

# Complication of Laparoscopic Surgery

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# APAGE

The Asia-Pacific Association for Gynecologic Endoscopy and Minimally Invasive Therapy



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## ***Laparoscopic Management of Major Vessel Injury***



## What are we trying to achieve with a laparoscopic approach?

1. To reduce pain & discomfort
2. To decrease the duration of hospitalization & the time to full recovery
3. To lessen adhesion formation
4. To get better outcome - should be an end point
5. Fertility Preservation

# Complication of Laparoscopy

- Common complication
  - ◆ Visceral injury
    - ◆ Ureteral / Bladder / Bowel
  - ◆ Delayed complications
    - ◆ Secondary necrosis of the bowel, ureter or bladder
- Mortality
  - ◆ Major vascular surgery
    - ◆ Accidents secondary to insertion of the pneumoperitoneum needle or trocar
  - ◆ Delayed diagnosis of bowel injury

# Complication of Laparoscopy

- Risk related major / advanced surgical procedure
  - ◆ Adhesiolysis techniques
  - ◆ Hysterectomy / treatment of pelvic floor / retroperitoneal endometriotic lesions
- Outcome
  - ◆ Intraoperative diagnosis of the injury (*most important*)
    - ◆ Reduced severity of complications and medico-legal actions
  - ◆ Immediate repair
    - ◆ Via laparoscopy or laparotomy during peri-operative period
  - ◆ Surgeon's level of experience

# Major Complications of Laparoscopy: A Follow-Up Finnish Study

PÄIVI HÄRKKI-SIREN, MD, JARI SJÖBERG, MD, PhD, AND TAPIO KURKI, MD, PhD

*Objective:* To examine recent complications in Finland.

*Methods:* This was a nationwide record-linkage study from January 1995 through December 1996 including all Finnish hospitals performing gynecologic laparoscopies. Data files of the National Patient Insurance Association and the Finnish Hospital Discharge Register were used. Data were compared with previous results from 1990 to 1994.

*Results:* Among 32,205 gynecologic laparoscopies, 130 major complications were noted. The total complication rate was 4.0 per 1000 procedures: 0.6 per 1000 in diagnostic laparoscopies, 0.5 per 1000 in sterilization, and 12.6 per 1000 in operative laparoscopies. Intestinal injuries were reported in 0.7 per 1000, incisional hernias in 0.3 per 1000, urinary tract injuries in 2.5 per 1000, major vascular injuries in 0.1 per 1000, and other injuries in 0.5 per 1000 gynecologic laparoscopic procedures. Seventy-five percent (88 of 118) of the major complications in operative laparoscopies occurred during hysterectomies. The total major complication rate decreased from 4.9% in 1993 to 2.3% in 1996 ( $\chi^2 = 8.55$ ,  $P = .003$ ), but the incidence of ureteral injuries remained stable, at about 1% of laparoscopic hysterectomies. Ureteral injuries were most common in local hospitals (2.6%), followed by central (1.1%) and university hospitals (0.9%). From 1990 through 1996, the relative risk for ureteral injury in laparoscopic hysterectomies, compared with other operative laparoscopies was 29.0 (95% confidence interval [CI] 13.3, 63.0), for bladder injury 13.0 (95% CI 6.0, 28.2), for intestinal injury 1.3 (95% CI 0.6, 2.5), and for major vascular injury 0.4 (95% CI 0.1, 3.6). Compared with the figures for 1990–1994, all major complications in operative laparoscopies increased, from 0 per 1000 in 1990 to 14.0 per 1000 in 1996 ( $\chi^2 = 20.28$ ,  $P < .001$ ), but part of this increase was due to the increased proportion of laparoscopic hysterectomies.

*Conclusion:* Laparoscopic hysterectomies are still associated with a stable 1% risk of ureteral injury, whereas other major complications were decreasing until 1996. Complications in other laparoscopic procedures generally are rare. (Obstet Gynecol 1999;94:94–8. © 1999 by The American College of Obstetricians and Gynecologists.)

