

# Olive Oil and the Treatment of Adhesive Small Bowel Obstruction

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## Abstract

**Background:** Post-operative adhesions are the most common cause of small bowel obstruction. The management of small bowel obstruction is surgical and non-surgical. Some studies are conducted to show the efficacy of non-surgical management of adhesive small bowel obstruction such as sesame oil, water - soluble contrasts such as gastrographin.

**Objectives:** The current study aimed to evaluate the effect of oral olive oil on the management of adhesive small bowel obstruction.

**Methods:** All the patients admitted with adhesive bowel obstruction in the hospital affiliated to Shiraz University of Medical Sciences, Shiraz, Iran, from October 2012 to September 2013 that had inclusion criteria were evaluated by general surgeon. The patients were separated into two groups and standard management was done. Then 12 hours after admission, 150 mL olive oil was given by nasogastric (NG) tube to the first group.

**Results:** The spontaneous resolution time of small bowel obstruction was significantly longer in the control group than the treatment group (59 hours vs. 35 hours). The hospital stay was shorter in the treatment group than the control (three days vs. six days).

**Conclusions:** The study results demonstrated that olive is an effective and safe adjunct to the conservative management of small bowel obstruction and markedly reduces the time of resolution of symptoms and length of hospital stay.

**Keywords:** Adhesion, Small Bowel, Olive Oil, Obstruction

## 1. Background

Abdominal adhesions are defined as abnormal connective tissues attachments between tissue, organs or both in the abdominal cavity that are normally separated. The adhesion bands can be congenital that are infrequent causes of bowel obstruction or acquired that can be usually due to peritoneal injuries such as abdominopelvic surgery (1).

Post-operative adhesions are the most common cause of small bowel obstruction and adhesions formation detected in 93% to 100% of transperitoneal surgeries (2). Also, adhesive small bowel obstruction is a common cause of hospital admission and its consequences impose a significant socioeconomic burden, and the treatment of adhesive small bowel obstruction needs fundamental portion of national health care resources for any country (1). About 80% of bowel obstruction happens in the small intestine and the other 20% occurs in the colon (3).

Although there are wide variations in the etiology of small bowel obstruction throughout the world, the three main categories are as follows:

- 1- Extrinsic causes such as adhesions, hernia and tumor
- 2- Intraluminal causes such as gall stone, foreign body

3- Intramural abnormality such as tumors, stricture and inflammation

It is estimated that approximately 85% of all small bowel obstructions are secondary to adhesion, hernias or tumors (4). Previous studies showed that adhesive small bowel obstruction after proctocolectomy, appendectomy and cholecystectomy developed (5-9).

In terms of management of small bowel obstruction, two main surgical and non-surgical methods are advised. The most important factor to manage adhesion bowel obstruction is detection of patients who need emergency surgical intervention. In some cases, patients with small bowel obstruction secondary to an adhesive band may be treated by lysis of adhesions.

Patients with partial adhesive small bowel obstruction may be managed conservatively. This management should be focused on fluid resuscitation, electrolyte correction, intestinal decompression with nasogastric (NG) tube, and antibiotic therapy. The most important initial step in small bowel obstruction management is fluid resuscitation, since patients with small bowel obstruction present volume losses and may need large amount of fluid. Also, NG suction and intestinal decompression with NG

tube is important to prevent aspiration during vomiting and general anesthesia (8). Another important stage in the bowel obstruction management is intravenous antibiotic therapy due to bacterial translocation (10). Some studies showed the efficacy of non-surgical methods to manage adhesion of small bowel obstruction by agents such as sesame oil and water - soluble contrasts (e.g., gastrographin) (2).

## 2. Objectives

The current study aimed to evaluate the effect of oral olive oil on the management of adhesive small bowel obstruction with no surgical intervention.

## 3. Methods

All patients with small bowel obstruction resulted from previous abdominal surgery were evaluated. The patients were evaluated by general surgeons. If the patients needed emergency surgical intervention, they were excluded. Small bowel adhesive band was defined by the history of previous laparotomy (more than four weeks), clinical symptoms and signs of mechanical obstruction such as abdominal pain, vomiting, distention and/or obstipation. Plain abdominal radiograph in supine and upright position were taken, suggestive of small bowel obstruction.

