

Case Conference

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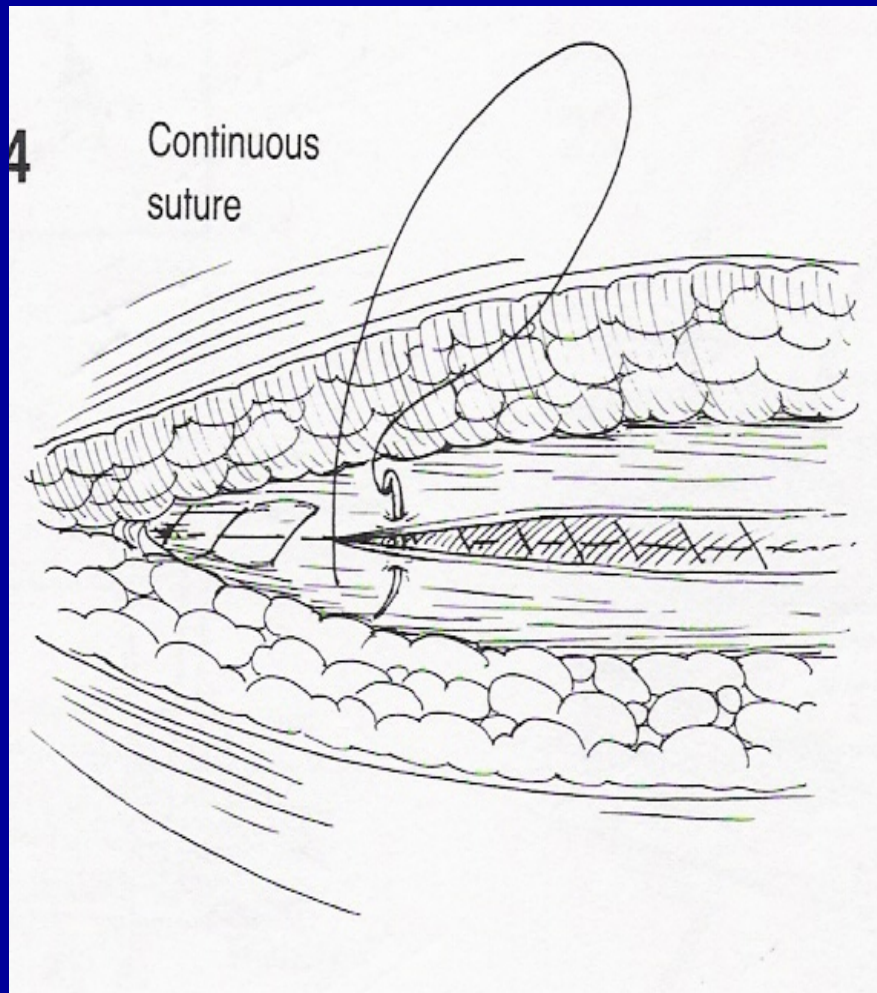
Abdominal Wall Closure

General considerations

Optimal closure technique based on:

1. Amount of blood lost
 2. Volume of fluid received
 3. Degree of contamination present
 4. Nutritional status
 5. Overall stability
- speed of closure may be determining factor
 - every effort should be made to close fascia primarily

Standard abdominal wall closure

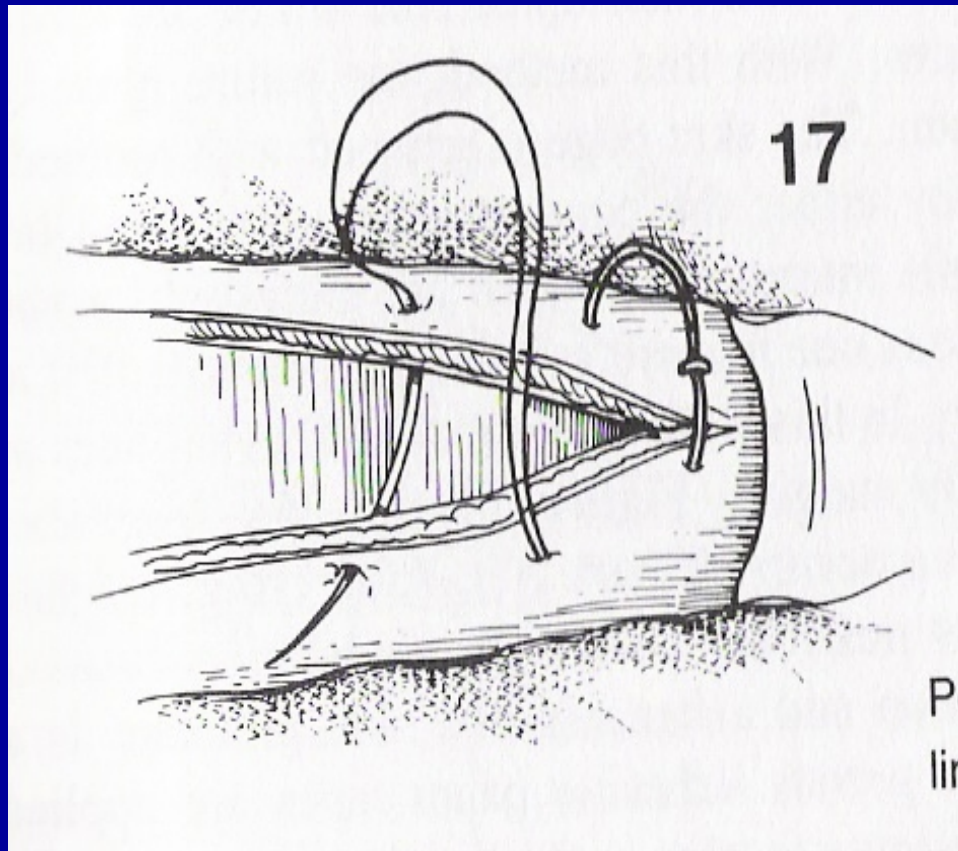


-most common technique
is continuous closure
with monofilament
suture

-major benefit:
relatively fast

-close in single or multiple
layers (peritoneum and
fascia)

