UNIVERSITÉ Grenoble Alpes

CHU GRENOBLE ALPES

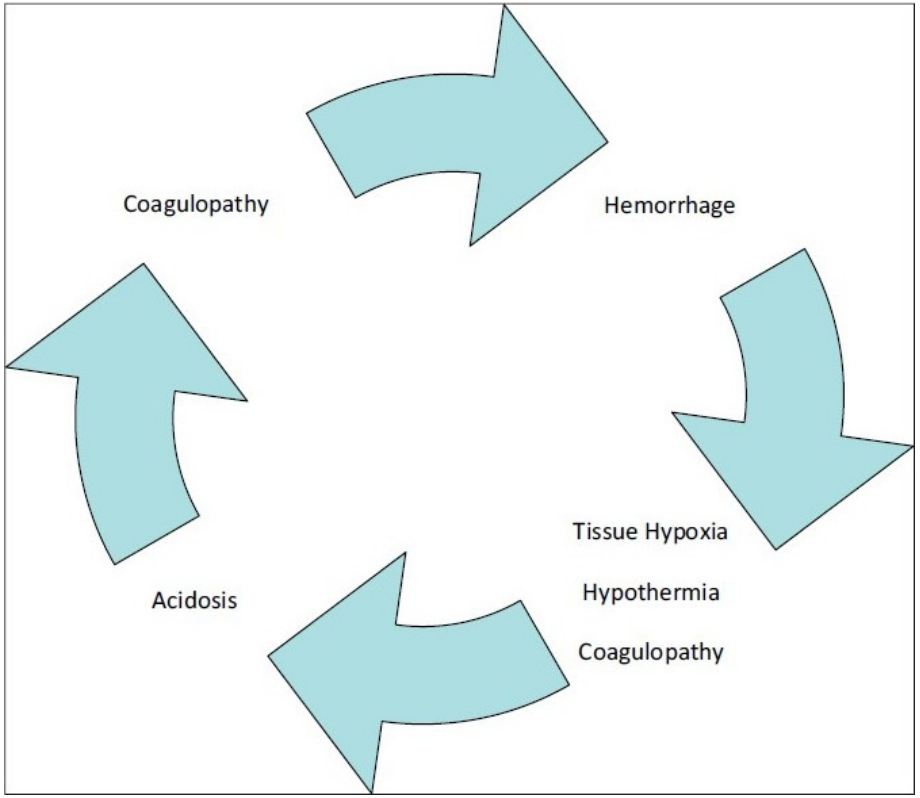
HOW TO CLOSE LAPAROTOMY AFTER DAMAGE CONTROL SURGERY

C. Arvieux, E. Girard, J. Abba.

Grenoble

Alpes Trauma Centre

Damage Control Surgery (DCS) :
To avoid metabolic failure



Philosophy

*« The goal of damage control is to restaure **normal physiology** rather than **normal anatomy** »*

NATO (Handbook war surgery)

Lethal triad :

HYPOTHERMIA-ACIDOSIS-COAGULOPATHY

Damage control : 3 steps

1. **Abbreviated laparotomy (<1 hour)**

   Short surgical measures :

   Control of massive bleeding & fecal spillage

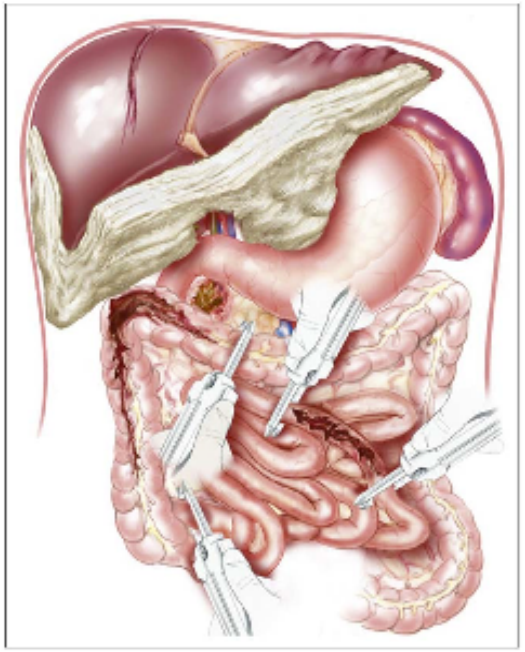
   Temporary abdominal closure to prevent ACS

2. **Intensive care setting**

   Correction of abnormal physiological parameters

3. **Planned definitive re-exploration**

   Correction of anatomical derangements



Moore EE. Am J Surg 1996

Intensive Care Med (2013) 39:1190–1206
DOI 10.1007/s00134-013-2906-z

CONFERENCE REPORTS AND EXPERT PANEL

Andrew W. Kirkpatrick
Derek J. Roberts
Jan De Waele
Roman Jaeschke
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Bart De Keulenaer
Juan Duchesne
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Ari Leppaniemi
Janeth C. Ejike

Intra-abdominal hypertension and the abdominal compartment syndrome: updated consensus definitions and clinical practice guidelines from the World Society of the Abdominal Compartment Syndrome

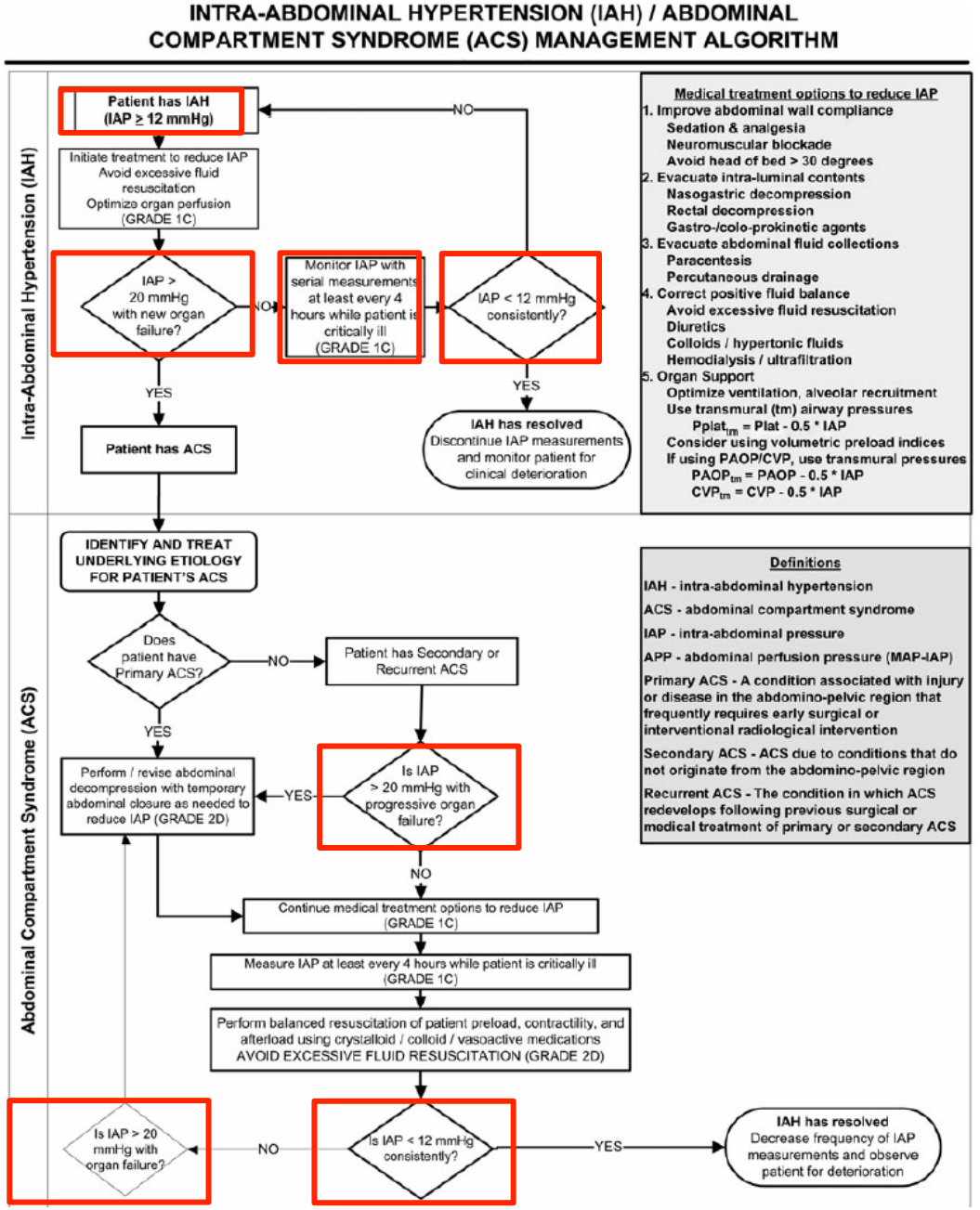
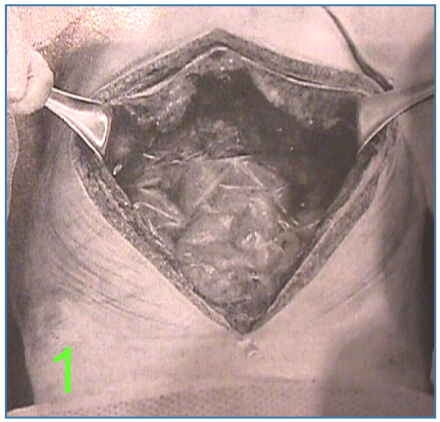


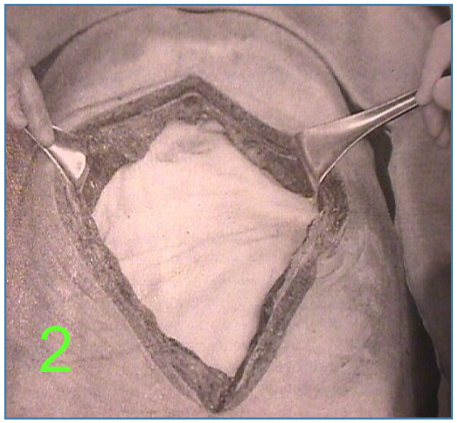
Fig. 1 Updated intra-abdominal hypertension (*IAH*)/abdominal compartment syndrome (*ACS*) management algorithm. *IAP* intra-abdominal pressure

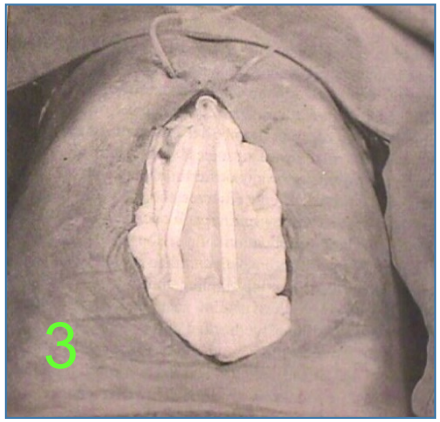
Vacuum pack technique = gold standard

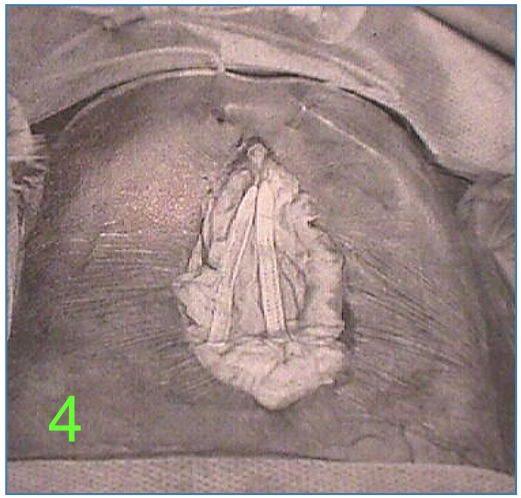
Vacuum Pack Technique of Temporary Abdominal Closure: A 7-Year Experience with 112 Patients

Donald E. Barker, MD, Henry J. Kaufman, MD, Lisa A. Smith, MD, David L. Ciraulo, DO, MPH, Charles L. Richart, MD, and R. Phillip Burns, MD



