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original article

Adhesions small bowel obstruction in emergency setting: conservative or operative treatment?

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SUMMARY: **Adhesions small bowel obstruction in emergency setting: conservative or operative treatment?**

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Adhesions small bowel obstructions (aSBO) are among the leading causes of emergency operative intervention. About the 80% of aSBO cases resolve without a surgical treatment. It's important to identify which patients could undergo a conservative treatment to prevent an useless surgery

The aim of this study is to determine findings that can indicate whether patients with aSBO should undergo a conservative or a surgical treatment.

313 patients with diagnosis of submission of aSBO were restudied. Patients were divided into two groups based on the different type of treatment received, 225 patients who underwent surgical treatment within 24 hours after admission, 88 patients which underwent conservative treatment successfully. For each patient, clinical, hematochemical and radiological findings have been analysed.

The treatment of aSBO should be, at the beginning, conservative except that cases that presents clinical and/or CT-scan findings predictive for a surgical treatment (free peritoneal fluid, mesenteric edema, transitional point) or a peritonitis (pneumatosis intestinalis, pneumoperitoneum).

KEY WORDS: aSBO - Adhesions lysis.

Introduction

Small bowel obstruction is a severe situation that mandates rapid diagnosis and treatment (1-3).

In the United States, intestinal obstruction represents about 15% of all emergency admissions for abdominal pain, with more than 300,000 admissions each year (4).

It is an important cause of morbidity and mortality and it is responsible for nearly 30,000 deaths (5).

In the first semester of 2015, the Italian Department of Health reported that 22,716 patients were discharged with a diagnosis of "intestinal obstruction without mention of hernia" after a total of 194.474 days of hospitalization, for an average of 8,6 days of hospitalization per patient (6).

About 50% to 80% of the small-bowel obstructions are the result of peritoneal adhesions (7).

Approximately 85% of adhesive SBOs are caused by postoperative adhesions, 10 % are caused by peritonitis, and 5% have unknown or congenital etiology (8).

According to data gathered in 2014 by the Italian Department of Health, 10,819 lysis of peritoneal adhesions were performed without complications while 4,682 lysis of peritoneal adhesions led to complications and to a total of 67.762 and 50.970 days of hospitalization, respectively (9).

Despite the prominence of the problem, the management of postoperative adhesions has been, and continues to be, a clinical challenge.

The aim of this study is to determine the clinical, hematochemical and radiological parameters that can indicate whether patients with aSBO should be surgically treated within 24 hours after admission or if a conservative therapy is more appropriate.

Patients and methods

Institutional review board approval was obtained for these studies.

In the Emergency Department of Policlinico Umber-

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to I in Rome, from 2005 to 2014, 313 patients with diagnosis of submission of aSBO were restudied. The diagnosis of aSBO was based on clinical symptoms and signs (abdominal pain, nausea, vomiting, abdominal distension, and/or absence of bowel movement and flatus) and X-ray and CT findings. All patients had undergone previous abdominal surgery on at least one occasion and all of them had been CT scanned once admitted.

For each patient, the following parameters, on the basis of clinical experience and scientific literature (10-13), have been analyzed:

- ***Clinical parameters***
  - Vomit
  - Stoppage of flatus and/or defecation
- ***Hematochemical parameters***
  - WBC
  - CRP
  - LDH
  - Lactate
  - Sodium
  - Potassium
- ***CT findings (only IV contrast was administered)***
  - Air-fluid level
  - Dilatation of small bowel
  - Small bowel-wall thickening
  - Increase/decrease/lack of bowel-wall enhancement
  - Transitional point
  - Small bowel faeces sign
  - Pneumatosis intestinalis
  - Mesenteric edema
  - Mesenteric vessels swelling/twisting
  - Mesenteric arteries thrombosis
  - Bowel wall perforation with pneumoperitoneum
  - Free peritoneal fluid
  - Small bowel faeces sign.

Patients were divided into two groups based on the different type of treatment received.

The first group included 225 patients who underwent surgical treatment within 24 hours after admission, while the second group consisted of 88 patients which underwent conservative treatment successfully.

The operative group was also divided into two more subgroups based on the presence of bowel ischemia and the need of bowel resection.

"Statistical Package for the Social Sciences", version 20 for Macintosh (SPSS, Chicago, Illinois, USA) was used for statistical analysis. Descriptive statistical methods were used to compare the qualitative variables in addition to the ANOVA . The chi-square test and the Fisher exact test were used to obtain qualitative data.

