INCARCERATED & STRANGULATED GROIN HERNIAS

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Department of Surgery

NO DISCLOSURES

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WORLD SOCIETY OF EMERGENCY SURGERY GUIDELINES FOR EMERGENCY REPAIR OF COMPLICATED HERNIAS

- Repair of incarcerated hernias – both ventral and groin – may be performed with a laparoscopic (grade 1C recommendation).
- Prosthetic repair with synthetic mesh is recommended for patients with intestinal incarceration and no signs of intestinal strangulation or concurrent bowel resection (clean surgical field) (grade 1A recommendation).
- The increased likelihood of surgical site infection may suggest additive risk for permanent synthetic mesh repair (grade 1C recommendation).

Sartelli, M., Coccolini, F., van Ramshorst, G.H. *et al.* WSES guidelines for emergency repair of complicated abdominal wall hernias. *World J Emerg Surg* **8,** 50 (2013) doi:10.1186/1749-7922-8-50

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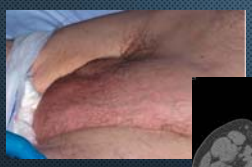
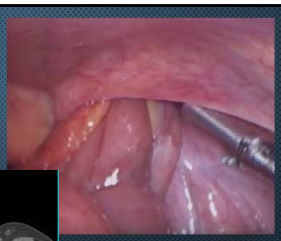
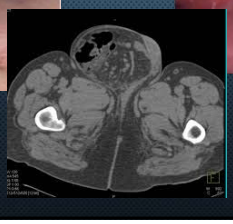
THE 2AM CONSULT…







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SEEMS LIKE HASSLE, WHY BOTHER?

- All things MIS
  - Faster recovery
  - Less pain
  - Shorter hospital length of stay
  - Better cosmesis
- Allows for through evaluation of the abdomen without a laparotomy and better visualization than inguinal incision
- Ability to perform hernia reduction under direct vision
- Allows for diagnosis and possible repair of contralateral hernia

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WHAT IS MY APPROACH?

Step 1: Clinically stable?

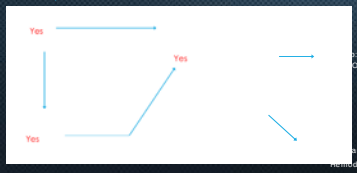
No → open vs most expeditious approach

Yes → MIS

Step 2: SBO?

Yes → Open

No (Minimal) → MIS Approach



Step 6: Hernia Repair

- Timing
- Type of hernia repair
- Type of mesh

Hernia Repair

Open

Tissue Repair

Mesh Repair

MIS

Transabdominal preperitoneal repair (TAPP)

Robotic – TAPP (R-TAPP)

Total extraperitoneal repair (TEP)

: Bowel resection

Open vs MIS

and reassess

Hemodynamic stability?

Gross contamination of hernia defect/sac?

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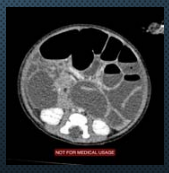
Step 1: Clinically stable?

No → Open vs most expeditious approach

Yes → Consider MIS approach

No working space for laparoscopy!



Step 2: SBO?

Yes → Open

- #1 reason for failed MIS approach

No /Minimal → MIS Approach

- Hassan entry to avoid bowel injury in setting of SBO

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Step 3: Reduction?

Yes →

No →

Step 4: Bowel viability?

No → Non-viable bowel

Yes →

1. Irrigate hernia sac,
2. Continue on to hernia repair

Step 3b: Try all tips/tricks***

Yes →

No → If failed then convert to open

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TIPS/TRICKS TO REDUCE THE HERNIA

- Attempt bowel reduction after induction of general anesthesia
- Sweeping motions
- Use atraumatic graspers
- Big bites on tissue to prevent tearing
- Avoid touching the bowel, pull on mesentery
- Traction and countertraction
- External compression of hernia to aid in reduction
- Open the hernia sac

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DIRECT HERNIA

- Open the hernia sac →
  - Releasing incision on the anteromedial aspect of defect to avoid epigastric/iliac vessels
  - Open the conjoined tendon or the outer rim of the abdominal rectus

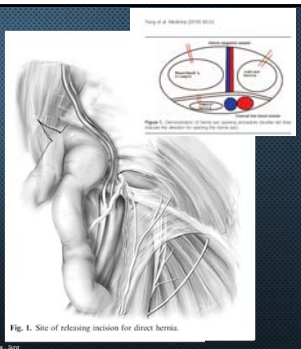

Fig. 1. Site of releasing incision for direct hernia.