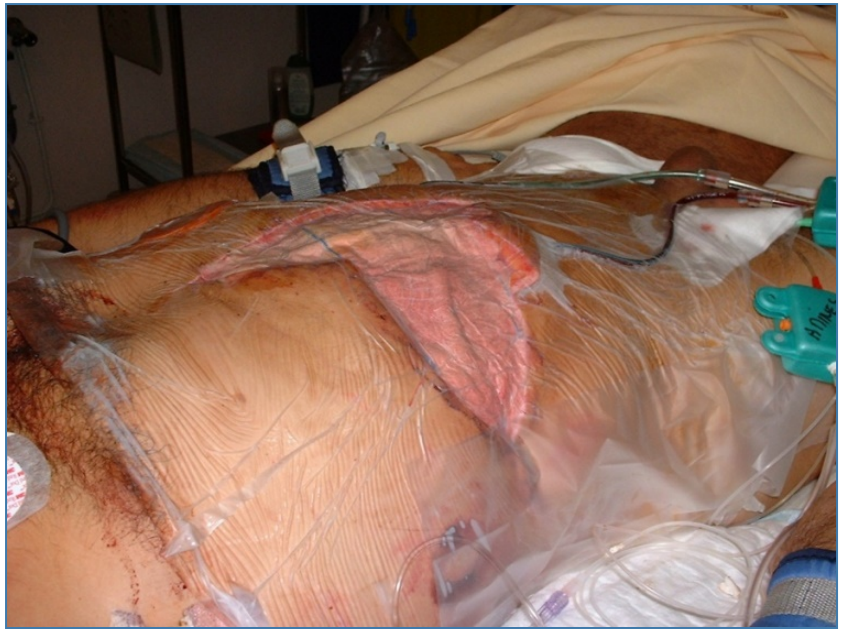




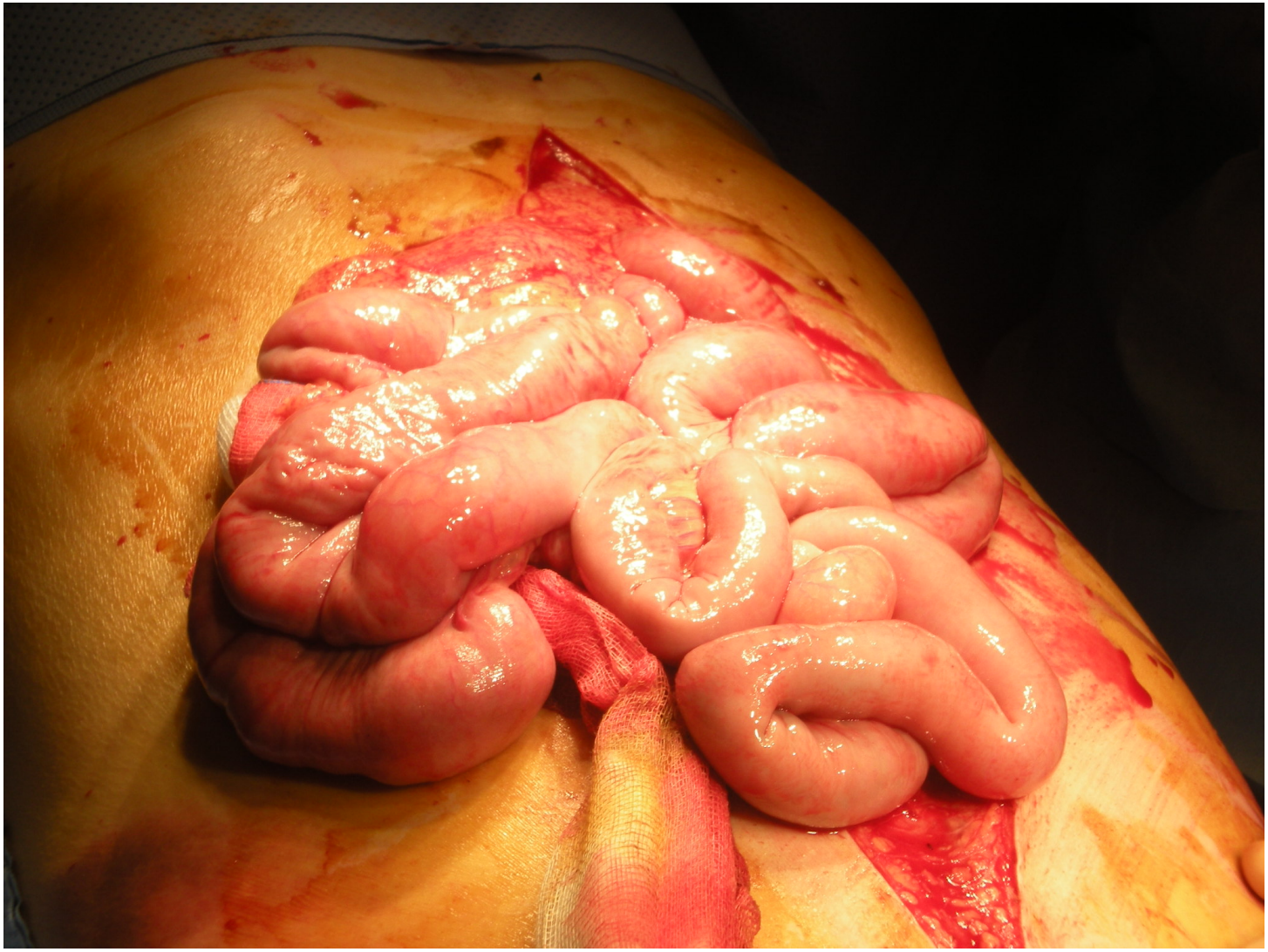


J Trauma 2000

Avoid non typical incisions :



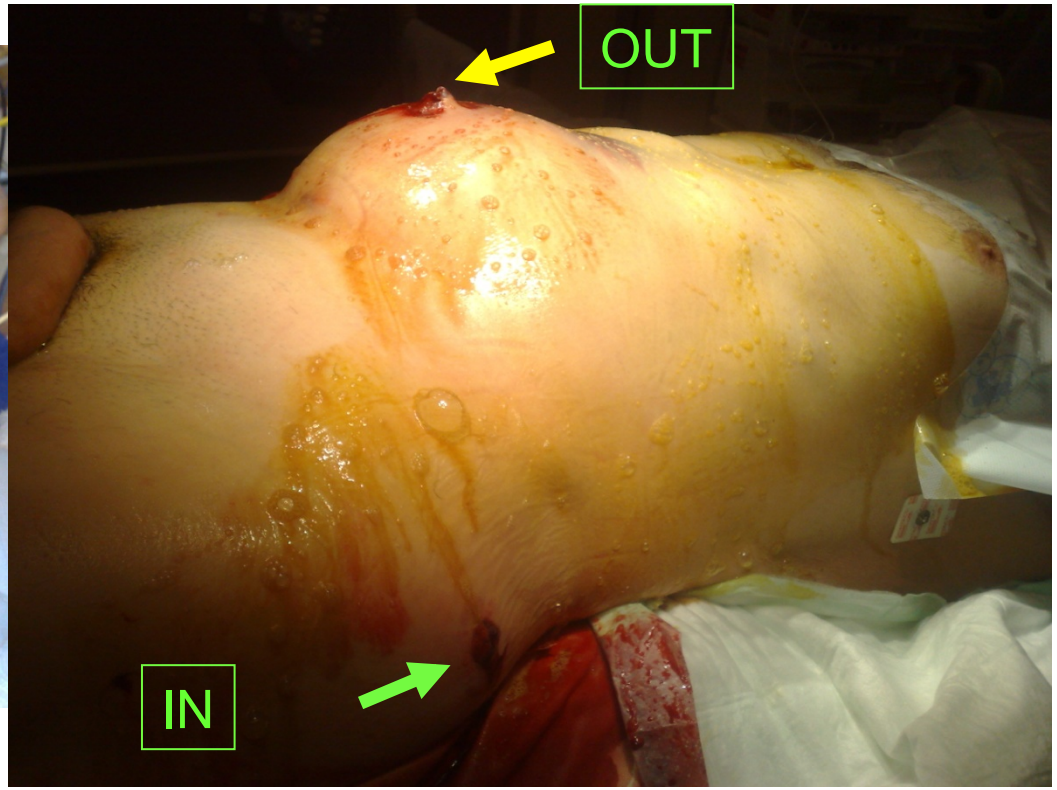
Severe pelvic trauma; embolization; ACS H2



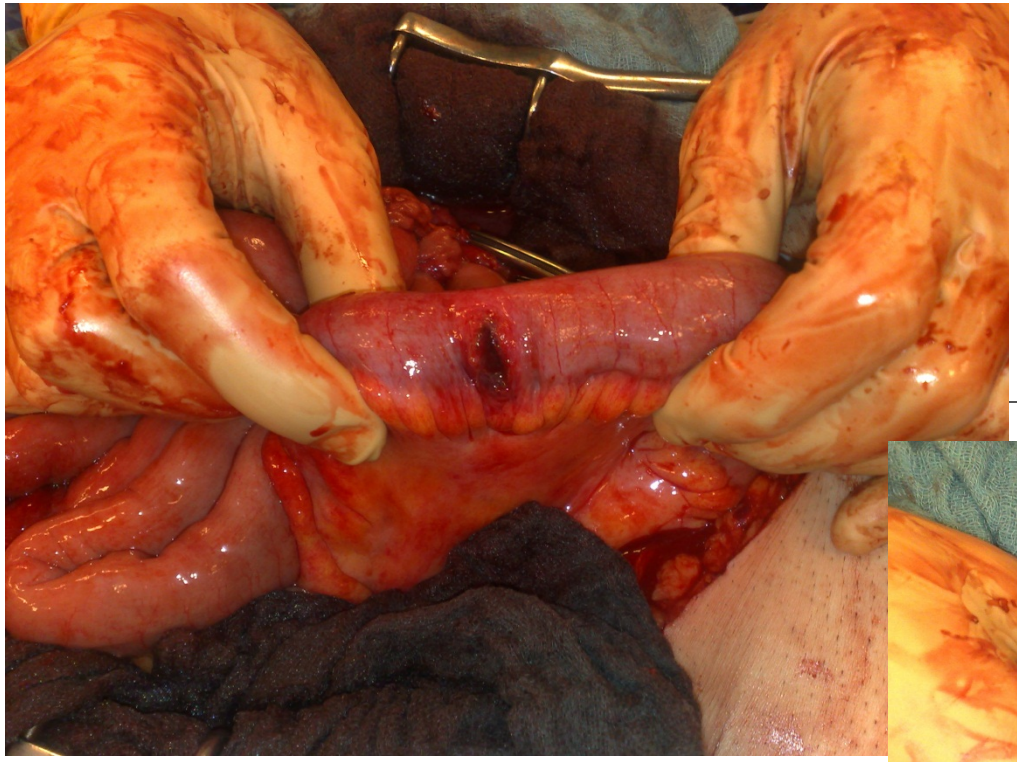
Pelvic packing and VAC (KCI©) system

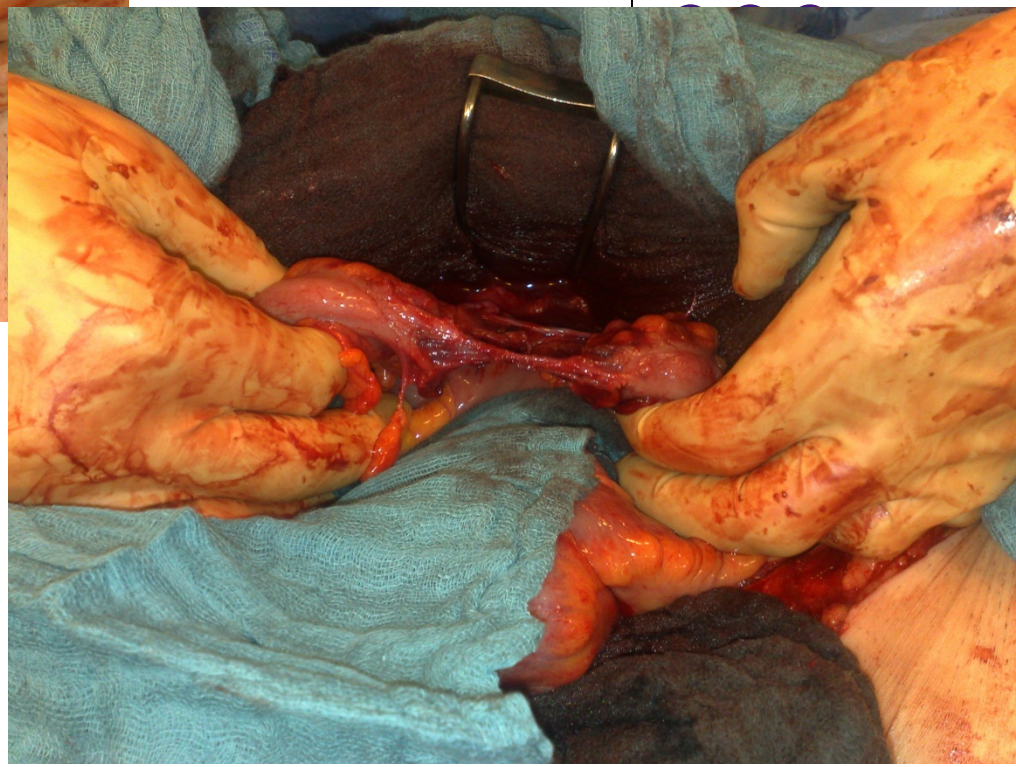
Men 55 ans.

