

# LAPAROSCOPIC REPAIR OF VENTRAL HERNIAS

## Background

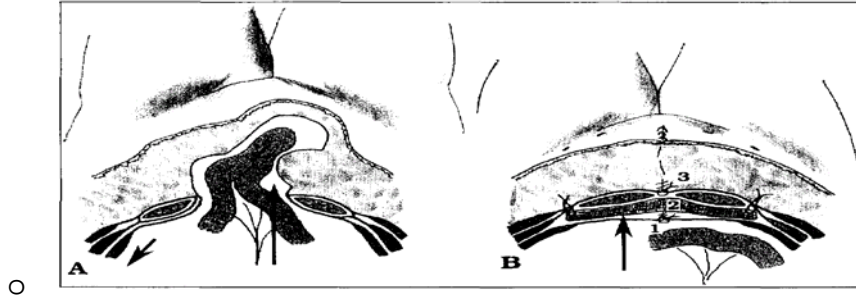
- Approximately 100,000 incisional ventral hernias repaired annually
- 2 million laparotomies / year -- 2-11% risk of developing incisional hernia

## Risk Factors

- Patient Factors
  - Age > 65
  - Male
  - Malnourished, hypoproteinemic
  - Anemia
  - Emergent laparotomy
  - Obesity
- Perioperative Factors
  - Wound infection (23% risk of hernia after infection – Bucknall 1985)
  - Factors that stress the wound
    - Intestinal ileus
    - Coughing
    - Vomiting
    - Urinary Retention
- Technical Factors
  - Type of incision – Paramedian and Transverse incisions less
  - Suture Type – continuous, absorbable

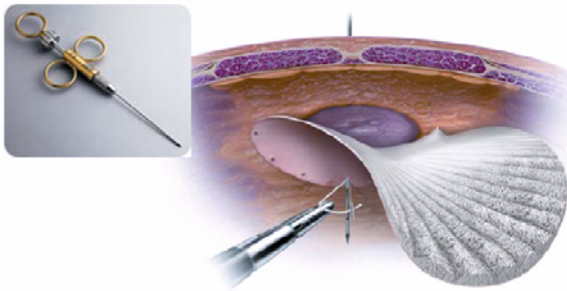
## Techniques of Hernia Repair

- Primary Repair
  - Recurrence rates of up to 50%
  - Always under tension
  - Not recommended for defects > 4-5cm
- Prosthetic Mesh Repair
  - Onlay technique
    - Sutured anterior to rectus sheath
    - Large subcutaneous dissection -- seroma , mesh infection
    - > 12% recurrence
  - Inlay technique
    - Mesh sewn circumferentially to fascial edge
    - 10-20% recurrence
  - Retrorectus mesh repair (Rives-Stoppa Repair)
    - Dissection between the rectus muscle and underlying posterior rectus sheath / preperitoneal space
    - Mesh fixed to muscle layer above
    - Recurrence < 5-10%
    - Large dissection - Mesh infection in 5-12%

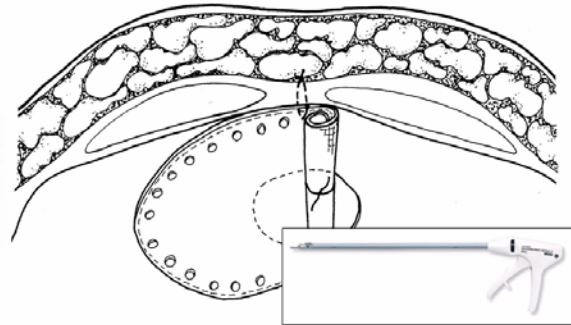


- Intraoperative Underlay Mesh repair
  - Enter the abdomen, dissect away bowel from abdominal wall
  - Suture mesh against posterior abdominal wall
  - Require bilayer meshes
  - Allows largest overlap of mesh
- Laparoscopic Intraoperative Underlay Mesh repair
  - Enter the abdomen away from the hernia defect
  - Mesh inserted through trocar site
  - Fixed to underside of abd wall w/ full thickness sutures or tacks

### Suture Fixation



### Tack Fixation



- Laparoscopic Ventral Hernia Repair – Technical Factors
  - Sutures vs. Tacks
    - Use of tacks is quicker
    - Transabdominal sutures too painful
    - Tacks limited penetration into abdominal wall
  - Mesh overlap
    - Larger overlap helps 3-5 cm

### Complications

- Mesh infection
  - Infection rates < 2 %
  - No dissection needed to place mesh
  - Newer antibiotic impregnated meshes in development

Wound and mesh complications in large series of laparoscopic ventral hernia repairs ( $\geq 50$  patients)