Standard abdominal wall closure



- single layer
- continuous vs. interrupted: no difference in rate of fascial dehiscence, but extent of dehiscence generally less with interrupted method

Open abdomen technique

- the abdomen that won't close should not be closed
- basic surgical principle: tissue anastomoses subjected to strain are commonly made ischemic, resulting in anastomotic breakdown or hernia formation
- strained closure elevates intraabdominal pressure with associated compromise of abdominal wall blood flow, abdominal organ perfusion, respiratory function, venous return and cardiac output
- open abdomen technique is method of choice for managing select group of critically ill patients, significantly improves patient survival

Open abdomen technique

Disadvantages of open abdomen closure:

Exposed intestines at increased risk for perforation, subsequent “enteroatmospheric” fistulas

Definitive closure extremely difficult due to fascial retraction, resulting in huge incisional hernias

Indications for open technique

1. Excessive visceral edema / bowel distention- fascial edges may not be brought together
2. Post “damage control” laparotomy- gauze packs may displace abdominal contents
3. Planned reexploration- closure damages fascia before the definitive repair
4. Intraabdominal hypertension (> 15 mm Hg)
normal postop intra-abdominal pressure 5 – 15 mm Hg; when IAH accompanied by end-organ dysfunction, known as abdominal compartment syndrome

Abdominal compartment syndrome

Signs of organ dysfunction due to ACS:

Hypotension

Oliguria unresponsive to fluid

Refractory acidosis

Hypercarbia

Hypoxia refractory to increased FiO₂/PEEP

Elevated peak inspiratory pressures

Abdominal compartment syndrome

PE unreliable for identification of IAH, therefore intravesicular pressure monitoring can be done with Foley catheter

Pressure > 25 mm Hg with ≥ 1 sign organ dysfunction should be decompressed by laparotomy

Before decompression some authors recommend “decompression cocktail” of 1 – 2 L crystalloid, 100mEq Na bicarb, 50 g mannitol (sudden systemic reinfusion of acidotic, hyperkalemic mesenteric blood may cause cardiac arrest)

Options for temporary closure

Simple coverage with moist lap pads

Towel clips

“Bogota Bag”

Repeated entry: zippers, velcro, slide fasteners

Mesh

Simple coverage with moist lap pads / towels



- perform only in extreme circumstances
- gauze adheres to bowel, deserosalizes when unpack
- nonadherent material should be placed directly against abdominal viscera
- drain placed between nonadherent material and towel

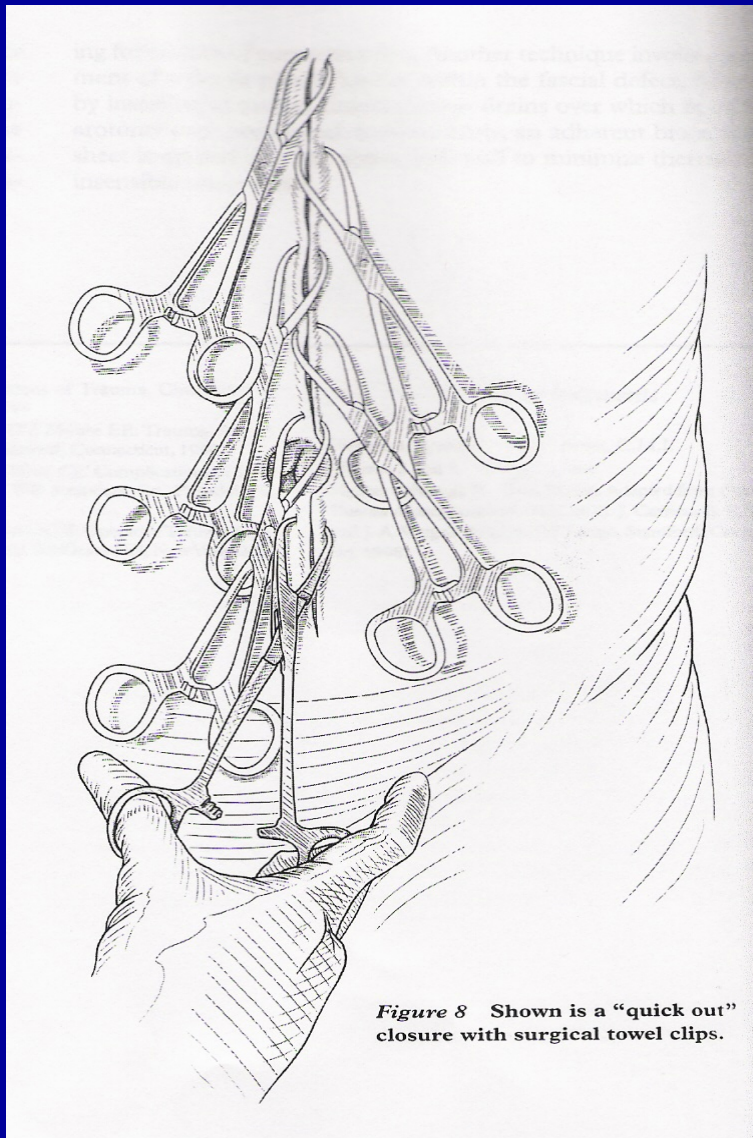


Figure 8 Shown is a "quick out" closure with surgical towel clips.