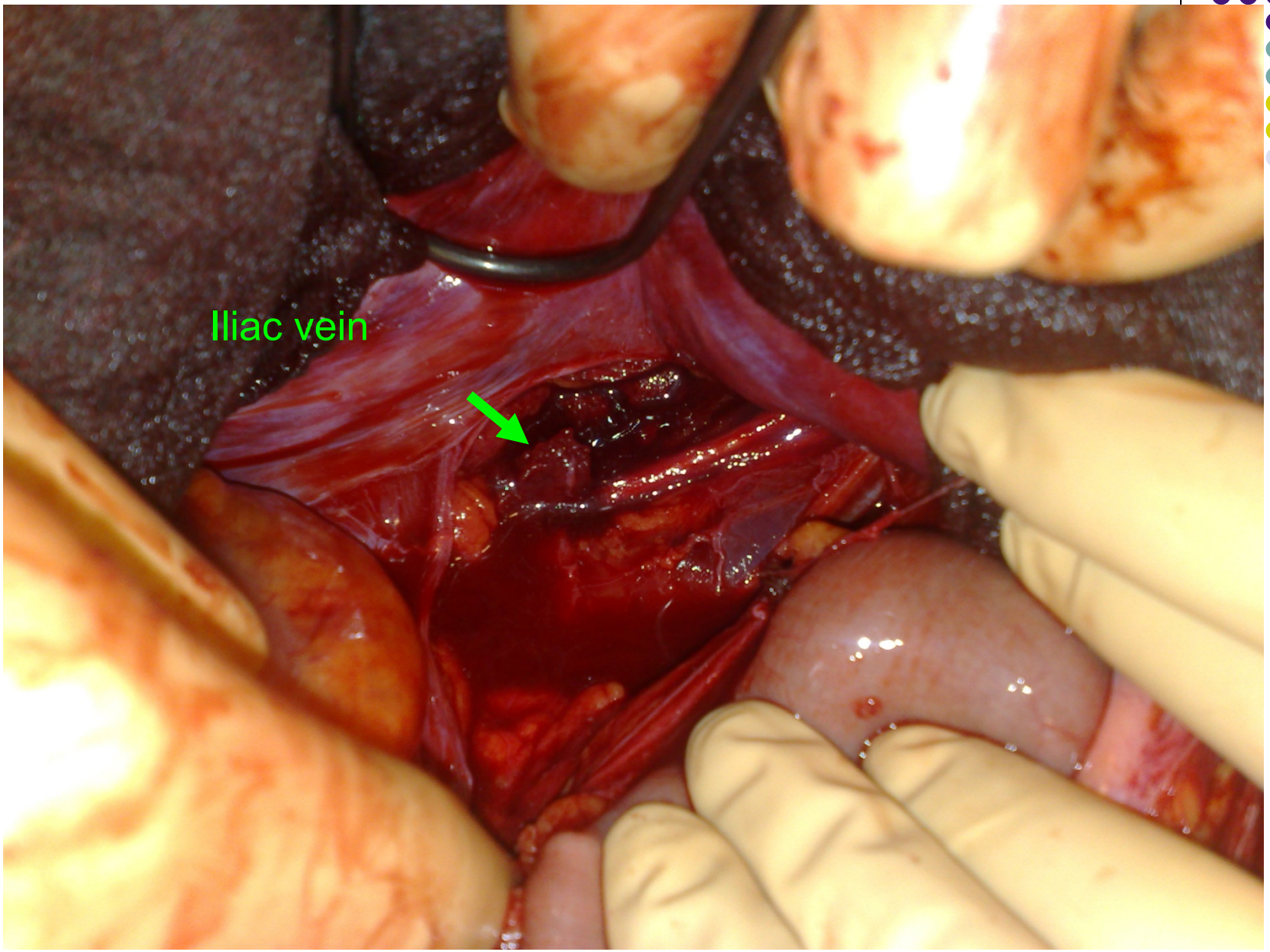
- Gunshot (hunting)
- Hemodynamic instability



Laparotomy





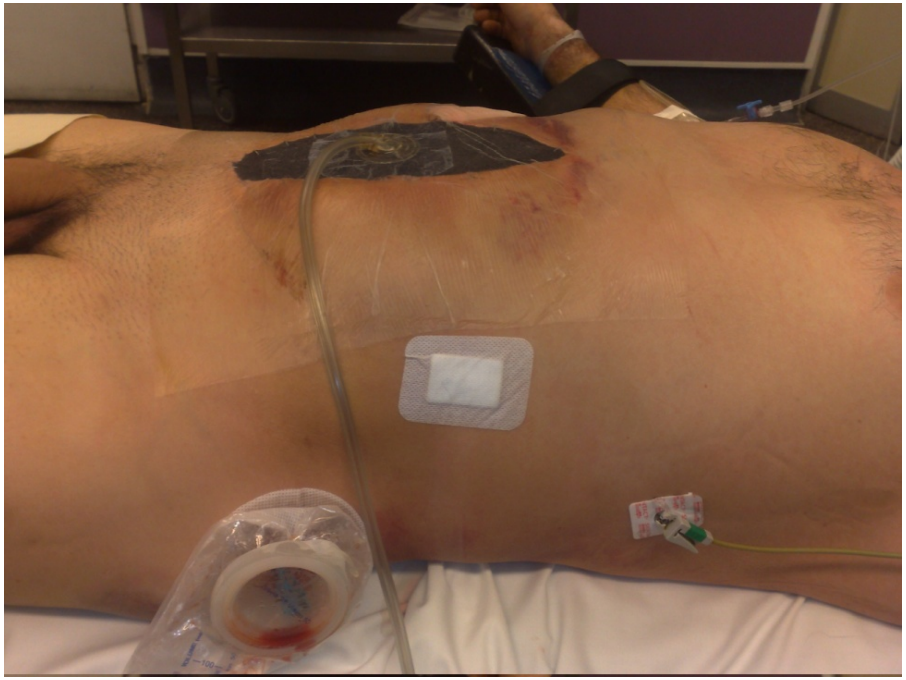

Iliac vein

Damage control :

- Intestinal resection (stapple)
- Suture of the iliac vein

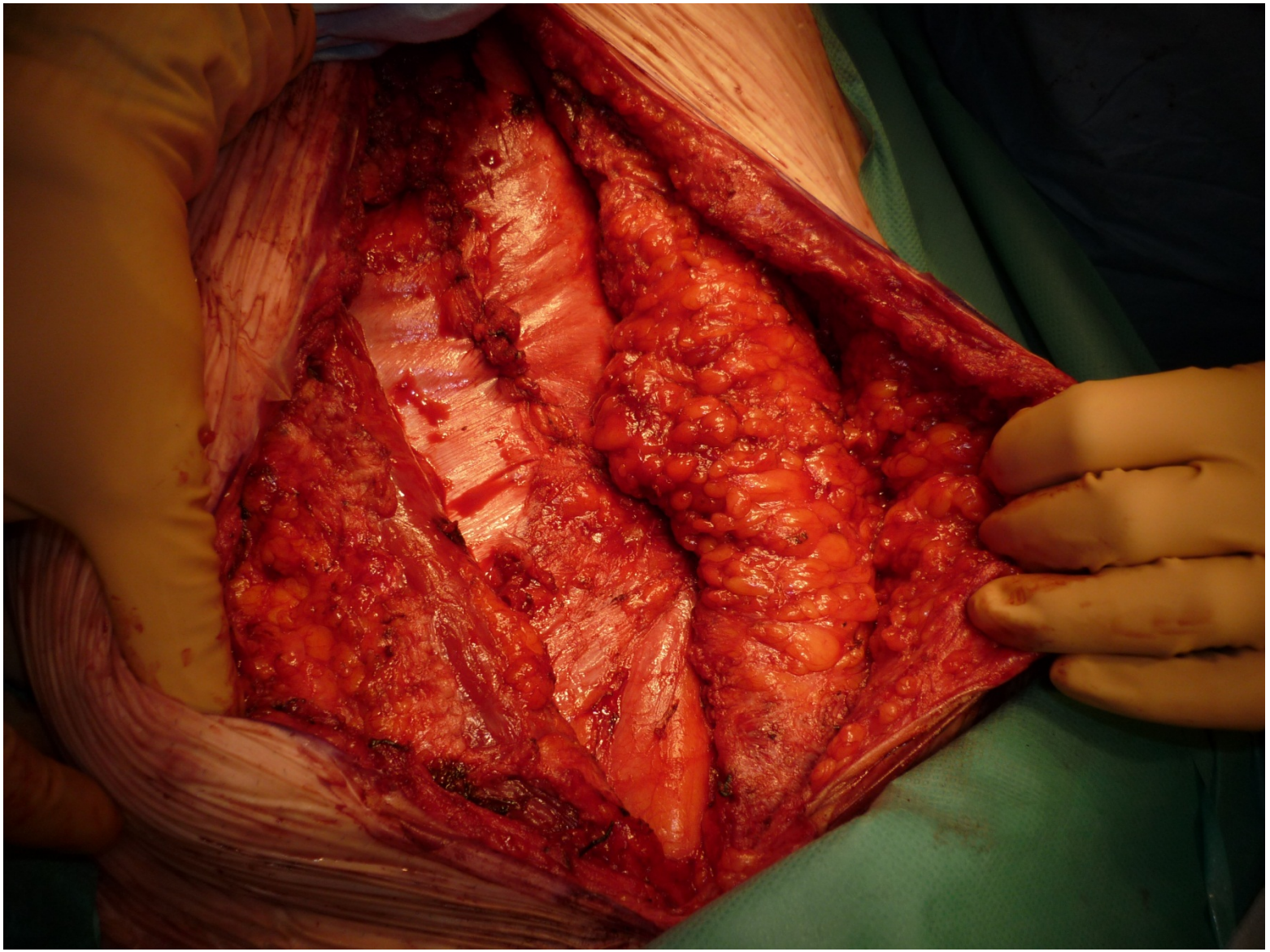
Surgery day 2, 5 , 7 :

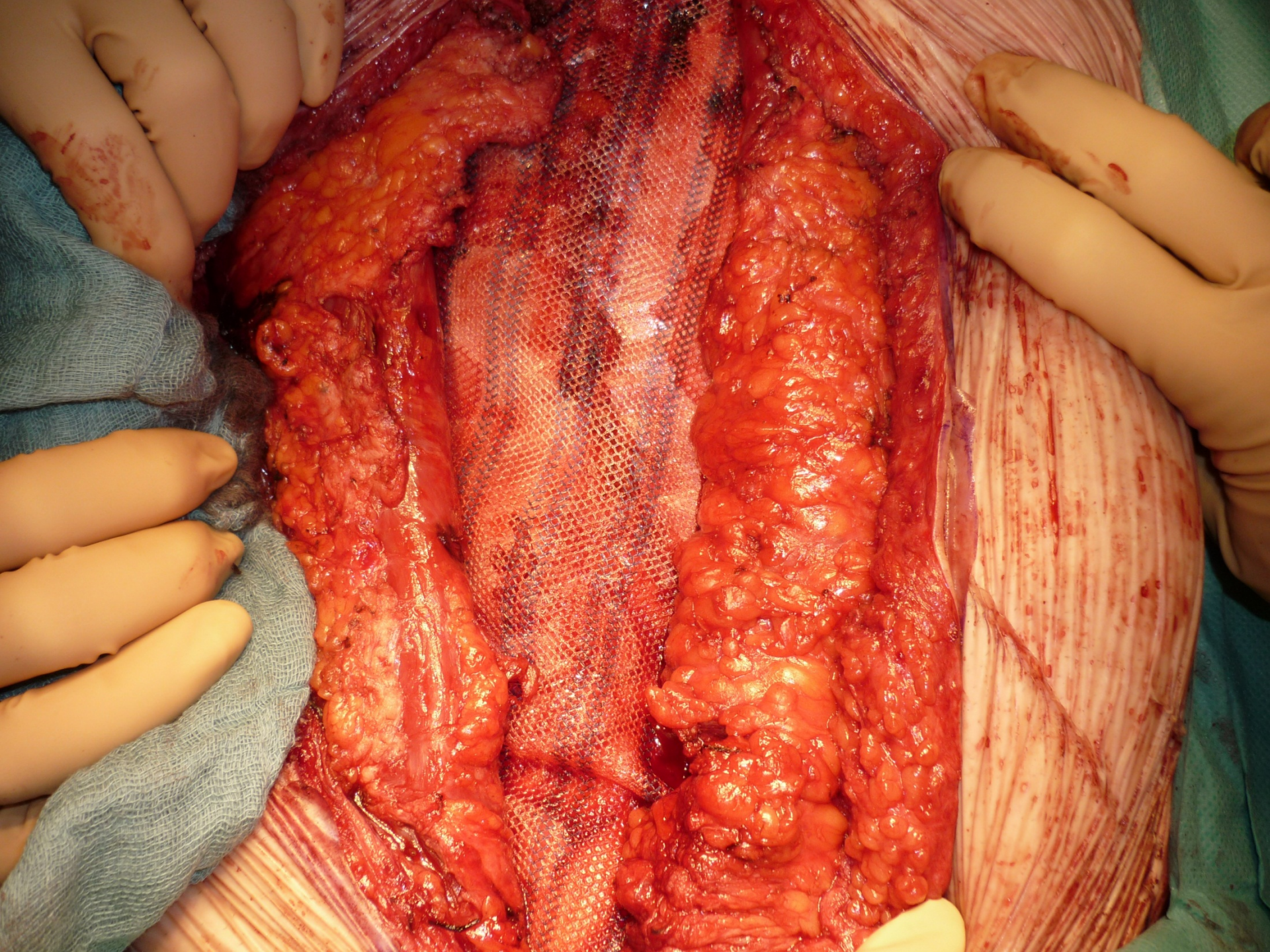
- Anastomosis X2
- Closure by VAC X 3 (smaller each time)



