24 39 28 45.2 10 29	3 16.6 2 11.1 13 72.2

Table VII:- Distribution of cases according to physical signs.

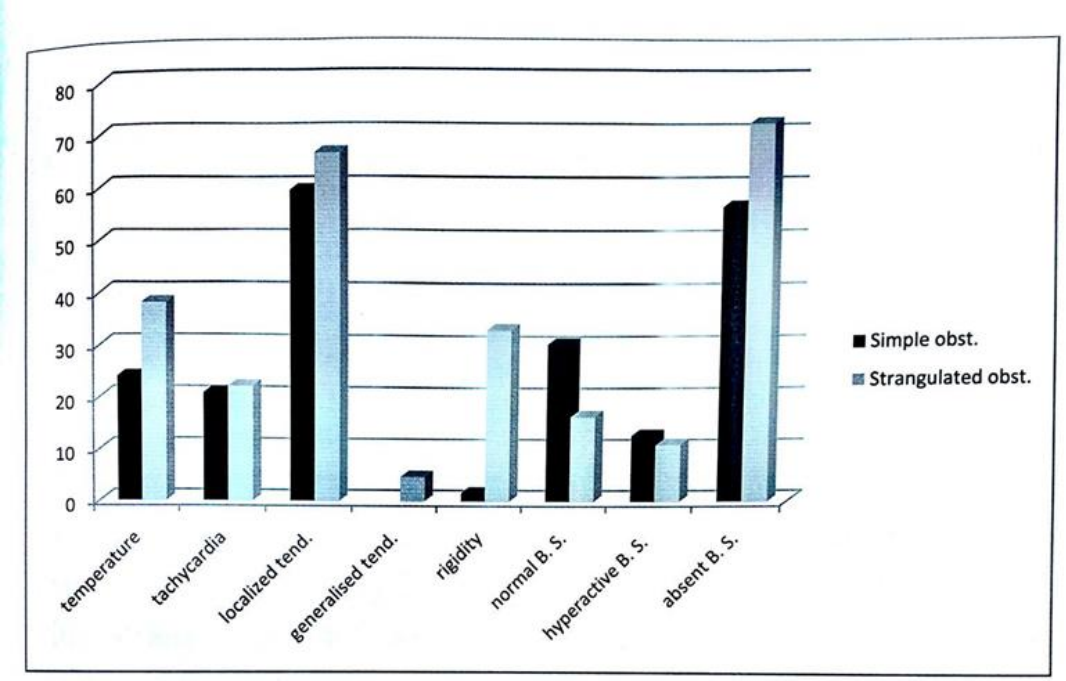

Fig 3:- Bar chart for the presenting physical signs .

Four patients (26.66%) with strangulated bowel obstruction had WBC count more than 18000/mm3, in comparison to 2 patients (4.25%) with simple bowel obstruction. (Table IX)

WBC count	Simple obst.		Strangulated obst.	
	No	%	No	%
<10000/mm3	13	27.65	3	20
10000-18000/mm3	32	68.08	8	53.33
>18000/mm3	1	1.61	4	26.66
Total	46		15	

Table IX :- intestinal obstruction and WBC count

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Forty - nine (49) patients (79.03%) with simple intestinal obstruction had positive X-Ray findings; while15 patients (83.3%) with Strangulated obstruction group had positive X-Ray findings. Normal radiological finding were due to either early finding or a high obstruction level (Table X)

X-ray finding	Simple obst.		Strangulated obst.	
	No	%	No	%
Multiple dilated bowel loops with air and fluid levels	49	79.03	15	83.3
Normal finding	13	3	3	16.6

Table X;-X-ray finding

The mean period for successful conservative treatment was 31.3 hours. Mean while 22 patients (78.56%) were successfully treated with in the first 48 hours. (Table XI)

Time	Successful conservation Treatment	
	No	%
Within 24 hours	9	32.14
Within 48 hours	13	46.42
Within 72 hours	5	17.85
Within 96 hours	1	3.57

Table XI:-Response of intestinal obstruction to conservative treatment.

When surgery was required for adhesive bowel obstruction, Adhesiolysis was the most common operation carried out in 8 patients (50%, followed by resection with direct anastomosis operation in 6 patients (37.5%). (Table XII)

	No of patients	%
(enterolysis) adhesiolysis	8	50
Bowel reaction with direct anastomosis when compromised bowel encountered	6	37.5
Formation of coetanaeous stoma proximal of the obstruction	1	6.25
Short circuiting anastomosis around an obstruction	1	6.25

Table XII; - operation carried for adhesive bowel obstruction.

