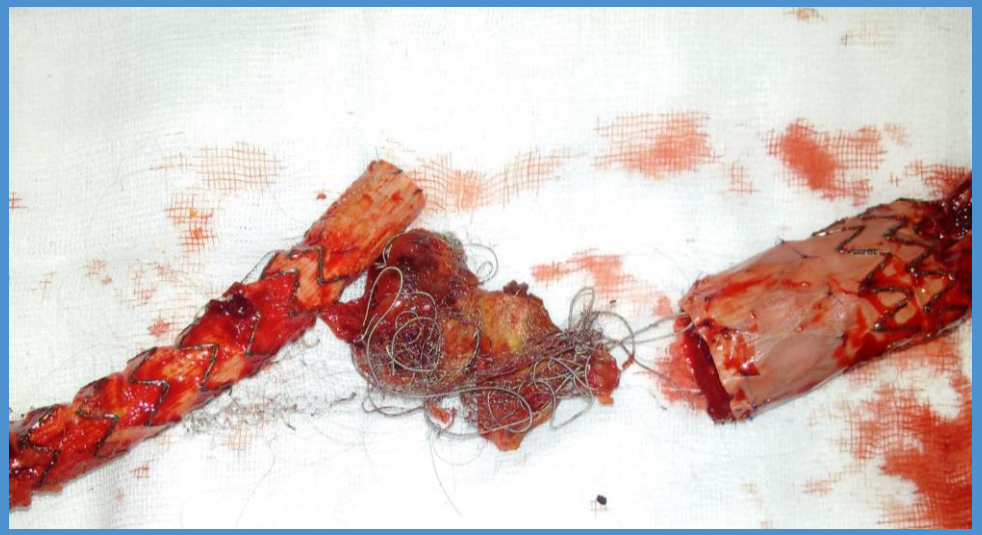
I-MEET may 31st, 2018

Explantation of different EVAR devices with infection



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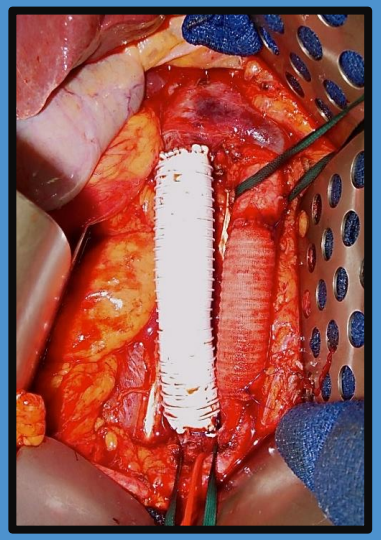
Xavier BERARD

My Disclosure

- I have the following potential conflicts of interest to report:
  - Receipt of grants/research support
  - Receipt of honoraria and travel support
- With Maquet-GETINGE
- BUT NO CONFLICTS WITH ALL EVAR COMPANIES

Epidemiology

- Overall Graft infections : 1 to 6 % (except dialysis)
- Aortic graft infection :< 1 %
- Aorto bi-femoral graft infection: 2%
- infra-inguinal bypass > 6%
- Graft for dialysis access : 3 à 35%
- EVAR 0.2 to 5%



Diagnosis and management of prosthetic vascular graft infections L. Legout et al. Med Mal Infect 2012
Surgical treatment of infected prosthetic dialysis arteriovenous grafts: total versus partial graft excision P Warren et al. *Am Journ of Surgery 2007*
Treatment and outcomes of aortic endograft infection Smeds et al J Vasc Surg 2016

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Risk Factors for Graft Infection

Patient	Operation	After intervention
Age	Angiography	Inflammat
Men	Groin incision	Sero
Obesity	Long intervention	
Heart failure	Redo Surger	
Immunodeficiency	Emerg	
Diabetes		
Kidney failure		
COPD		
Leg ulc		

Undetermined for EVAR

Local complications: graft infection. M.R. Back. Rutherford's vascular surgery (7th ed.)

Vascular graft infections. B Hasse et al. European Journal of Medical Sciences 2013

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Symptoms of EVAR infection

- *From Smeds et al J Vasc Surg 2016*
- 2004-2014 multicentric, USA
- 206 patients
  - 180 EVAR
  - 26 TEVAR

Presenting symptom	*No. (%) (N = 206)*
Pain	137 (66)
Back	71 (52)
Abdominal	47 (34)
Groin	8 (6)
Chest	7 (5)
Flank	4 (2)
Fever/chills	137 (66)
Aortic fistula	55 (27)
Endoleak	36 (24)
Rupture	23 (11)
Asymptomatic	10 (5)

Smeds et al J Vasc Surg 2016

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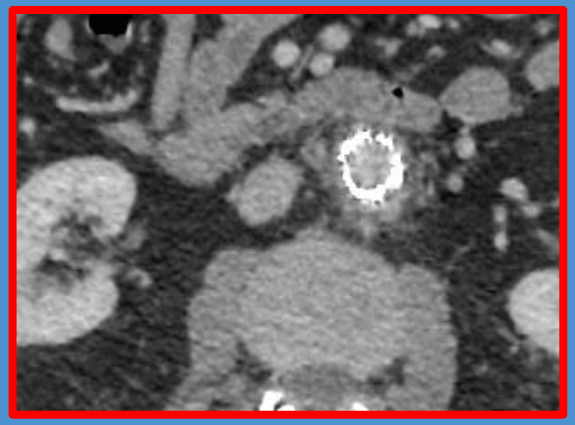
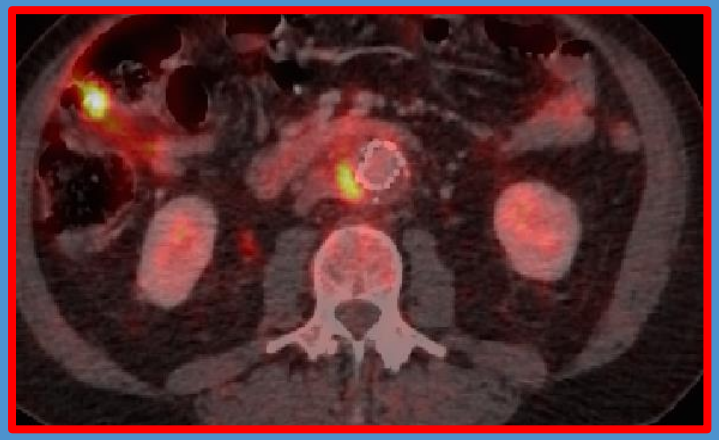
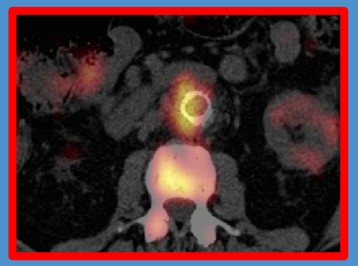
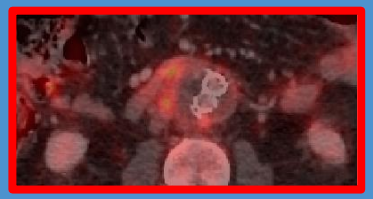
Imaging a suspicion



CTA with periaortic neck infiltration in contact with duodenum







A PET CTA withuptake in the neck (potential enteric fistula?)

