

I-MEET
NEXT GENERATION
JUNE 2nd 2016, Nice France

Sorry to curb the enthusiasm, but how to treat the infected endografts?

Xavier BERARD, Dominique MIDY, Eric DUCASSE

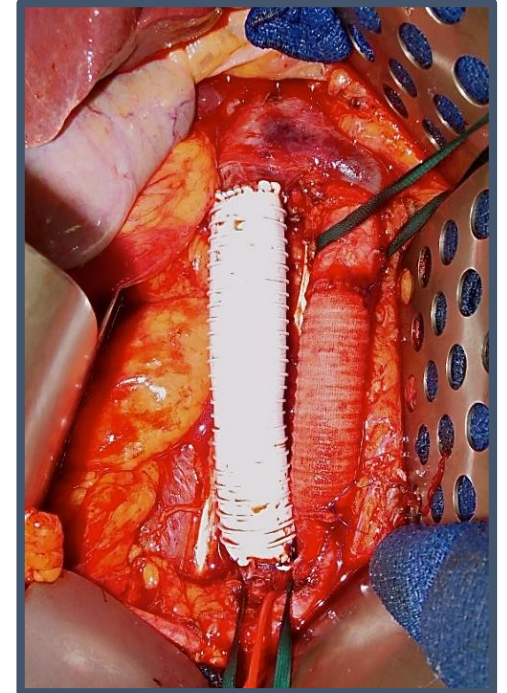
Vascular Surgery Department, Bordeaux , France



université
de **BORDEAUX**

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%**



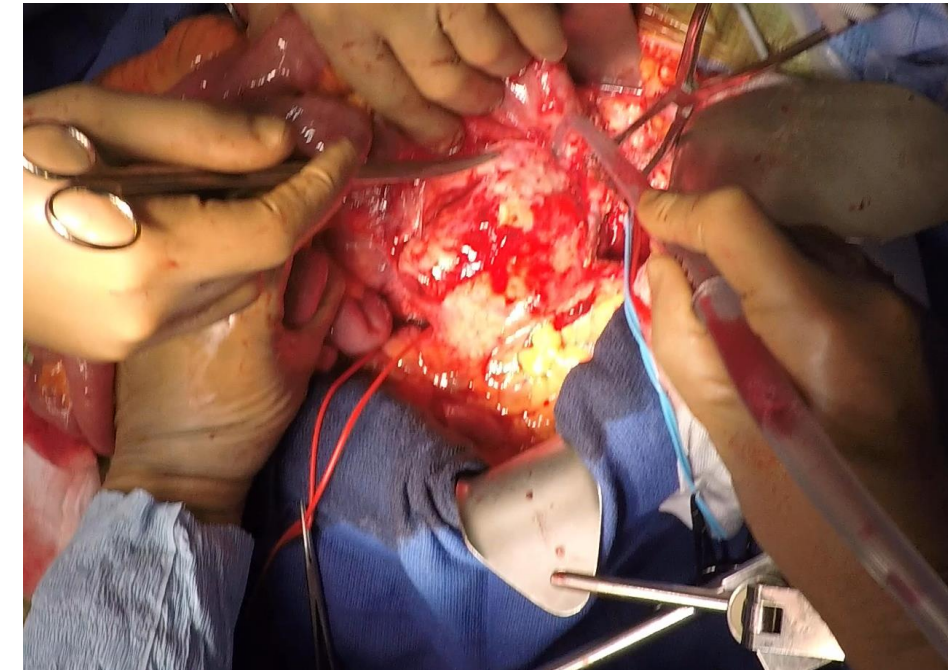
Diagnosis and management of prosthetic vascular graft infections L. Legout et al. Med Mal Infect 2012

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

Risk Factors for Graft Infection

Patient	Operation	After intervention
Age Men Obesity Heart failure Immunodeficiency Diabetes Kidney failure COPD Leg ulcer Prolonged hospital stay	Angiography Groin incision Long intervention Redo Surgery Emergency Bowel suturing	Inflammatory wound Seroma Haematoma Pseudo-aneurysm