Ferdi, G., Shapiro, K., Chaudry, G. et al. Laparoscopic extraperitoneal approach to acutely incarcerated inguinal hernia . *Surg Endosc* **18,** 228–231 (2004) doi:10.1007/s00464-003-8185-y
*Yang S, Zhang G, Jin C, Cao J, Zhu Y, Shen Y, Wang M. Transabdominal preperitoneal laparoscopic approach for incarcerated inguinal hernia repair. A report of 73 cases. *Medicine (Baltimore)*. 2016 Dec;95(52):e5686. doi: 10.1097/MD.0000000000005686. PMID: 28033260; PMCID: PMC5207556.

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INDIRECT HERNIA

- Dividing the epigastric vessels may allow for easier dissection of the sac
- Additional 5mm port may aid in dissection
- Divide the internal ring at 12 o'clock toward the external ring
- Releasing incision anterolateral at site of epigastric vessels

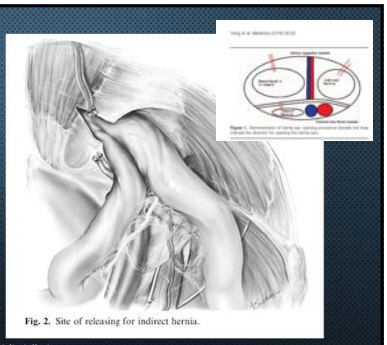

Fig. 2. Site of releasing for indirect hernia.

Ferdi, G., Shapiro, K., Chaudry, G. et al. Laparoscopic extraperitoneal approach to acutely incarcerated inguinal hernia . *Surg Endosc* **18,** 228–231 (2004) doi:10.1007/s00464-003-8185-y
Yang S, Zhang G, Jin C, Cao J, Zhu Y, Shen Y, Wang M. Transabdominal preperitoneal laparoscopic approach for incarcerated inguinal hernia repair. A report of 73 cases. Medicine (Baltimore). 2016 Dec;95(52):e5686. doi: 10.1097/MD.0000000000005686. PMID: 28033260; PMCID: PMC5207556.

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FEMORAL HERNIA

Releasing incision is often needed at the iliopubic tract insertion into cooper's ligament at the medial portion of the femoral ring

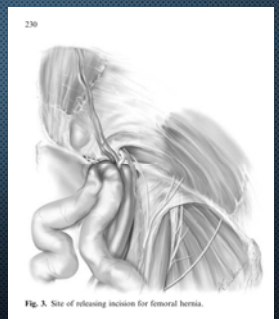

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Fig. 3. Site of releasing incision for femoral hernia.

Ferdi, G., Shapiro, K., Chaudry, G. et al. Laparoscopic extraperitoneal approach to acutely incarcerated inguinal hernia . *Surg Endosc* **18,** 228–231 (2004) doi:10.1007/s00464-003-8185-y

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Step 4: Bowel viability?

No → Non-viable bowel → Step 4b: Bowel resection
Open vs MIS

Yes →

1. Irrigate hernia sac,
2. Continue on to hernia repair

Step 5: Stop and reassess
Hemodynamic stability?
Gross contamination of hernia defect/sac?

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Step 5: Stop and reassess
Hemodynamic stability?
Gross contamination of hernia defect/sac?

Step 6: Hernia Repair

- Timing ?
- Type of hernia repair ?
- Mesh ?

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SHOULD I FIX THE HERNIA OR LEAVE IT FOR ANOTHER DAY?

Timing of hernia repair → Deferred
Timing of hernia repair → Delayed (24-48hrs)
Timing of hernia repair → Immediate

Always fix the hernia!
Otherwise risk of re-incarceration/strangulation
Reassess patient when ready for hernia repair
Hemodynamic stability?
Hernia sac/defect – gross contamination?

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AREN'T YOU WORRIED ABOUT A MESH INFECTION???

Recently studies have demonstrated the safety of mesh implantation after incarcerated/ strangulated MIS hernia repair

[1]Yang et al. : 72 incarcerated/2 strangulated inguinal hernia s/p TAPP repair → 1 SSI

[2]Hoffman et al.: 15 incarcerated inguinal hernia s/p TEP repair → 0 SSI

[3]Liu et al.: 167 incarcerated/strangulated inguinal hernias → 122 open/45 laparoscopic, all with mesh

- 45 (8.4%) bowel resection
- Overall 3% SSI
- 2/25 SSI after bowel resection

346 *Surgical Innovation 26(3)*

Table 2. Postoperative Complications.

