TEP, TAPP, IPOM, AND Open: an algorithmic approach to inguinal hernias

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Disclosures

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- MAB: VIA Surgical
- Founder: IncLinx.com

Mount Sinai Medical Center
New York City
Thank You
Groin Hernias

- Annual repairs: 20M worldwide, 800,000 in US
- Recurrence in 2%
- Significant pain in 6 - 8%
  - (50,000 new cases of pain per year)
Introduction: Recipe for Success

Inguinal Hernia Repair

- Patient
- Technique
- Prosthetic
Technique will depend on experience and outcomes.
Why laparoscopy for inguinal?

• In USA, many still choose open repair
  – Cost ($)
  – Anesthesia
Why laparoscopy for inguinal?
Laparoscopy (TEP): Outcomes

• Rapid recovery
• Quick return to work and daily activities
• Better Quality of Life outcomes
• Less acute pain complaints
• Very few intraabdominal morbidities
• Overall very low recurrence rates*

*when performed by experienced groups
TEP vs OPEN (level 1 evidence)

Pain in first 6 weeks: Favors TEP

- Dahlstrand U et al. 2013.
  - TEP under general anesthesia is superior to Lichtenstein under local in terms of pain 6 weeks after surgery: a randomized clinical trial. Surg Endosc
TEP vs Lichtenstein (2013): systematic review with meta-analyses and trial sequential analyses of RCT

• 13 trials had randomized 5404 patients

• **No conclusive evidence** of a difference b/t TEP and Lichtenstein for
  – chronic pain,
  – recurrences,
  – severe complications.

? Technique

- Surgeons who specialized in one method of hernia repair appeared to have excellent outcomes whenever they operated.

Evolution of Inguinal Hernia

1559 - 1989

Open

- Stromayr 1559
- Lucas-Championnière 1881
- Bassini 1889
- McVay 1942
- Shouldice 1945
- Lichtenstein 1984
- Stoppa 1989

Evolution of Inguinal Hernia

1559 - 1989
- Stromayr 1559
- Lucas-Championnière 1881
- Bassini 1889
- McVay 1942
- Shouldice 1945
- Lichtenstein 1984
- Stoppa 1989

1990-2008
- Ger 1990
- Velez and others in 1990
- Others

2009 ---
- Just now being described

SILS / NOTES / Robotics

Find a Doctor

Dr. Diego R. Camacho, MD
Specializes in General Surgery - Male - Age 42

Patient Satisfaction

Montefiore Medical Center
111 E 210th St
Bronx, NY 10467
Phone Number & Directions →

How was your experience?

Dr. Camacho's Background
Research training, expertise and qualifications
Connect with friends and the world around you on Facebook.

See photos and updates from friends in News Feed.

Share what’s new in your life on your Timeline.

Find more of what you’re looking for with Graph Search.

Sign Up
It’s free and always will be.

First Name
Last Name

Your Email
Re-enter Email
New Password

Birthday

Why do I need a birthday?

Female
Male

By clicking Sign Up, you agree to our Terms and that you read our Data Use Policy, including our Cookie Use.

Sign Up

Create a Page for a celebrity, band or business.
Matt Maunu

16 y/o male with inguinal hernia. Mesh or no mesh?

Amiki Szold If mesh is good for a 20 year old, why is it different 4 years earlier?
3 hours ago · Like

Brian Jacob Lap tep with mesh is great for the recurrence after Marcy.
3 hours ago · Like

Guy Voeller coz you don't know how to do proper Marcy
2 hours ago via email · Like

Andreas Koch ... but is there real evidence to use mesh in every case?? For a 20 years old male with an L I Hernia Shouldice or marcy would also be a good choice, the problem of all studies is that we are looking for THE INGUINAL HERNIA without classification of size and location, we don' t know which is the best procedure in case of young males with small indirect hernias
2 hours ago · Like

Michael Rosen If he isn't symptomatic just wait
2 hours ago via mobile · Like

Matt Maunu That's what I recommended, and they agreed. Now mom is a little nervous about waiting. I'll try and reassure them again, but, if pushed am leaning towards a TEP with light weight mesh. But, will use this discussion when I speak with mom about the options/risks/etc.
2 hours ago via mobile · Like
Patient Education– CeQOL

All decisions start with the patient

- Individualize our approaches
  - Option you choose will depend on
    - Patient goals / expectations
    - Patient history (pain or bulge)
    - Patient’s hernia
    - Intraoperative findings
    - Surgeon’s experience
- Hernia surgeons need to know how to perform ALL
Laparoscopy vs. Lichtenstein: QoL