Inflammatory AAA, jejunal
adherence to the sac

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

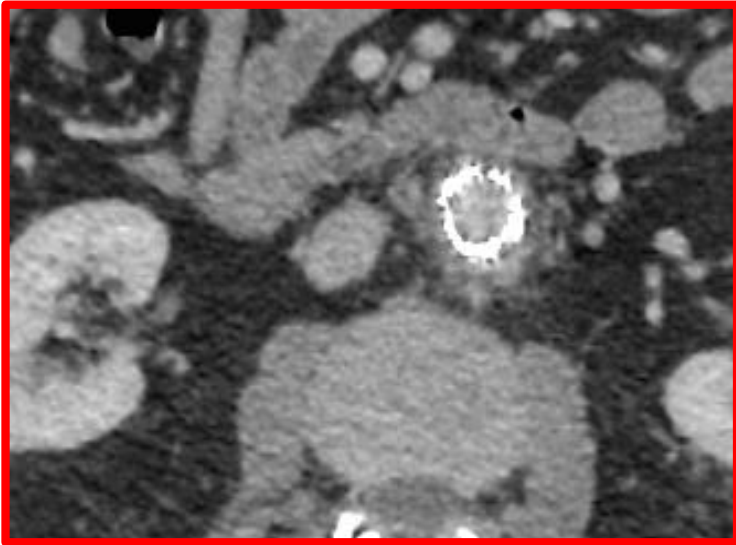
Symptoms of EVAR infection

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

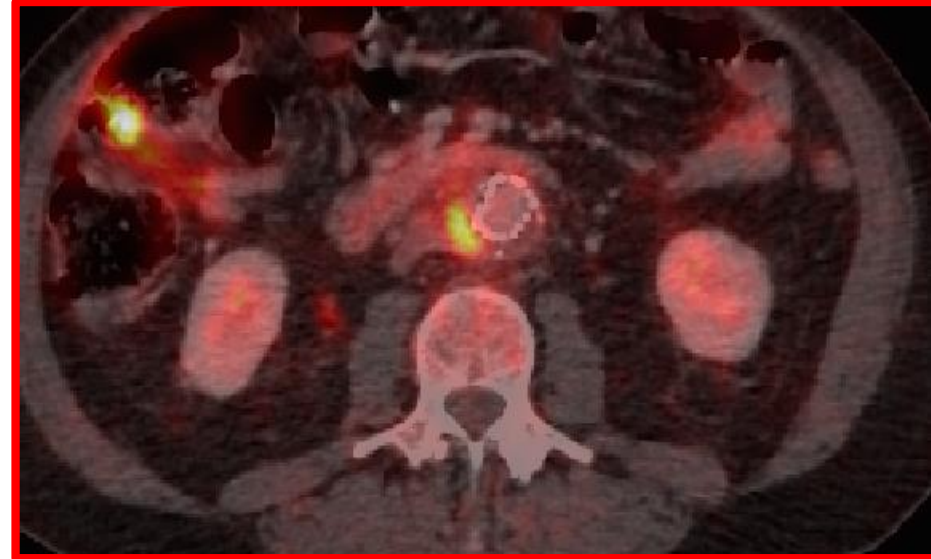
<i>Presenting symptom</i>	<i>No. (%) (N = 206)</i>
Pain	137 (66)
Back	71 (52)
Abdominal	47 (34)
Groin	8 (6)
Chest	7 (5)
Flank	4 (2)
Fever/chills	137 (66)
Aortic fistula	55 (27)
Endoleak	50 (24)
Rupture	23 (11)
Asymptomatic	10 (5)

Smeds et al J Vasc Surg 2016

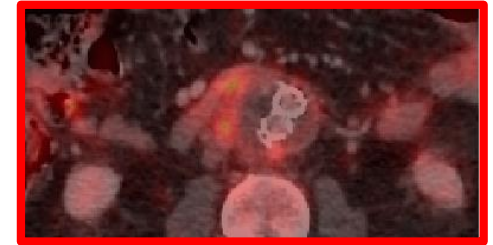
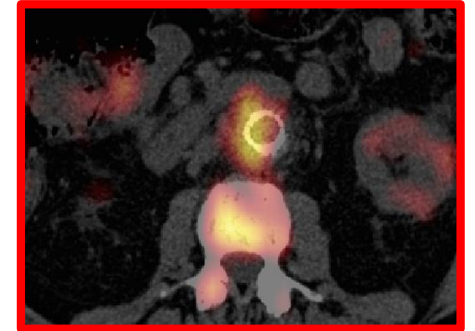
Imaging a suspicion