M1

Planned surgery M18 :



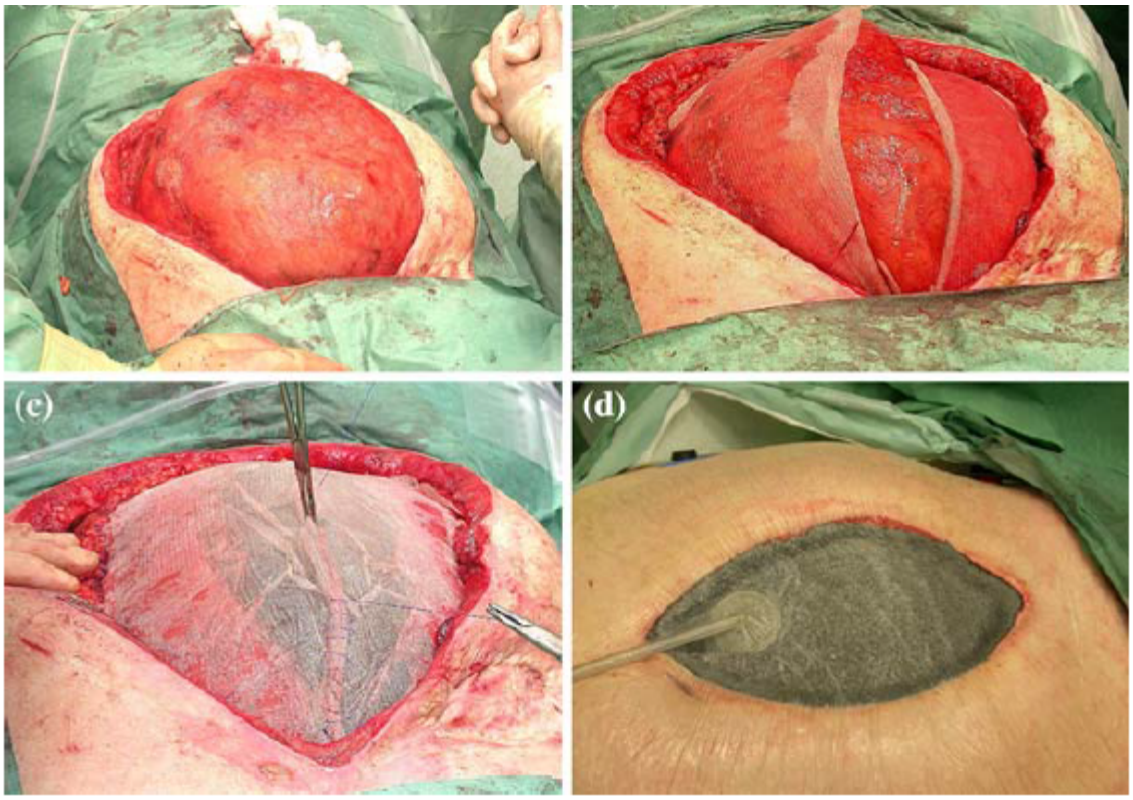


World J Surg (2007) 31:2133–2137
DOI 10.1007/s00268-007-9222-0

World Journal of Surgery

Vacuum-assisted Wound Closure and Mesh-mediated Fascial Traction—A Novel Technique for Late Closure of the Open Abdomen

Ulf Petersson · Stefan Acosta · Martin Björck



Original article

Multicentre prospective study of fascial closure rate after open abdomen with vacuum and mesh-mediated fascial traction

S. Acosta[1], T. Bjarnason[2], U. Petersson[2], B. Pålsson[2], A. Wanhainen[3], M. Svensson[3,4], K. Djavani[3,5] and M. Björck[3]

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Correspondence to: Dr S. Acosta, Vascular Centre, Skane University Hospital, 205 02 Malmö, Sweden (e-mail: Stefan.acosta@skane.se)

	n
During VAWCM treatment	
Intestinal or infection problems	
Intestinal fistula	7
Cardiac arrest during initiation of anaesthesia before VAWC dressing change	1
After VAWCM treatment	
Intestinal or deep infection problems	
Intestinal fistula	1
Intra-abdominal abscess	4
Mesh infection after abdominal wall reconstruction	1
Vascular prosthesis infection (femorofemoral crossover graft)	1
Aortoenteric fistula	1
Wound infection	
Superficial	10
Deep	1
Wound dehiscence needing resuture	1
Total no. of complications	42
Total no. of patients with complications	29

VAWC(M), vacuum-assisted wound closure (and mesh-mediated fascial traction).

The fascial closure rate among 111 patients in the present study was unexpectedly high: 76·6 per cent in the intention-to-treat and 89 per cent in the per-protocol analysis. The present cohort comprised a clinically

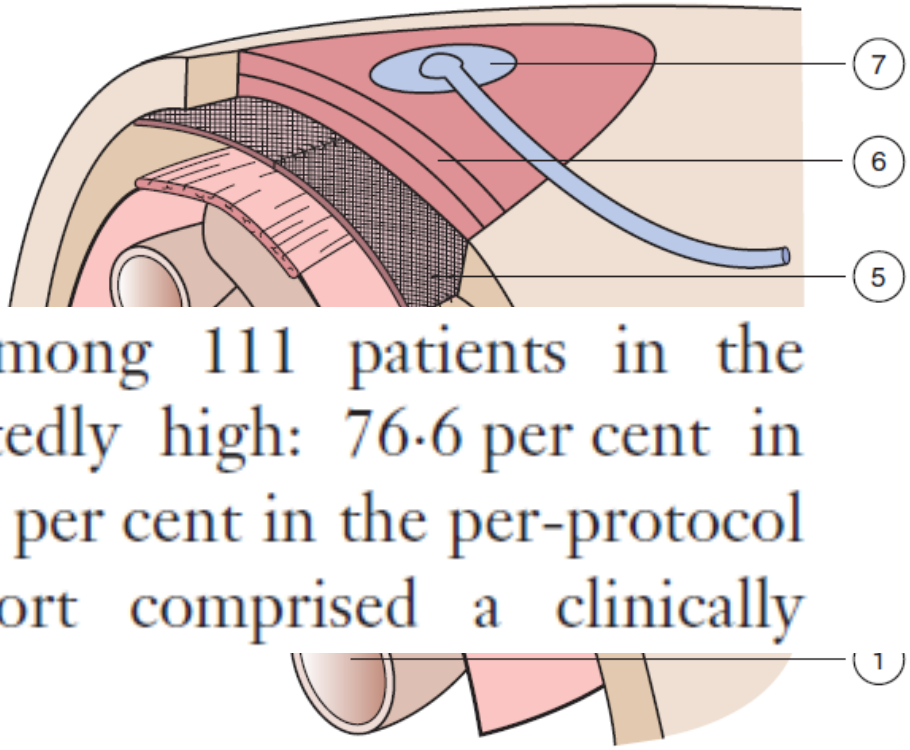
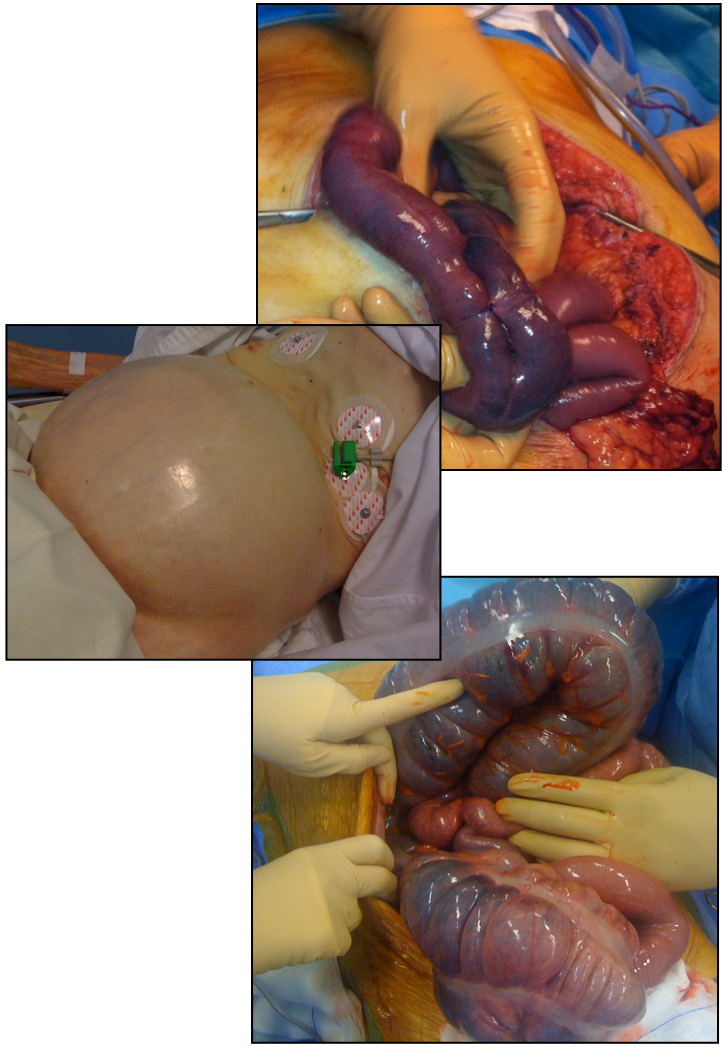


Fig. 1 Vacuum-assisted wound closure and mesh-mediated fascial traction technique: 1, bowel; 2, visceral protective layer; 3, abdominal wall; 4, abdominal wall fascia; 5, polypropylene mesh, consisting of two mesh halves, sutured to the fascia laterally and to each other in the midline; 6, two pieces of polyurethane foam placed on top of the mesh and subcutaneously between the wound edges; 7, tubing set with an interface pad attached to an opening in the self-adhesive drapes and connected to the vacuum source

Damage control surgery in a non-trauma setting ?

- Often necessity of adjustment of VAC technique
- Definitive fascia closure not always possible
- Septic environment
- Anticipate +++



Methods *(Patients)*

- Grenoble University Hospital

- Retrospective study : Jan. 2005 - Dec. 2015

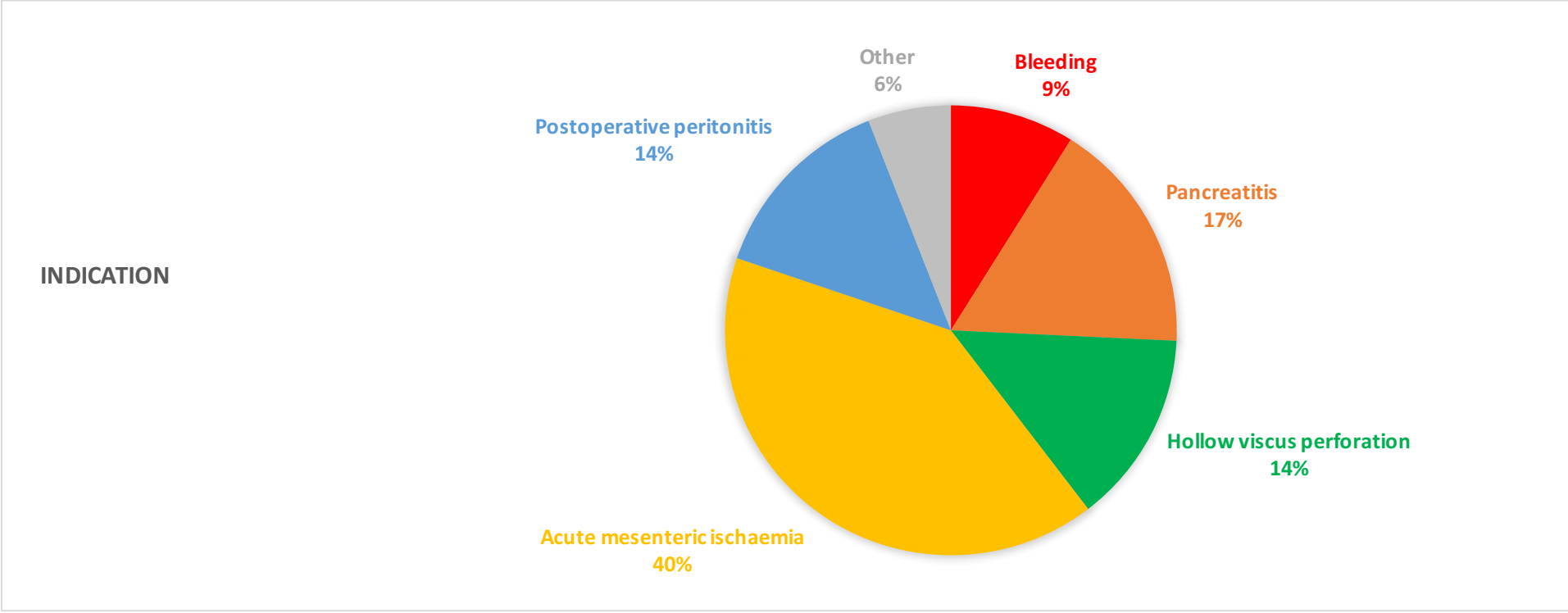
- Inclusion : **all patients who underwent DCS**
- 90-days mortality
- Comparison of observed mortality to that calculated from :
  - SAPS II – *Score used by French intensivists*
  - **APACHE II**
  - POSSUM – *included perioperative criteria*
- Risk factors for operative mortality (multivariate analysis)