**Table 2.** Laparoscopic Procedures in Which Major Complications Occurred, 1995–1996

Type of injury	<i>n</i>
Intestinal injury ( <i>n</i> = 24)	
Diagnostic laparoscopy	2
Sterilization laparoscopy	7
Operative laparoscopy	15
Ectopic pregnancy (1)	
Myomectomy (1)	
Salpingo-oophorectomy (2)	
Ovarian cystectomy (4)	
Laparoscopic hysterectomy (7)	
Incisional hernia ( <i>n</i> = 8)	
Operative laparoscopy	8
Ovarian cystectomy (1)	
Ectopic pregnancy (1)	
Salpingo-oophorectomy (3)	
Laparoscopic hysterectomy (3)	
Bladder injuries ( <i>n</i> = 22)	
Simple bladder injury ( <i>n</i> = 12)	
Operative laparoscopy	12
Ovarian cystectomy (1)	
Salpingo-oophorectomy (1)	
Colposuspension (3)	
Laparoscopic hysterectomy (7)	
Vesicovaginal fistula ( <i>n</i> = 10)	
Operative laparoscopy	10
Laparoscopic hysterectomy (10)	
Ureteral injuries ( <i>n</i> = 57)	
Operative laparoscopy	57
Endometriosis (1)	
Adhesiolysis (1)	
Colposuspension (1)	
Salpingo-oophorectomy (3)	
Laparoscopic hysterectomy (51)	
Major vascular injuries ( <i>n</i> = 4)	
Diagnostic laparoscopy	1
Operative laparoscopy	3
Endometriosis (1)	
Tubal torsion (1)	
Parovarian cystectomy (1)	
Other injuries ( <i>n</i> = 15)	
Diagnostic laparoscopy	1
Sterilization laparoscopy	1
Operative laparoscopy	13
Endometriosis (1)	
Colposuspension (2)	
Laparoscopic hysterectomy (10)	
Total	130

# Laparoscopic Surgeries

## Basic Techniques:

- Well Anesthesia
- Empty the bladder, bowel & stomach
- Head down & upward set the bowel
- Restore the normal anatomy.
- Hemostasis with cooling system.
- Meticulous homeostasis



# Potential Risk

## Factors of Vascular Injuries

- 1) Operator Inexperience
- 2) Obese patients
- 3) Dull Veress needle and trocar
- 4) Failure to stabilize the abdominal wall
- 5) Inadequate pneumoperitoneum

# Potential Risk Factors of Vascular Injuries (cont')

- 1) Forceful thrusing motion for insertion
- 2) Lateral insertion of the accessory trocars
- 3) Inappropriate patient's positioning
- 4) Bulging stomach
- 5) Failure to note anatomic landmarks

# Management of Vessels Injuries in Trocar (needle) insertion

- Do not remove the trocar sleeve before bleeding is controlled (?)
- Bipolar desiccation
- Hemoclips application
- Suture:
  - a) Laparoscopically or Laparotomically
  - b) Large curved needle
  - c) Large straight needle

# Management of Vessels Injuries

- Compression to avoid a large hematoma
- Identify the injured vessel
- Check bleeders with bipolar or hemoclips
- Replacement or Bypass procedures
- Observation (bowel, bleeder,.....) after hemostasis
- Drainage and God bless



# Bowel Injury in GYN laparoscopy

## ■ Prevalence

- ◆ 1/2861 to 1/3333 procedures

( Lehmann-Willenbrock E, Riedel HH, Mecke H, et al:  
Pelviscopy/laparoscopy and its complications in Germany. J  
Reprod Med 37:671–677, 1992 )

- ◆ Low risk, but potentially fetal

- ◆ Minor surgery (diagnosis or tubal sterilization): 0.04 to 0.08%

- ◆ Operative laparoscopy: 0.18 to 0.33%

( Härkki-Siren P, Kurki T: Anationwide analysis of  
laparoscopic complications. Obstet Gynecol 89:108–112,  
1997)

( Härkki-Siren P, Sjöberg J, Kurki T: Major complications of  
laparoscopy: A follow-up Finnish study. Obstet Gynecol  
94:94–98, 1999 )

→ Large, multicenter surveys and injury-based data collections  
needed

# Risk of Bowel Injury

- Increased risk
  - ◆ History of laparotomy
  - ◆ Very obese or thin abdominal wall
  - ◆ Many attempts to insert the Veress needle or cannula
  - ◆ Surgery including enterolysis and adhesiolysis
- High suspicion of possible undiagnosed bowel injury if patients do not improve steadily after surgery
  - ◆ Pyrexia of 38° C or more
  - ◆ Absent bowel sounds
  - ◆ Acute abdomen

# Prevention of Bowel Injury

- Preoperative bowel preparation in patients with a predisposing factor
  - ◆ Suspected visceral injury in every case of extensive adhesiolysis
    - ◆ Slightest doubt the appropriate exploration and tests for leakage of bowel contents performed
- Application of a Veress needle control test
  - ◆ Such as the hanging drop or aspiration technique
- No more than three attempts at insertion
- Open laparoscopy in patients at risk: *controversial*
  - ◆ Reduced risk of undiagnosed bowel injury