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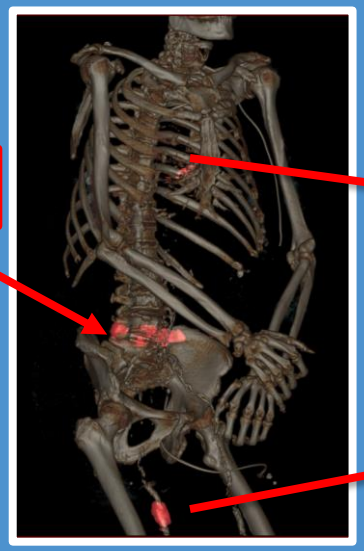
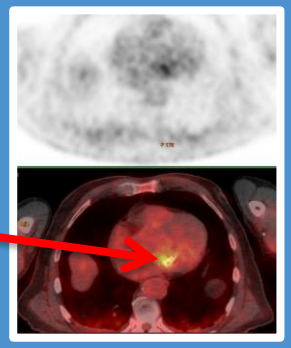
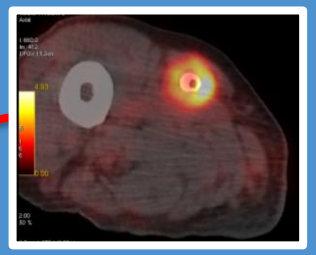
Determine the infection scenario with PET-CT

Spondylodiscitis





Endocarditits



Stent in femoral position infected

Berard et al. Circulation 2014

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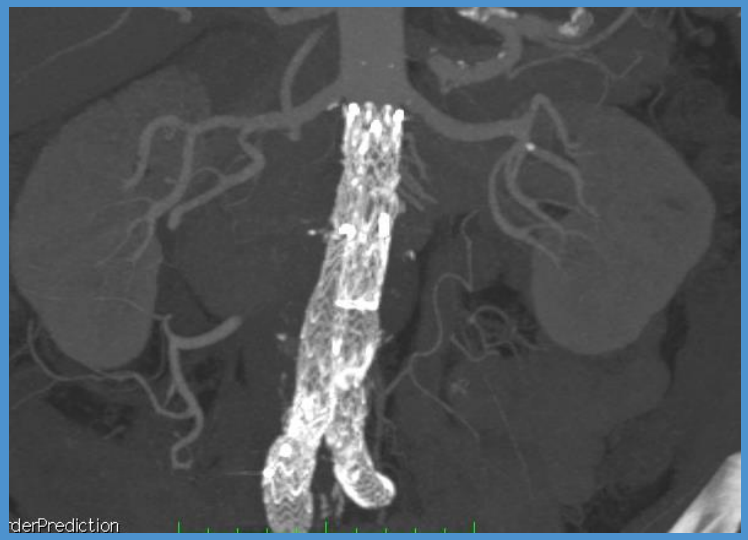
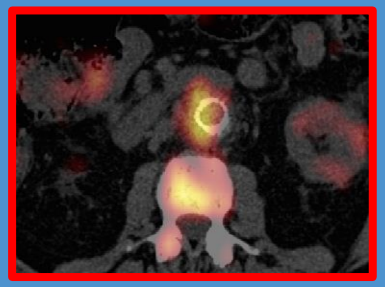
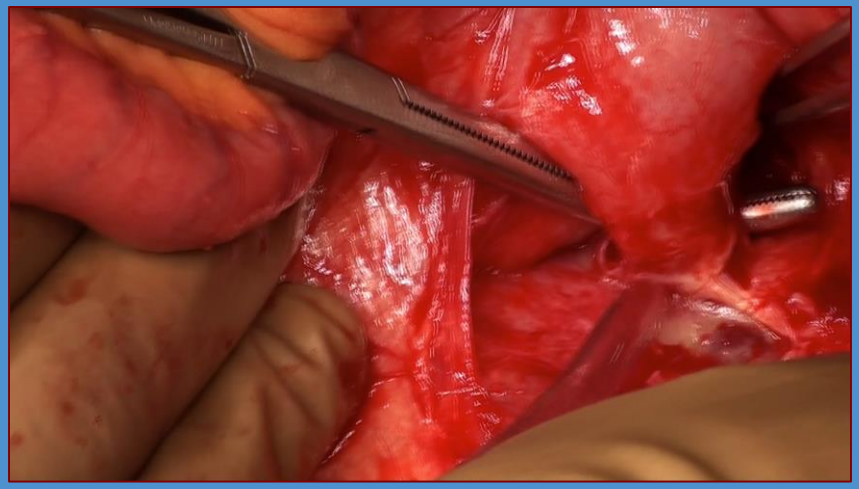
Which approach?

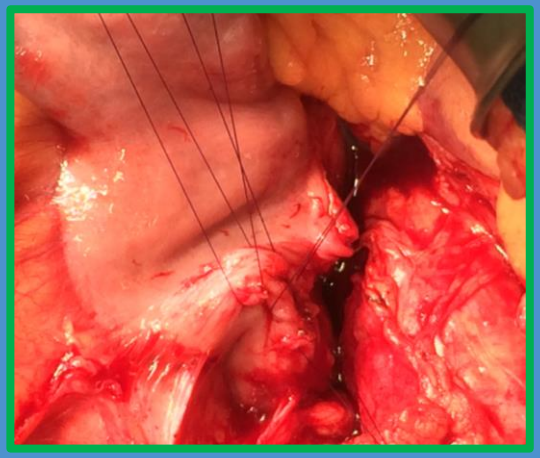


- Trans-abdominal
  - Need for bowel repair
  - Difficult right iliac limb extraction
  - Okay for Simple aortic proximal fixation
    - Gore C3
    - SupraRenal stent not above SMA
    - Nice renal arteries

Difficulties and Strategy
Preference to transabdominal approach







Duodenal adherence to aortic neck
During EVAR explantation

Duodenum direct suture for prosthetic enteric fistulae

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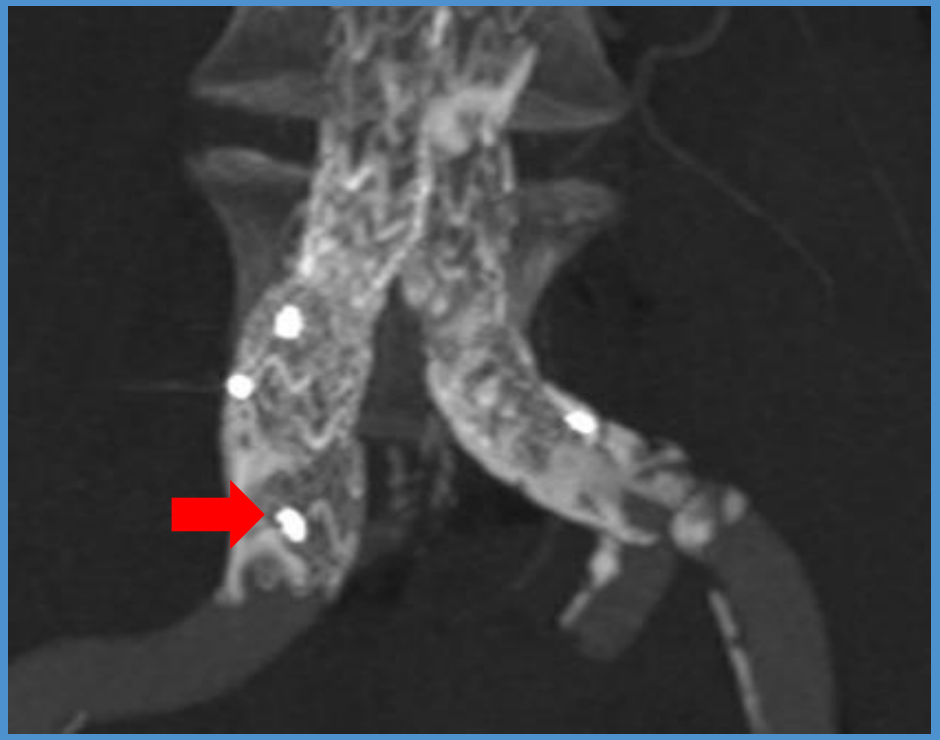
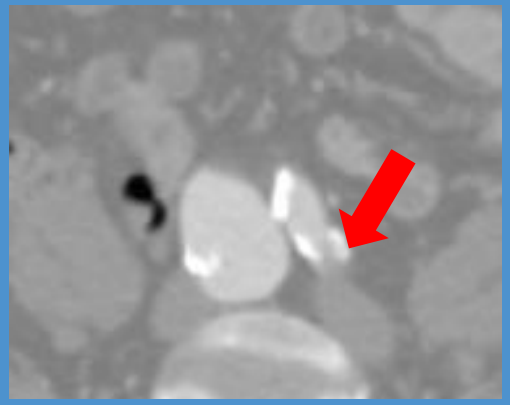
Identified difficulties and strategy