The morbidity rate encountered during the study was higher in the operative group, and wound related complications were more common (8 patients), in comparison to complication. (Table XIII)

	Operative group	Conservative Group
Gastrointestinal related complications Recurrent SBO…… Intra-abdominal abscess Enterocutaneous fistulae	 1 2	2
Cardiac related complications	1	
Respiratory system related complications	3	1
Wound related complications Infection…… Dehiscence……	 6 2	
Total	17	4

Table XIII: - Complication encountered during the study.

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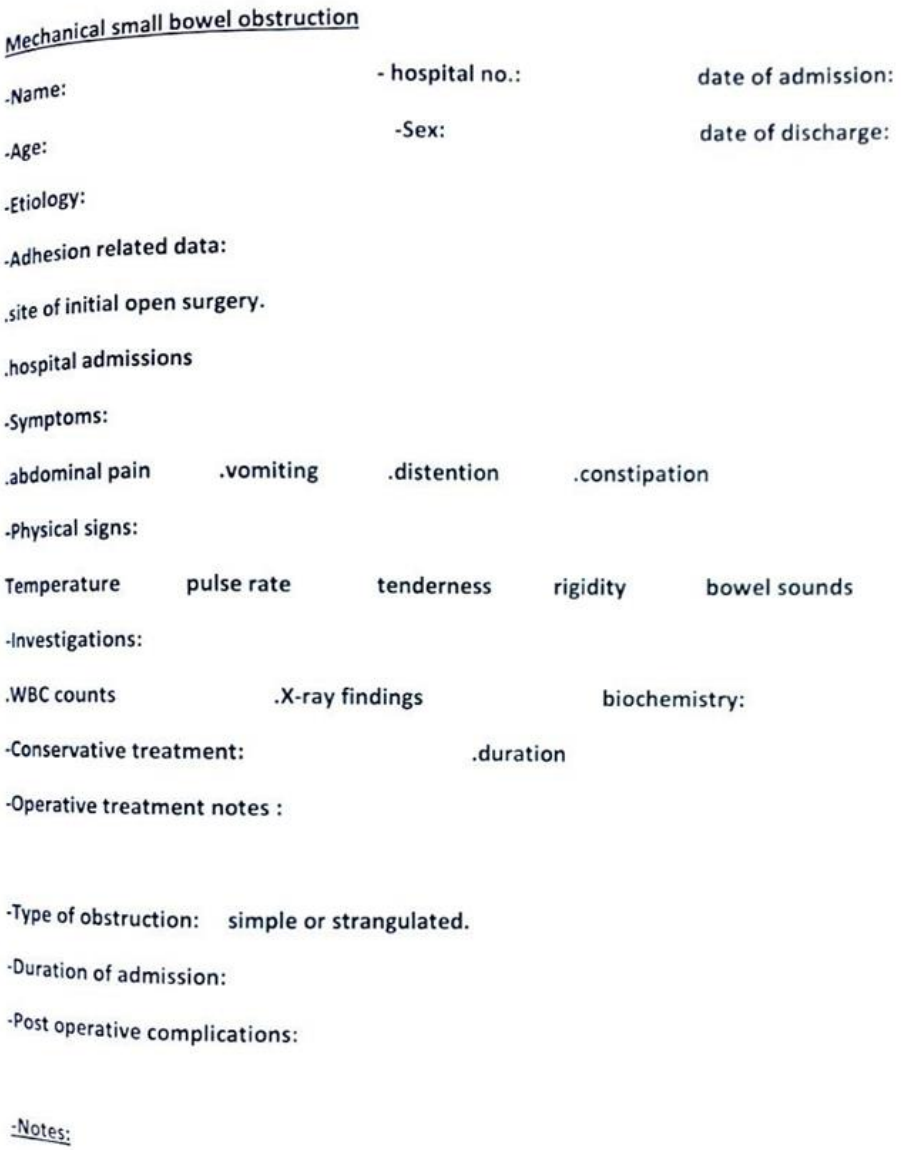
Mean hospital stay for the operative group was 8.1 days; while in the conservative group was 5days.