Towel clips

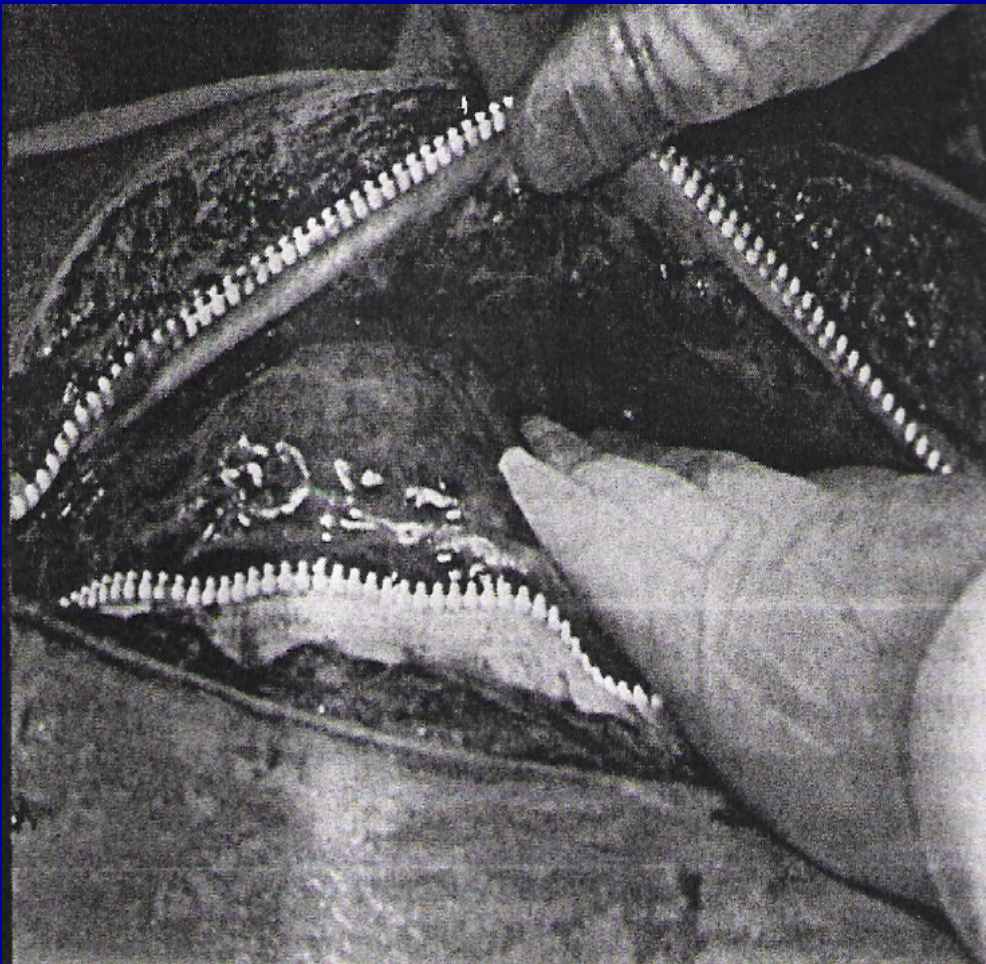
- skin approximation in conjunction with occlusive dressing
- simple coverage/ towel clips used when patient grossly unstable/coagulopathic

Bogota Bag



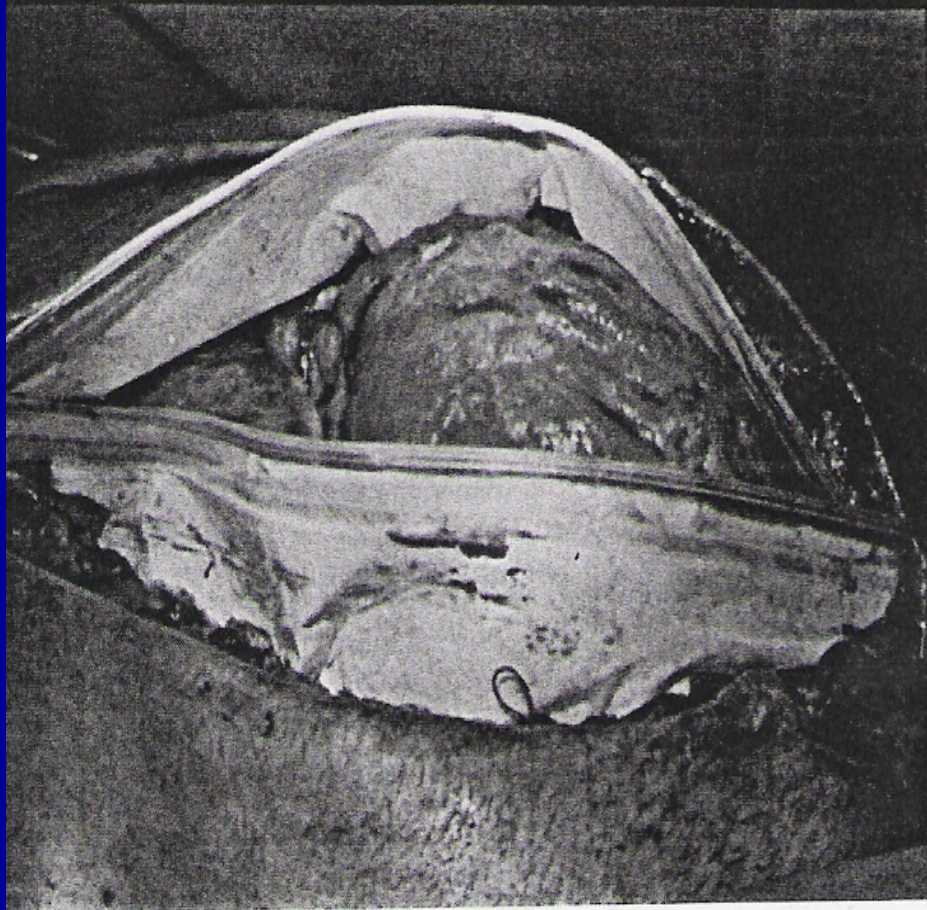
- named for Columbian surgeons who initially described its use
- sterilized 3-L cystoscopy fluid irrigation bag
- nonadherent, nondistensible, inexpensive
- can also use plastic wound drape or sterile radiograph cassette cover