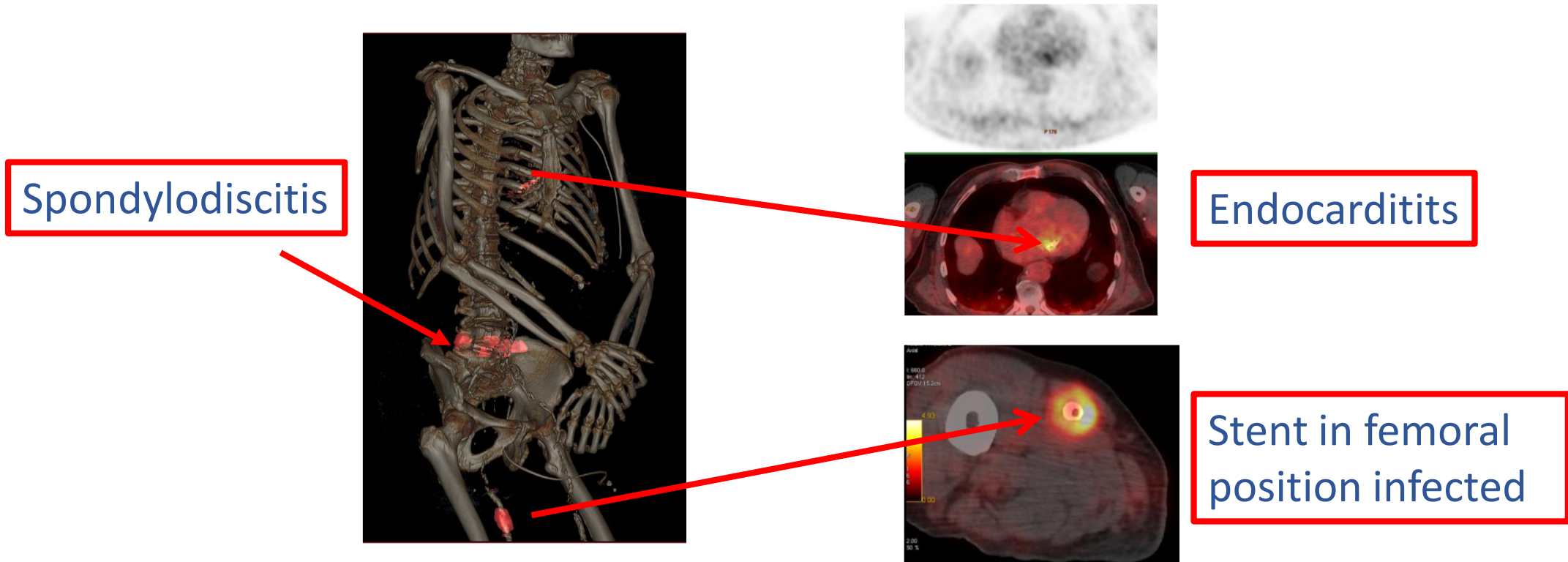
.CTA with periaortic neck
infiltration in contact with
duodenum