The mortality rate in this series was 3.75% (3 patients);

- The first was a male with 51 years with strangulated obstruction due to adhesions, and septicemia was the cause of death.
- The second case was a female 63 years old with simple obstruction due to metastatic adenocarcinoma of stomach.
- The third case was a female 66 years old with strangulated obstruction due to obstructed incisional hernia, and the myocardial infarction was the cause of death



Mechanical small bowel obstruction

.Name: - hospital no.: date of admission:

.Age: -Sex: date of discharge:

-Etiology:

-Adhesion related data:

.site of initial open surgery.

.hospital admissions

-Symptoms:

.abdominal pain .vomiting .distention .constipation

-Physical signs:

Temperature pulse rate tenderness rigidity bowel sounds

-Investigations:

.WBC counts .X-ray findings biochemistry:

-Conservative treatment: .duration

-Operative treatment notes :

-Type of obstruction: simple or strangulated.

-Duration of admission:

-Post operative complications:

-Notes:

FIG.4 the form used in the study

Discussion

Intestinal obstruction with its attendant condition remains a major problem of surgery 23

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The complexities of the modern day surgery management of small bowel obstruction continue to focus on avoiding operative delay, and in turn, the always dreaded full consequences of strangulation?

In this study bowel obstruction was most prevalent in adult between 30-60 year of age (65%) and less common over 60 years of age (13.75%) and this is similar to Mucha and Mohamed et al results.

One of the unappreciated difficulties in attempting to analyze our etiological factors was the presence of more than one etiological factors at the time of operation in some cases and for the purpose of categorization, the dominant etiology responsible for each particular episode of obstruction was chosen, (done by Mucha).

Postoperative adhesions have long been the most common cause of obstruction in western countries. This has also been the case in our study, while obstructed external hernia is still the main cause of obstruction in other parts of Middle East, revealed by McEntee et al 26 and Bevan 27

- The observed increased incidence of obstruction due to adhesion is probably due to the improved provision of health care resulting in an increase in number of abdominal operations and an increase in early treatment of hernia

In our series adhesion was the main etiological factor (53.75%, followed by hernia (27.5%), inflammatory obstruction (7.5%), and tumors (6.25%). These approximate the results of Mohamed et al .

The rates of readmission after initial mid gut and hind gut surgery were substantially higher than the rates after gynecological and other abdominal surgeries. This finding provides an indication of relative risk of directly related adhesion disorders after initial surgery site and this information may be useful in the planning of adhesion prevention strategies .This approximate Ellis et al results

In this study, it is important to stress on early surgical intervention in case presented with obstructed hernia, since strangulation encountered in this group was really high and similar to Mucha results.

The statistical analysis in this study for a reliable conventional clinical indicator that may assist in the early identification of strangulation obstruction showed a significant statistical correlation between strangulation obstruction and the presence of preoperative constant abdominal pain, feculent vomiting, temperature >38 C, rigidity or W.B.C count >1800/mm3. Our results really approximate Bizer and Leffal et al 28

In contrast, other studies failed to establish strangulation obstruction based on preoperative clinical findings and recommended early operation for all patients with small bowel obstruction 16.24.25.2.30

As in all categories of small bowel obstruction, we found that blood biochemical studies proved to be absolutely of no value in determining the presence or absence of obstruction, also in clarifying the need for operative intervention 16.21.31.32

Plain abdominal films (erect, supine) represent the appropriate initial investigations for all patients suspected with small bowel obstruction and in majority of cases it is the only investigation adequate for diagnosis. this study showed that plain abdominal films were capable of diagnosing intestinal obstruction in about 80% of cases ,compared to 60-70% reported by Nolan et al and Nelson et al .

However, contraindication to barium use in perforation accompanied by inadequate evidence that partial obstruction may be converted to complete obstruction and a serious complication arise due to intraperitoneal leakage of barium from intestine lumen really limits it is use in our study ,as in other studies 33.36.37.38

From other studies barium may be useful in selective cases when the diagnosis is in doubt, unclear etiology of obstruction and when a choice between continuous conservative treatment and surgery need to be made 33.35.36.39

Ultrasound examination has been described in the diagnosis of small bowel obstruction 40.41.42

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CT examination which showed that it can accurately diagnose small bowel obstruction, cause ,location and the presence or absence of strangulation 3.44.45.46 in this study we did not resort to these investigations because of lack of facilities and it don't offer information more

In our series 36 patients received early surgical intervention while the remaining 44 patients were managed conservatively with nasogastric tube decompression intravenous fluids, vital signs charts and electrolytes replacement.