Differences were considered statistically significant when P<0,05. Furthermore, sensitivity, specificity and positive predictive value were used for the comparison of the qualitative data.

Results

The study group consisted of 57,5% of women and 42,5% of men. The mean age was 64 years, (64 years for female; 64,5 for male). In the operative group, the clinical sign "stoppage of flatus and/or defecation" was present in 87 patients (38,7%), in the conservative group it was present in 35 subjects (39,7%). Using the F-test to compare the data, there was no statistical significance for this sign. 150 patients of the operative group (66,7%) and 50 patients of the conservative group (56,8%) presented vomit, with a p-value near the statistical significance (0,068). The hematochemical values taken into consideration (WC, CRP, LDH, Lactate, Sodium and Potassium) have been analysed.

There aren't significant differences between the two groups. WC and Lactate values are a little higher within the members of the operative group, while CPR is higher in the conservative group. Sodium and Potassium have similar values in the two groups.

The first radiological exam, abdominal x-ray, was performed for each patient. Air-fluid level was present in 88,7% of the total study group.

Every patient received an abdomen CT scan. The CT finding of air-fluid levels is visible in 95,1% of the operative group and in the 85,2% of the conservative group with a p-value<0,05, but a specificity of 5,1%.

The same sign, after having statistically compared the ischemic and non- ischemic group, showed no difference.

Free peritoneal fluid at CT-scan is detected in 76,4% of patients who underwent a surgical treatment and in 39,8% of patients treated conservatively with a p-value <0,001 and a sensitivity and specificity of 56,4% and 76,4%, respectively. This radiological finding is not relevant when the ischemic and non-ischemic groups are compared.

Transitional point is present in 71,1% of patients of the operative group, in 37,5% of the non-operative group having a p-value <0,001, sensitivity of 70,7%, specificity of 57,7% and 82% of positive predictive value. Between the ischemic and non-ischemic group there are not significant differences.

The radiological finding of wall bowel thickening had no statistical relevance once the operative and non-operative groups were compared, while the comparison between the ischemic and non-ischemic group showed a p-value of 0,039, sensitivity of 44,19%, specificity of 70,49% and a positive predictive value of 26,03%.

The comparison of mesenteric edema between the operative and non-operative groups has a p-value <0,001 and sensitivity, specificity and positive predictive value of 21,3%, 92,3% and 88%, respectively. The same finding compared amongst the patients of ischemic and non-ischemic group has not relevance.

At CT-scan, the small bowel feces sign doesn't have statistical significance in the two comparisons.

Dilatation of small bowel, compared amongst the patients of the operative and non-operative group, has a p-value <0,001, but a specificity of 9%, the same sign in comparison among ischemic and non-ischemic has not statistical relevance.

Pneumatosis intestinalis was present in only two cases, both treated surgically.

Increase/decrease/lack of bowel-wall enhancement compared between the operative (20,9%) and non-operative (19,3%) groups has a p-value of 0,444, specificity 79,5% and sensitivity 20,9%.

Mesenteric vessels swelling/twisting isn't statistically significant, having a p-value a little bit higher of the statistical significance (0,057).

Mesenteric arteries thrombosis has not relevance in the statistical analysis (Tables 1-3) (Figures 1-3).

TABLE 1 - ANALYSIS OF CLINICAL AND CT FINDINGS BETWEEN OPERATIVE AND NON-OPERATIVE GROUP.

	OPERATIVE GROUP	NON-OPERATIVE GROUP	*P-VALUE*	*SENSITIVITY*	*SPECIFICITY*
Vomit	150(66)	50(56)	0,068	66,6%	43,2%
Stoppage of flatus and/or defecation	87(38)	35(39)	0,478	38,6%	60,2%
Air-fluid level	214(95)	75(85)	0,005	95,1%	5,1%
Dilatation of small bowel	214(95)	72(81)	<0,001	95,1%	9,0%
Small bowel wall thickening	73(32)	25(28)	0,291	32,4%	69,2%
Increase/decrease/lack of bowel enanchement	47(20)	17(19)	0,444	20,9%	79,5%
Transitional point	160(71)	33(37)	<0,001	70,7%	57,7%
Small bowel faces sign	27(12)	8(9)	0,303	12,0%	89,7%
Pneumatosis intestinalis	2(0)	0	0,516	0,89%	100,0%
Mesenteric edema	48(21)	6(6)	0,001	21,3%	92,3%
Mesenteric vessels swelling/twisting	47(20)	11(12)	0,057	20,0%	85,9%
Mesenteric arteries thrombosis	2(0)	0	0,516	0,89%	100,0%
Bowel wall perforation with pneumoperitoneum	1(0)	0	0,719	0,44%	100,0%
Free peritoneal fluid	172(76)	35(39)	<0,001	76,4%	56,4%

TABLE 2 - ANALYSIS OF CLINICAL AND CT FINDINGS BETWEEN ISCHEMIC AND NON-ISCHEMIC GROUP.