Gore C3 with right bell bottom
Left iliac calcification
Potential Aorto-bifemoral bypass



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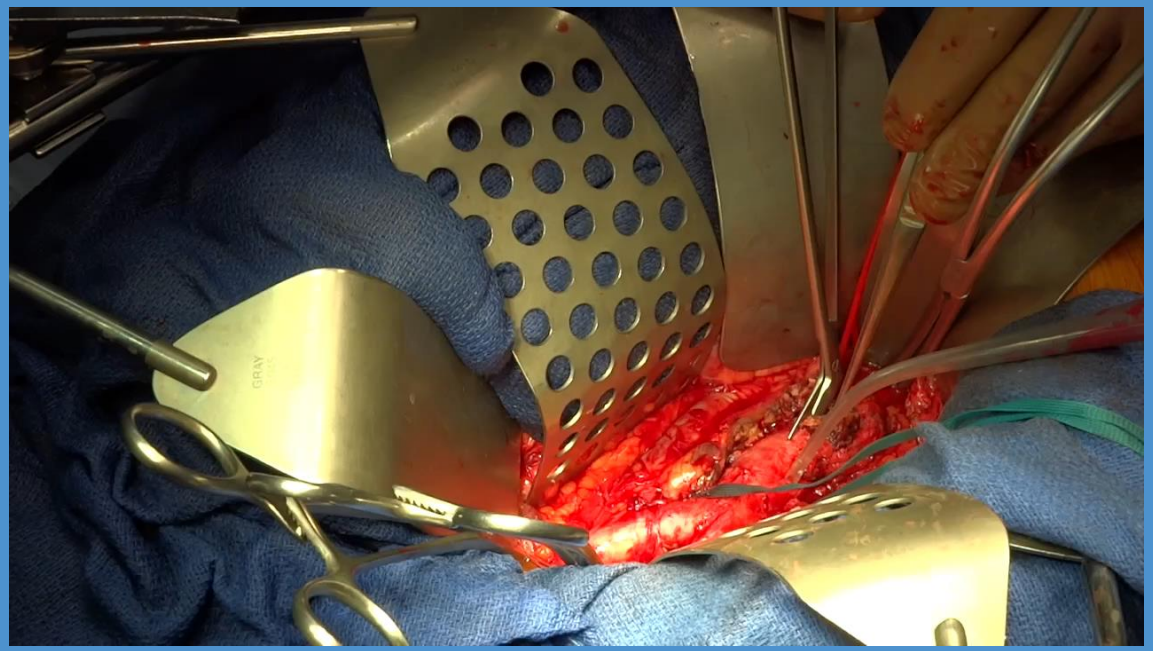
Explant of a Bridge EVAR

- Bridge EVAR : temporary placement of EVAR to rescue:
  - Rupture of proximal pseudoaneurysms following aortic graft surgery
  - Aorto-enteric fistulae in native aortic infections

Explant of a Bridge EVAR



- Bridge for aorto-enteric fistula (Q fever aortitis) treated with Gore C3
- No difficulties in extraction at day 7
- No risk of iliac damage
- Tubed pericardium

Median laparotomy
Supra renal aortic clamping

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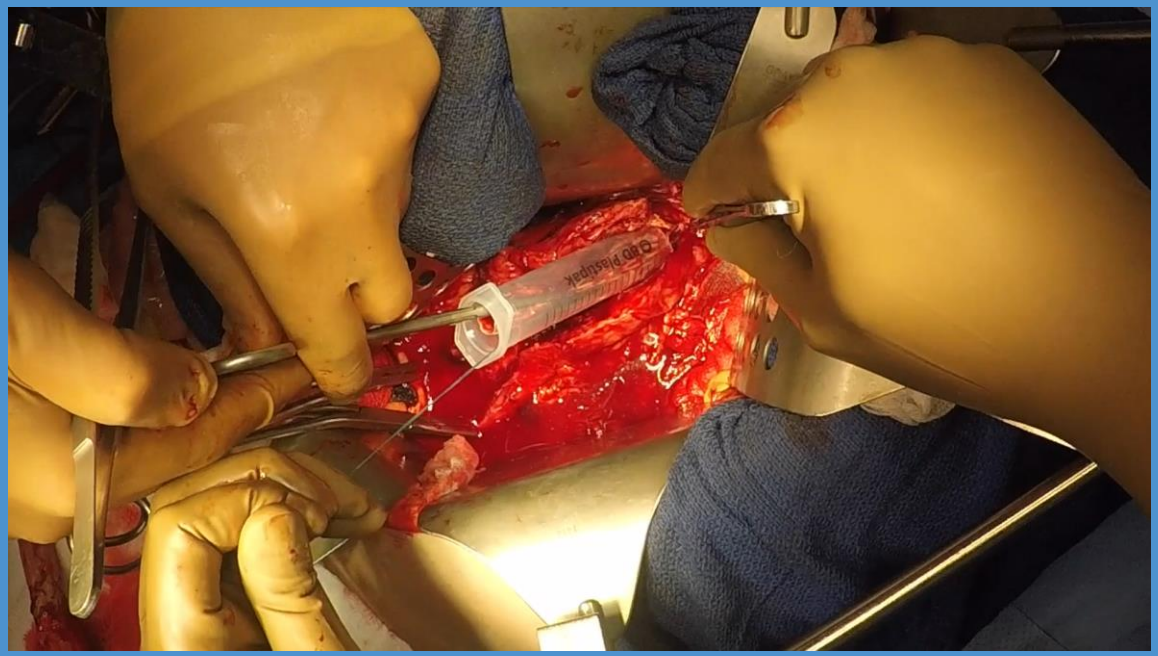
COOK EVAR extraction through trans-abdominal incision