Results

1925 non-traumatic abdominal emergencies

→**164 DCS (9%)**

- 104 men (63%)
- Median age : 66 years [IQR 54; 75]



- Abdominal compartment syndrome : 52 patients (32%)

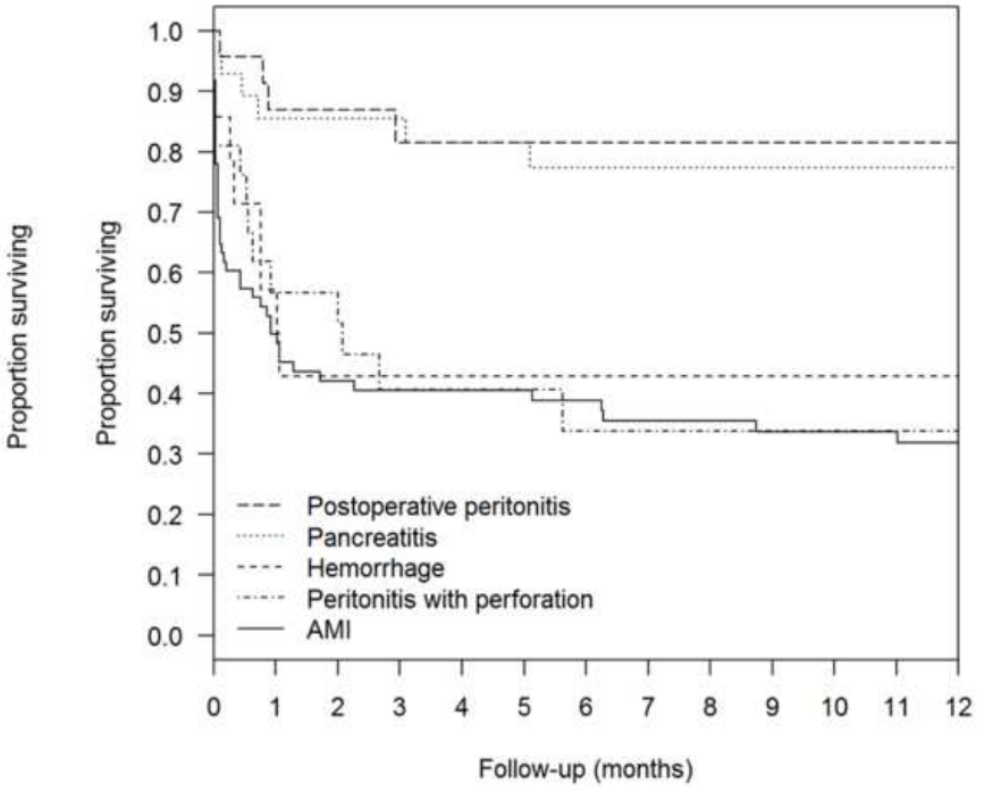
Morbidity & Mortality

Mortality :

21% died shortly after DCS
37% died within 30 days
45% died within 90 days

90-days morbidity : 91%

Survival curves of DCS indications



Perioperative course

- Median 1st surgery duration : 55 min [30; 60]

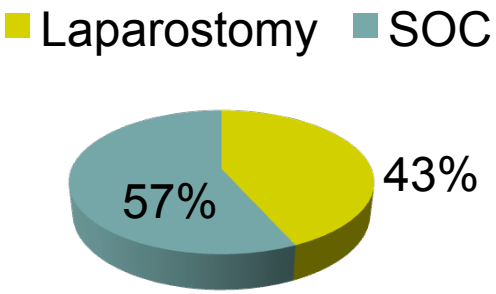
Digestive resection	103 (63%)
Digestive re-resection	31 (20%)
Organ resected	
Small bowel	50 (30%)
Colon	72 (44%)
Right	32
Left	22
Total	17
Rectum	3
Gallbladder	10
Spleen	2
Stomach	3

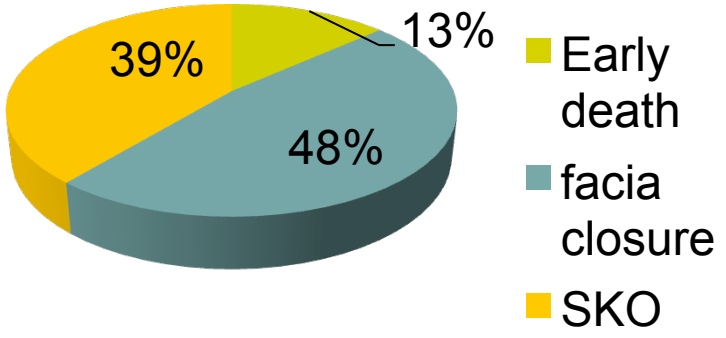
Abdominal closure

- 164 patients
- 1st step :
  - Laparostomy : 71 patients
  - Skin only closure (SOC) in 93 patients
  - Number of surgery :
- Died with open : 15 patients
- Died <15days : 20 patients
- Stomy : 46 patients
  - Definitive : 27 patients
- Survivors >15 days :129 patients
  - Final Closure : mean 7 days

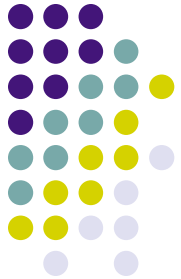
median 5 days (extr 2-43)

  - Primary Fascia Closure : 71
  - SOC : 58



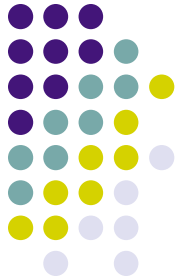


Female, 55 ans



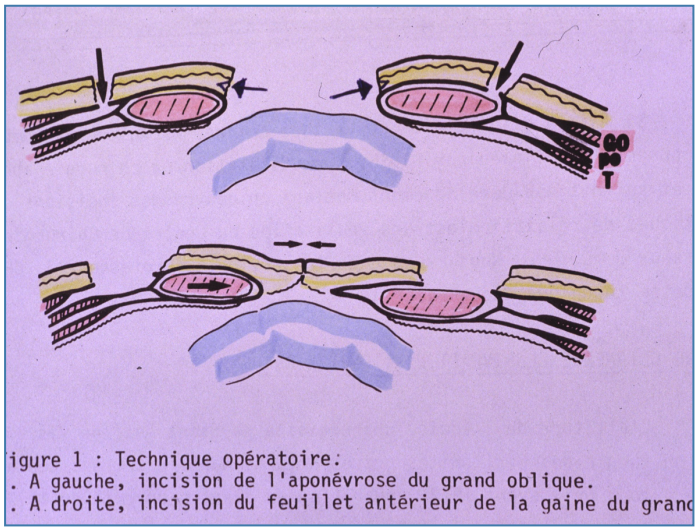
- Obesity BMI 30
- Hypertension
- Smoking habit and Bronchopathy
- Drinking habit
- Hysterectomy
- Appendectomy

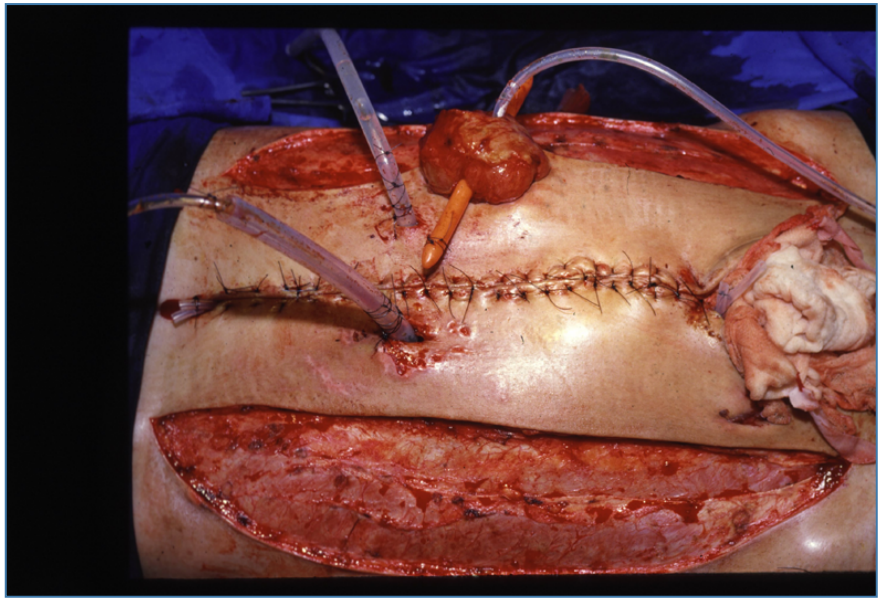
Acute pancreatitis



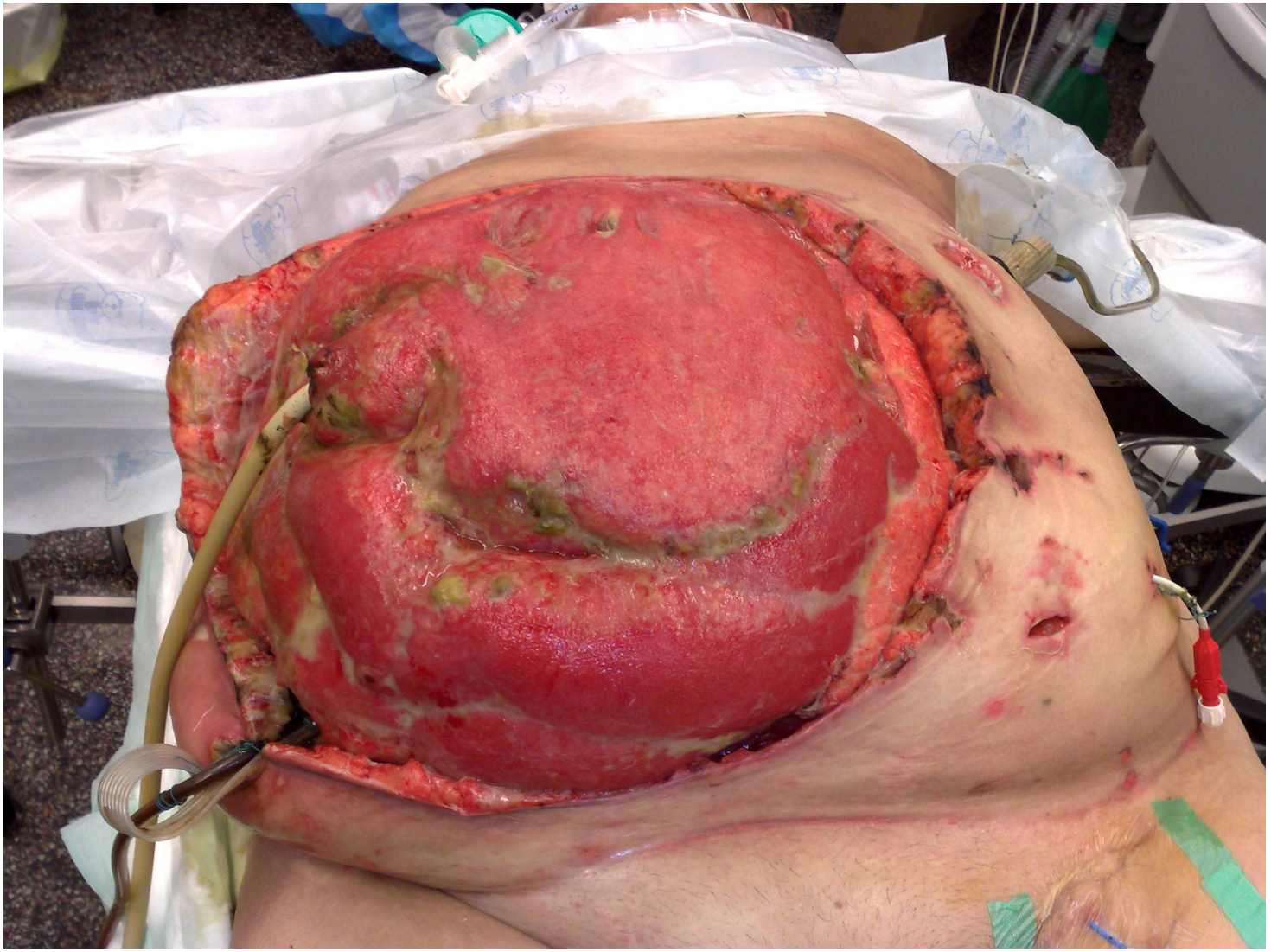
- Sepsis
- Surgery
  - Cholecystectomy
  - Jejunostomy
  - Acute parforation of the duodenum : drain in the duodenum
  - Sepsis : Mickulicz
  - Parietal necrosis : open abdomen and vertical incision
  - Need nursing care +++