Items	Open Surgery Group (N = 122)	Laparoscopic Surgery Group (N = 45)	P
Wound infection	5 (3.0%)	0	
Nonviable hernia content	2/20 (10.0%)	0/5	
Viable hernia content	3/102 (2.9%)	0/40	
Mesh infection	0	0	
Chest infection	8 (6.6%)	2 (4.4%)	.909
DVT	2 (1.6%)	0	
Mortality			
Pulmonary embolism	1 (0.8%)	0	
Myocardial infarction	1 (0.8%)	0	
Recurrence	2	0	
Operation time (minutes)	65 ± 13	70 ± 15	.503
Hospital stay (days)	6.2 ± 2.6	3.6 ± 0.6	.022

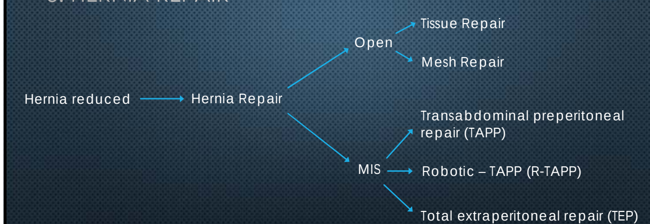
Abbreviation: DVT, deep vein thrombosis.

[1]Yang S, Zhang G, Jin C, Cao J, Zhu Y, Shen Y, Wang M. Transabdominal preperitoneal laparoscopic approach for incarcerated inguinal hernia repair: A report of 73 cases. *Medicine (Baltimore)*. 2016 Dec;95(52):e5686. doi: 10.1097/MD.0000000000005686. PMID: 28033260; PMCID: PMC5207556.

[2]Hoffman, A., Leshem, E., Zmora, O. et al. Surg Endosc (2010) 24: 1815. https://doi.org/10.1007/s00464-009-0857-9

[3]Liu, J., Zhai, Z., & Chen, J. (2019). The Use of Prosthetic Mesh in the Emergency Management of Acute Incarcerated Inguinal Hernias. *Surgical Innovation*, *26*(3), 344–349. https://doi.org/10.1177/1553350619828900

6. HERNIA REPAIR



*<u>*Must start TAPP/intraperitoneal first – reduce hernia/resect bowel then continue TAPP or TEP</u>*

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TAPP VS. TEP – DO WHAT YOU KNOW!

- 12 mm supraumbilical port + 2-5mm midclavicular line
- Open peritoneum 4 cm superiorly from medial umbilical ligament to ASIS
- Create peritoneal flap exposing the inferior epigastric vessels, pubic symphysis, Cooper's ligament, & iliopubic tract
- Introduce mesh (10-15 cm wide)
- Tack fixation of mesh to Cooper's ligament
- Closure of peritoneum (tacks or suture)

- Infraumbilical incision in the anterior fascia is made lateral to the linea alba, rectus muscle retracted laterally, exposing the posterior rectus sheath
- Open up the preperitoneal space under direct visualization
- Place two 5 mm trocars under direct visualization in the infraumbilical midline
- Landmarks and dissection are identical to the TAPP repair
- No closure of the peritoneum unless there an inadvertent defect is made

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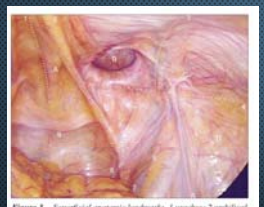
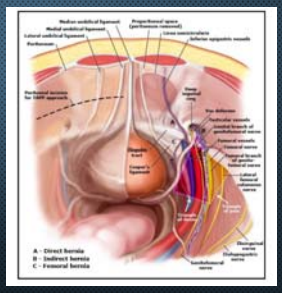


Figure 3. Superficial anatomic landmarks. 1 urachus; 2 umbilical medial ligament; 3 epigastric vessels; 4 projection of inguinal ligament (iliopubic tract); 5 testicular vessels; 6 external iliac artery; 7 external iliac vein; 8 vas deferens; 9 urinary bladder. A internal inguinal region; B middle inguinal region with large direct hernia; C external inguinal region (deep inguinal ring); D pain triangle; E vascular triangle



Moldovanu, R & Pavy, G- (2014). Laparoscopic Transabdominal Pre-Peritoneal (TAPP) Procedure - Step-by-Step Tips and Tricks.. Chirurgia (Bucharest, Romania : 1990). 109. 407-415.