	ISCHEMIC GROUP	NON- ISCHEMIC GROUP	*P-VALUE*	*SENSITIVITY*	*SPECIFICITY*
Vomit	26(61)	124(67)	0,290	17,3%	78,6%
Stoppage of flatus and/or defecation	18(42)	69(37)	0,327	20,6%	85,2%
Air-fluid level	40(95)	174(95)	0,663	93,0%	4,9%
Dilatation of small bowel	41(97)	173(94)	0,357	95,3%	5,5%
Small bowel wall thickening	19(45)	54(29)	0,039	44,2%	70,5%
Increase/decrease/lack of bowel enanchement	13(30)	34(18)	0,062	30,2%	81,4%
Transitional point	29(69)	131(71)	0,439	67,4%	28,4%
Small bowel faces sign	7(16)	20(10)	0,216	16,3%	89,1%
Pneumatosis intestinalis	0	2(0)	0,661	0%	98,9%%
Mesenteric edema	14(33)	34(18)	0,032	32,6%	80,9%
Mesenteric vessels swelling/twisting	11(26)	36(19)	0,230	25,6%	80,9%
Mesenteric arteries thrombosis	0	2(0)	0,661	0%	98,9%
Bowel wall perforation with pneumoperitoneum	1(0)	0	0,187	2,3%	100,0%
Free peritoneal fluid	36(85)	136(74)	0,082	83,7%	25,7%

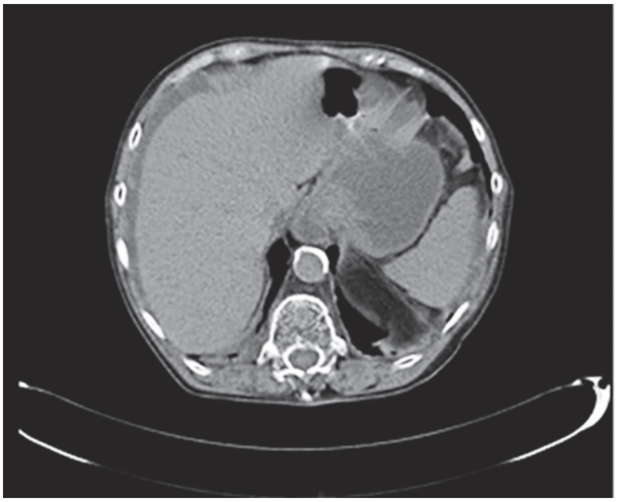

Figure 1 - CT-scan: free peritoneal fluid.

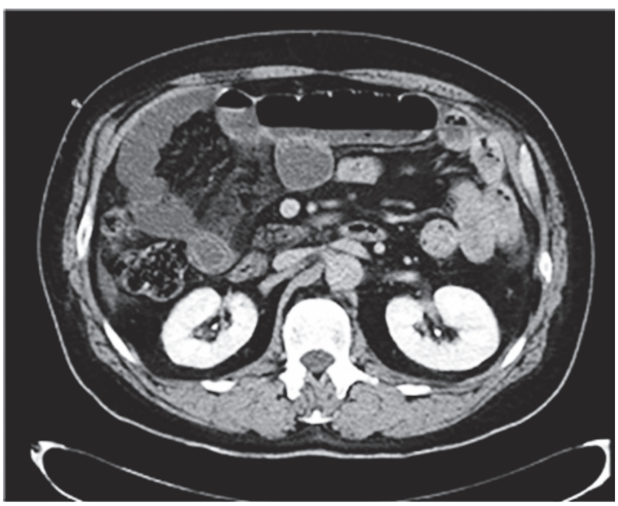

Figure 2 - CT-scan: mesenteric edema.

