

Form "EAST Multicenter Study Proposal"

Study Title	Prospective randomized comparison of early laparoscopic enterolysis versus trial of nonoperative management for small bowel obstruction
Primary investigator / Senior researcher	Kevin Pei, MD
Email of Primary investigator / Senior researcher	kevin.pei@yale.edu
Co-primary investigator	Kimberly Davis, MD, MBA
Use this area to briefly (1-2 paragraphs only) outline the burden of the problem to be examined	<p>Post-surgical adhesive disease is the leading cause of small bowel obstruction (SBO) in the United States (1). Contemporary management of SBO frequently includes a trial of non-operative management (TNOM) reportedly with resolution in upwards of 70% of patients (2). Operative management of high grade bowel obstructions is associated with lower reoccurrence and longer disease-free interval when compared to non-operative management (3). Recently, laparoscopic enterolysis is shown to be effective and safe for management of SBO (4-6). Additionally, retrospective studies using NSQIP data demonstrate that laparoscopic enterolysis may decrease post-operative complications and length of stay when compared to open technique (7).</p> <p>Analysis of early surgical intervention (less than 24 hours from admission) versus traditional management shows conflicting results for complications and mortality (8, 9). To our knowledge, no prospective randomized trials have compared laparoscopic early intervention versus TNOM. Our hypothesis is that early laparoscopic enterolysis will result in decreased overall complications and shorter length of stay.</p>
Primary aim	<ol style="list-style-type: none">1. Identifying decrease in complications that occur when comparing early laparoscopic enterolysis versus trial of non-operative management1. Examine length of stay2. Examine cost savings for early laparoscopic enterolysis
Secondary aims	<ol style="list-style-type: none">3. Determine if a trial of nonoperative management decreases success rate of laparoscopic enterolysis.

1.Age >18

2.CT A/P showing high grade obstruction (all patients will obtain a CT A/P as per Level 1 recommendations based on EAST practice guidelines) (3).

a.High grade bowel obstruction is defined as (10):

i.Transition point

ii.Distal small collapse with proximal dilatation

iii.Small bowel feces sign

iv.50% difference in caliber change between proximal dilated bowel and distal decompressed bowel

v.Intra-abdominal free fluid without clinical signs of ischemia

Inclusion Criteria

1.Hemodynamic instability (SBP<90)

2.Peritonitis

3.Enterocutaneous fistula

Exclusion Criteria

4.Cirrhosis

5.previous enterolysis (more than 1)

6.Contraindication to laparoscopic surgery

Interventions:

Laparoscopic enterolysis within 24 hours of admission

Trial of non-operative management

Methodology

Protocol:

Patients with diagnosis of small bowel obstruction and who meet inclusion criteria will be approached for participation. Following informed consent, patient will be randomized to either Early Laparoscopy or TNOM arms. Randomization will be performed utilizing an online randomization coding tool.

Therapeutic Interventions

Patient randomized to the early laparoscopy arm will undergo diagnostic laparoscopy within 24 hours of admission (depending on surgeon and operating room availability). Standard laparoscopy will be performed including supine positioning, sequential compression devices, and appropriate pre-incision antibiotics. Trocar placement will be at the surgeon's discretion and as appropriate for the patient's previous incisions. The necessity for conversion will be left to the discretion of the attending surgeon. Post operative management include awaiting return of bowel function for advancement of diet. No nasogastric tubes will be placed routinely.

Patients randomized to the trial of nonoperative management arm will undergo standard therapy including nil per os (NPO), stomach decompression only if actively vomiting, intravenous fluids while awaiting return of bowel function. Patients who do not achieve return of bowel function within 5 days of admission will undergo laparoscopic enterolysis with the understanding that conversion to open procedure may be necessary.

In both arms, if open laparotomy is necessary, standard midline incision will be utilized. Closure will be performed with running, nonabsorbable suture.

Resolution of bowel function in either arm is defined as flatus.

Primary Outcome

1.Any complications (per National Surgical Quality Improvement Project)

Secondary Outcomes

- 1.Length of stay
- 2.Cost
- 3.Hospital re-admission
- 4.Unplanned return to operating room
- 5.30 day mortality

Demographics:

1.DOB

2.Gender

3.Race

4.Ethnicity

Admission Physiology

1.Vital signs

2.Labs: CHEM, CBC, prealbumin, lactate

3.Surgical history (previous surgeries)

4.If previous surgery, type of incision and approach

5.Comorbidities

**List specific variables to
be collected & analyzed**

a.Height

b.Weight

c.DM

d.Smoker

e.Dyspnea

f.Functional status

g.COPD

h.Ascites

i.CHF

j.Hypertension with meds

k.ARF

l.ESRD

m. Disseminated cancer

n. Weight loss > 10%

o. Bleeding disorder

p. Pre-op transfusion

q. Sepsis

r. Septic shock

Operative:

1. NSQIP Preop risk stratification per ACS calculator

2. Days from admission to operation

3. Operative time

4. Operative team characteristics (resident level, attending experience)

5. Wound class

6. Blood loss

7. ASA class

8. Conversion to open

9. Reason for conversion

10. Unable to complete surgery

11. Reason for inability to complete surgery (e.g. frozen abdomen, carcinomatosis)

12. Peritoneal adhesion index (PAI) (11)

Complications:

1. Superficial SSI

2. Deep SSI

3. Organ space SSI

4.Wound disruption

5.Pneumonia

6.PE

7.Vent days

8.AKI

9.ARF

10.UTI

11.Stroke

12.Cardiac arrest

13.MI

14.Sepsis

15.DVT

Outcomes

1.Readmission

2.Reoperation

3.Death

4.Length of stay

5.Reoccurrences within 6 months

6. Conversion rate from laparoscopy to open

Data will be collected prospectively via standardized data sheet.

Outline the data collection plan and statistical analysis plan succinctly

Differences in continuous variable between laparoscopic enterolysis versus trial of nonoperative management will be compared by means of the student's t-test. A chi-squared test will be used for assessing differences in proportions between these groups of patients. Multivariate analysis will be performed to evaluate contributing factors to outcomes. The null hypothesis is that there is no difference in postoperative complications or outcomes.

Outline consent procedures here, if applicable

Informed consent will be obtained for all patients meeting inclusion criteria by a member of the investigative team. When necessary, surrogate decision maker will be asked for consent. Patients may withdrawal from the study at any time. If a patient was randomized to the early laparoscopic arm prior and withdrawals prior to surgery, attending surgeon will provide standard management per institution.

Succinctly outline a risk/benefit analysis

Laparoscopic enterolysis carries risks of enterotomy, nontherapeutic surgery, and conversion to open procedure. These risks will be mitigated by an experienced, laparoscopic surgeon. Risks of the trial of non-operative management arm carry risk of bowel ischemia, perforation, need for surgery, higher percentage of open conversion, and enterotomy.

Benefit of early Laparoscopic enterolysis may include shorter length of stay, less pain, less surgical complications and mortality

Include a brief listing of key references

1. Miller G, Boman J, Shrier I, Gordon PH. Etiology of small bowel obstruction. *Am J Surg.* 2000 Jul;180(1):33-6.
2. Tanaka S, Yamamoto T, Kubota D, et al. Predictive factors for surgical indication in adhesive small bowel obstruction. *Am J Surg.* 2008 Jul;196(1):23-7.
3. Maung AA, Johnson DC, Piper GL, et al. Evaluation and management of small-bowel obstruction: an Eastern Association for the Surgery of Trauma practice management guideline. *The journal of trauma and acute care surgery.* 2012 Nov;73(5 Suppl 4):S362-9.
4. Zerey M, Sechrist CW, Kercher KW, Sing RF, Matthews BD, Heniford BT. The laparoscopic management of small-bowel obstruction. *Am J Surg.* 2007 Dec;194(6):882-7; discussion 7-8.
5. Strickland P, Lourie DJ, Suddleson EA, Blitz JB, Stain SC. Is laparoscopy safe and effective for treatment of acute small-bowel obstruction? *Surg Endosc.* 1999 Jul;13(7):695-8.
6. Li MZ, Lian L, Xiao LB, Wu WH, He YL, Song XM. Laparoscopic versus open adhesiolysis in patients with adhesive small bowel obstruction: a systematic review and meta-analysis. *Am J Surg.* 2012 Nov;204(5):779-86.
7. Saleh F, Ambrosini L, Jackson T, Okrainec A. Laparoscopic versus open surgical management of small bowel obstruction: an analysis of short-term outcomes. *Surg Endosc.* 2014 Aug;28(8):2381-6.
8. Bauer J, Keeley B, Krieger B, et al. Adhesive Small Bowel Obstruction: Early Operative versus Observational Management. *Am Surg.* 2015 Jun;81(6):614-20.
9. Teixeira PG, Karamanos E, Talving P, Inaba K, Lam L, Demetriades D. Early operation is associated with a survival benefit for patients with adhesive bowel obstruction. *Ann Surg.* 2013 Sep;258(3):459-65.
10. Silva AC, Pimenta M, Guimaraes LS. Small Bowel Obstruction: What to Look For. *Radiographics.* 2009;29(2):423-39.
11. Coccolini F, Ansaloni L, Manfredi R, et al. Peritoneal adhesion index (PAI): proposal of a score for the "ignored iceberg" of medicine and surgery. *World J Emerg Surg.* 2013;8(1):6.