Successful conservative treatment was achieved in (63.63%), corresponding to 73% reported by Seror et.

The success rate of conservative treatment during the first 48 hours was 78%.

The present study does not recommend emergency operative intervention in all patients with small bowel obstruction and non operative treatment in selected patients is sometimes a good choice otherwise patients should undergo operation if conservative treatment does not result

In improvement within the first 48 hours. In that we agree with Sarr et al loand Bizer et al results17.

Other reports suggested that the period of conservative treatment for obstruction should not exceed 24 hours in that sense we agree with Sarr et al results.

Other reports suggested that the period of conservative treatment for obstruction should not exceed 24 hours unless there is clear clinical and radiological evidence that the resolving while others advice 48 - 72 hours. 15.17.35

Adhesiolysis was the most commonly used procedures in the series although due to unhealthy segment resection was inevitable.

A number of authors consider some form of placation operations to patients subjected to repeated episodes of small bowel obstruction,of them are Noble placation ,Charles - Phillips procedures and Bakers tube to act as an internal splint holding the bowel in gentle curves and preventing kinking while adhesions forms 49.50

In this study we did not use any of theis procedures.

Complication rate was higher in the operative group as compared to conservative group wound infections involved 6 patients, which was the most common complications encountered during the study. On the other hand more than one complication was encountered in the same patient in

Conclusion

Adhesion was the cause of small intestinal obstruction in 53.75%, and hernia in 27.5% of patient.

The incidence of strangulation obstruction was higher in obstructed hernia as compared to adhesive obstruction.

Mid and hindgut related operations were the most common site of initial open surgery that could cause a subsequent adhesive bowel obstruction.

Clinical criteria that can be of help in predicting strangulation obstruction were constant abdominal pain, feculent vomiting, temperature > 38c, rigidity, or WBC count >18000 cell/mm3

Successful results by conservative treatment can be achieved.

Morbidity rates, mortality rates, and hospital stay were higher in the operative group in comparison to conservative group.

References

1. David L: Acute abdomen and surgical gasroenterology. Merck maneual.2005; 25:1-4
2. Mucha PJ; Small intestinal obstruction.Surg.Clin.North Am.2001; 67:597-620.
3. Ellis H; Mecanical intestinal obstruction. British Med .J.1998, 283:1203-1204.

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4. Chakrabarty PB,et al. Acute intestinal obstruction...Indian M.A. 1997;67;64-68.
5. Charles VM; intestinal obstruction. In baily and love's short practice of surgery 25nd ed.: chapman and hall. 2008, 51:810.
6. Mohamed A.Y,Al-Gaithi A, Langevin J.M, Nassar A.H.M. causes and management of intestinal obstruction in a Saudi Arabian hospital.J.R. Coll. Edinb. 2003,42;21-23.
7. Cole WH, Robert S. intestinal obstruction in adults. Am.Surg. 1982; 28; 133.
8. Colette L, Edmonds R, Togut AJ. Mechanical bowel obstruction .AM.J. Surg. 1962; 104:370.
9. Adesola AO. Intestinal obstruction in Africa. West Afr... Med. J •1999; 17:185.
10. Cole GC. Review of 436 cases of intestinal obstruction in Ibadan Gut. 2004; 5:151.
11. Omo-Dare P. Observation on strangulated hernia in Nigeria. Nigeria Med. Assoc. 2002;3: 289.
12. Johnson RH. Bowel obstruction in Botswana hospital .East Afr. Med .J.1987;52:319.
13. Ellis H. Moran J B, Thompson NJ, Parker M, Parker M, Wilson M, Menzies D. Adhesion-related hospital readmissions after abdominal and pelvic surgery: a retrospective chorot study. LANCET, 1999;353: 1476-
14. Menzies D, Ellis H Intestinal obstruction from adhesion: how big is the problem !Ann.R. C oll. Surg. Engl.1990;72:60-63.
15. Tanphiphat C, chittmittrapaps;adhesive small bowl obstruction ,a review of 321 cases in a Thai hospital. Am Surg. 1987,154:283-7.
16. Sarr MO et al. preoperative recognition of strangulation obstruction.Am.Surg. 1983,145:176-82.
17. Bizar LS et al.Small bowl obstruction.surgery 1981.89:407 113.
18. Hofstetter SR; Acute adhesive obstruction of the small intestinal Surgery Gyu.and Obst.1981,152:141-143
19. Richards' W, Williams L.F; Obstruction of the large and small intestine. Surgical clinics of north America. 1988,68:355-376.
20. Zollinger RM, Kinsey DL: Diagnosis and management of intestinal obstruction. Am . Surg. 1968;30:1-5.
21. Cohn 11, Bronside GH: Imbalance of the normal microbial flora Influence of strangulation obstruction upon the bacterial ecology of the small intestine Am.J. Dis. 1976;10:873-882.
22. Davidson AT: Early operation in the treatment of the small bowel obstruction.J. Natl. Med. Association. 1986; 73:245-264.
23. Nolan DG, Marks CG: The Barium infusion in small intestinal obstruction .Clin. Radiology 1988;73:651-653.
24. Nelson S W, Christoforidis AJ: The use of barium sulphate suspensions in mechanical obstruction of the intestinal obstruction of the small intestine .A.j.R. 1975:101:367-378.
25. Erricksen AS, et al. Use of gastrointestinal contrast studies • in obstruction of the small bowel and large bowel. Dis. Col. And Rect. 1990;33:56-64.
26. Goldbery HI, Dodds J: Roentgen evaluation of small bowel obstruction. Dig. Dis. And Scien .1989; 783-788.
27. Peterson LA et al. Enteroclysis in partial small bowel obstruction. Am. J. Surg. 1984;147:325-329.
28. HANSY et a l. and when to use barium for diasis for small bowel obstruction. Southern med. J. 1989;72:1519-23.