# The Incidence of Adhesions After Prior Laparotomy ? (N=360)

## Adhesion :

	bowel	omentum
Pfannenstiel :	13%	87%
Midline below the umbilicus :	17%	83%
Midline above the umbilicus :	40%	60%

## Subjects with all types of incision :

Gynecologic (42 %) > Obstetric (22%)

## Number of incisions

Complication : 6%

## Table Organs Injured

	United States (N=135 patients)	Non-United States (N=111 patients)
Liver	4	2
Small bowel	38	51
Stomach	1	3
Colon, rectum	28	28
Biliary	3	1
Bladder	5	4
Aorta	6	2
Iliac artery	36	12
Vena cava, ILV	22	6

ILV=iliac vein

## Table Instruments Responsible for Injuries

	No. of Injuries
Needle	39
Blunt cannula	16
Trocar <sup>a</sup>	191

<sup>a</sup>Includes 14 secondary trocars  
8(3):341-347,2001

Stephen L. Corson, J Am Assoc Gynecol Laparosc

# A New Portal for Laparoscopic Gynecologic Procedures: Experience in 188 Cases

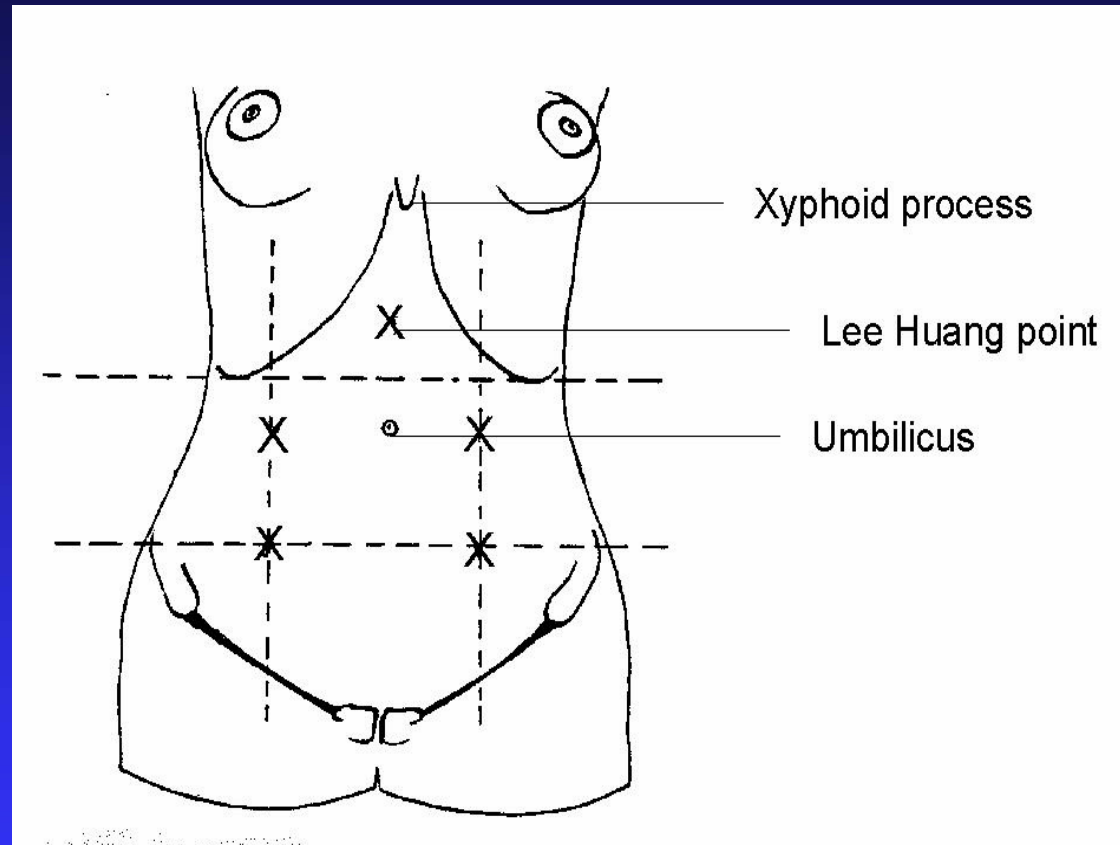
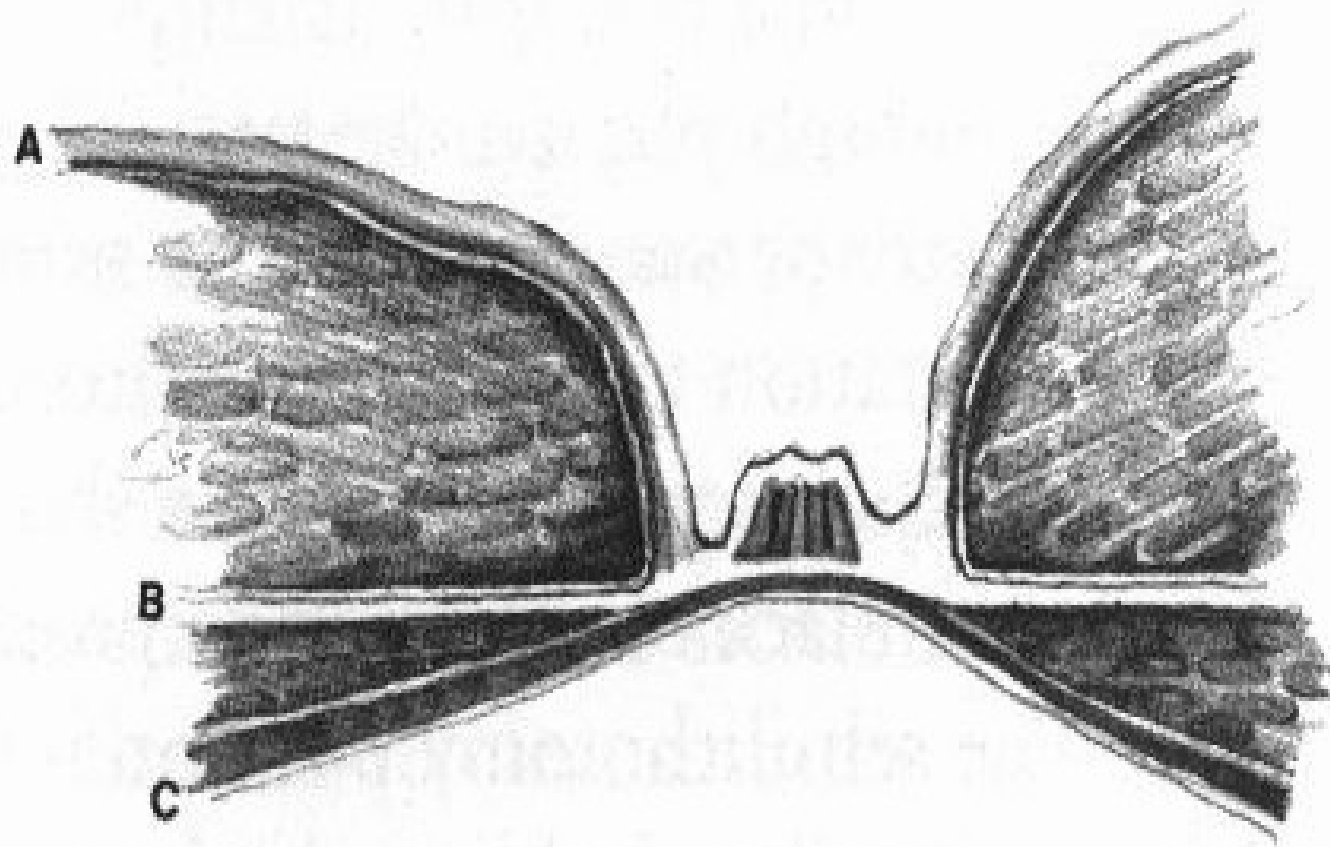
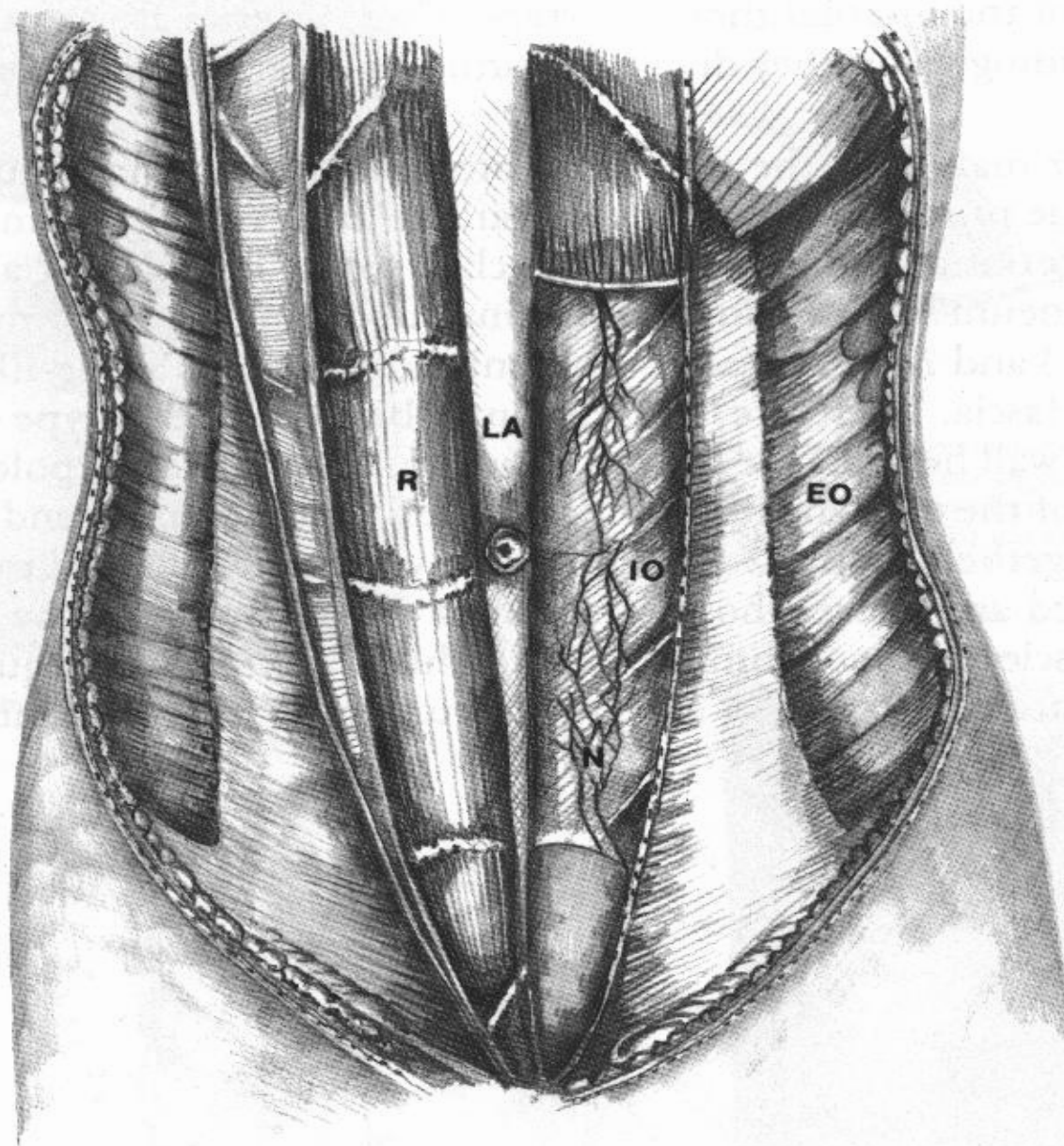