Cook suprarenal fixation
Clamp planning : supracoeliac

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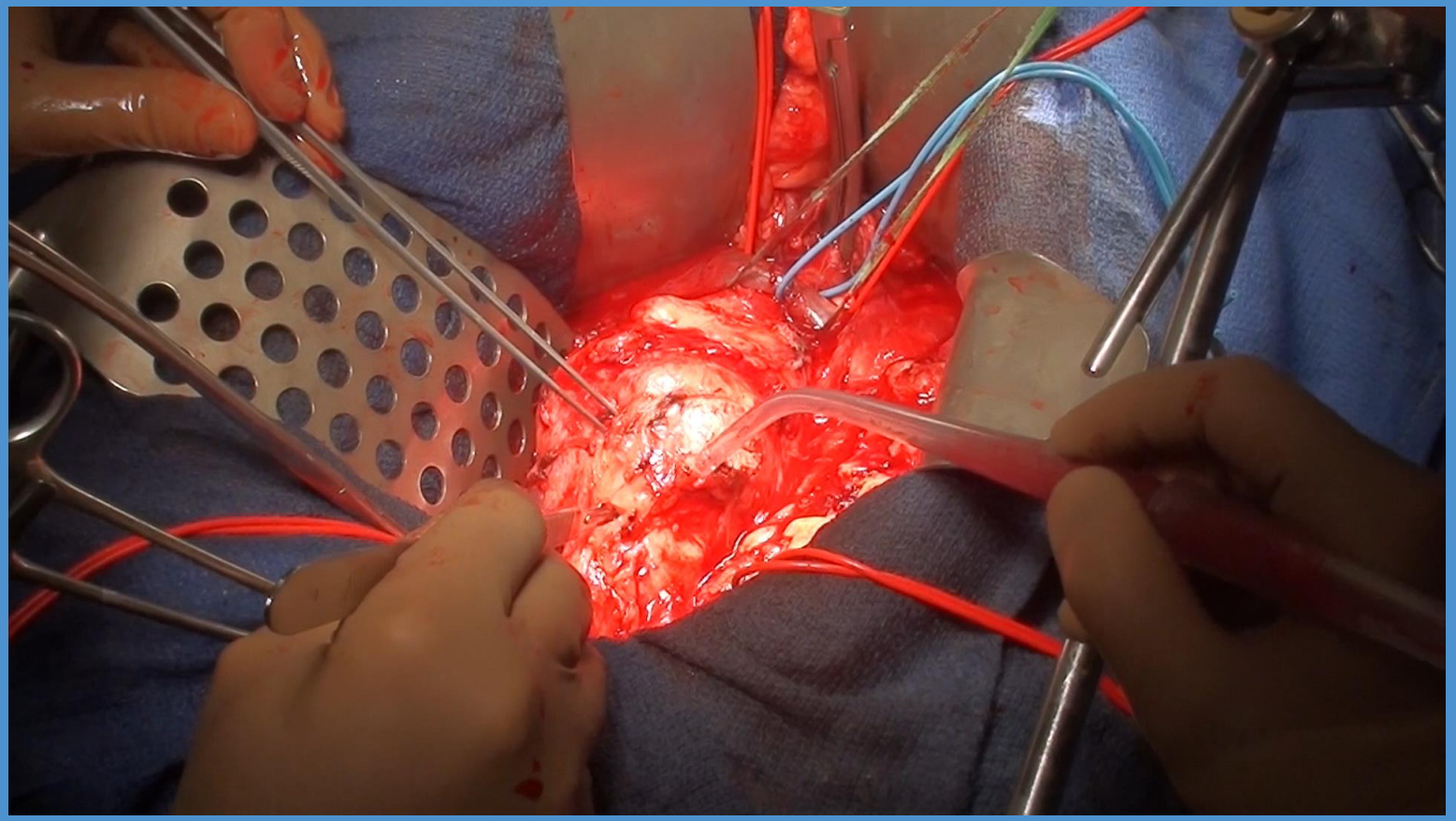
Medtronic EVAR extraction through trans-abdominal incision



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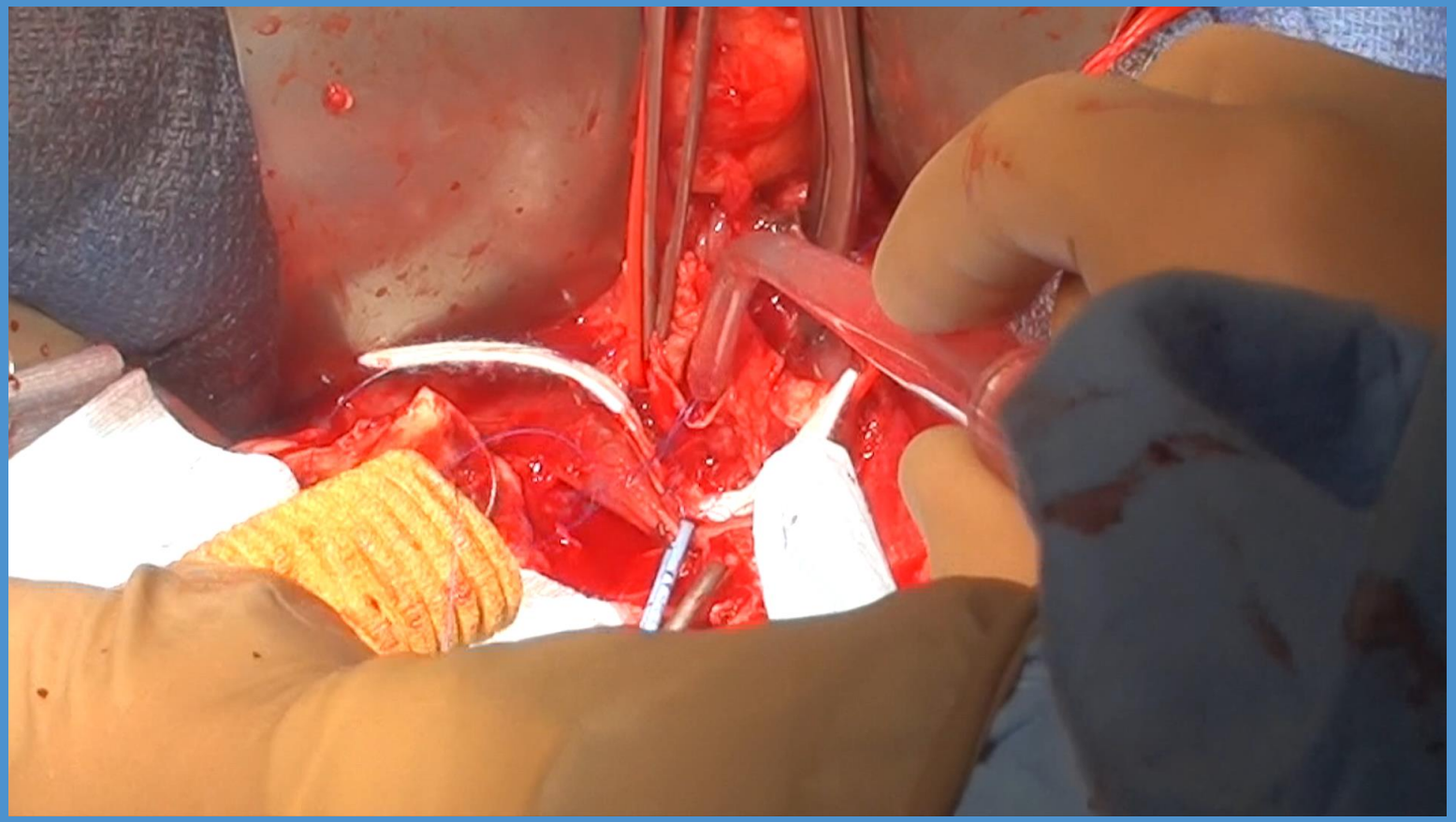
Medtronic EVAR extraction through trans-abdominal incision



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Which approach?

- Retroperitoneal (Thoraco-abdominal)
  - No Need for bowel repair or limited to 4th portion of duodenum (direct suture)
  - Easy right iliac limb extraction
  - Perfect for Difficult aortic proximal fixation
    - SupraRenal stent in front of or above SMA
    - FEVAR, Chimney extraction or post ostial diseased (left++) renal arteries

