SCQR & Hernia Surgery: Everything you wanted to know, but were afraid to ask
Richard E. Burney, MD, FACS is a general surgeon who joined the faculty at Michigan Medicine in 1976. In addition to working as a general/endocrine/gastrointestinal/trauma/critical care surgeon, he played many leadership roles, including head of the emergency service, medical director of Survival Flight, head of the Michigan Committee on Trauma, President of the Michigan Peer Review Organization, and Chairperson of the Michigan Board of Medicine. He has had a long-standing interest in quality of care, doing some of the first studies on patient reported outcomes and functional health status after surgery. He was President of the American Health Quality Association during the period when CMS made the transition from quality assessment to quality improvement, with the help of the Institute for Healthcare Quality Improvement (IHI). He joined MSQC in November 2019 when he stepped away from working in the operating room after 50 years as a surgeon.
Objectives

• Provide details of anatomical structures
• Identify key terms and concepts related to CPT coding
• Describe the different common and uncommon hernia types
• Describe the use of mesh, the different types, and placements
• Illustrate devices used during hernia surgery
• Review surgical techniques
A hernia is a defect in the abdominal wall musculature or fascia through which intra-abdominal contents protrude.
Basic Anatomy: two perspectives

Regions of the Abdominal Wall
- Epigastric area
- Umbilical/periumbilical
- Flank/Lumbar area
- Hypogastric area

Landmarks of the Abdominal Wall
- Linea Semilunaris: Lateral edge of rectus sheath
- Arcuate Line: Lower edge of posterior rectus sheath
- Inguinal canal
• Linea alba = midline confluence of the aponeuroses of rectus muscles.
• Aponeurosis of external oblique → anterior rectus sheath.
• Aponeurosis of internal oblique above the level of the umbilicus → anterior and posterior rectus sheath.
• Aponeurosis of the transversus abdominis above the level of the umbilicus → posterior rectus sheath.
• There is no posterior rectus sheath below the umbilicus.
Abdominal Wall Hernia Locations (as distinct from hernia types) for Synoptic note*

*For MSQC – M1 and M2 will be captured as M2 (Program Manual-pg 199)
## Terms and Concepts

<table>
<thead>
<tr>
<th>Initial Hernia</th>
<th>Recurrent Hernia</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Hernia has not been previously surgically repaired</td>
<td>• Hernia has been previously surgically repaired</td>
</tr>
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</table>

**Common error**: An **initial** incisional hernia is the *first repair* of an incisional hernia (aka: an incisional hernia that has not been previously repaired). Some surgeons will errantly call *any* incisional hernia ‘recurrent’. It is only **recurrent** if it has been repaired one or more times before.
### Terms and Concepts

<table>
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<th>Reducible</th>
<th>Incarcerated</th>
<th>Strangulated</th>
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<tbody>
<tr>
<td>• Hernia reduces spontaneously when patient is supine and relaxed, or contents can be pushed back in with gentle manipulation.</td>
<td>• Hernia content is non-reducible by palpation or change of position</td>
<td>• Blood supply to hernia contents is compromised, leading to ischemia and or necrosis.</td>
</tr>
<tr>
<td></td>
<td>• May contain preperitoneal or omental fat, or bowel</td>
<td>• Associated with bowel obstruction if hernia contains bowel</td>
</tr>
<tr>
<td></td>
<td>• Not usually a surgical emergency in absence of pain, tenderness or without evidence of bowel obstruction</td>
<td>• Surgical emergency</td>
</tr>
</tbody>
</table>

**Controversy:** The terms “incarcerated” and “strangulated” are often mixed up, misused, or misapplied in operative notes.
Why Repair a Hernia?