Figure. Anterior abdominal wall showing Lee Huang point and additional portal sites.



**Figure 2.4** Coronal section of the umbilicus and periumbilical region. All layers of tissue are confluent at the umbilicus thus presenting the thinnest depth on the anterior abdominal wall. Skin (A), fascia (B) and anterior parietal peritoneum (C) form a single plane at this level.



**Figure 2.1** Muscles of the anterior abdominal wall. Illustration shows the rectus muscle (R), the external oblique (EO) and the internal oblique (IO). Their aponeurotic covering becomes a single layer at the medial raphe (linea alba) (LA). Innervation (N) to the anterior abdominal wall is shown on the left (patient's).

## Anatomical relation

- The skin is innervated by **7th to 12th intercostals nerves** and the first lumbar nerve in the intercostals form of iliohypogastric nerve
- The **thoracoepigastric, intercostals** and **superficial epigastric arteries** and veins form a network over this area.
- the three flat muscles(**external oblique, internal oblique, and tranversus**) form a sheath around each vertical muscle ( rectus abdominis) before fusing in the midline at the linea alba.

# Operative Technique

- **Supine position** before, then in deep Trendelenburg position.
- A small vertical skin incision at the middle point (Lee-Huang point)
- Trocar was inserted through this point with the angle of 60 degree to the abdominal wall



# Advantages

Advantages when compare with left upper quadrant approach.

- avoids major blood vessels and nerves as the plane is more or less avascular and aneural.
- Affords wide access to abdominal cavity in major surgeries.
- Provides proper visual angle and increases the working distance.
- No additional incisions were required.

# Disadvantage

- **Risks of damage in visceral Organ:** ranging from superficial serosal damage to complete perforation of stomach, intestine and colon.
- **Injury to blood vessels**



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## ***Laparoscopic Management of Colon Injury***



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***THANKS FOR YOUR  
ATTENTION!!!***