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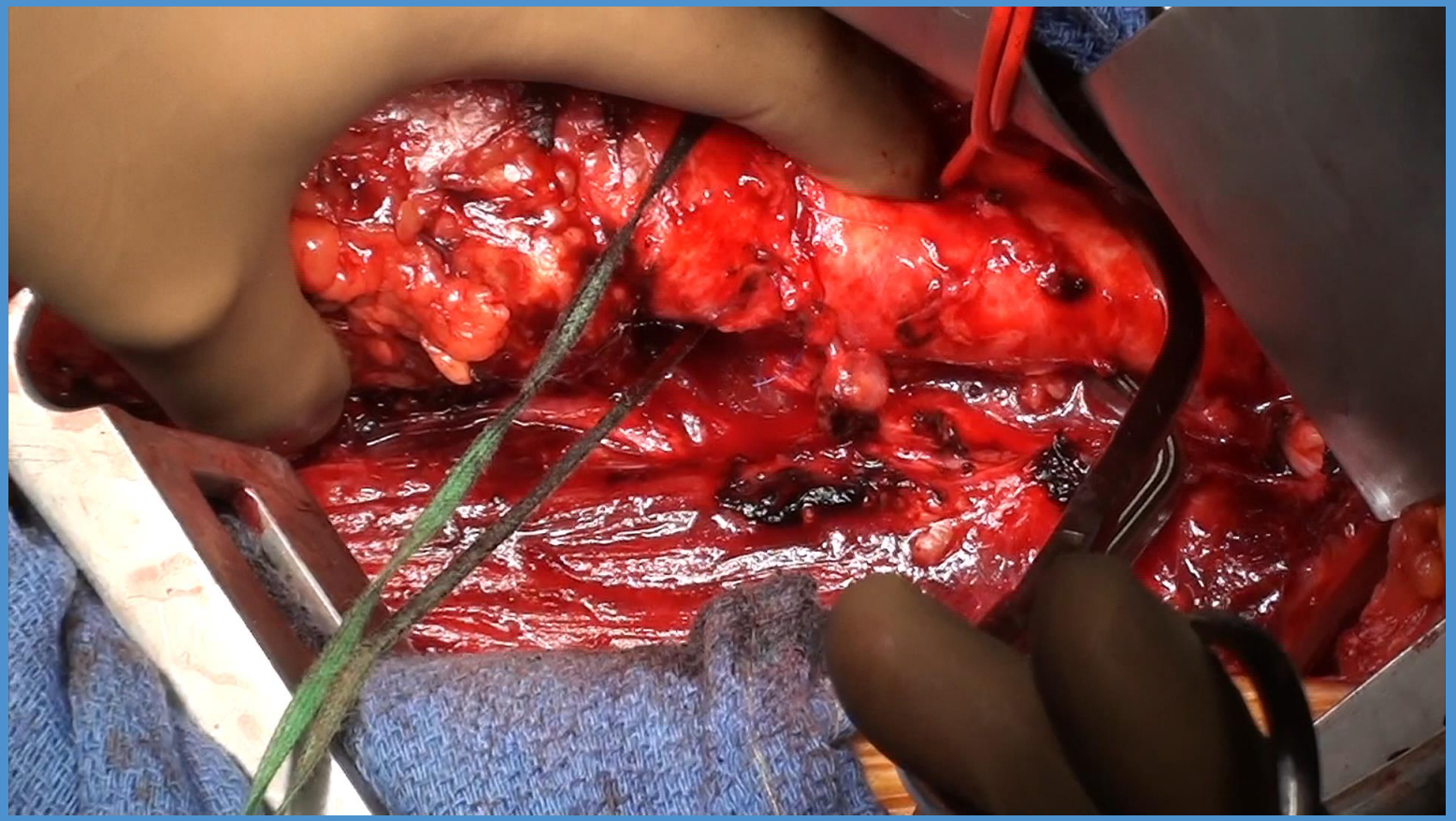
Cook EVAR extraction through 9th rib thoraco-abdominal incision



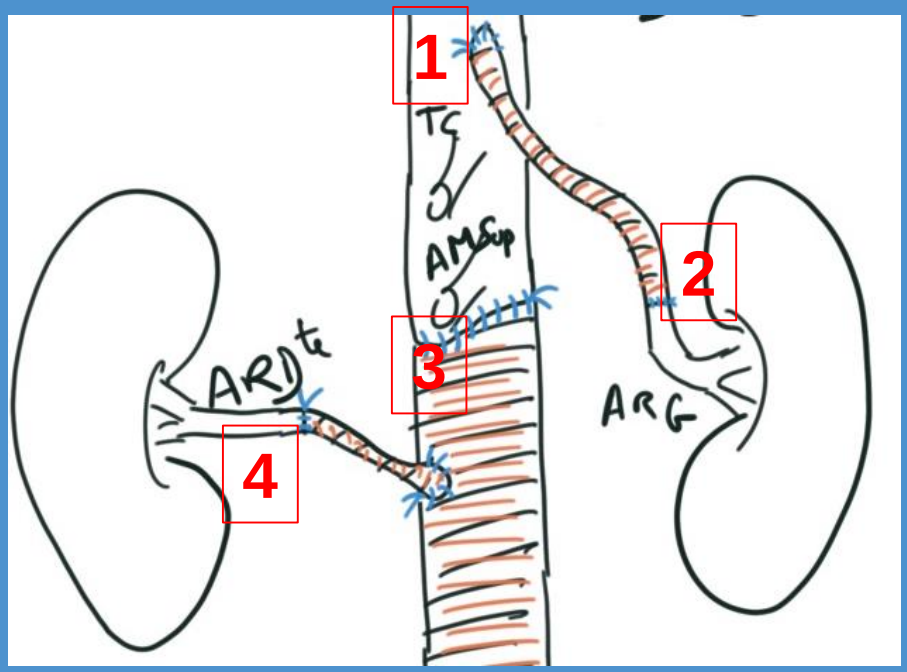
ChimneyEVAR extraction through 9th rib thoraco-abdominal incision

1- Thoracic cross clamp (10 min) to suture laterally 8 mm dacron

2- Left Renal Art cross clamp (10 min) to connect distaly the 8 mm graft

3- Supra SMA cross clamp (20 min) to suture aortic graft with presutured 8 mm dacron

4- Distal Right Renal Art sutured to 8 mm dacron (cold ischemia 50 minutes) then Cross clamp of aortic graft below right renal graft origin