Repeated entry



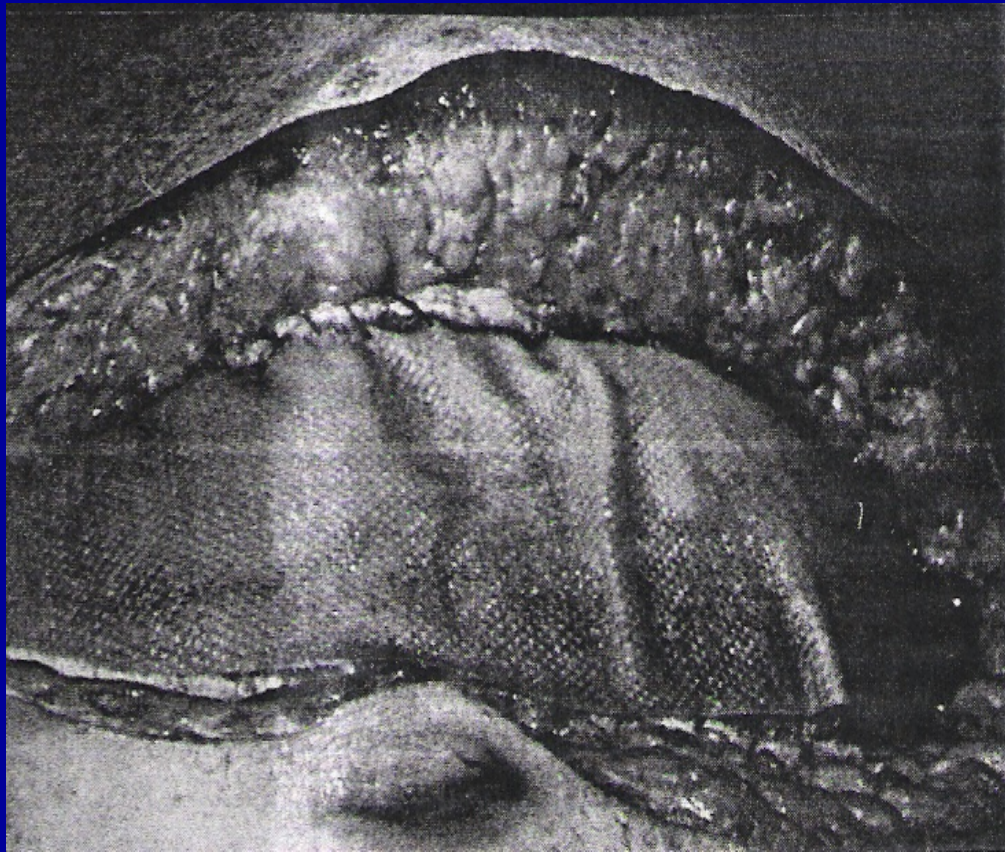
-can suture pre-sterilized zipper to edge of Bogota bag or mesh