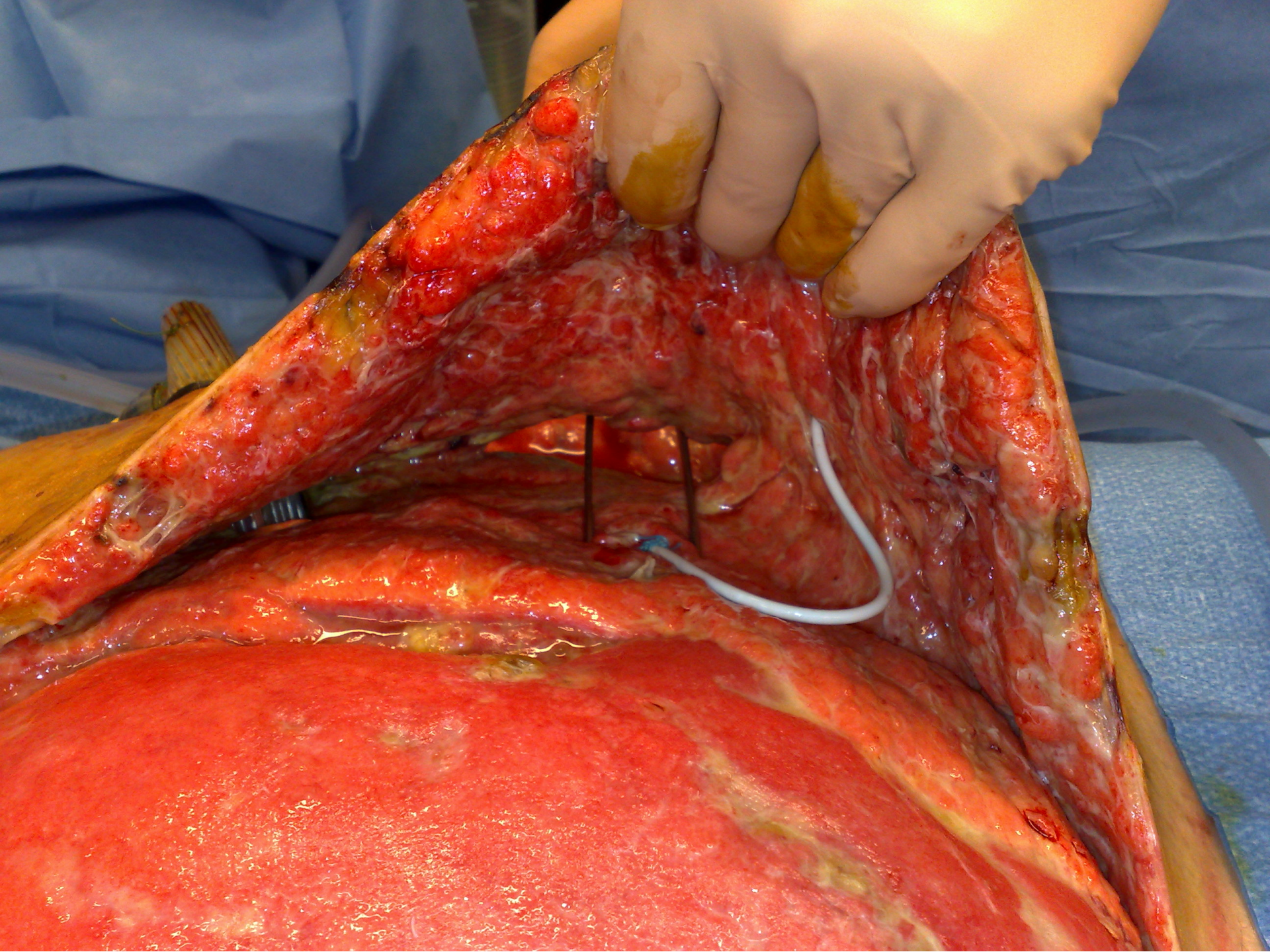
Discharge incision =



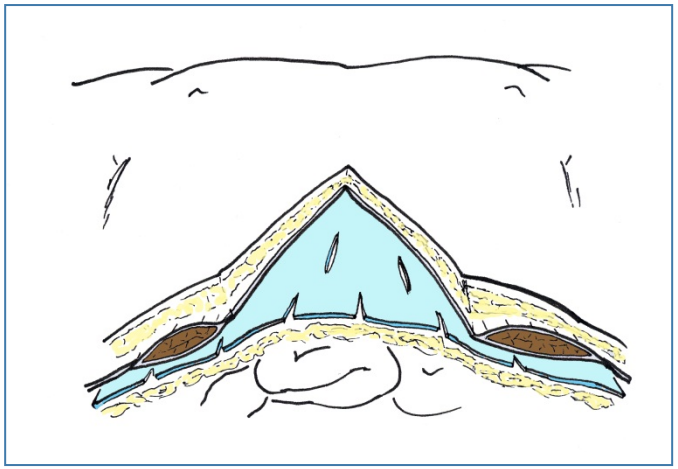


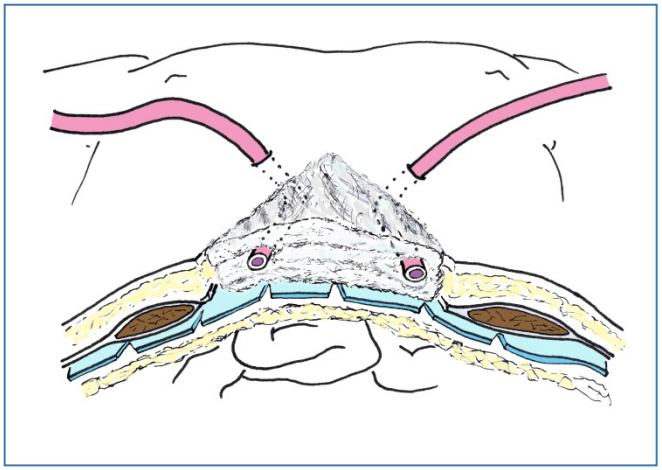
Referred to University Hospital Grenoble-Alpes