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29. Matce JR, Codon RE. Prospective evaluation of abdominal sonography for the diagnosis of bowel Obstruction. Ann. Surg. 1998; 223:237-41.

30. Blard KI. Abdominal sonography for the diagnosis of bowel obstruction. Ann. Surg. 1998; 223:235-236

31. Czechowski J. conventional radiology and sonography in the diagnosis of the small bowel obstruction and strangulation. Acta-Radiol. 2006; 37:186-9.

32. Mellins HZ, Rigler LG : The roentgen findings in strangulating obstruction of the small intestine . Am. J. Roentgenol. 1954; 71:404-414.

33. Nelson SW, Eggleston W: Findings on plain roentgenograms of the abdomen associated with mesenteric vascular occlusions with possible new signs of mesenteric venous thrombosis. Am. J. Roentgenol. 1968; 83:886-894.

34. Frimann-Dahl j:Roentgen examinations in acute abdominal disease 3d ed. Springfield, Ill, Thomas, 1987.

35. Dixon JA, Harman CG, Nichols RL, Englert E:Intestinal motility following luminal and vascular occlusion of the small intestine. Gastroenterology. 1979:58:673-678.

36. Serer D, et al. How conservatively can postoperative small bowel obstruction Am.J. Surg. 1999; 65:1126.

37. Nassar AHM. The delay of operation related to the mortality in acute intestinal obstruction. Presented at the Annual Clinical and Scientific Meeting, Royal College of Surgeons, Edinburgh, and May 1995.

38. Charles VM. Intestinal obstruction. In Bailey and Love's Short Practice of surgery 25th ed.: Chapman and hall .2008 ; 1198-1199.

39. Bartolo DCC, Johnstone JMS, Macleod IB, Rintoul R.F.

40. Operations on the intestine. In; Farquharson s Textbook of Operative Surgery 8th Ed. New York: Churchill Livingstone; 22:467.

41. Maglinte DD, Heitkamp DE, Howard TJ, Kelvin FM, Lappas JC. Current concepts in imaging of small bowel obstruction. Radiol Clin North Am. 2003;41:263-83, vi.

42. Daneshmand S, Hedley CG, Stain SC. The utility and reliability of computed. tomography scan in the diagnosis of small bowel obstruction.

43. Am Surg %1999 Obuz F, Terzi C, Sokmen S, Yilmaz E, Yildiz D, Fuzun M. The efficacy of helical CT in the diagnosis of small bowel obstruction. Eur J Radiol %2003 Dec; 48(3):299 - 304.0ct

44. Assalia A, Schein M, Kopelman D, Hirshberg A, Hashmonai M. Therapeutic effectof oral Gastrografin in adhesive, partial small-bowel obstruction: a prospective randomized trial. Surgery %1994 Apr; 115 (4):433 -7.

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