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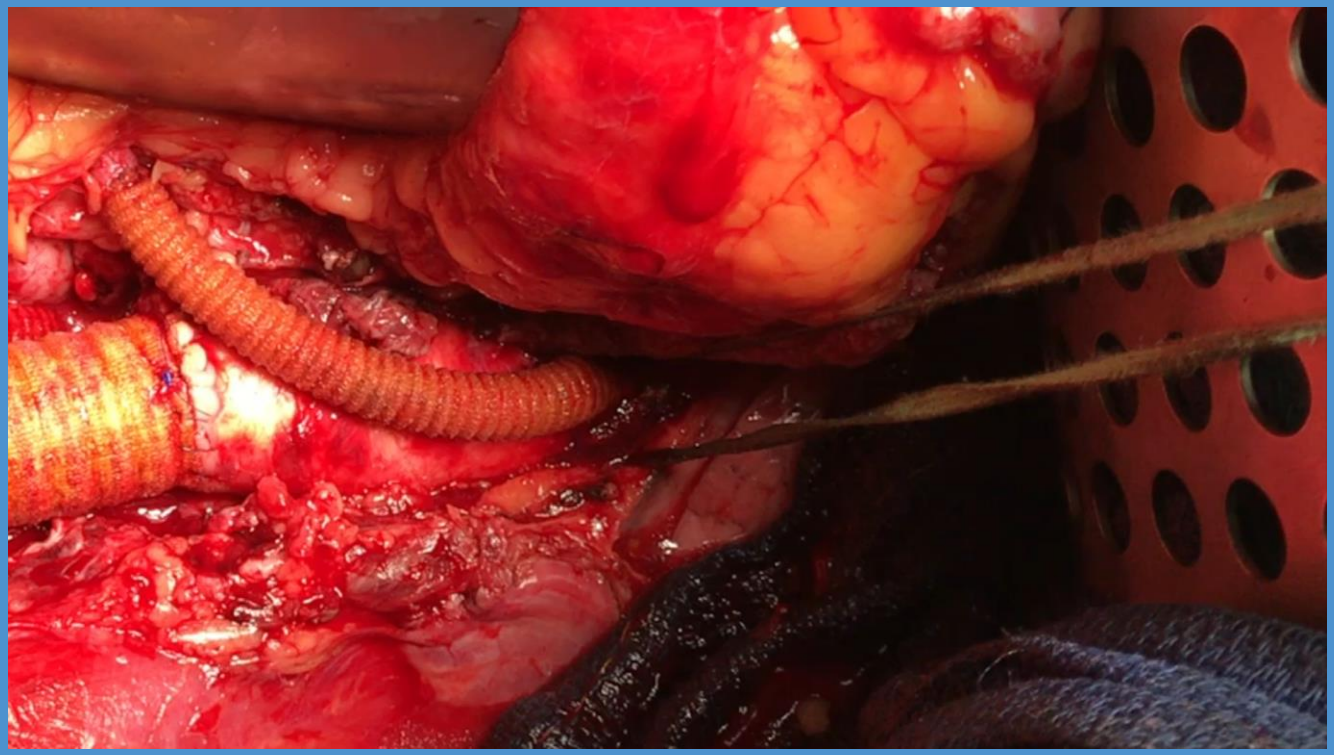
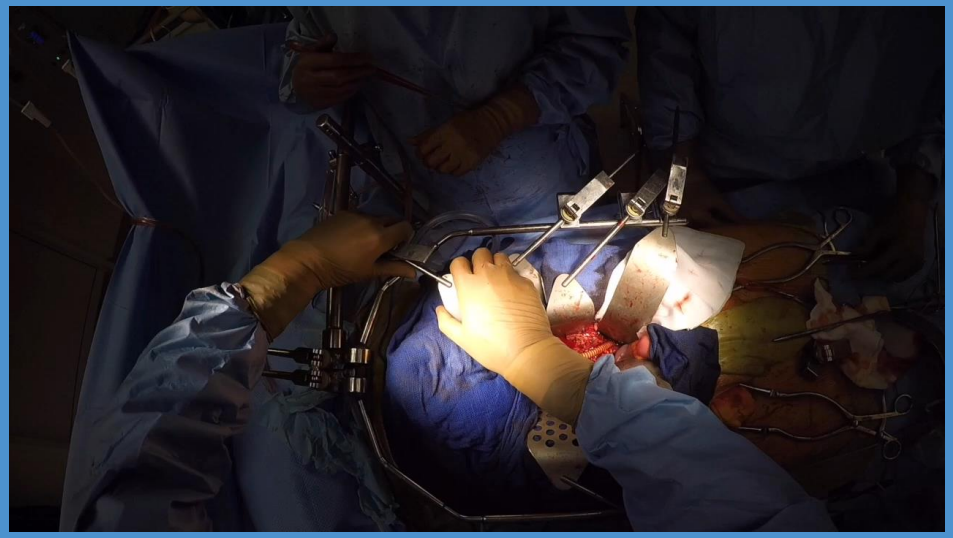
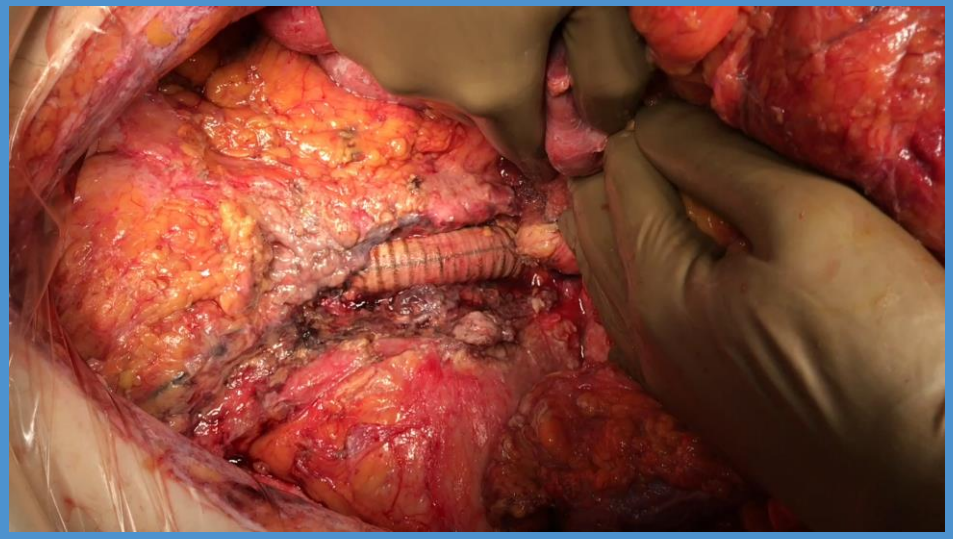
ChimneyEVAR extraction through 9th rib thoraco-abdominal incision



How to isolate (recover) the new graft?



The Omentoplasty



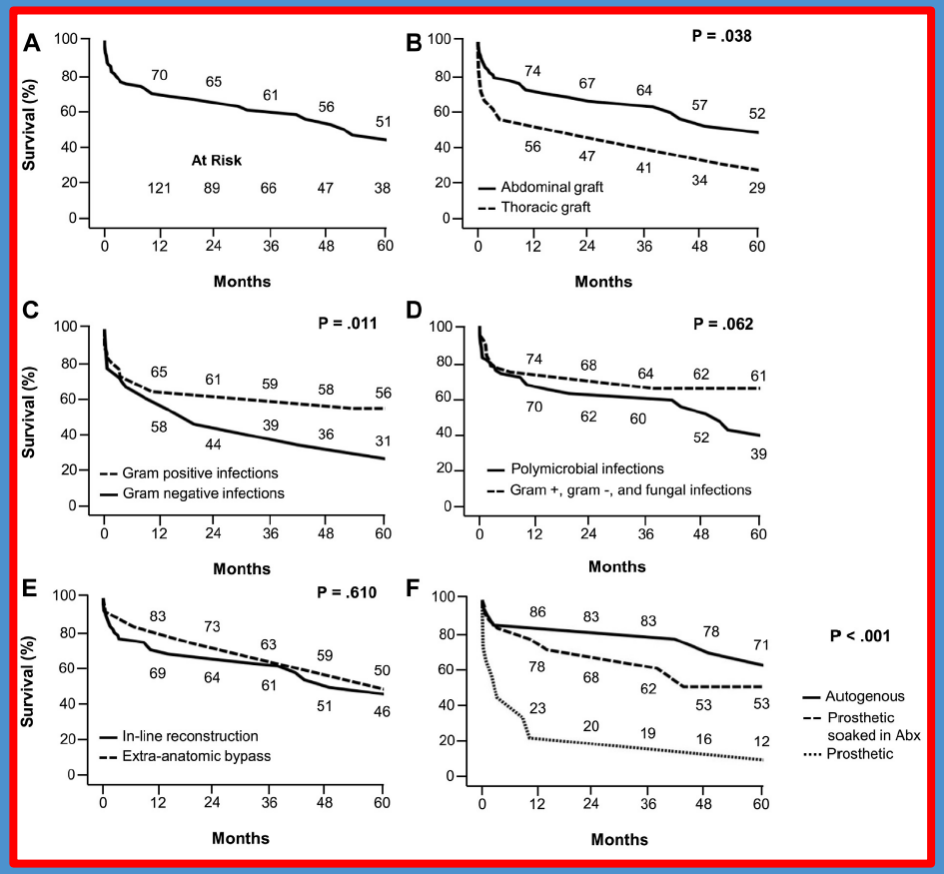
And when great omentum is missing…Gerota plasty

Sometimes delay closure to perform 2nd look at day 2 or 3

- Delay the abdominal closure
  - Visceral oedema due to massive fluid administration and/or ischemia reperfusion
  - Doubt in bowel ischemia
  - Higher risk of bleeding :
    - Acidosis
    - Hypothermia

