

Bowel injury in laparoscopic surgery

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Bowel injury is thought to be a rare complication of laparoscopy but carries a high rate of morbidity and mortality, particularly when diagnosed postoperatively.

AREAS OF DISCUSSION

- Relevance.
- Incidence.
- Prevention.
- Diagnosis & Management.

RELEVANCE?

Relevance?

- Increasing use of laparoscopy and robotic surgery in current scenario especially for more advanced procedures
- The number of serious adverse events following laparoscopy is also **on the rise**. Association of Surgeons of Great Britain and Ireland. Survey of injuries associated with laparoscopic surgery 2010.
- 50% of bowel injuries and 60% of vascular injuries- undiagnosed at the time of primary surgery.
- Missed/delayed diagnosis-increased risk of bowel perforation and consequently sepsis and even death.

INCIDENCE

Laparoscopic bowel injury in retroperitoneal surgery: current incidence and outcomes.

MJ, Faiena I, Cinman N, Kucharczyk J, Meriggi JS, Waingankar N, Richstone L, Kavoussi LR
J Urol. 2010 Aug;184(2):589-94.

- Retrospective study.
- Between 2006 and 2009.
- 1,073 laparoscopic surgeries on upper urinary tract, adrenal & RP LN.
- Bowel injury - 8 cases /1073 (0.75%), 6 identified intraoperatively and 2 post-operatively.

Laparoscopic bowel injury in retroperitoneal surgery: current incidence and outcomes.

Faiena I, Cinman N, Kucharczyk J, Meriggi JS, Waingankar N, Richstone L, Kavoussi LR
J Urol. 2010 Aug;184(2)

- Urology series of bowel injury- **0.65%** incidence in 14,447 laparoscopic procedures
- 46.7% of injuries unrecognized at surgery.
- Incidence of bowel injury has increased with time.
- Percent of **unrecognized bowel injury** -dramatically decreased from the early (**70.4%**) to the more recent (**36.9%**) laparoscopic era.

Bowel injury in gynecologic laparoscopy: a systematic review

Llarena NC, Shah AB, Milad MP.

Obstet Gynecol. 2015 Jun;125(6):1407-17

- Meta analysis of Ninety studies published between 1972 and 2014.
- 474,063 gynecologic laparoscopies; Number of bowel injuries- 604.
- Incidence of bowel injury in gynecologic laparoscopy- 1 in 769.
- The rate of bowel injury varied by procedure- 1 in 3,333 (0.03%) for sterilization , 1 in 256 (0.39%) for hysterectomy.
- Small intestine was the most frequently damaged region of the gastrointestinal tract, representing (47%) of bowel injuries.

Large bowel injuries during gynecological laparoscopy

Ülker K, Anuk T, Bozkurt M, Karasu Y.

World Journal of Clinical Cases : WJCC. 2014;2(12):846-851

- Gastrointestinal tract injury during laparoscopy ranged between 0.03 and 0.18%.
- Third most frequent mortal complication of laparoscopy after anesthesia and major vessel injuries
- Gastrointestinal injuries occur more often at the small bowel.
- Large bowel and stomach, may also be injured.

Surgical series

- Gastrointestinal tract injury during laparoscopy was 0.13% in the meta-analysis performed by Van der Voort et al.

van der Voort M, Heijnsdijk EA, Gouma DJ.

Bowel injury as a complication of laparoscopy. Br J Surg. 2004;91:1253–1258

LARGE BOWEL INJURIES DURING THE SETTING UP PHASE OF LAPAROSCOPY

- 30% to 50% of the bowel injuries occur during Veress needle or trocar insertion into the abdominal cavity.

Margina JF. Complications of laparoscopic surgery. Clin Obstet Gynecol. 2002;45:469–480

- 32.1% of the gastrointestinal injuries occurred during the initial set up procedure.
- Bowel injuries due to
 - Pneumoperitoneum needle- 10.7%.
 - Umbilical trocar - 16.1%.
 - Suprapubic trocar- 5.3%

Chapron C, Pierre F, Harchaoui Y, Lacroix S, Béguin S, Querleu D, Lansac J, Dubuisson JB.

Gastrointestinal injuries during gynaecological laparoscopy. Hum Reprod. 1999;14:333–337

LARGE BOWEL INJURIES DURING THE OPERATIVE PHASE OF LAPAROSCOPY

- Trauma secondary to tissue dissection and manipulation or electrosurgical energy use.
- Of the gastrointestinal injuries in gynaecological laparoscopy,
Operative phase injuries- 57.2%.
 - Electrosurgery injuries- 10.7%.
 - Sharp dissection injuries- 46.5%.