Repeated entry



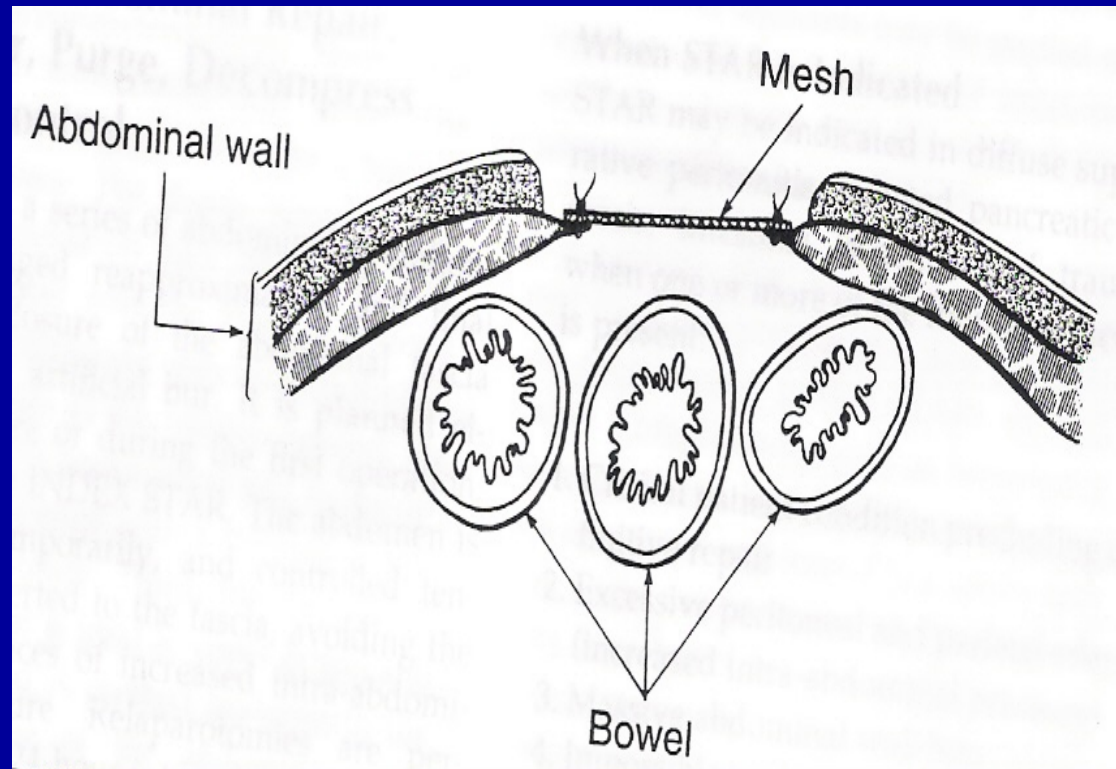
-Zip-lock bag closure

Mesh closure

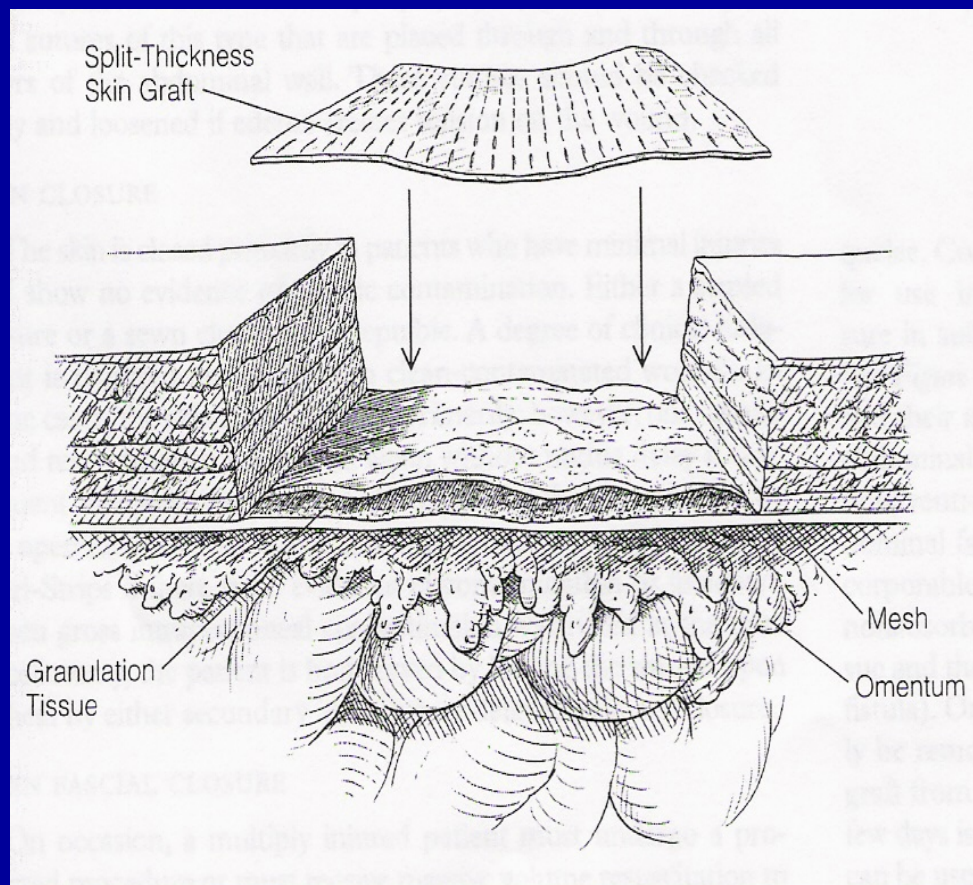


- closure with absorbable mesh (Vicryl)
- sewn to fascia for intermediate duration closure (or to skin if need repeat operation)
- PTSG applied when sufficient granulation tissue

Mesh closure



Skin grafting



-PTSG can be applied directly to exposed viscera once abdominal contents “frozen”

-waiting for granulation bed increases risk for bowel injury/ fistula

Repeat operation

- reexplore after resuscitation and reversal of hypothermia, acidosis, and coagulopathy
- complete intestinal anastomoses, unpack raw hemorrhagic surfaces, search for previously unidentified injuries
- after definitive repair of injuries, proceed with standard closure if possible
- if visceral edema persists, continue with temporary closure methods

Vacuum-assisted fascial closure

- Miller, et al. Wake Forest. Annals of surgery, 5/04
- VAC dressing placed when initial edema resolved and sponge can fit in wound
- nonadherent polyethylene sheet placed over bowel and under fascial edges to prevent adhesions
- VAC sponge held in place with adherent dressing
- vacuum allows for constant medial traction on fascia, preventing retraction and loss of domain
- dressing changed every 3 to 5 days in OR or ICU if necessary
- 88% of patients had primary fascial closure at mean time of 9.5 days