**Cosmesis** - Hernias are ugly!

**Function**
- Discomfort
  - Common symptoms: Bulge, dull ache
  - Less Common symptoms: Pain/Tenderness
- Impair function
- Affect activities of daily living or work

**Prevention**
- Reduce/eliminate risk of strangulation
- Pain management - Protruding hernias may cause pain
- Difficult to reduce – at risk for strangulation

**Not all hernias need to be repaired or should be repaired**
Surgical Approaches

Open
- Operation done through skin incision over the site of the hernia
- Advantageous for incarcerated or strangulated hernias

Laparoscopic (minimally invasive)
- Operation done via laparoscopic ports
- Less pain after operation
- Note: Fascial defect may not be closed, only covered by mesh

Robotic (minimally invasive)
- Newer form of laparoscopic repair
- Controversial: Not proven beneficial for abdominal wall hernias
Hernia Types & CPT Codes Overview

Ventral Hernia: A generic term encompassing *all anterior* hernia types

### Common types of ventral hernias

<table>
<thead>
<tr>
<th>Hernia Type</th>
<th>CPT Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epigastric</td>
<td>• 49570, 49572, 49652, 49653</td>
</tr>
<tr>
<td>Umbilical</td>
<td>• 49585, 49587, 49652, 49653</td>
</tr>
<tr>
<td>Incisional</td>
<td>• 49560, 49561, 49565, 49566, 49654, 49655, 49656, 49657&lt;br&gt;• Parastomal (44346)‡</td>
</tr>
<tr>
<td>Inguinal</td>
<td>• 49505, 49507, 49520, 49521, 49525, 49650, 49651</td>
</tr>
<tr>
<td>Femoral</td>
<td>• 49550, 49553, 49555, 49557, 49659*</td>
</tr>
</tbody>
</table>

### Uncommon types of ventral hernias

<table>
<thead>
<tr>
<th>Hernia Type</th>
<th>CPT Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spigelian</td>
<td>• 49590, 49652, 49653</td>
</tr>
<tr>
<td>Lumbar</td>
<td>• 49540‡</td>
</tr>
</tbody>
</table>

Tip: Diastasis recti is not a true hernia; it is a gap between left & right rectus abdominus muscle. The surgical repair is a form of ‘tummy tuck’

*unlisted code to capture laparoscopic femoral hernia repair only<br>‡Note-MSQC does not capture this procedure.*
Hernia Types - Common

Umbilical hernia

- Bulge that pushes umbilical skin outward
- Always has peritoneal sac
- Caused by fascial defect (failure of fascial fusion) at site of umbilical cord vessels.
- Usually contains omentum and preperitoneal fat, but may harbor bowel

Technique
- Open: If small, easily repaired primarily, under local anesthesia and sedation.
  - Many surgeons may choose to place mesh (Prolene, “Ventralex” patch)
- Laparoscopic: Repair with mesh underlay indicated for large or recurrent hernias

Discussion & Practice
- Operative Report #1: Umbilical Hernia
- CPT Code?
Incisional hernia

Can occur anywhere there has been an abdominal incision including laparoscopic/robotic port sites and temporary stoma sites.

Causes

• Failure of wound healing
• Risk factors such as obesity, smoking, history of aneurysm

Technique

• Variety of approaches and techniques (can be confusing)
• Almost always uses mesh reinforcement – WHY?
  o Incisional hernias develop as a result of a failure of wound healing
  o 30-50% of primary incisional hernia repairs fail

The debate is not WHETHER to use mesh, but rather WHAT KIND of mesh to use and WHERE to place it!
More on MESH later!

Discussion & Practice

• Operative Report #2: Incisional Hernia
• CPT Code
## Clinical Pearls from the Surgeon’s Perspective

### Ventral vs Incisional Hernia

<table>
<thead>
<tr>
<th>Patient Classification</th>
<th>Incisional</th>
<th>Ventral</th>
<th>Mesh</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Open</strong></td>
<td>49560 (49561): Repair initial (recurrent) <strong>incisional</strong> or ventral hernia; reducible.</td>
<td>49560 (49561): Repair initial (recurrent) <strong>incisional</strong> or ventral hernia; reducible.</td>
<td>Ventral/Incisional (49560, 49561, 49565, 49566) does not include mesh Umbilical, epigastric, and Spigelian does include mesh (49570, 49571, 49585, 49587 and 49590).</td>
</tr>
<tr>
<td><strong>Laparoscopic</strong></td>
<td>49654 (49655): Laparoscopy, surgical, repair, <strong>incisional</strong> hernia; reducible (incarcerated/strangulated)</td>
<td>49652 (49653): Laparoscopy, surgical, repair, ventral, umbilical, Spigelian or epigastric hernia; reducible (incarcerated/strangulated)</td>
<td>All laparoscopic hernia repairs include mesh</td>
</tr>
</tbody>
</table>

TIP: MSQC Appendix A informs you which CPT codes include the mesh.
Hernia Types - Common

**Epigastric Hernia**

- Bulge in upper midline between umbilicus and xiphoid, usually closer to umbilicus.
  - There may be more than one small fascial defect
  - May be mistaken for and/or coincident with umbilical hernia

- Caused by small fascial defect(s) in the decussation (interdigitation) of the fibers of the linea alba.