VAC closure

Outcomes following EVAR extraction



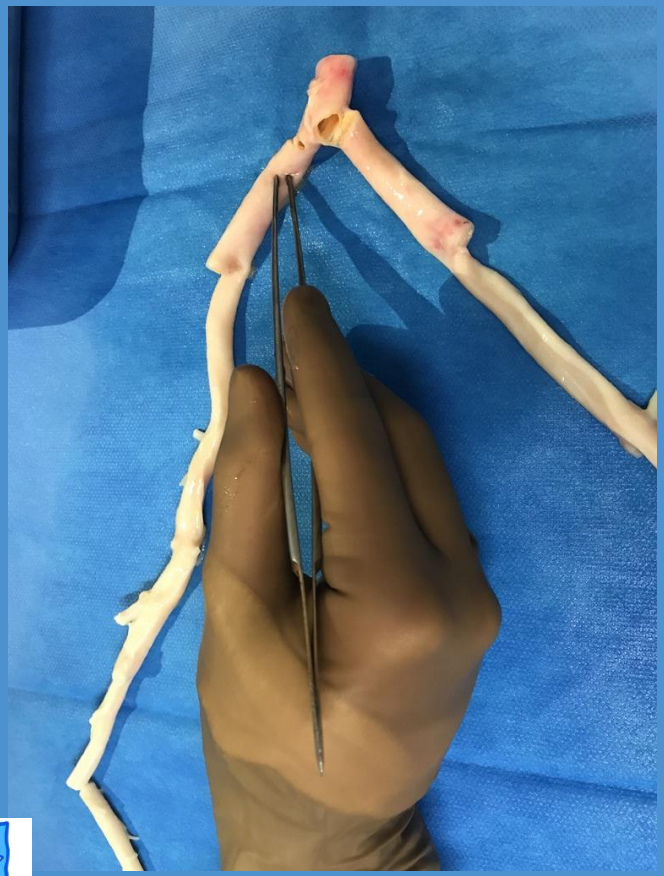
TEVAR are worse than EVAR

Polymicrobial and BGN are hard to treat

Autogenous and antimicrobial grafts do it better

Smeds et al J Vasc Surg 2016

Cadaveric artery bad defrost



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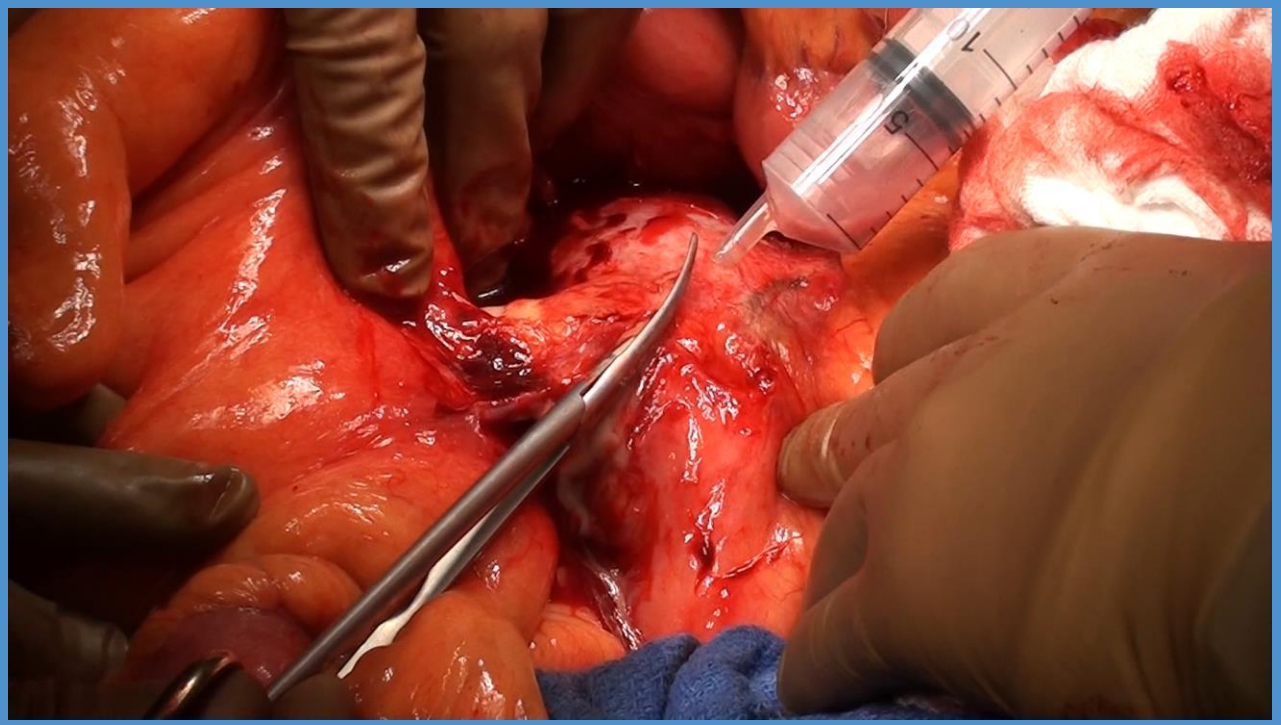
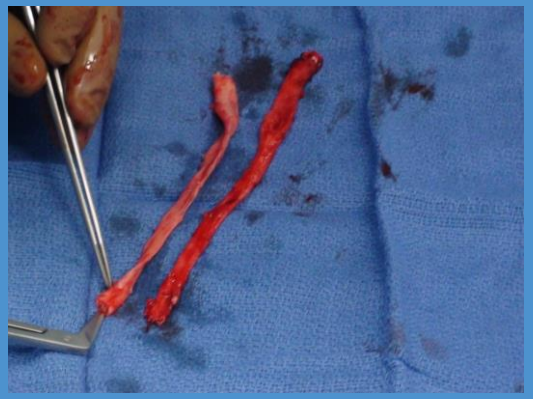
UnBridge C3 with total biological conduit





How to extend length and diameter by adding tubed pericardium to femoral veins?