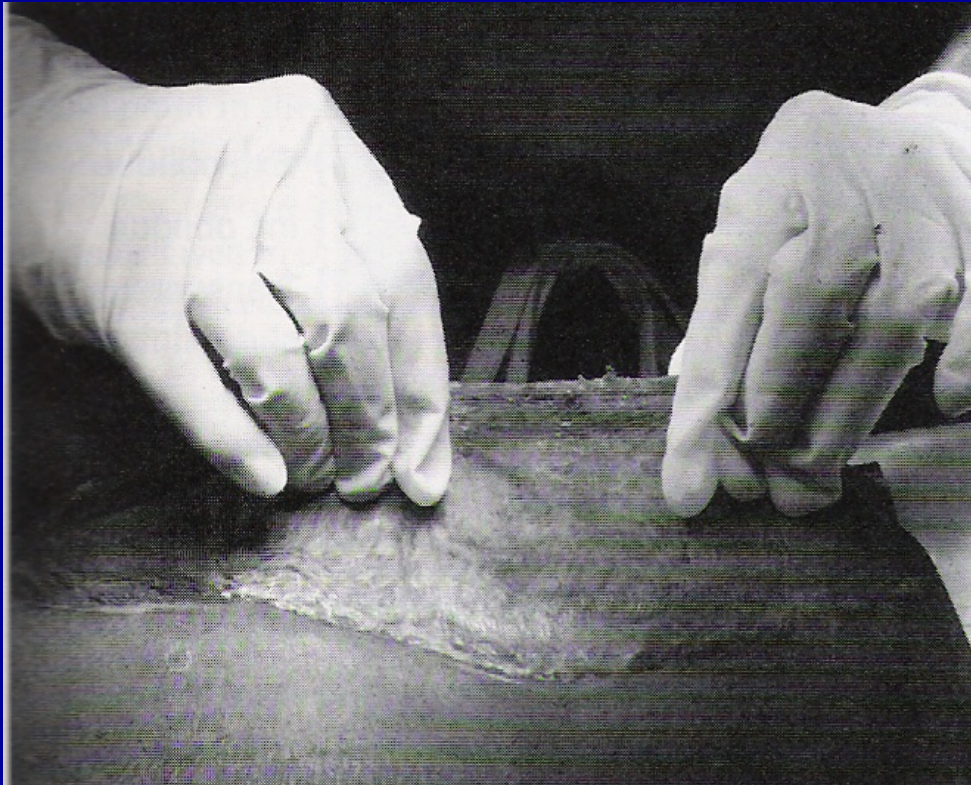
Late definitive closure

- failure to close midline fascia results in giant ventral hernia with significant deformity
- patients experience minimal discomfort, although activity (eg. lifting) is limited
- 6 to 12 months allows adhesions to mature and nutritional status to recover
- when the skin graft can be elevated off underlying viscera, the abdomen is ready for closure

Late definitive closure

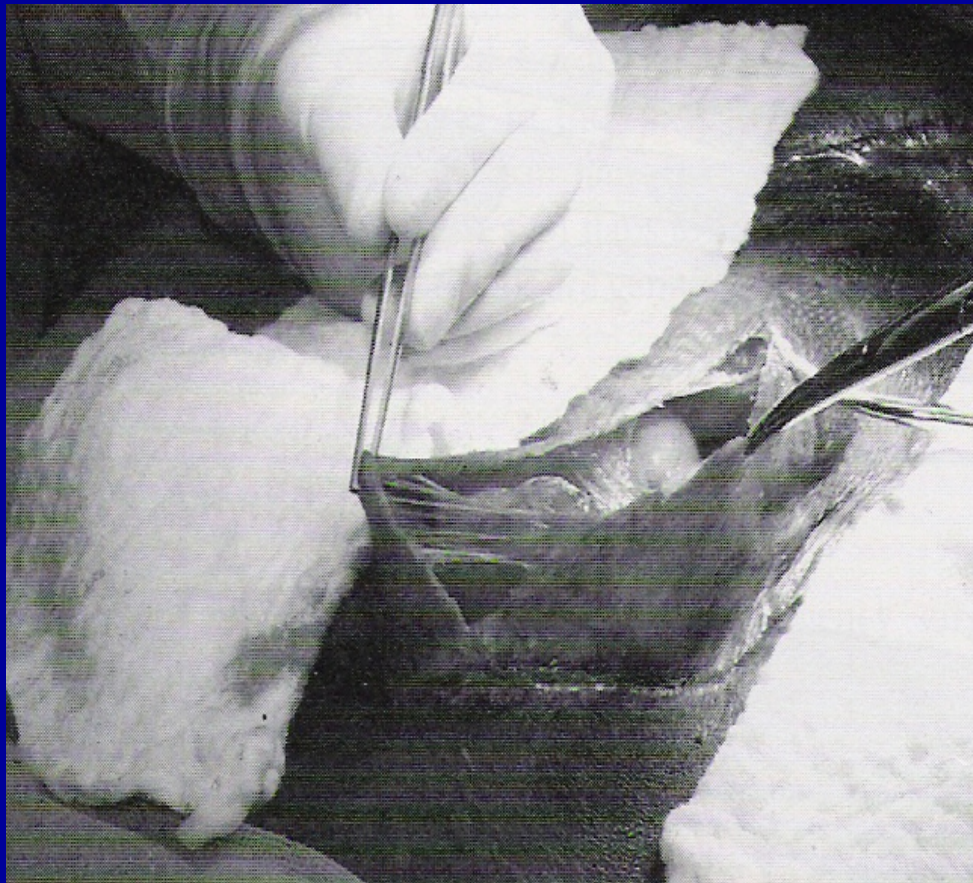
- presence of an ostomy or fistula requires decision for stoma closure at the same time as abdominal wall defect or in staged operations
- staged procedure done in presence of complex fistula or if there is need for prosthetic material
- abdomen entered at border between SG and normal abdominal tissue, resulting in only limited graft necrosis on closure