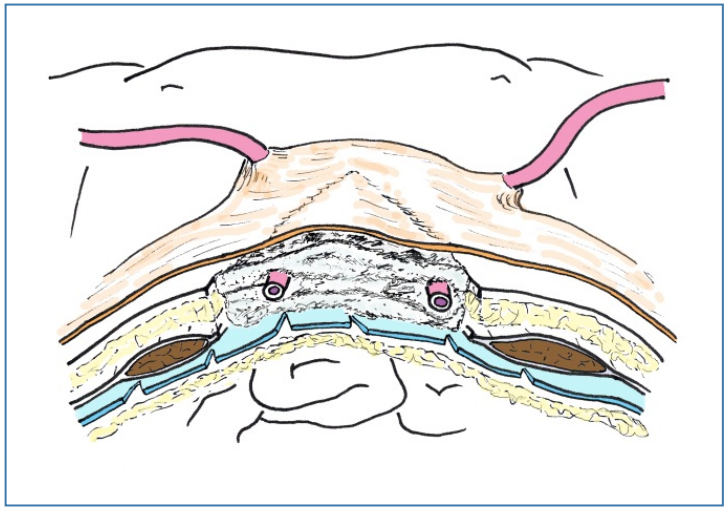


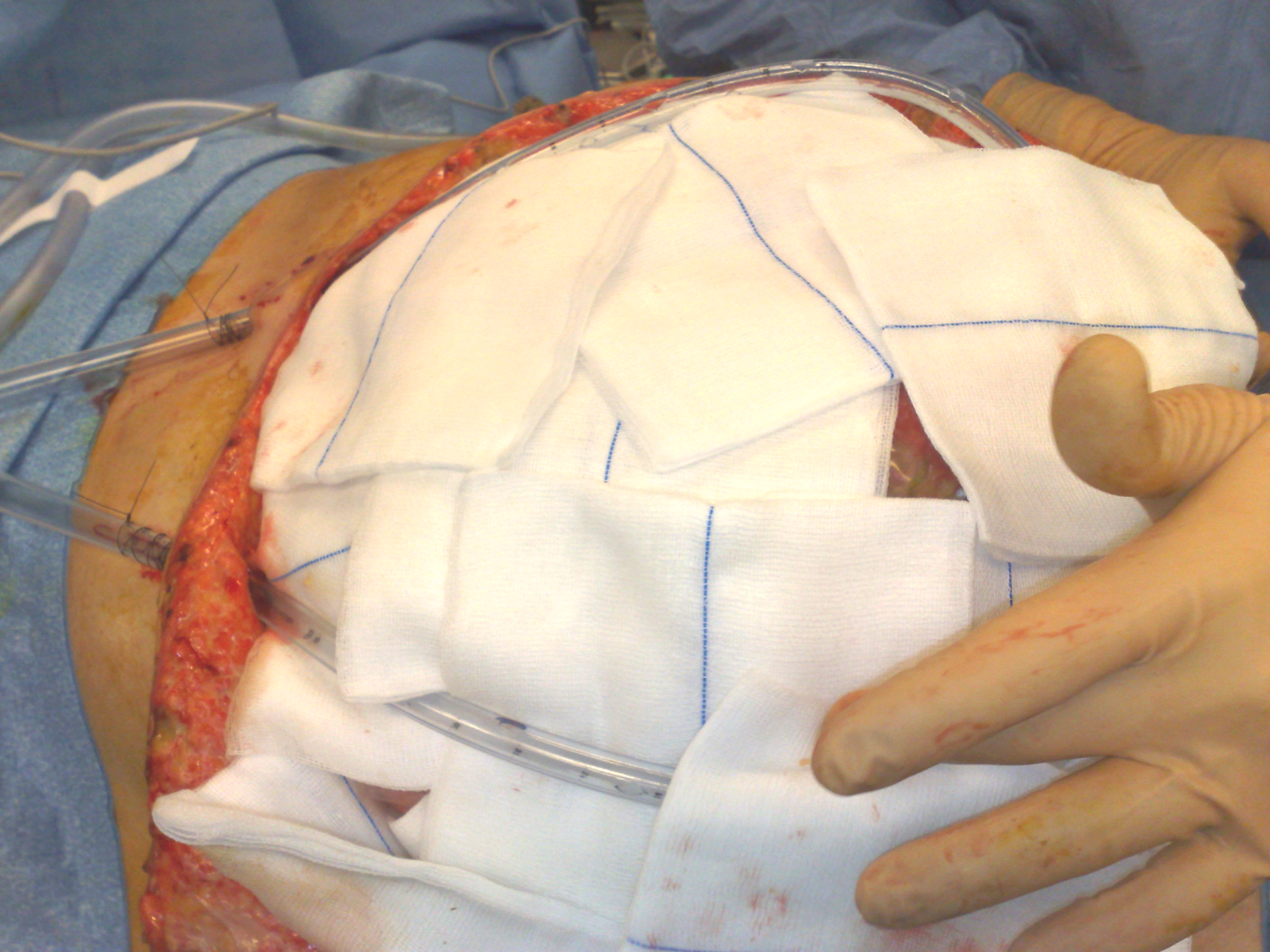


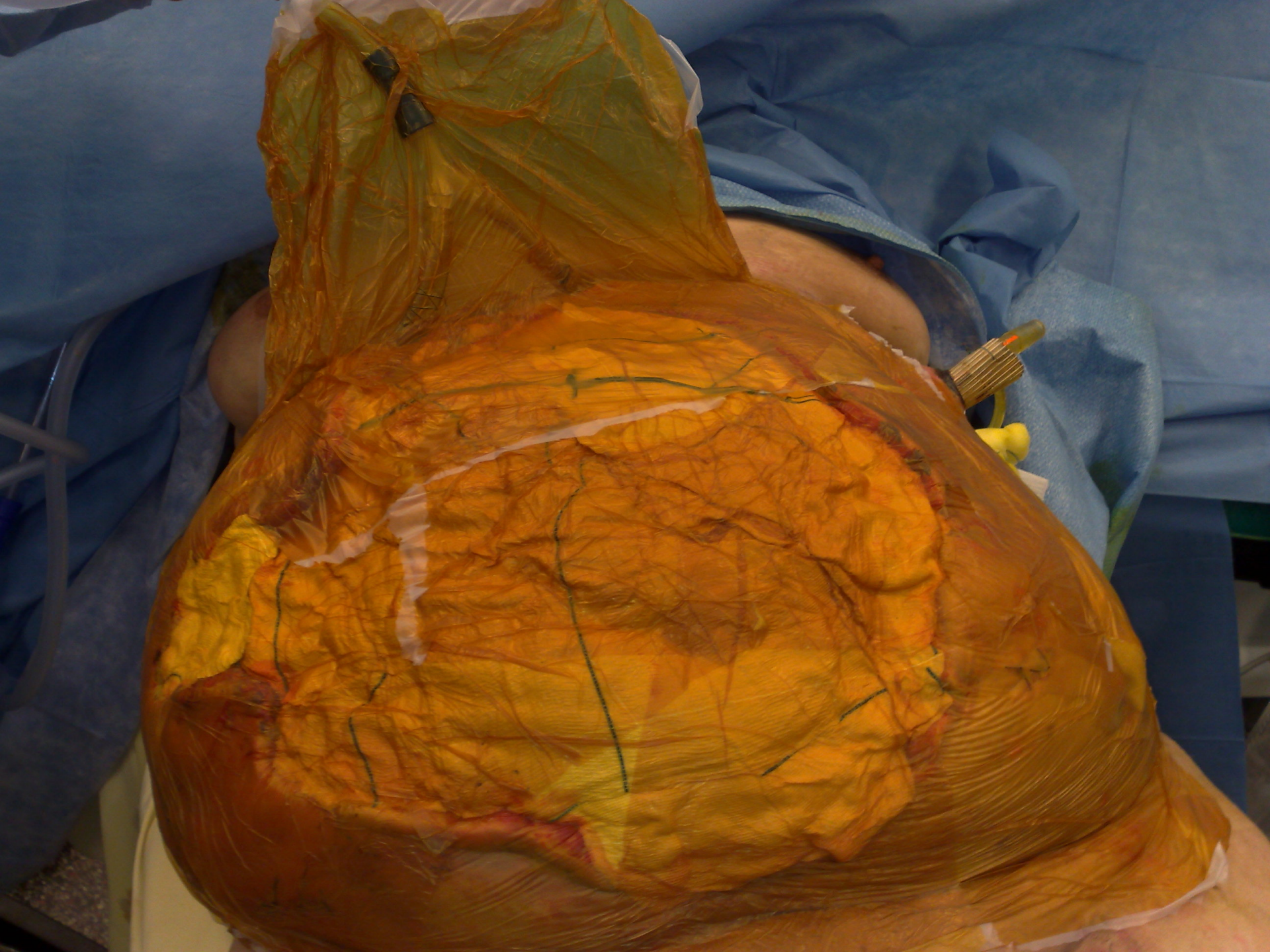
Home-made vacuum laparostomy

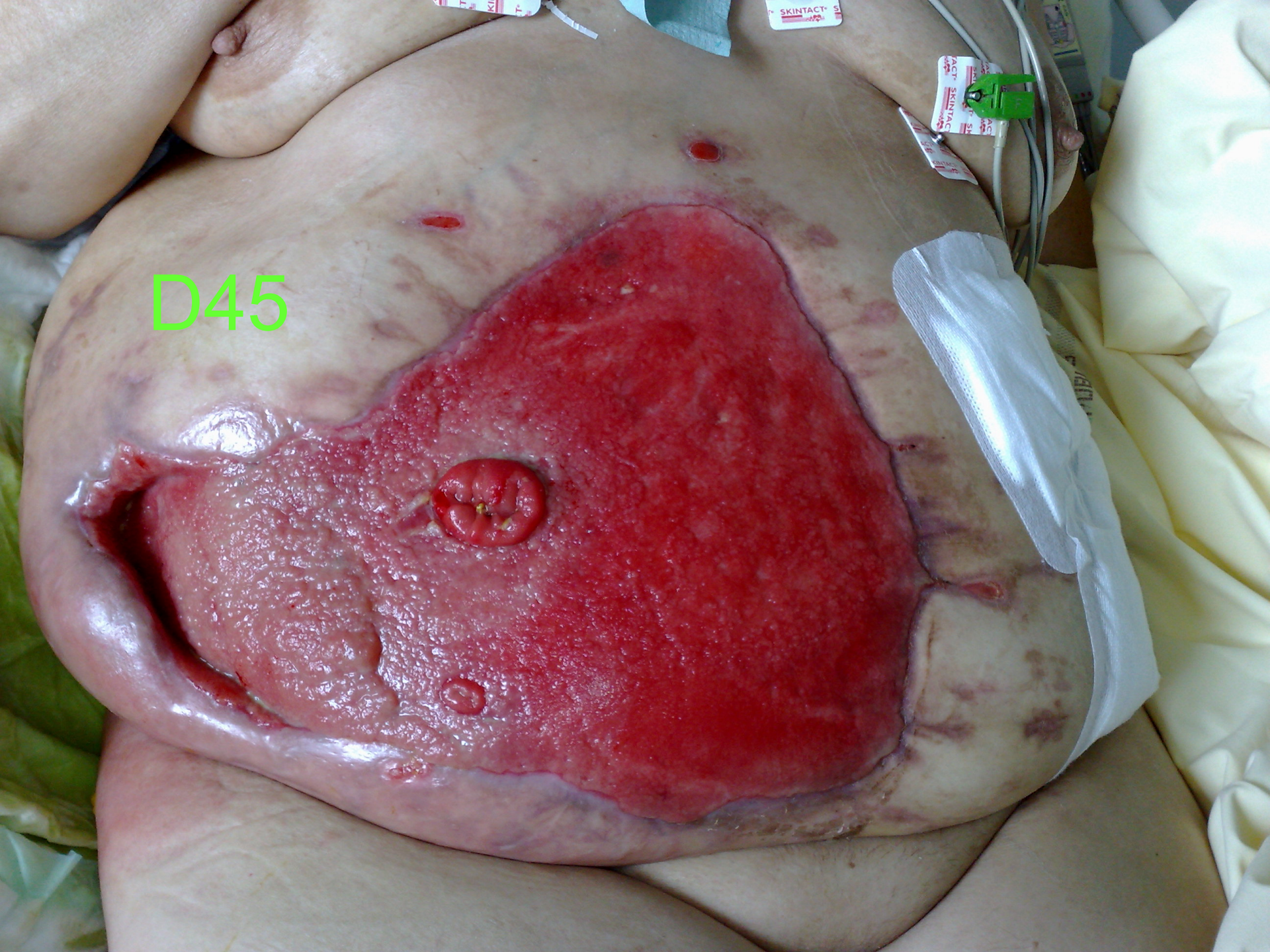








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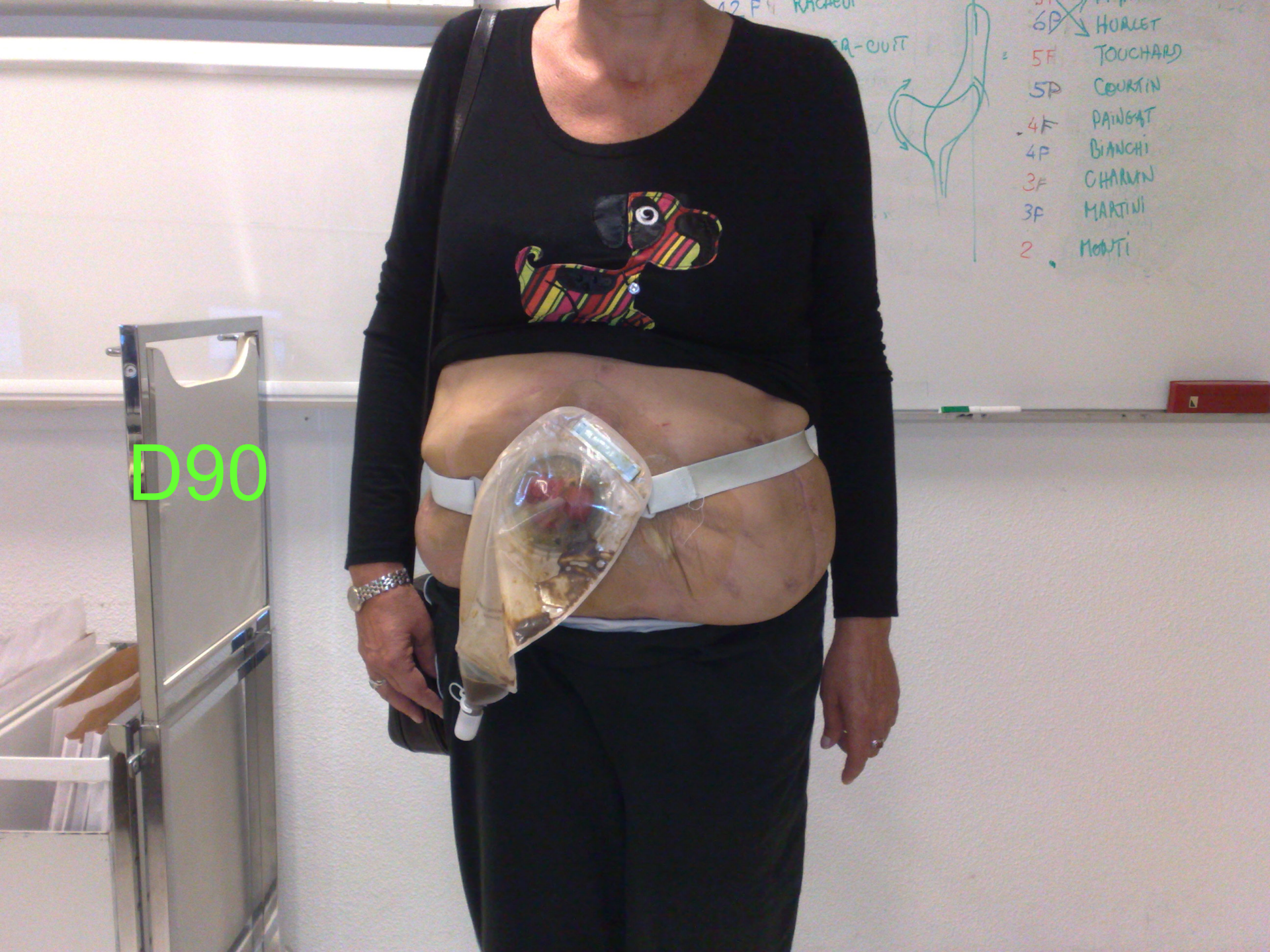
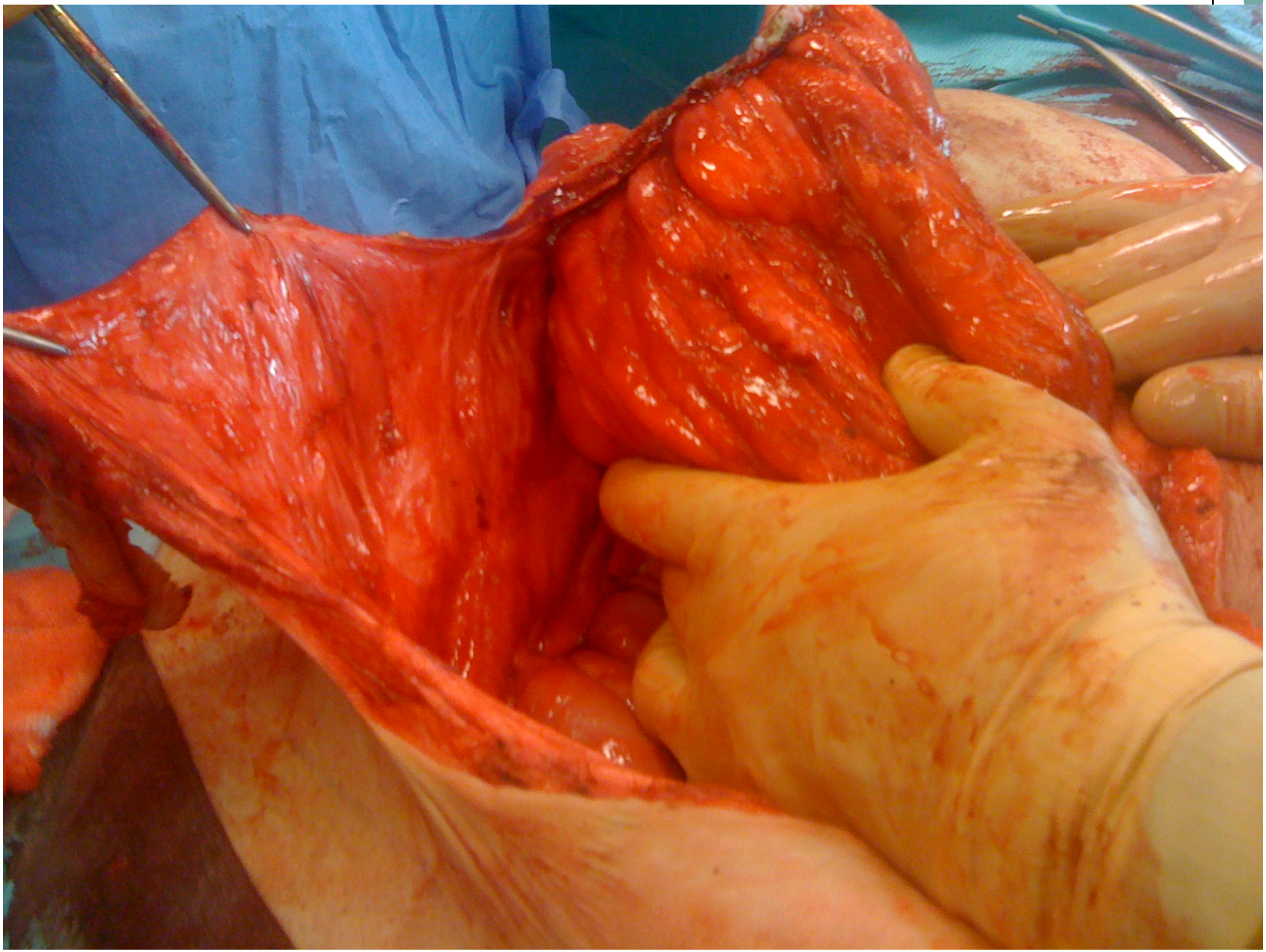
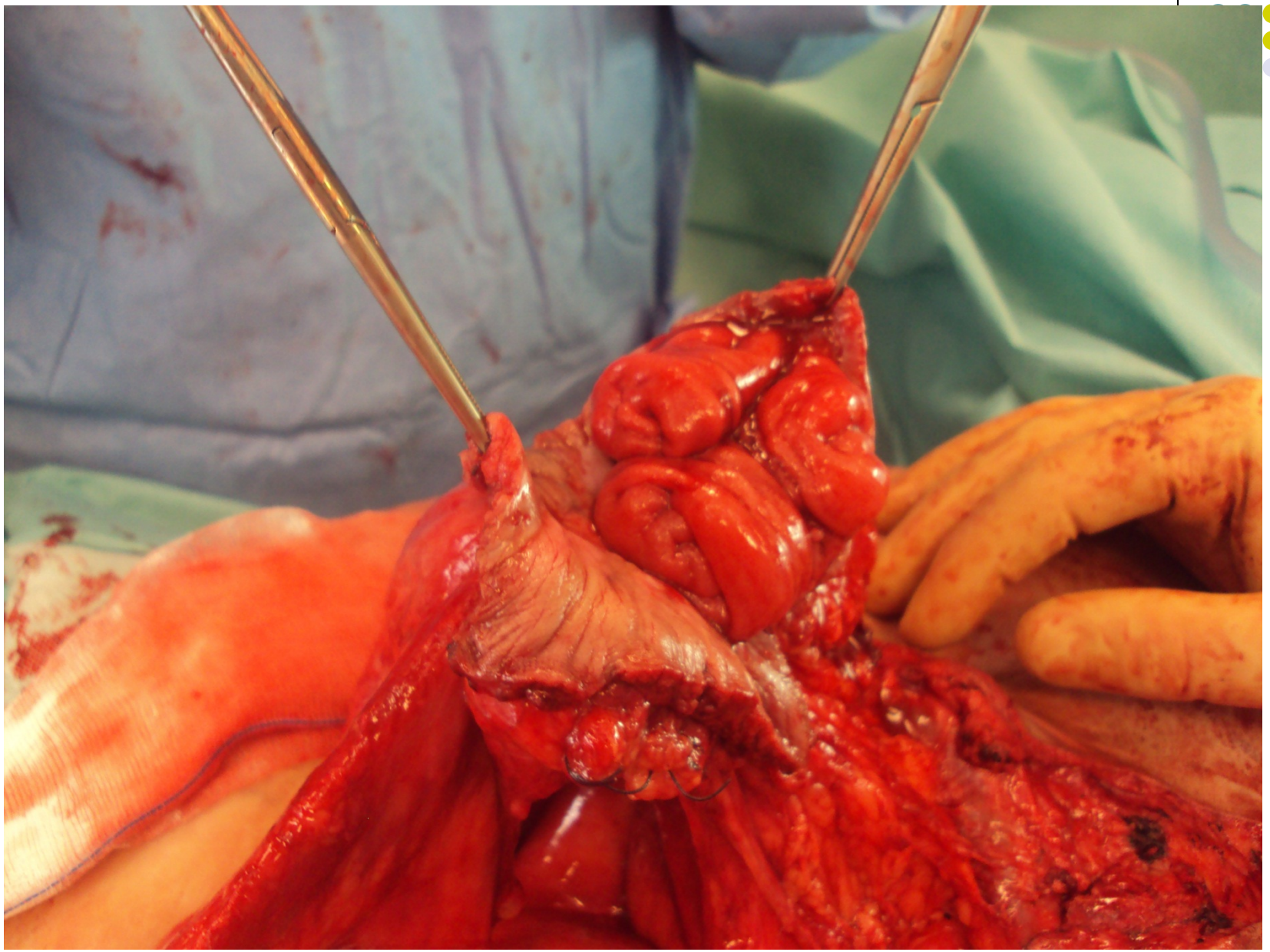