Chapron C, Pierre F, Harchaoui Y, Lacroix S, Béguin S, Querleu D, Lansac J, Dubuisson JB.
Gastrointestinal injuries during gynaecological laparoscopy.
Hum Reprod. 1999;14:333–337.

PREVENTION

- Comprehensive preoperative evaluation, proper consultations, patient selection and risk assessment.
- Preoperative bowel preparation, decompression of the stomach with an orogastric or nasogastric tube- prevent potential injuries occurring during abdominal access. Ülker K, Anuk T, Bozkurt M, Karasu Y.

Large bowel injuries during gynecological laparoscopy.

World Journal of Clinical Cases : WJCC. 2014;2(12):846-851.

- Umbilical stalk elevation (USE) technique improve the success rate of Veress needle insertion in obese patients- prevent access related bowel injuries.

Ozdemir A, Gungorduk K, Ulker K, Yasar L, Ertas IE, Gokcu M, Solmaz U, Sancı M.

Umbilical stalk elevation technique for safer Veress needle insertion in obese patients: a case-control study

Eur J Obstet Gynecol Reprod Biol. 2014;180:168–171.

Establishing pneumoperitoneum: Verres or Hasson? The debate continues.

N Dunne, M Booth, TCB Dehn

[Ann R Coll Surg Engl.](#) 2011 Jan;93(1):22-4.

- STUDY

- Prospective study , 6 yr period.

- 3126 patients- underwent laparoscopic surgery performed by 2 GI surgeons.

- One surgeon preferred the Verres needle and the other an open technique.

- Comparison of incidence and severity of complications of both techniques.

- RESULTS:

- no significant difference between the technique chosen and incidence of complications.

Laparoscopic entry techniques

Ahmed G, Gent D, Henderson D, O'Flynn H, Watson A
Cochrane Database Syst Rev. 2015 Aug 31;8

- RESULTS

- Insufficient evidence to recommend one laparoscopic entry technique over another.

- Open-entry technique- less rates of failed entry when compared to a closed-entry technique.

- No evidence of a difference in the incidence of visceral or vascular injury between the two.

Open Versus Closed Laparoscopy: Yet an Unresolved Controversy.

[Taye MK¹](#), [Fazal SA²](#), [Pegu D Saikia D](#)
[J Clin Diagn Res.](#) 2016 Feb;10(2):QC04-7.

- -To compare the rate of occurrence and nature of complications in open and closed laparoscopy during pneumoperitoneum.
- -Total 3000 cases included-1500 open laparoscopy and 1500 closed laparoscopy.
-Complications occurring in both the groups compared by using Fisher's-exact test
- **RESULTS:**
 - Closed laparoscopy group-minor complications- 5.33%; major complications- 1.33%.
 - Open laparoscopy group-minor complications- 4%; major complications-0.13%
 - p-value of the difference between the two groups for minor complications and major complications- significant.

- **CONCLUSION :**

- Open laparoscopy- better than closed laparoscopy** in terms of rate of occurrence of complications & nature and severity of complications .

DIAGNOSIS

Post laparoscopic Surgery,

**Look for steady
improvement.**

Worry when it is absent.

DIAGNOSIS

- One to two thirds of bowel injuries- detected intraoperatively.
- Half of the injuries- identified between POD1 and POD7.
- Most patients- No typical symptoms of bowel injury.
- Symptoms: low-grade fever, nausea, vomiting, ileus, severe abdominal pain, leucopenia or a normal leukocyte count, C- Reactive protein, elevated immature white-cell elements
- In many cases, patients present with peritonitis and the situation increases the rates of morbidity and mortality.
- Sepsis and acute abdominal pain- observed 1-2 d after surgery.

DIAGNOSIS

- Features s/o Large bowel injury
 - Brownish fluid in a saline aspiration test.
 - Fecal smell.
- In case of suspicion of bowel perforation- Veress needle replaced by sterile one & Field beneath the primary entrance- examined after introduction of telescope.
- In a recent experimental study, insertion of a rectal catheter attached to a urine bag was recommended to identify large bowel injuries.
- accumulation of gas in the connected bag would signal small and hardly demonstrable large bowel injuries.

Ülker K, Aksoy Ö, Hüseyinoğlu Ü, Ermutlu CS, Sülü B, Kılıç E. Rectal Catheterization for the Diagnosis of Iatrogenic Descending Colon Injuries during CO2 Laparoscopy: An Experimental Study. Kafkas Üniversitesi Veteriner Fakültesi Dergisi. 2013;19:A111–A116

Signs and symptoms of intestinal injury

Symptoms	Signs
Abdominal pain	Direct /rebound tenderness
Bloating	Abdominal distension
Nausea, vomiting	Diminished bowel sounds
Fever, chills	Elevated or subnormal temperature
Difficulty breathing	Tachypnea, tachycardia
Weakness	Pallor, hypotension, diminished consciousness

Baggish MS. One hundred and thirty small and large bowel injuries associated with gynecologic laparoscopic operations. J Gynecol Surg. 2007;23:83-95.