Fig. 2 Main categories of SF-36 form. * Significant result

Laparoscopy vs. Open: Chronic Pain

- RCT

N=1370

665 TEP

- 5 years

705 Open

- 94% follow-up

- 5 years

TEP vs. Lichtenstein: Chronic Pain


* P < 0.001
Left Inguinal Anatomy: Laparoscopic View

- Internal Ring
- Inferior Epigastric Vessels
- Rectus Abdominis Muscle
- Iliopubic Tract
- Pubic Tubercle
- Femoral Ring
- Cooper's Ligament
- External Iliac Artery
- External Iliac Vein

Types of Inguinal Hernias:
- **Indirect**
- **Direct**
- **Femoral**
Right Groin Nerves and Laparoscopic Mesh Anatomic Relationship in a Cadaveric Dissection
TEP equipment
Incision and Entry into preperitoneal space: TEP
TEP: Creating the preperitoneal space
Trocars: standard TEP
“e-TEP” (modification of TEP)

The enhanced view—totally extraperitoneal technique for repair of inguinal hernia

Jorge Daes

Fig. 4 Setup for a unilateral right inguinal hernia
LEFT GROIN: Peritoneum reduced
LEFT GROIN: Peritoneum reduced

Direct space

Indirect space

Cord
Laparoscopy: great for direct hernia
laparoscopy: great for femoral hernia
laparoscopy: great for indirect hernia
Mesh covers all defects with overlap
TEP vs. TAPP

- More than 12,000 patients
  - No differences for recurrence rates, vascular injuries, and OR time
  - TEP
    - More conversions to another type of procedure
    - May be harder to learn
  - TAPP
    - Slightly higher
      - Intraabdominal adhesions
      - Trocar site hernias
      - Visceral injuries

TEP vs. TAPP: Only one RCT

• 1 RCT (n=52)
  – Length of stay was shorter in the TEP group
    • (mean difference: -0.70 days, 95% CI -1.33 to -0.07; p=0.03)
  – No differences in OR time, LOS, recurrence, return to activity

Schrenk, British Journal of Surgery 1996
TEP: no peritoneum to close!
TAPP: early internal hernia through peritoneal defect
TAPP: early trocar site hernia

Higher occurrence of bowel obstruction
TAPP: 0.5% (6 / 1,157) versus 0.07% (1/1,357) for TEP

TAPP: late adhesions
So, TEP or TAPP or open
How do I choose??
All are appropriate at different times
Indications / recommendations

**TEP**
- All Primary Hernia
  - (unilateral or bilateral)
- All Recurrences
  - Following open hernia repair
- Prior lower midline incisions and prostatectomy*

**TAPP**
Primary Hernia with history of lower abdominal surgery

- Outcomes- TEP
  - 1388 patients/10 years
    - 171 previous lower midline incision
- Enterotomy: 3
  - All in early experience
- Cystotomy: 4

Schwab JR. et al. Surg Endosc. 2002
## Indications / recommendations

<table>
<thead>
<tr>
<th>TEP</th>
<th>TAPP</th>
</tr>
</thead>
</table>
| • Primary Hernia  
  – (unilateral or bilateral) | |
| • Recurrences  
  – Following open hernia repair | |
| • Prior abdominal surgical history, including lower midline and prostatectomy* | |
Incarcerations / strangulations
Indications / recommendations

**TEP**
- Primary Hernia
  - (unilateral or bilateral)
- Recurrent hernia
  - Following open hernia repair
- Prior abdominal surgical history, even involving lower midline

**TAPP**
- Incarcerations or strangulations
Scrotal Hernias
Indications / recommendations

**TEP**
- Primary Hernia
  - (unilateral or bilateral)
- Recurrent hernia
  - Following open hernia repair
- Prior abdominal surgical history, even involving lower midline

**TAPP**
- Incarcerations or strangulations
- Scrotal hernias
Inguinodynia: tack
Inguinodynia: recurrence
Inguinodynia: old mesh
Inguinodynia: missed hernia after plug and patch
## Indications / recommendations

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• Prior abdominal surgical history, even involving lower midline | • Incarcerations or strangulations  
• Scrotal hernias  
• **Inguinodynia** |
Recurrences

<table>
<thead>
<tr>
<th>Investigator</th>
<th>Recurrence rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Laparoscopic</td>
</tr>
<tr>
<td>TAPP versus open mesh</td>
<td></td>
</tr>
<tr>
<td>Payne, et al [18]</td>
<td>0</td>
</tr>
<tr>
<td>Filippi, et al [19]</td>
<td>0</td>
</tr>
<tr>
<td>Haijkainen, et al [20]</td>
<td>0</td>
</tr>
<tr>
<td>Khoury, et al [31]</td>
<td>3%</td>
</tr>
<tr>
<td>Andersson, et al [32]</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Bringman, et al [33]</td>
<td>2 (2%)</td>
</tr>
<tr>
<td>Colak, et al [34]</td>
<td>2 (3%)</td>
</tr>
<tr>
<td>Lal, et al [35]</td>
<td>0</td>
</tr>
<tr>
<td>Eklund, et al [36]</td>
<td>5 (1%)</td>
</tr>
<tr>
<td>Multicenter prospective randomized trials</td>
<td></td>
</tr>
<tr>
<td>MRC [37]</td>
<td>7 (1.9%)</td>
</tr>
<tr>
<td>SCUR [39]</td>
<td>4</td>
</tr>
<tr>
<td>VA [40]</td>
<td>10.1%</td>
</tr>
</tbody>
</table>