- Contains only preperitoneal fat unless very large

- Technique: Primary (open) repair can often be done under local anesthesia with sedation
Hernia Types - Common

Inguinal Hernia Types

**Indirect**
- Peritoneal sac coming through internal inguinal ring
- Might contain bowel

**Direct**
- Bulging of inguinal floor between internal and external rings
- Usually contains preperitoneal fat
- Very large ones may contain bowel

**Sliding**
- Variation of indirect
- Bowel fused to peritoneum comes through a widely dilated internal inguinal ring

For MSQC, the type is not a factor in abstracting our cases, but it is in determining CPT code.
Hernia Types - Common

Inguinal Hernia

Surgical Approach: Open

- Primary tissue (suture) repair
  - Less commonly performed today because of recurrence rate.

- Mesh reinforced repair
  - “Lichtenstein” or “tension-free” repair
    - Usually using polypropylene (Prolite, Prolene) mesh
    - Placed over inguinal floor below external oblique aponeurosis

- Open preperitoneal repair using mesh – analogous to laparoscopic
**Hernia Types - Common**

**Inguinal Hernia**

**Minimally Invasive (Laparoscopic/Robotic) Approach**

- **TEP** – *totally extraperitoneal*
  - Done in preperitoneal space between peritoneum and abdominal wall
  - May use inflatable balloon to open this space
  - Mesh may be held in place by tacks or pressure of peritoneum after insufflation reduced

- **TAPP** – *transabdominal pre-peritoneal*
  - Scope and instruments placed into peritoneal cavity
  - Peritoneal flap (window) opened to expose inguinal space from below
  - After mesh inserted, peritoneal flap closed with tacks or staples

For MSQC, the L/S technique is not a factor in assigning CPT code

**Discussion**

- Operative Report: Inguinal Hernia
- CPT Code
Another Device Used During Hernia Surgery

Dissection Balloon

Example: Applied Medical
What is in the Inguinal Canal?

- In men: it contains the cremaster muscle, which envelops the cord structures (vas deferens, testicular vessels, nerves, fatty tissue, and associated connective tissues).

- In women: it contains the cremaster muscle, round ligament from the uterus, nerves, fat, and connective tissues.

- The ilioinguinal, genital branch of the genitofemoral n., & other nerves may be found in or on the cremaster muscle, on the internal oblique muscle, and along the inguinal floor.
Lipoma of the Cord

- Fat is commonly found in the inguinal canal whether you have a hernia or not. When there is a large amount, it’s called a lipoma of the cord.

- Large lipomas of the cord may be hard to differentiate from true hernias.

- Normally, they do not change in shape or configuration with coughing or straining.

- They are mistakenly called a “hernia” on ultrasound.
Clinical Pearls from the surgeon’s perspective

Inguinal CPT Codes and Clinical Review

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<td><strong>Open</strong></td>
<td>49505 (49520): Repair initial (recurrent) inguinal hernia, age 5 years or older; reducible</td>
<td>49507 (49521): Repair initial (recurrent) inguinal hernia, age 5 years or older; incarcerated or strangulated</td>
</tr>
<tr>
<td><strong>Laparoscopic/Robotic</strong>*</td>
<td>49650 (49651): Laparoscopy, surgical; repair initial (recurrent) inguinal hernia</td>
<td>49650 (49651): Laparoscopy, surgical; repair initial (recurrent) inguinal hernia</td>
</tr>
</tbody>
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*There is no CPT Code specifically for laparoscopic repair of incarcerated/strangulated inguinal hernia; if they are truly incarcerated, this is not the ideal approach.