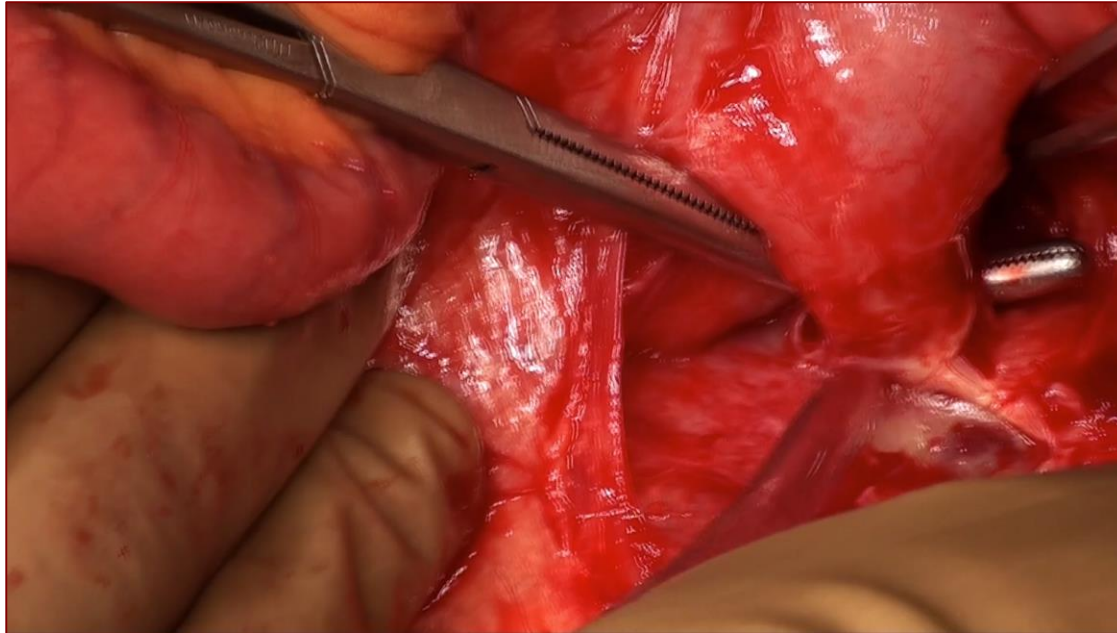
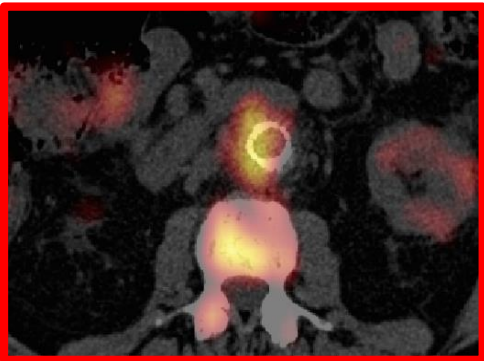
A PET CTA withuptake in the neck (potential enteric fistula?)