Laparoscopic: 0 – 13%
Open: 0 – 11%
Laparoscopy for recurrences: not widely used in Europe

- **R1 recurrence**: most authors prefer a Gilbert’s repair through an anterior approach, under local anesthesia.

- **R2 recurrence**: preperitoneal modified Wantz repair under local anesthesia. If R2 recurrence is due to a previous preperitoneal mesh repair, an anterior approach with a Lichtenstein, Gilbert or Trabucco repair is preferable. In both cases, only local anesthesia is used and the patient is discharged immediately.

- **In patients with an R3 recurrence**, prefer a Stoppa operation by preperitoneal approach, the Wantz technique or the laparoscopic technique.

Recurrent Inguinal Hernia: Any data to support laparoscopy?

- **82 patients** (recurrences following open repairs)
  - Giant scrotal hernias excluded
- **Randomly assigned to**
  - TAPP (24) [Group A]
  - TEP (26) [Group B]
  - Open Lichtenstein (32) [Group C]
- Followed post-operatively for 3 years
- **Primary outcomes**
  - Pain
  - Return to normal activities (professional or otherwise)

Significantly less pain laparoscopically.

Table 3. Visual analog scale of pain

<table>
<thead>
<tr>
<th>Time point postoperatively</th>
<th>TAPP (GROUP A: n = 24)</th>
<th>TEP (GROUP B: n = 26)</th>
<th>OPEN (GROUP C: n = 32)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hours</td>
<td>4</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12 hours</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>24 hours</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>48 hours</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>7 days</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>20 days</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Return to full ordinary and professional activities</td>
<td>Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>14 ± 9</td>
<td>13 ± 8</td>
<td>20 ± 11</td>
</tr>
</tbody>
</table>

*Median values recorded postoperatively with patients at rest (p = 0.001). Days (mean values) until return to full ordinary and professional activities (p = 0.001) also are presented.

- Lap repair was the reference standard.
  - Suture repair (2.55 hazard ratio for recurrence)
  - Plug repair (2.31)
  - Lichtenstein repair (1.53)
  - Open preperitoneal mesh (1.36)
- Laparoscopic and open preperitoneal repair were associated with a lower risk of reoperation following repairs of an open recurrence (p<0.001)
Etiology: Mesh shrinks
Recurrence after TEP or TAPP
Recurrence after TEP or TAPP:
- large defects: role for IPOM
## Indications / recommendations

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<td><strong>Recurrence</strong></td>
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<td>Prior abdominal surgical history, even involving lower midline</td>
<td><strong>After TEP or TAPP</strong></td>
</tr>
</tbody>
</table>
Female, palpable inguinal hernia, but also a history of Pfennenstein
Recommendations

**TEP**
- Primary Hernia
  - (unilateral or bilateral)
- Recurrent hernia
  - Following open hernia repair

**TAPP**
- Incarcerations or strangulations
- Scrotal hernias
- Inguinodynia
- Recurrence
  - After TEP or TAPP
- Women with previous Pfenensteil
- Prior abdominal surgical history involving lower midline*

*Can also be done via an open technique*
Not all hernias need to be fixed

- Evidence to support watchful waiting until symptoms worsen without adverse events
Conclusions

Is this patient a candidate for a laparoscopic repair?

- Type of hernia
- Patient's history, goals
- Intraoperative findings

Laparoscopy: TEP / TAPP / IPOM?

Initial choice depends on experience

Open technique viable?

Does patient need surgery?

Yes

No

1) Lichtenstein
2) Plugs
3) Open Preperitoneal
4) Lap assisted hybrids

1) Watchful waiting
Conclusions

• Establish and individualize goals

• There is no “one BEST” approach
  – A hernia specialist should be familiar with all available options
  – Each method has its merits and its disadvantages

• Utilize the technique you are most familiar with, but have back up plans for specific scenarios
Hernia Surgeon Global Communities

#Quality Improvement Through Social Media

- Google+
  - bpjacob@gmail.com

- Ask to join:

- International Hernia Collaboration

- www.herniagroup.com
Surgical Spring Week
SAGES 2014
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April 2 - 5, 2014  Salt Lake City, UT

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