D90
6P HURLET
5F TOUCHARD
5P COURTIN
4F PAINGAT
4P BIANCHI
3F CHARUIN
3P MARTINI
2 MOUTI

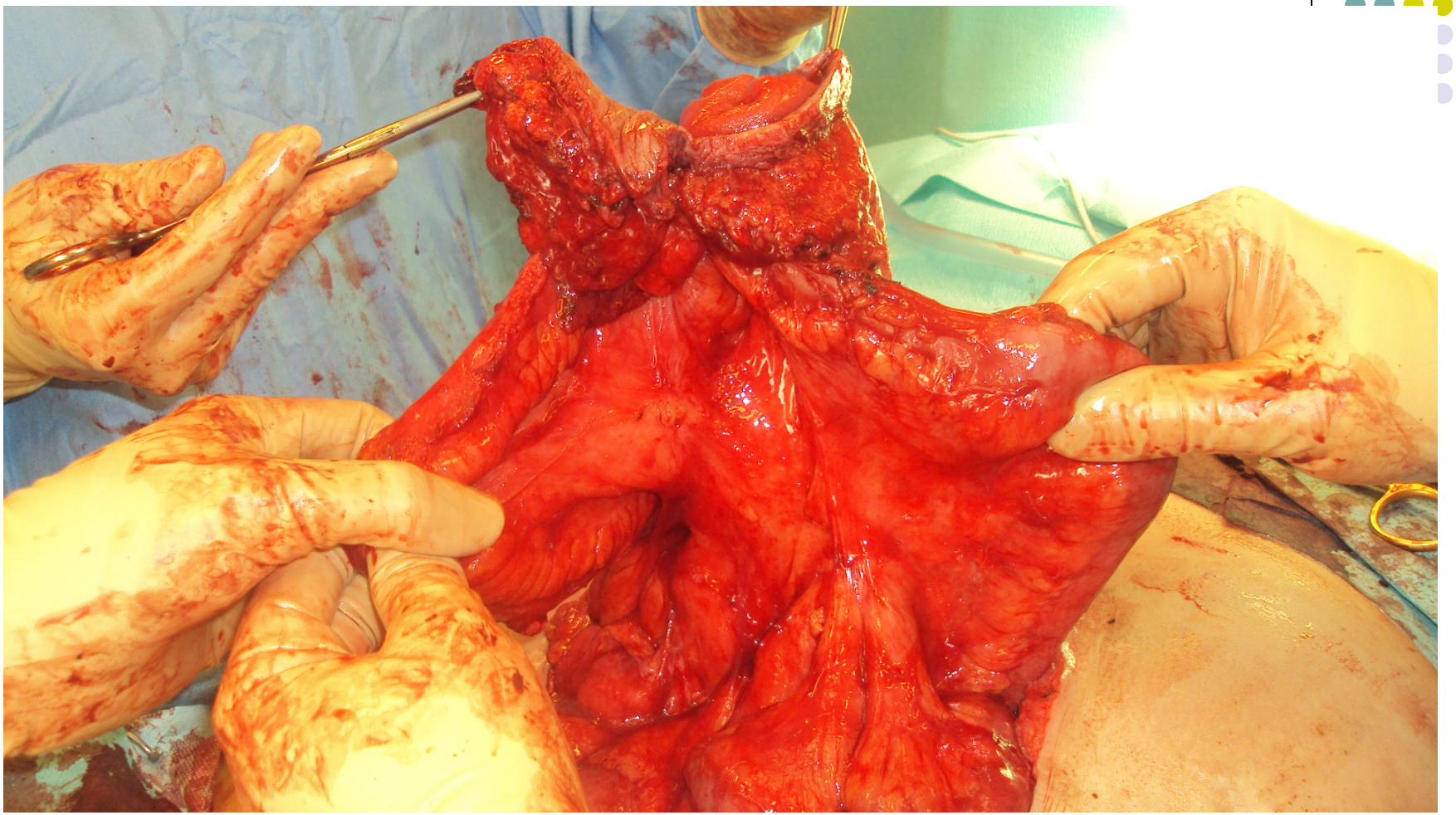

2 yrs

PLANNED SURGERY

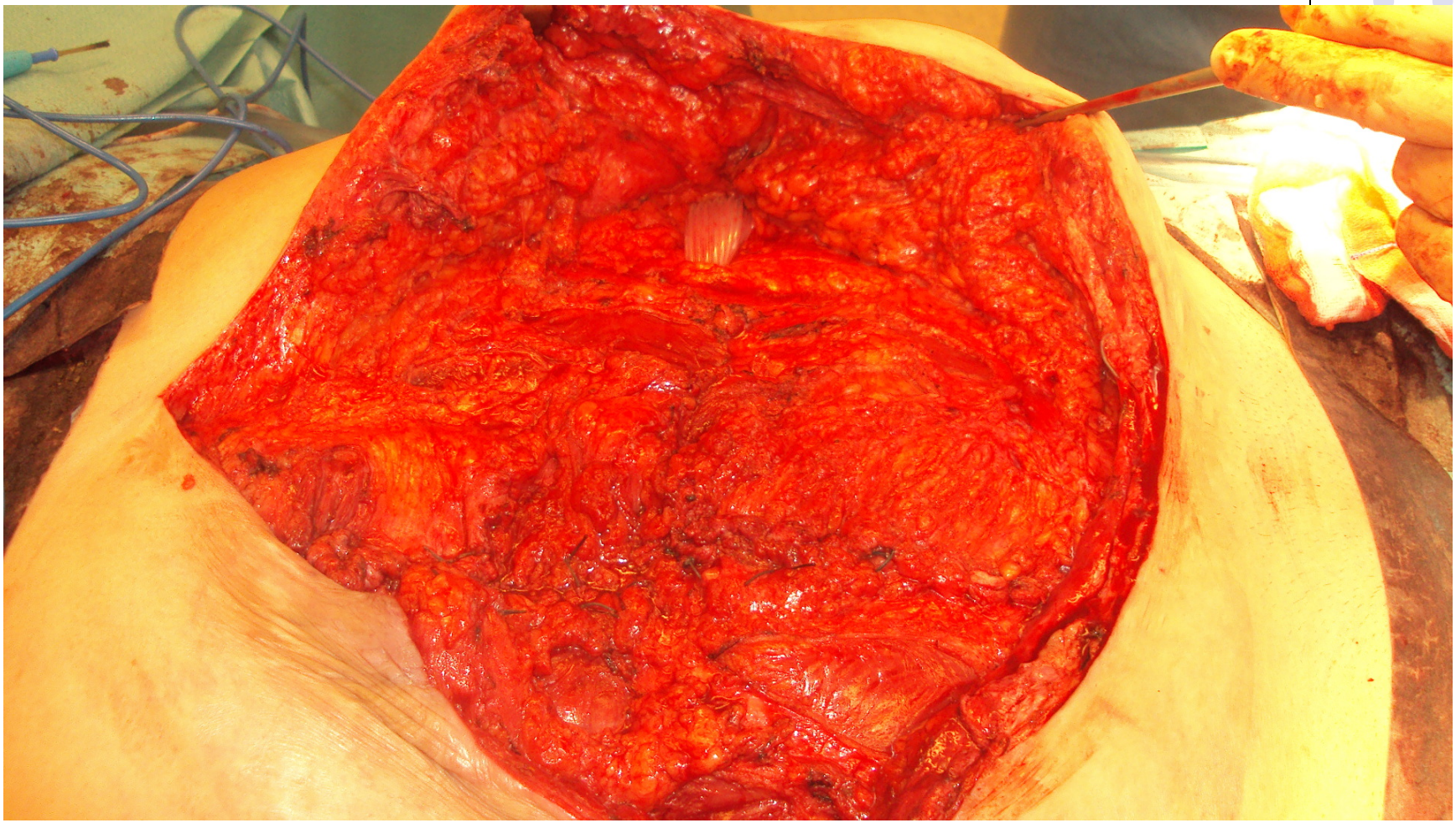


Jejunal resection <30cm





Retroaponevrotic Biological Mesh



HOW TO CLOSE LAPAROTOMY AFTER DAMAGE CONTROL SURGERY?

- Trauma patient
  - shorten the delay between resurgery
  - Mesh assisted closure
- Non trauma patients
  - Home made VAC
  - Anticipation (>1/4 definitive stomy)