Discussion:
- Read the operative note carefully to determine whether difficulty was encountered in reducing the hernia during the procedure.
- Some “incarcerated” hernias reduce as soon as anesthesia is induced. Should these qualify as incarcerated?
Clinical Pearls from the Surgeons’ Perspective

Sliding inguinal hernia CPT codes and Clinical Review

• There is a lot of variation on what surgeons can call a sliding hernia.
  o 49525: Repair inguinal hernia, **sliding**, any age.
    ▪ To qualify as a sliding hernia (and be coded as such), there should be a description of the wall of the hernia sac that has peritoneal content (bowel, omentum, pre-peritoneal fat) fused to it so that it cannot be reduced separately from the sac.
    ▪ Large sliding hernias can be more difficult because there is more diffuse weakness or larger defect in the internal oblique to repair before the mesh can be inserted.
  o Can a direct inguinal hernia also be a sliding hernia?
    ▪ Yes, but only on the rare occasion that the bladder (or other retroperitoneal structure) is in the hernia and is part of the hernia sac.

Tip: Since the laparoscopic repair of a sliding hernia is managed the same as a direct or indirect inguinal hernia, use that CPT code (49650 | 49651).
Hernia Types - Common

Femoral Hernia

• Comes through defect in inguinal ligament adjacent to femoral vein
  o Not in inguinal canal, hence different from inguinal hernia

• Occurs primarily in slender young or older women

• Peritoneal sac
  o May contain bowel or omentum
  o High risk of incarceration/strangulation

Technique:
• Repair similar to inguinal hernia – can be done open or laparoscopically.

• Strangulated femoral hernia may require bowel resection - best done open.
Hernia Types - Uncommon

Spigelian Hernia

- Rare, difficult to diagnose.
- Develops at or near intersection of arcuate line and linea semilunaris, just lateral to rectus muscle.
- Has peritoneal sac; can cause bowel obstruction.
- Laparoscopic approach preferred for diagnosis and treatment.
Mesh Types

More than 60 types/brands of mesh on the market (MSQC Program Manual pgs. 273-274)

- Most are **non-absorbable (synthetic or biosynthetic)**

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
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<tbody>
<tr>
<td>Permanent</td>
<td>Infection</td>
</tr>
<tr>
<td>Stronger</td>
<td>Erosion</td>
</tr>
<tr>
<td>Fewer reoccurrences</td>
<td>Pain</td>
</tr>
<tr>
<td></td>
<td>Cannot be used in contaminated cases</td>
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- **Absorbable (Biologic, absorbable synthetic)**

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<tbody>
<tr>
<td>Can be used in contaminated cases</td>
<td>Reabsorbs</td>
</tr>
<tr>
<td>Does not erode through adjacent tissues</td>
<td>Higher hernia reoccurrence rate</td>
</tr>
</tbody>
</table>
GENERAL PRINCIPLES for Mesh Placement and Fascial Closure

- Primary fascial closure is desirable
- Sublay is more effective than onlay
- Several methods to achieve primary fascial closure
  - Relaxing incision(s)
  - Component separation
    - Anterior to rectus muscle
    - Posterior to rectus muscle
  - Transversus abdominus release
    - Posterior to rectus m.
- Avoid mesh contact with bowel when possible by pre-peritoneal or subfascial placement
Mesh Placement

Where does the mesh go?

• Primary fascial closure with mesh insertion/reinforcement is preferred

  o **Onlay**
    On top of fascial repair

  o **Inlay**
    Patch repair with mesh bridging gap in fascia

  o **Sublay (underlay)**
    ▪ Retrorectus
    ▪ Preperitoneal
    ▪ Intraperitoneal
Skin
Ext Oblique
Int Oblique
Transversus abd
Peritoneum
Rectus Ms
Anterior fascial release/component separation
Transversus abdominus release
Myofascial Release – Component Separation

Transversus abdominis release
- Variation on sublay

- Technique
  - Open posterior leaf of internal oblique
  - Gains access transversalis plane
  - Opens huge retrorectus/retromuscular space for placing mesh
Mesh Fixation Devices & Methods

Suture
Absorbable tacks
Non-absorbable tacks
Self-gripping/self-fixating mesh
Adhesive (glue)