- CT abdomen- fecal material outside the large bowel and/or free air in the peritoneum.
- Additional imaging work up- gastrograffin enema.

MANAGEMENT

MANAGEMENT

- Small injuries by a Veress needle may be managed conservatively- close observation in hospital, intravenous hyperalimentation and antibiotics.
- Superficial electrocautery bowel injuries- 6% need open exploration due to acute perforation during the observation period.
- Intra-operative repair of the damaged bowel- safer in every suspicious electrocautery bowel injury.
- Most trocar injuries need a primary closure in one or two layers.
- Larger injuries with an ambiguous tissue injury may necessitate colostomy.

MANAGEMENT

- Injury at the ascending colon- resection of the injured section and a primary anastomosis.
- Ileostomy with diversion of the intestinal contents speeds up healing.
- If bowel is not prepared preoperatively & descending colon, sigmoid or rectum injured- diverting colostomy with resection of the injured portion is recommended.

Nezhat C, Nezhat F, Nezhat C. Overview of complications. In: Nezhat C, Nezhat F, Nezhat C, editors. Nezhat's operative gynecologic laparoscopy and hysteroscopy. New York: Cambridge University Press; 2008. pp. 582–600.

Management and outcome of rectal injury during gynecologic laparoscopic surgery.

[Jo EJ](#), [Lee YY](#), [Kim TJ](#), [Choi CH](#), [Lee JW](#), [Bae DS](#), [Kim BG](#).

-To assess the incidence and management of accidental rectal injury during gynecologic laparoscopic surgery.

• **CONCLUSION:**

-Rectal injury gynaecological laparoscopy can be repaired successfully without the need for a colostomy if adequate rectal tissue is available and recognized during surgery.

[J Minim Invasive Gynecol.](#) 2008 Nov-Dec;15(6):689-94.

Laparoscopic management of complications in gynecologic laparoscopic surgery: a 5-year experience in a single center.

[Kyung MS](#), [Choi JS](#), [Lee JH](#), [Jung US](#), [Lee KW](#).

- **STUDY OBJECTIVE:**

-To evaluate the feasibility and efficacy of laparoscopic management of complications without conversion to laparotomy in gynecologic laparoscopic surgery.

- **CONCLUSION:**

-Laparoscopic management of complications in gynecologic laparoscopic surgery is feasible and efficient.

Management of Large Bowel Injury During Laparoscopic Surgery.

Hegde CV. *Journal of Obstetrics and Gynaecology of India*. 2012;62(5):501-503.

- Primary closure:

Indication: Absence of significant bowel contamination.

- Resection:

Indication: Thermal bowel injuries.

- Colostomy

Primary repair of laparoscopic bowel injury

- Primary repair – Open/Laparoscopic depending on skills.
- Transmural defects through which the intestinal submucosa or mucosa is visible- require repair.
- Two-layer closure approach more common.
- full thickness continuous stitch, interrupted seromuscular stitch.
- Edges may need freshening.
- Check bowel integrity- Air leak test.

Management of Large Bowel Injury During Laparoscopic Surgery.

Hegde CV. *Journal of Obstetrics and Gynaecology of India*. 2012;62(5):501-503.

- Colostomy in laparoscopic bowel injuries:

Indications:

- Severe fecal contamination.
- Huge blood loss > 1 litre intraoperatively.
- Shock due to bowel injury.
- Delayed recognition.

Fecal diversion in Colon injury

- Colostomy- does not guarantee protection against anastomotic leak.
 - Cochrane meta-analysis from 2009.
 - 6 studies with 705 patients.
 - Fecal diversion or primary repair- no difference in mortality.
 - Primary repair- morbidity
 - complications.
 - intra-abdominal infections
 - total infections
 - wound complications
- Lower incidence
Than colostomy.

Current management of colon trauma.

Maxwell RA, Fabian TC. World J Surg. 2003;27:632–639.

- Compilation of data from 20 retrospective studies.
- Overall complication rates in:
 - Primary repair- 14%.
 - Colostomy- 31%.
- Mortality rates- equivalent for both.

Post-operative care

- Drain:
 - Drain for 5 days V/s no drain.
 - No difference in leak, morbidity, mortality.
- Nasogastric decompression:
 - early feeding or patient-controlled feeding- safe in both lap & open bowel resections.(As shown by several RCTs).
- Adequate intravenous hydration post-operative.
- Recognise Re-leaks post resections (incidence- 6%) early.

Thank You...