Reconstruction



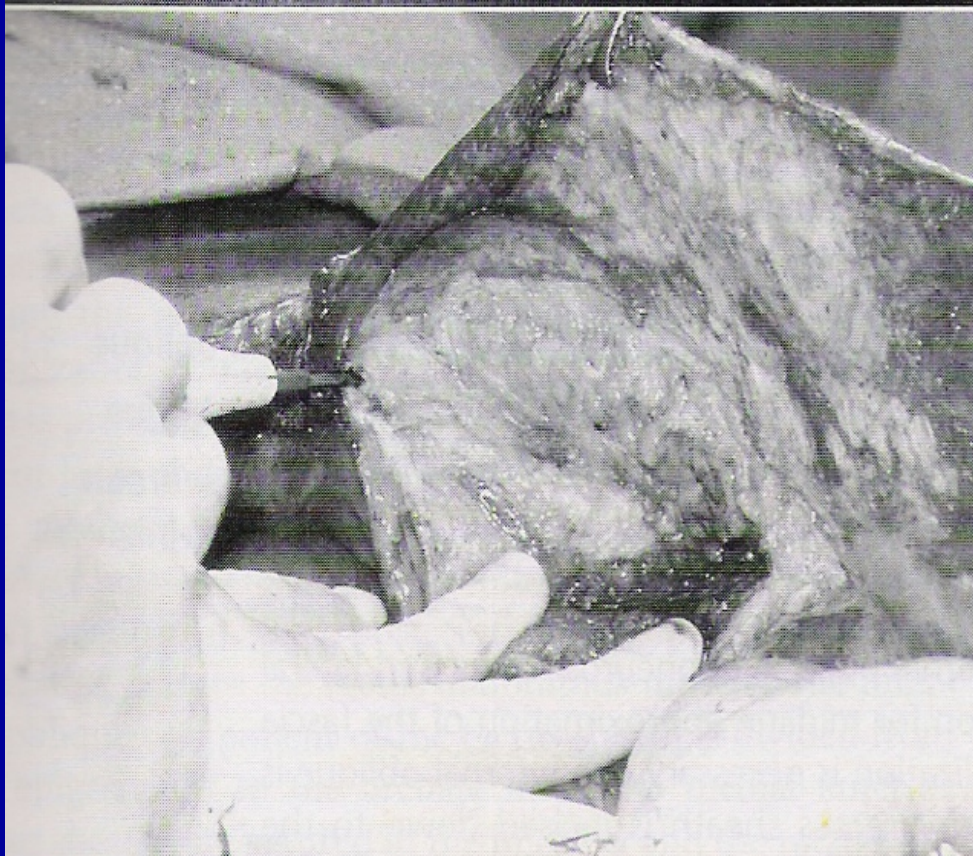
- when SG can be elevated off viscera, abdomen is ready for closure
- Incision through SG

Reconstruction



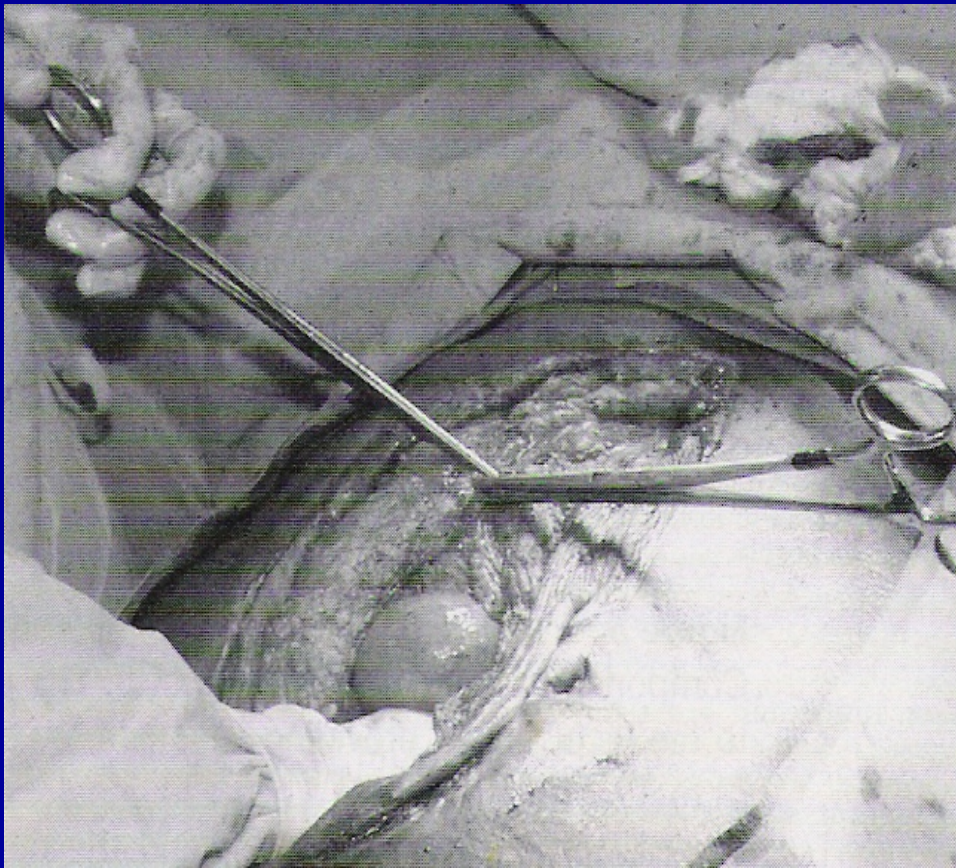
- underlying bowel usually easily separated from SG
- graft excised, LOA completed