Covidien AbsorbaTack

http://www.laparoscopicexperts.com/laparoscopic-ventral-hernia-repair/
SCQR FAQs

• Please review the different mesh products. Many of them are similar.
  • See chart on slide 27
• How does the type of mesh you choose affect surgical outcomes?
  • See chart on slide 27.
  • In general, permanent mesh has lower recurrence rate, used in clean, non-contaminated cases.
  • It should not be used in contaminated or infected field because infected mesh is a difficult problem.
• How to determine which to choose for mesh placement: underlay, overlay, etc
  • Experience, judgment, anatomy. Not all options are possible or desirable in all patients.
• What are the differences between onlay, inlay and sublay?
  • See slides 28-30
  • Onlay is on top of fascia; inlay is between fascial edges; sublay is underneath the muscle or fascia. Sublay may be retrorectus, preperitoneal, or intraperitoneal.
Meaning of “Obstructed” in ICD-10 is not at all clear

• Incarcerated does not mean obstructed.
• Incarcerated means the bowel, omentum or some other tissue is stuck within the hernia, but without signs of bowel obstruction. GI function is normal.
• Obstruction literally means a bowel obstruction, so that signs and symptoms of that would have to be documented when using an ICD-10 code with obstruction.

• From the surgeon’s standpoint, the correspondence between coding and clinical reality (i.e., extent of disease, difficulty of procedure) is poor and leaves a great deal to be desired.
We hope that synoptic operative note will help us gain the information we need to carry out quality improvement,

And provide consistent data describing what was done for subsequent analysis.

Slide 36 has more information on variables called for in pilot project on hernia tab.

Hernia/Mesh Length and Width FAQs

Here are some tips we’ve learned for MEASUREMENTS, whether for the hernia or the mesh:

• Only one (1) value is provided (NOTE: for our purposes, 'dimension' = shape...so length or width, diameter or length X width)
  o Dimension is given as either length or width, capture the measurement in the identified variable, then capture 0.0 for the missing variable
    • Example: surgeon states “incisional hernia width is 8cm” and the surgeon did not provide the 2nd measure (length)
    • REPORT: hernia width = 8 (cm) AND hernia length = 0.0.

• No dimension is given in the documents (neither length or width), capture the known measurement in LENGTH, then capture 0.0 for the WIDTH
  o Example: surgeon states “hernia is 5.5 cm”
  o REPORT: hernia length = 5.5 (cm) AND hernia width = 0.0.

• Dimension is given as diameter, or circular or ‘size of small orange (etc.)’*
  o Example: surgeon states “hernia diameter is 4 cm”. Note: diameter = circle, which means equal measurements for length & width.
  o REPORT: hernia length = 4 (cm) and hernia width = 4 (cm)

• Zero/No dimensions or values are provided in the operative report or the preop documentation (H&P or Surgical Consult)
  o REPORT: 0.0 will be captured for BOTH length and width

• Both measurement values are provided, but NO dimensions, then capture 1st measurement as LENGTH and 2nd measurement as WIDTH
  o Example: surgeon states “4x6 mesh was placed”
  o REPORT: mesh length = 4 (cm) and mesh width = 6 (cm).

• *When a dimension is given as a descriptor, such as fruit, ball, fist – please send the description to MSQC DHL as we are trying to establish some equivalents values in centimeters.

• If not on the operative note, see if there is a CT study that may provide dimensions or the surgeons H&P, office notes prior to surgery or surgical consult.

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FAQ’s from survey

• How to determine location when specific landmarks are not documented.
  • Make your best guess? Call it ventral. Talk to a surgeon.

• Can you explain terminology that would be found in a robotic repair?
  • Docking of robot means bringing the robot into place and locking it into position.
  • Placement of robotic arms means attaching the robot arms to instruments that have been inserted through laparoscopic ports.
  • Otherwise terminology is basically the same as laparoscopic.
Resources:
https://emedicine.medscape.com/article/1534321-technique#c3
  Laparoscopic Inguinal Hernia Repair Technique.

  Technique of Groin Hernia Repair

https://www.slideshare.net/easwaramoorthy/prosthesis-and-fixation-device
  Information about use of Mesh and Mesh Fixation

https://www.youtube.com/watch?v=cFM7OkKMtOI
  AbsorbaTack™ 20 Short Product Animation for Open Ventral Hernia Repair