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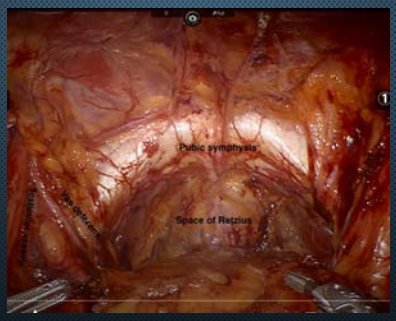

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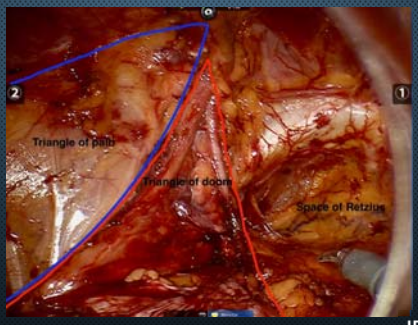

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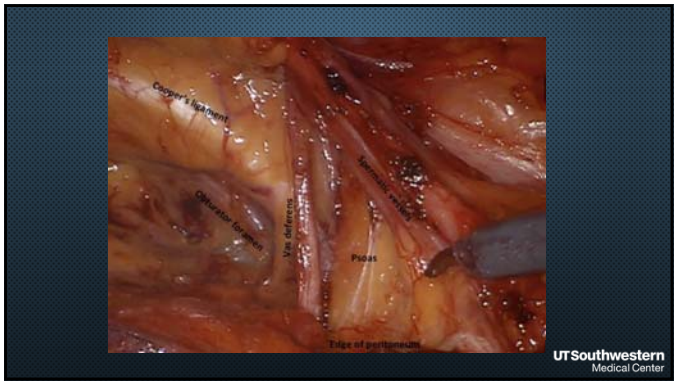
Cooper's ligament
Obturator foramen
Vas deferens
Spermatic vessels
Psoas
Edge of peritoneum
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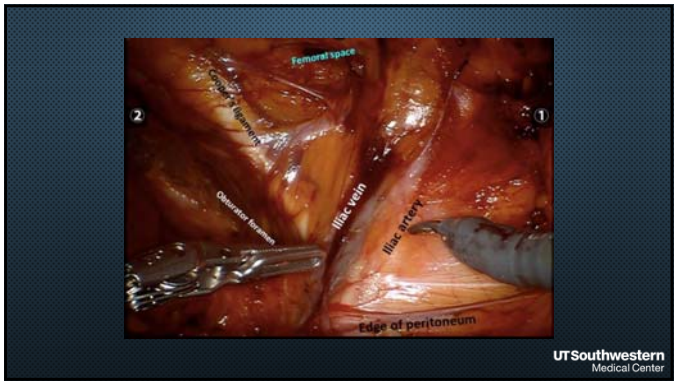
Femoral space
2
1
Obturator foramen
Iliac vein
Iliac artery
Edge of peritoneum
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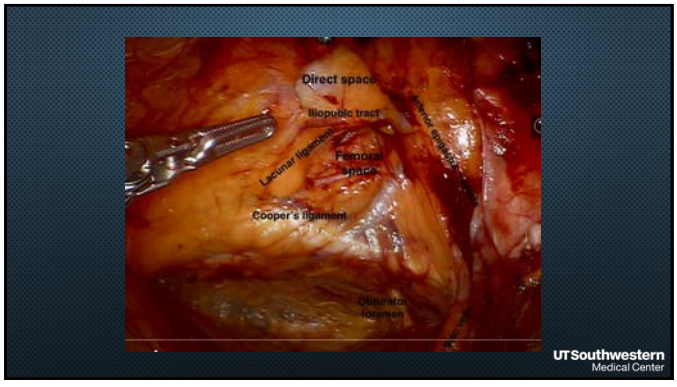
Direct space
Iliopubic tract
Lacunar ligament
Femoral space
Cooper's ligament
Obturator foramen
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MY 2 CENTS…

- This is not a 1 size fits all – every patient is different, every hernia is different
- Assess your resources – staff, equipment, assistant
- You can always start MIS and abort
- Be willing to step outside of your comfort zone
- Improve skills by doing elective MIS hernia repairs
- When its been awhile, I still review pictures to remind myself of anatomy
- Patient selection is important

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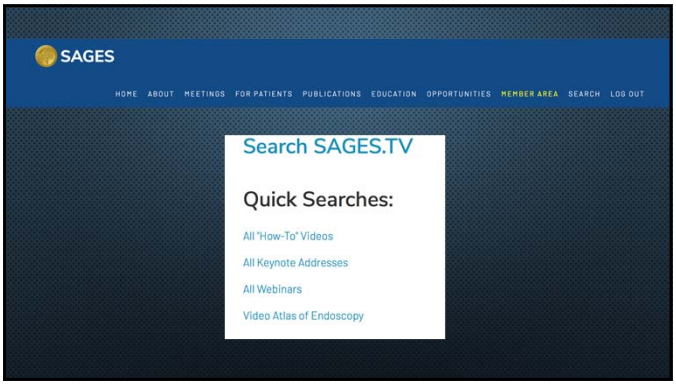

THANK YOU!