Inclusion criteria were as follows:

- Age more than 18 years old
- Previous laparotomy (> 4 weeks)
- Adhesive small bowel obstruction symptoms such as abdominal pain, vomiting and abdominal distention
- Plain and upright abdominal radiography demonstrating dilated loops in small intestine and rectum and air fluid levels in the colon

Exclusion criteria were as follows:

- Clinical evidence of bowel strangulation including intractable pain, fever and leukocytosis
- Clinical evidence of peritonitis
- Previous abdominal and pelvic radiation
- Inflammatory bowel diseases (ulcerative colitis and the Crohn disease)
- Past medical history of cancer (gastrointestinal and pancreas cancers)
- Patient who underwent operation within the first 24 hours after admission
- Patient who refused to use NG tube decompression
- Strangulated hernia
- Non cooperative patients such as the ones with mental retardation

- Immunocompromised patient, patient with diabetes, history of familial hypertriglyceridemia

- Unconscious patient that cannot be evaluated perfectly

From October 2012 to September 2013, all the patients admitted with adhesive bowel obstruction to Shahid Faghihi hospital affiliated to Shiraz University of Medical Sciences, Shiraz, Iran, that had the inclusion criteria were evaluated by the general surgeon. The patients who needed non-surgical management, after taking consent form, were included in the current research. The patients were divided into two groups, simple randomization based on the admission days. Patients admitted on even days were considered as the treatment group and the ones admitted on odd days as the control group.

For all recruited patients with no oral intake, intravenous fluid and antibiotic, NG tube, serial physical examination and laboratory studies were performed. Twelve hours after admission, 150 mL olive oil manufactured by Famila Company in Iran was given by NG tube to the treatment group as a single dose. Olive oil ingredients per 100 g were as follows: Saturated fat: 14 g, polyunsaturated fat: 11 g, monounsaturated fat: 73 g, cholesterol: 0, sodium: 2 g, potassium: 1 g, carbohydrate: 0, protein: 0. Then NG tube was closed for three hours. In the control group, non-surgical standard management of adhesive bowel obstruction was performed (similar to the first group except consumption of olive oil). Patients were examined every two hours for NG drainage, nausea and vomiting, decreased abdominal pain, and distention, duration of acceptable laboratory findings (such as WBC > 10000), plain abdominal radiography, time of bowel obstruction resolution and hospital stay. All patients in the treatment group were monitored for any plausible adverse effects of olive oil. In the course of the study, patients were excluded in case of any evidence of deteriorating bowel obstruction. The surgeons who visit the patient were not aware of the allocation of groups. The study was registered in the Iranian registry of clinical trials (IRCT; ID: IRCT201401059936N8). The institutional review board and the medical ethics committee of the hospital approved the study. The current study was in accordance with the 1975 Helsinki declaration as revised in 2008. Written informed consent was provided by each patient or his/her relatives.

SPSS statistical software (SPSS Inc., Chicago, IL, USA) (version 15) was used for data analysis. Qualitative variables were analyzed using the Fisher exact test. Quantitative variables were analyzed by Mann-Whitney U test or Independent T-test if appropriate. P values less than 0.05 were considered statistically significant.

#### 4. Results

From October 2012 to September 2013, 290 consecutive adult patients with small bowel obstruction were admitted to the emergency surgical ward of Shahid Faghihi hospital affiliated to Shiraz University of Medical Sciences. Two hundred and thirty three patients were excluded from the study according to the exclusion criteria, including patients with surgery performed within 24 hours after admission due to clinical evidence of bowel strangulation. The remaining 57 patients participated in the study (Table 1). Thirty patients (19 male and 11 female) received olive oil in addition to the conservative treatment and the other 27 patients (19 male and 8 female) were allocated into the control group. Both groups were well matched in terms of age, gender, duration of symptoms before admission, and clinical presentation ( $P$  value  $\leq 0.05$ ).