Reconstruction



- skin flaps raised just above fascial layer (preserves blood supply)
- flaps may be elevated laterally to flanks, and superiorly onto chest wall if necessary

Reconstruction

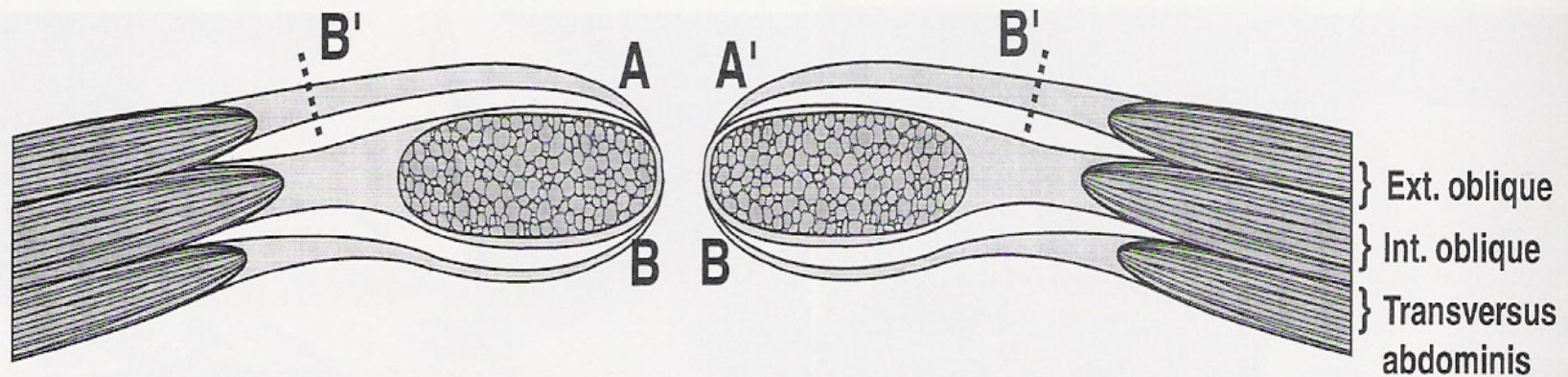


- tissue coverage may be achieved with skin flaps alone
- if fascia can close without excess tension, close primarily in standard manner

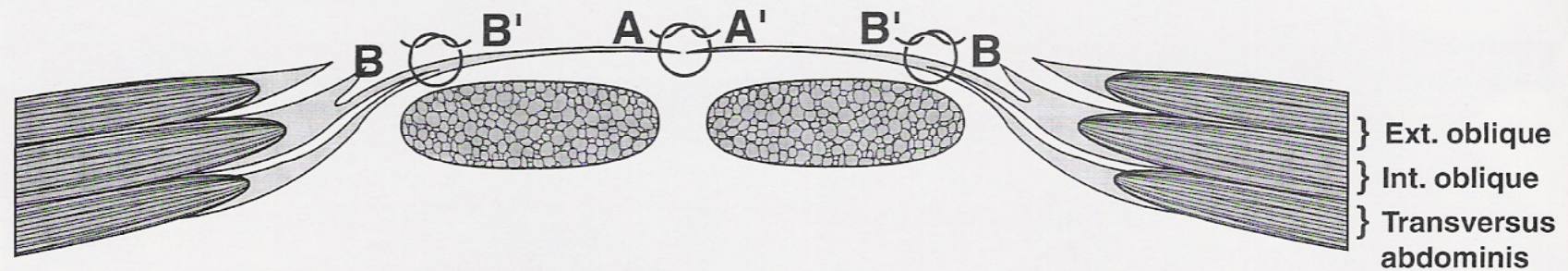
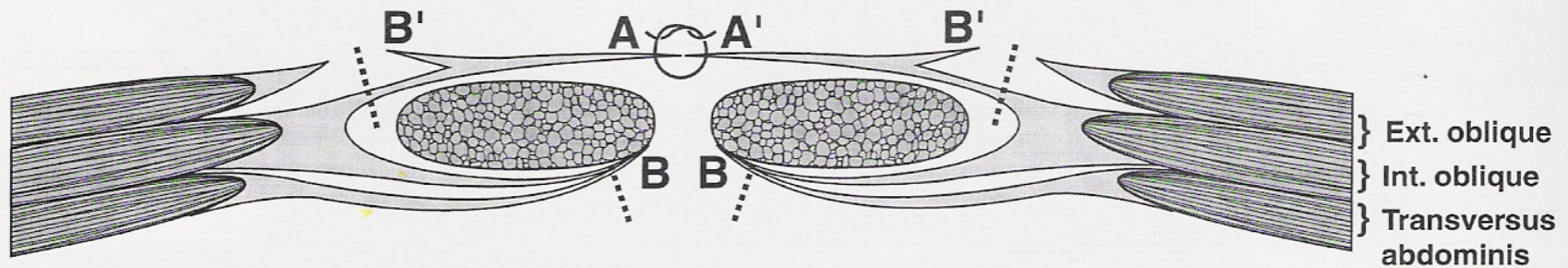
Reconstruction

if fascial defect remains:

- can place prosthetic mesh (eg. DualMesh)
- relaxing incisions in the external oblique aponeurosis lateral to rectus sheath



Reconstruction



Components separation method- for larger defects

-internal oblique incised lateral to rectus and posterior rectus sheath incised down to arcuate line

-lateral cut edge of post sheath brought anteriorly and sutured to the lateral anterior fascial layer