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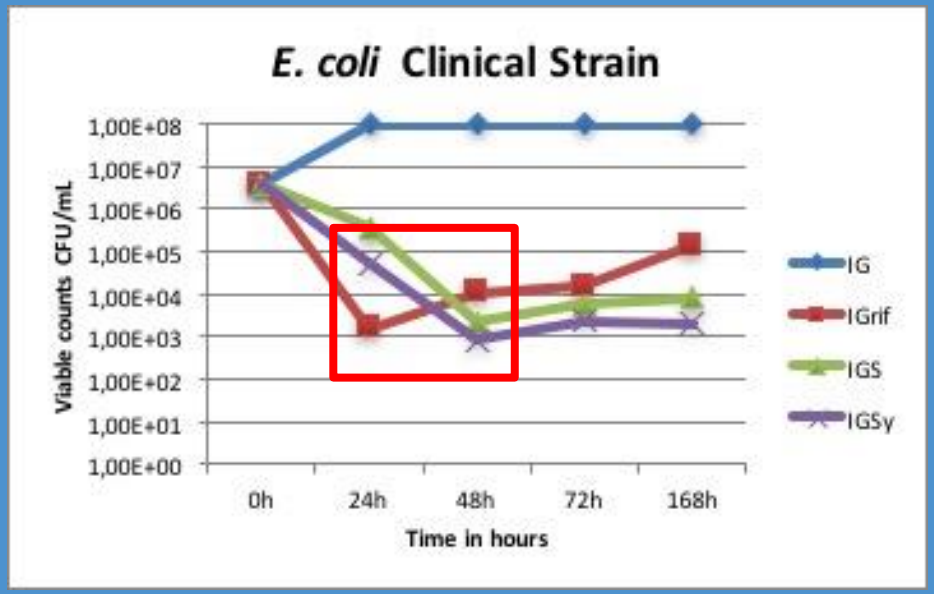
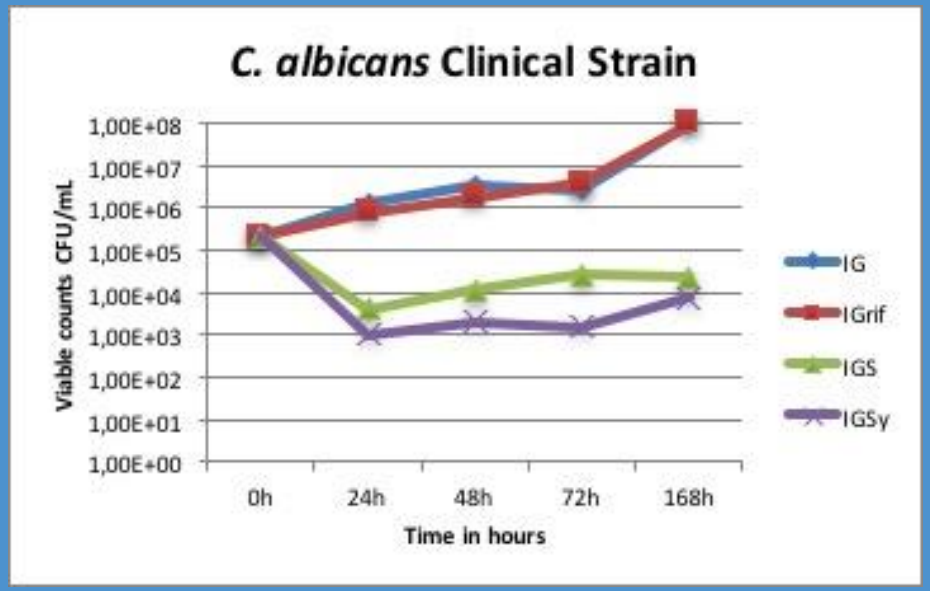
Silver+Triclosan Vs Rifampicin soaking

Bactericidal activity up to 7 days





X Berard et al under review April 2018

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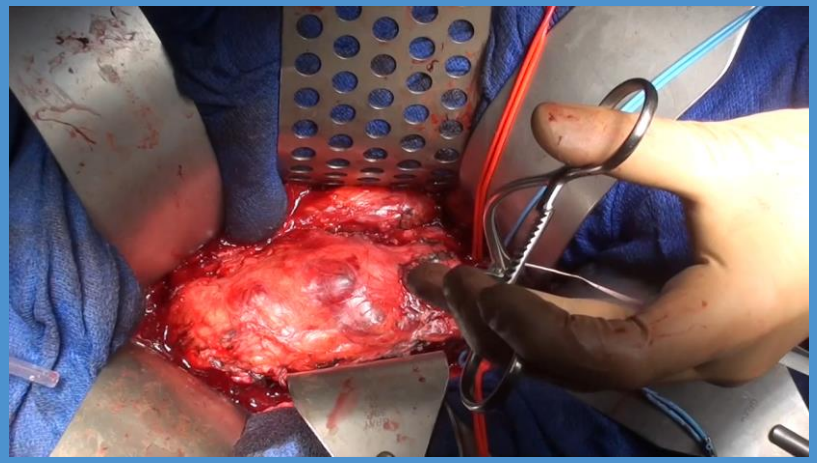
Conclusions

- **Planed strategy with dedicated approach**
- **Rapid Identification of microorganisms to target drug therapy**
  - Sonication of explanted material
  - PCR 16S
- **Multidisciplinary approach**
  - Adequate Imaging CT and PET-CT
  - Close surveillance
- **Find Solutions to reduce Reinfections**
  - Biological conduit
  - **Use of Synergy graft (silver + Triclosan) when prosthetic**
  - Adapted pre-operative antibiotic + anti-fungal drugs



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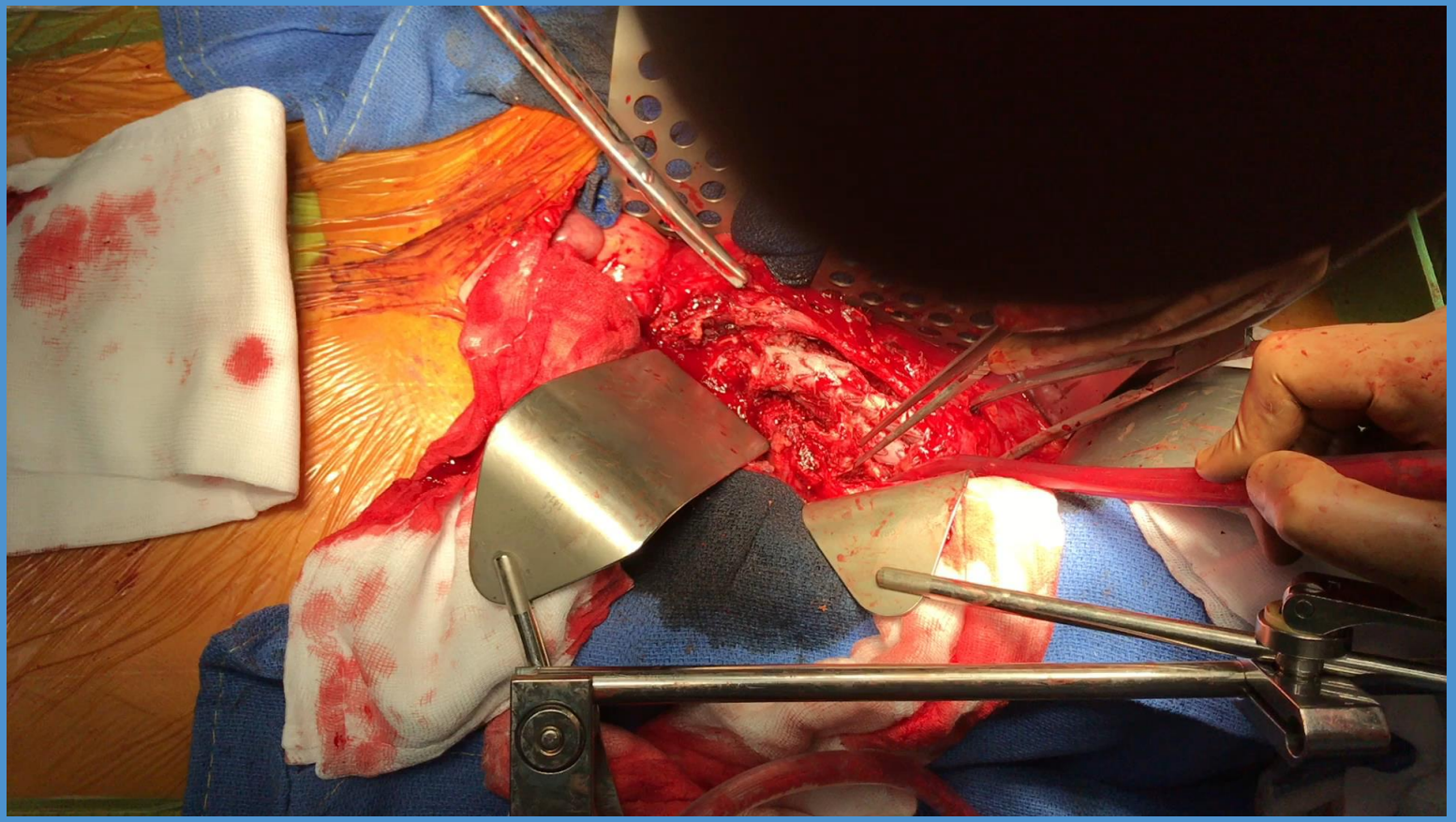
Thank you for your attention

xavier.berard@chu-bordeaux.fr

Conservative treatment



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