Table 1. Clinical Features

	Treatment (n = 30)	Control (n = 27)
<b>Male-female ratio</b>	19/11	19/8
<b>Age (year)</b>	47 (19 - 90)	47 (15 - 85)
<b>Clinical feature</b>		
Evolution time (h)	43 (80 - 192)	72 (24 - 240)
Abdominal pain	30 (100%)	26 (96.3%)
Distention	30 (100%)	26 (96.3%)
Constipation	8 (26.7%)	17 (63%)
Vomiting	17 (56.7%)	16 (59.3%)
<b>Type of previous surgery</b>		
Upper abdomen	4 (13.3%)	3 (11.1%)
Lower abdomen	7 (23.3%)	11 (40.7%)
Both	7 (23.3%)	5 (18.5%)
Mean time from the last admission (year)	5.23 (0.16-20)	4.38 (0.08 - 20)
<b>Number of previous surgeries</b>		
1	18 (60%)	18 (66.7%)
2	1 (3.3%)	3 (11.1%)
3	2 (6.7%)	0
<b>Nasogastric tube drainage (mL/h)</b>	18.82 (8-65)	29.95 (12.5-100)

Thirty-six patients had undergone a single previous abdominal operation, four patients had undergone a previous operation twice, and three patients had undergone operations previously three times due to diseases other than adhesive small bowel obstruction, cholecystectomy, appendectomy, cesarean section and total abdominal hysterectomy-bilateral salpingo-oophorectomy were

the most common previous operations (Flow diagram 1).

In this regards, the mean  $\pm$  SD duration of symptoms before hospital admission in the treatment and control groups were  $43.10 \pm 33.87$  hours and  $72.88 \pm 60.81$  hours, respectively. The ranges were 8 - 192 versus 24 - 240 hours, respectively.

The average output of nasogastric tube of each patient (total amount of drainage/duration) was used for evaluation. The output was 18.82 (8 - 65) mL/hour in the treatment and 29.95 (12.5 - 100) mL/hour in the control group, which showed smaller amount of NG drainage in the treatment group ( $P$  value  $< 0.001$ ).

The time to spontaneous resolution of small bowel obstruction was significantly longer in the control than the treatment group (59 hours vs. 35 hours;  $P = 0.011$ ). The hospital stay of the treatment group was significantly shorter than that of the control group (three vs. six days;  $P = 0.0321$ ) (Table 2). No patient in the treatment group reported any adverse effects to olive oil such as diarrhea.

The result of the current study was dependent to dose regimen of olive oil and it should be studied more by other doses of oil.

#### 5. Discussion

Results of the current study showed that olive oil may help to treat the adhesive small bowel obstruction. Abdominal surgeries performed on lower abdomen, pelvis or both tend to put patients at a higher risk for subsequent adhesive obstruction (11). The best method to treat adhesive small bowel obstruction is still controversial. In terms of management of small bowel obstruction, two main methods are advised, surgical and non-surgical. Adhesive small bowel obstruction commonly occurs after previous abdominal surgery but management of patients with small bowel obstruction by surgical method is a paradox.