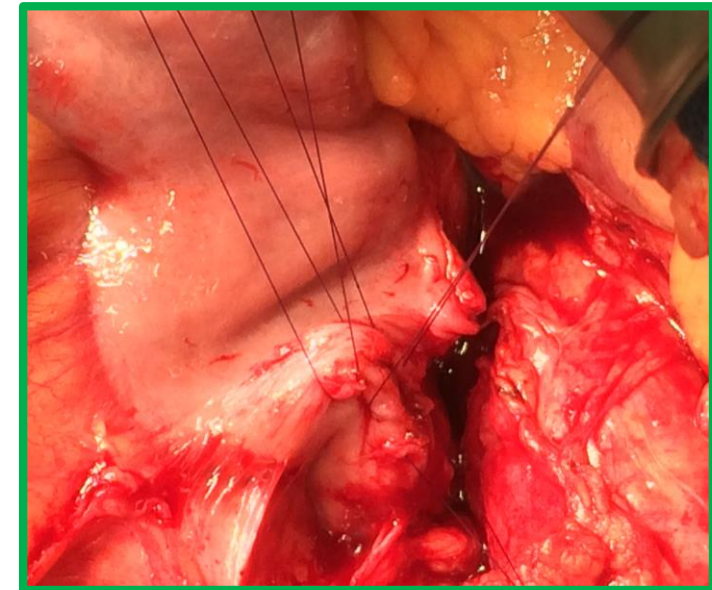
Determine the scenario with PET-CT



Difficulties and Strategy

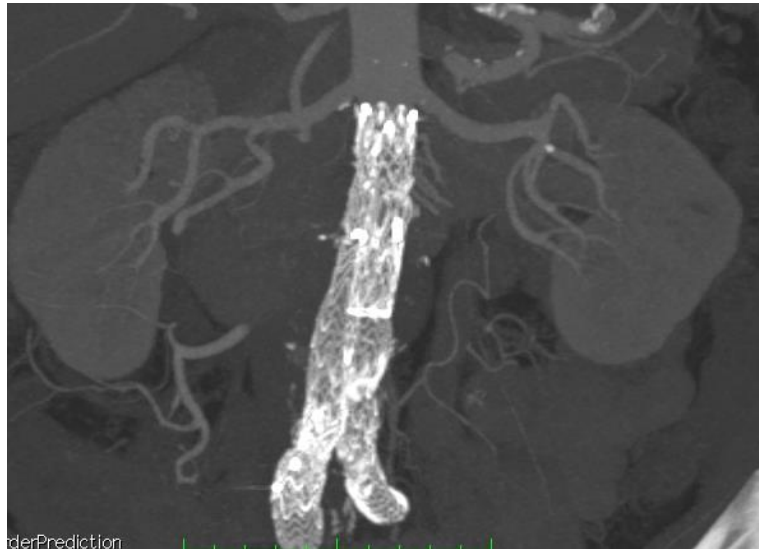


Duodenal adherence to aortic neck
During EVAR explantation