Name	Year	# pts	Seroma	Mesh infection	Wound infection	Fistula
Sanchez [41]	2004	85	8	0	0	0
Franklin [11]	2004	384	12	1	3	0
LeBlanc [19]	2003	200	15	4	0	0
Bower [28]	2003	100	1	2	0	0
Eid [18]	2003	79	3	0	0	0
Bencini [42]	2003	50	8	0	0	0
Carbajo [12]	2003	270	32	0	0	1
Rosen [45]	2003	100	4	2	4	0
Heniford [10]	2003	850	21	6	9	0
Bageacu [17]	2002	159	22	0	4	2
Aura [39]	2002	86	2	0	0	0
Raftopoulos [37]	2002	50	7	1	2	0
Ben-Haim [38]	2002	100	11	0	0	0
Gillian [16]	2002	100	3	0	0	0
Kirshtein [43]	2002	103	"most"	2	3	0
Berger [15]	2002	150	139	0	0	0
Birgisson [34]	2001	64	3	0	2	0
Chowbey [46]	2000	202	49	0	5	0
Toy [47]	1998	144	23	2	3	0
Overall		3276	363 (11.4%)	20 (0.6%)	35 (1.1%)	3 (0.1%)

- Seroma formation
  - Develop above the mesh and within the hernia sac
  - 97% will resolve within 8 weeks
- Persistent Pain
  - Point tenderness at site of transabdominal suture site
  - 1-3% cases
- Recurrence - Heniford 2003
  - 850 pts
  - Mean f/u 20.2 months
  - 34% Recurrent hernia
  - 13% complication rate -- < 2% wound infections
  - 4.7% recurrence overall

Rate of recurrence in select series of laparoscopic ventral hernia repair with and without the use of suture fixation

Name	Year	n	Defect size (cm <sup>2</sup> )	Mesh overlap	Suture fixation	Recurrence	Mean F/U (mths)
Franklin [11]	2004	384	NR	3-5 cm	"Most cases" <sup>a</sup>	11 (2.9%)	47.1
LeBlanc [19]	2003	200	111	$\geq 3$ cm	Yes	13 (6.5%)	36
Bower [28]	2003	100	124.4	$\geq 3$ cm	Yes	2 (2%)	6.5
Eid [18]	2003	23	103	3-5 cm	Yes <sup>b</sup>	0	13
Heniford [10]	2003	850	118	$\geq 3-5$ cm	Yes	40 (4.7%)	20.2
Raftopoulos [37]	2002	50	124.6	2-4 cm	Yes	1 (2.0%)	NR
Ben-Haim [38]	2002	100	30 <sup>d</sup>	NR	Yes	2 (2.0%)	19
Berger [15]	2002	150	96, 83 <sup>e</sup>	3-5 cm	Yes	4 (3.0%)	15
Aura [39]	2002	86	26.5 <sup>d</sup>	5 cm	Yes	6 (7.0%)	37
Parker [40]	2002	50	206	4 cm	Yes	0	41
Birgisson [34]	2001	64	4-416	$\geq 3$ cm	Yes	0	1-35
Total		2057				79 (3.8%)	

### Laparoscopic vs. Open Studies

- Many retrospective studies demonstrating benefits of Laparoscopic approach in terms of postoperative pain, morbidity, length of stay, and wound complications

Comparison studies of laparoscopic and open ventral hernia repairs

Name	Year	# patients		Morbidity		Mesh infection		Wound infection		Recurrence	
		lap / open	lap / open	lap / open	lap / open	lap / open	lap / open	lap / open	lap / open		
McGreevy [48]	2003	65	71	5	15	2	0	0	7	—	—
Raftopoulos [49]	2003	50	22	14	10	1	0	1	1	1	4
Wright [50]	2002	90	90	15	31	1	1	1	8	1	5
Robbins [51]	2001	18	31	—	—	1	4	1	0	—	—
DeMaria [36]	2000	21	18	13	13	1	2	1	4	1	0
Chari [52]	2000	14	14	2	2	0	1	—	—	—	—
Carbajo [35]	1999	30	30	20	6	0	3	0	5	1	2
Ramshaw [33]	1999	79	174	15	46	1	5	6	2	2	36
Park [23]	1998	56	49	10	18	2	1	0	2	6	17
Holzman [53]	1997	21	16	5	5	0	1	1	0	2	2
Percent				23.2	30.2	2.0	3.5	2.6	5.8	4.0	16.5

- Open operation – not defined
- 2 small prospective studies
  - Carbajo 1999 - 30/30 randomized prospective
    - 27 month f/u
    - Hospital stay, operative time shorter, complications less
    - 0 vs 6.7% recurrence
  - DeMaria 2000 - 21 lap / 18 open
    - Surgeon preference for operation type
    - Shorter hospital stay
    - No difference in recurrence or complications

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