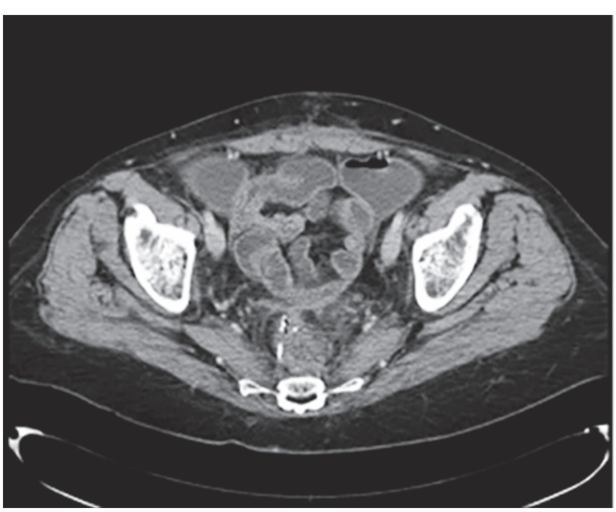

Figure 3 - Transitional point.

TABLE 3 - ANALYSIS OF HEMATOCHEMICAL VALUES BETWEEN OPERATIVE AND NON-OPERATIVE GROUP.

	OPERATIVE GROUP	NON-OPERATIVE GROUP	P-VALUE
WBC	11,5 ± 4,6	12,0 ± 4,8	0,429
CPR	4,1 ± 7,7	2,7 ± 5,3	0,180
LDH	219 ± 75	212 ± 65	0,396
Lactate	0,9 ± 0,1	1,4 ± 1,1	0,416
Sodium	137 ± 4	137 ± 4	0,232
Potassium	4,1 ± 0,5	4,0 ± 0,8	0,292

Discussions

Based on scientific data, an emergency surgical treatment for aSBO is only necessary for those patients which reported an organic lesion that caused a stenosis that doesn't allow any further procrastination (14).

The extension of this problem can be estimated by looking at Italian Health Department data on procedures performed in 2014 which show that 10.819 peritoneal adhesions lysis have been performed without any complications and 4.682 peritoneal adhesions lysis were followed by complications. The presence of peritoneal adhesions after a previous surgery has been often reported in the description of laparotomic or laparoscopic intervention performed for a different disease from aSBO (15, 16).

The ultimate goal for the surgeon is to promptly understand whether or not the patient should undergo a new operation. Nowadays we tend to believe that the initial approach should be conservative unless specific clinical signs and/or radiological findings are present. According to our statistics, the occurrence of vomiting and/or stoppage of flatus and/or defecation is not predictive of the type of treatment needed, unlike Zielinski et al. Changes in hematochemical values can only give indications about the severity or the length of aSBO but they still cannot be used to designate the candidates for a surgical treatment. When an aSBO is suspected, patients should get an abdominal X-ray and CT-scan. A significant difference of air-fluid levels detected by abdomen X-ray tests hasn't been proved after a comparison between the operative and non-operative group members. CT-scan findings that, after a comparison between the two groups, reveal the need of an emergency operation are the bowel wall thickening, the free peritoneal fluid, mesenteric edema and the presence of a transitional point. When instead these conditions don't occur, treatment should be conservative, at least initially. The medical treatment consists in fasting, IV hydration and application of naso-gastric (NG) tube ("drip and suck"). A shorter hospitalization, lower costs and the absence of intra and post-surgery complications (e.g. iatrogenic lesions, thrombosis, infections) are some of the advantages of the conservative treatment. Disadvantages include: shorter periods of time free from adhesions and higher morbidity and mortality in case of a late intervention. In order to avoid this last problem, the conservative treatment shouldn't be excessively long and the patient should undergo a surgery when the clinical conditions worsen, when inflammation indexes become higher, when air-fluid levels persist, when there is an obstacle to the passage of gastrographyn through the digestive tract, when the CT-scan findings considered indicative in this study are found with a later CT-scan.

Conclusions

The treatment of aSBO should be, at the beginning, conservative except for those cases that presents clinical and/or CT-scan findings (free peritoneal fluid, mesenteric edema, transitional point) that are predictive of surgical treatment or peritonitis (pneumatosis intestinalis, pneumoperitoneum). This cases need an urgent laparoscopic or laparotomic exploration and a bowel resection in case of ischemia.

The conservative treatment consists in fasting, IV hydration, parenteral nutrition, antibiotics, antithrombotics and insertion of NG tube.

During the conservative treatment it is important to assess the patient and CT images to see a possible worsening of the condition and, therefore, to let the patient promptly undergo sugery in order to avoid complications and to not increase the final prognosis.

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