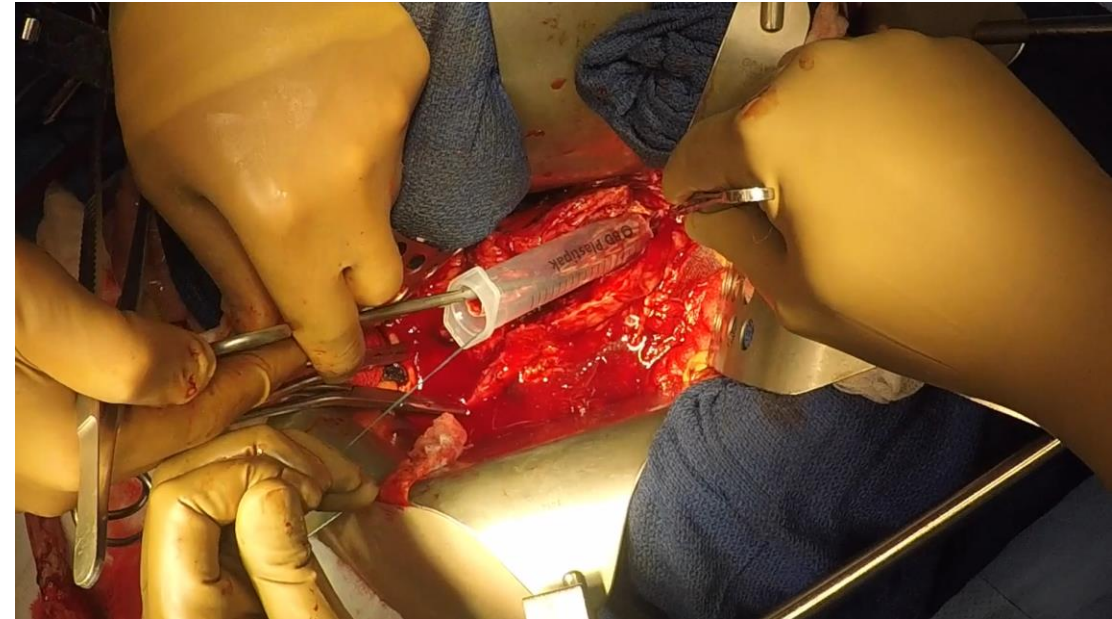


Duodenum direct suture for
prosthetic enteric fistulae

Difficulties and Strategy

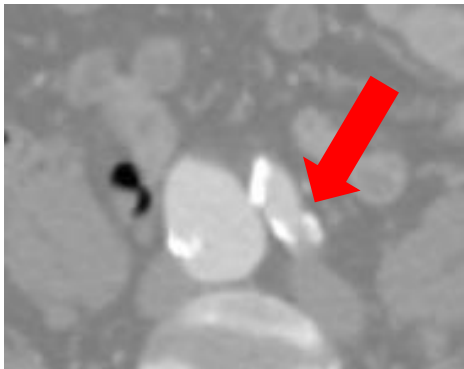
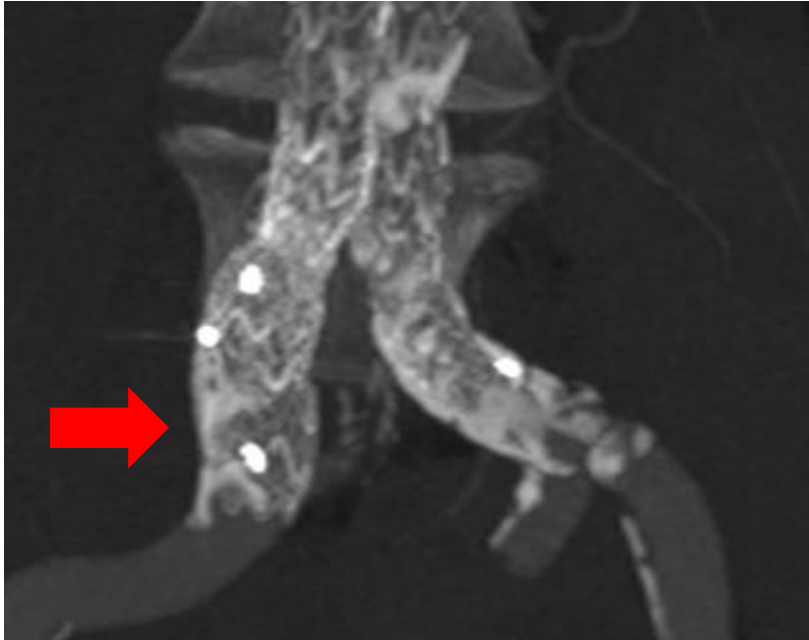