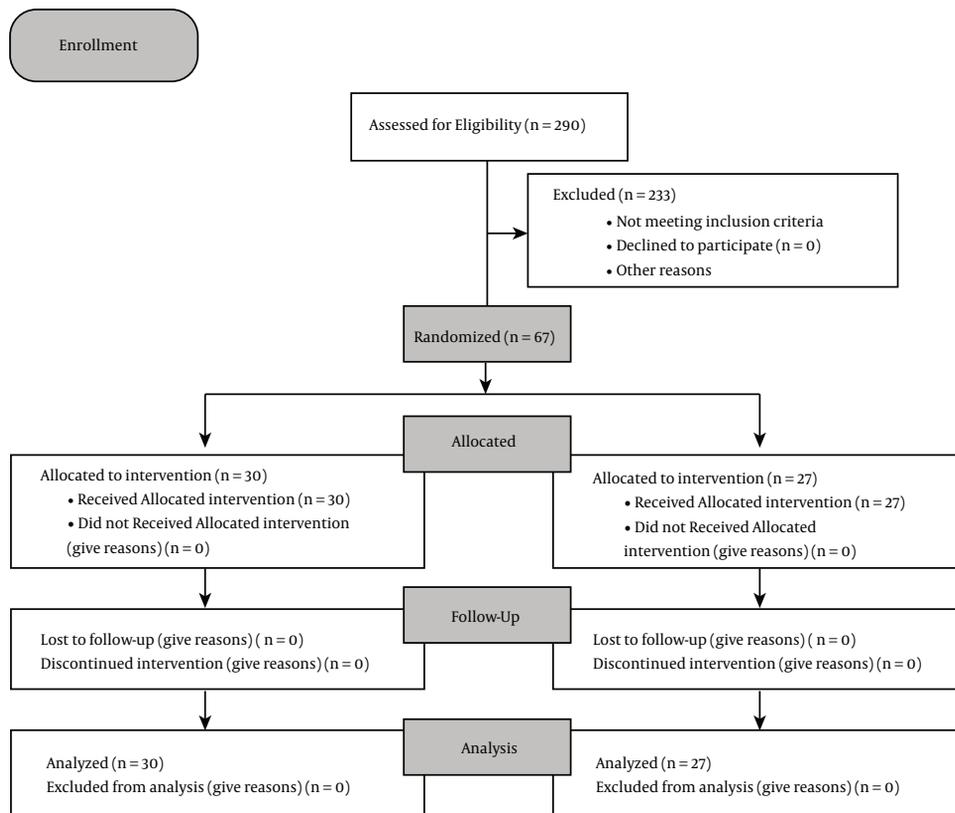
Previous studies reported that surgical rate of adhesive small bowel obstruction varies from 27% to 42% (12, 13). This rate in the current study was 14%.

The clinical effect of water soluble contrast is evaluated to predict the need for surgery in adhesive small bowel obstruction. Some authors suggested that Gastrografin (Schering, Berlin, Germany) promoted the resolution of obstruction (14-18), but its efficacy is still questionable and controversial and some rare complications associated with Gastrografin including anaphylactic reaction and lethal aspiration are reported (19, 20).

Previous studies showed safe and effective adjunct sesame oil to treat adhesive small bowel obstruction and suggested that use of sesame oil in addition to the conservative management of small bowel obstruction can reduce

**Table 2.** Hospital Stay

	Treatment (n = 30)	Control (n = 27)	P Value
Length of hospital stay (day)	3 (1-12)	6 (2-23)	0.0321
Complications	5 (30)	4 (27)	
Surgery need	4 (30)	3 (27)	
Resolution of symptom (hour)	34.92 (7-168)	58.76 (17-360)	0.011
Nasogastric tube drainage (mL/h)	18.82 (8-65)	29.95 (12.5-100)	0.000

**Figure 1.** Flow Diagram of the Study

the length of hospital stay, laparotomy rate and help resolution of symptoms quicker than conventional managements alone (2).

Olive oil is neutral, stable and non-irritating and in the current study, no adverse effects were observed in recipients of olive oil. In the study, symptoms of most patients were resolved 35 hours after administration of olive oil, although in the control group, it was 59 hours by conventional conservative management. Olive oil has many constituents such as triglyceride esters of oleic acid and palmitic acid and of other fatty acids, along with traces of

squalene and sterols (phytosterol and tocosterols); it helps by its lubrication and laxative nature and also movement of water to the lumen of intestine due to the different osmolality between the cells and the lumen of intestine.

There were several limitations in the study. The first limitation was that few patients were recruited in the study. Moreover, although inclusion and exclusion criteria were strict, there was a possibility that some of the patients in the treatment group were not admitted due to adhesion and were admitted because of other reasons such as constipation or ileus.

The results of the study demonstrated that olive is an effective and safe adjunct to the conservative management of small bowel obstruction and it markedly reduces the time of resolution of symptoms and length of hospital stay. To the authors' best knowledge, it was the first time that a study demonstrated the useful effect of olive oil to manage adhesive small bowel obstruction. The study showed that olive oil can markedly decrease the duration of symptoms and hospital stay by its lubrication and laxative nature that can enhance the bowel motility.

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