Emerging Concepts in Ventral Hernia Repair

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Hobart W. Harris, MD, MPH

Emerging Concepts in VHR: Overview

- Prevention
- New Prosthetics
- Surgical Techniques
- Summary

General surgeons perform approximately 400,000 ventral hernia repairs per year in the United States;

While most efforts are focused on new materials or surgical techniques, the optimal solution is prevention;

Currently, there are two approaches to prevent incisional hernias:
- “small bites” suture technique
- prophyllactic mesh

Prevention: small bites

Although experimental and clinical evidence indicate that a greater number of stitches with a suture length to wound length (SL:WL) ratio >4:1 is associated with a lower incidence of incisional hernia, there is no evidence from randomized clinical trials to support this.

Br J Surg. 1993;80:1284-1286
Prevention: small bites

• A double-blinded, multicenter, randomized controlled trial comparing a standardized large bite technique with a standardized small bites technique - bite widths of 5 mm and spaced 5 mm apart with 2-0 PDS using a 31 mm needle;

• Primary outcome is the incidence of incisional hernia after 1 year using ultrasound to measure the distance between the rectus muscles;

• Secondary outcomes will include postoperative complications, direct costs, indirect costs and quality of life;

• A total of 576 patients will be randomized in an effort to provide Level 1b evidence to identify which continuous closure technique better prevents incisional hernias. (Clinicaltrials.gov NCT01132209)

Prevention: prophylactic mesh

• A few small studies have shown a reduced incidence of incisional hernias by reinforcing the midline fascia with prolene mesh:

  • El-Khadrawy et al (Hernia 2009;13:267-24) reduced the IH rate (15% vs 5%) via subfascial mesh in 40 high-risk patients;

  • Gutierrez de la Pena et al (Hernia 2005;7:198-206) reduced the IH rate (11% vs 0%) in 100 randomized high-risk patients via mesh onlay.

• Still, prophylactic mesh is cumbersome, time consuming and reserved for high-risk patients.

New Prosthetics

• Lightweight prolene mesh is widely endorsed for both inguinal and incisional hernia repair;
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• New prosthetics have surfaced consisting of “regenerative matrices” that are intended for implantation to reinforce soft tissue where weakness exists:
  - BIO-A (WL Gore)
  - Matristem (Acell)

BIO-A is a slowly absorbed, synthetic polymer matrix composed of polyglycolic acid (vicryl; 67%) and trimethylene carbonate (TMC; 33%) designed to serve as a synthetic tissue scaffold that is ultimately replaced with collagen I.

Matristem is an extracellular matrix from porcine urinary bladder and is a non-crosslinked scaffold that contains an epithelial basement membrane. It is available as a powder and in thin and thick sheets.
Surgical Techniques: laparoscopic vs open

- As of 2011, there were 10 RCT’s published with a total of 880 patients comparing laparoscopic versus open surgical repair of primary ventral or incisional hernias;
- The recurrence rate was not different between laparoscopic and open surgery (RR 1.22; 95% CI 0.62 to 2.38), however follow-up was <2 years in half of the studies;
- The most clear and consistent result was that laparoscopic surgery reduced the risk of wound infection (RR = 0.26; 95% CI 0.15 to 0.46), but was associated with an increased risk of enterotomy and much higher hospital costs (RR = 2.49, 5-9X);
- The results were mixed in terms of operative time, LOS, pain, cosmesis and return to work.

Surgical Techniques: laparoscopic vs open

- Eker et al (JAMA Surg 2013;148:259-263) multicenter RCT between May 1999 and Dec 2006 involving 206 patients with incisional hernias (3-15 cm) and a mean follow-up of 3 years;
- Primary outcome was pain; secondary outcomes included intraoperative complications, operative time, LOS, morbidity and recurrence.
- Operative time (100 min vs 76 min) and intraoperative complications (9% vs 2% - 5% vs 1% enterotomies) were higher in the MIS group;
- Postoperative complications (4% vs 5% wound infection), pain, recurrence (18% vs 14%) and LOS were no different between groups.

Surgical Techniques: posterior components separation

- Bilateral components separation is a highly favored technique, bolstered by the general trend away from placing synthetic mesh in contact with the viscera, via underlay or bridging fascial defects;
- Various procedures fall under this general descriptive term:
  - anterior rectus release
  - posterior rectus release ± retrorectus (Rives-Stoppa)
  - posterior components separation
  - transversus abdominis release
Importantly, this technique cannot be combined with an anterior release. Two of the three abdominal obliques must be intact or a flank hernia will result.
• Prevention remains the optimal solution, but the current approaches lack innovation and suitable feasibility;

• The “new” generation of prosthetics revive claims of tissue regeneration all over again, thus, there is reason for caution;

• Surgical techniques for reconstructing the abdominal wall aim to keep mesh out of the peritoneal cavity, place the prosthetic within a well-vascularized compartment and reconstitute the linea alba.

• Comparisons of laparoscopic versus open surgery for moderate sized ventral hernias appear to indicate differences in enterotomy rates, operative time, wound infection and costs, without clear superiority of either technique.