Gore C3 infrarenal
Clamp planning : suprarenal
Risk for renal arteries : low

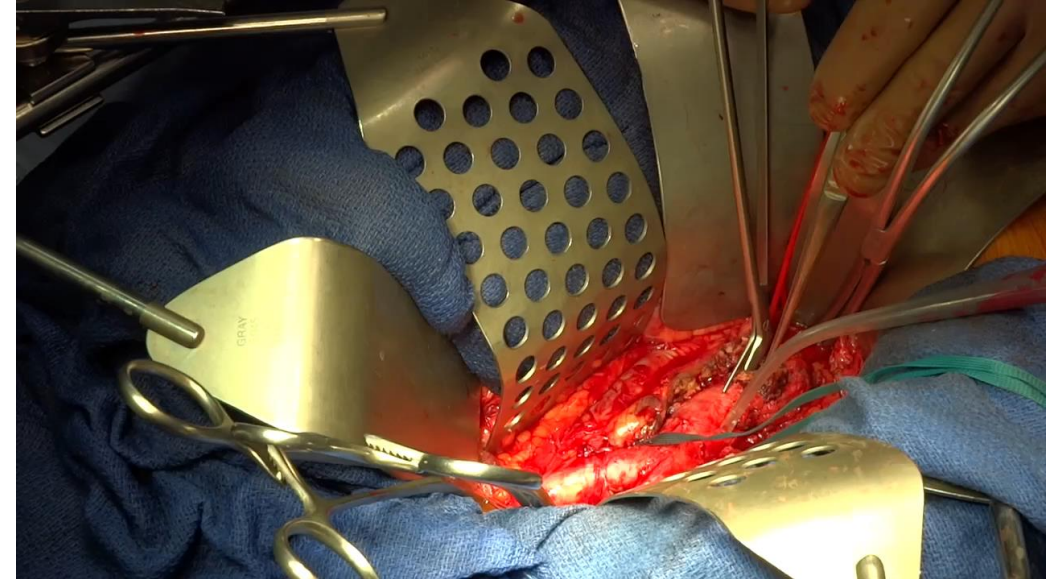


Cook supraceliac
Clamp planning : supracoeliac
Risk for renal arteries : high

Difficulties and Strategy

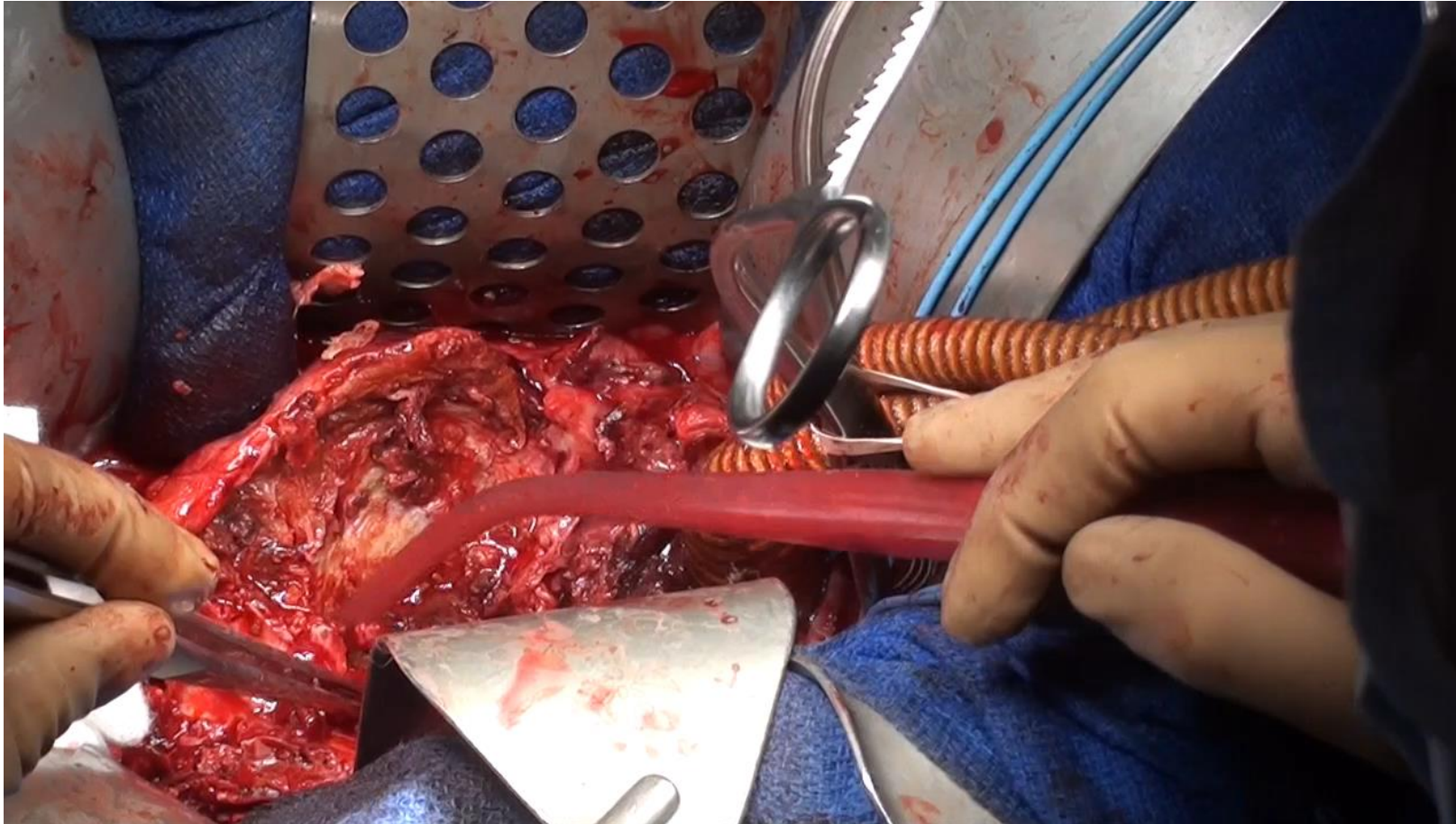


Gore C3 with right bell
bottom
Left iliac calcification
Aorto-bifemoral bypass

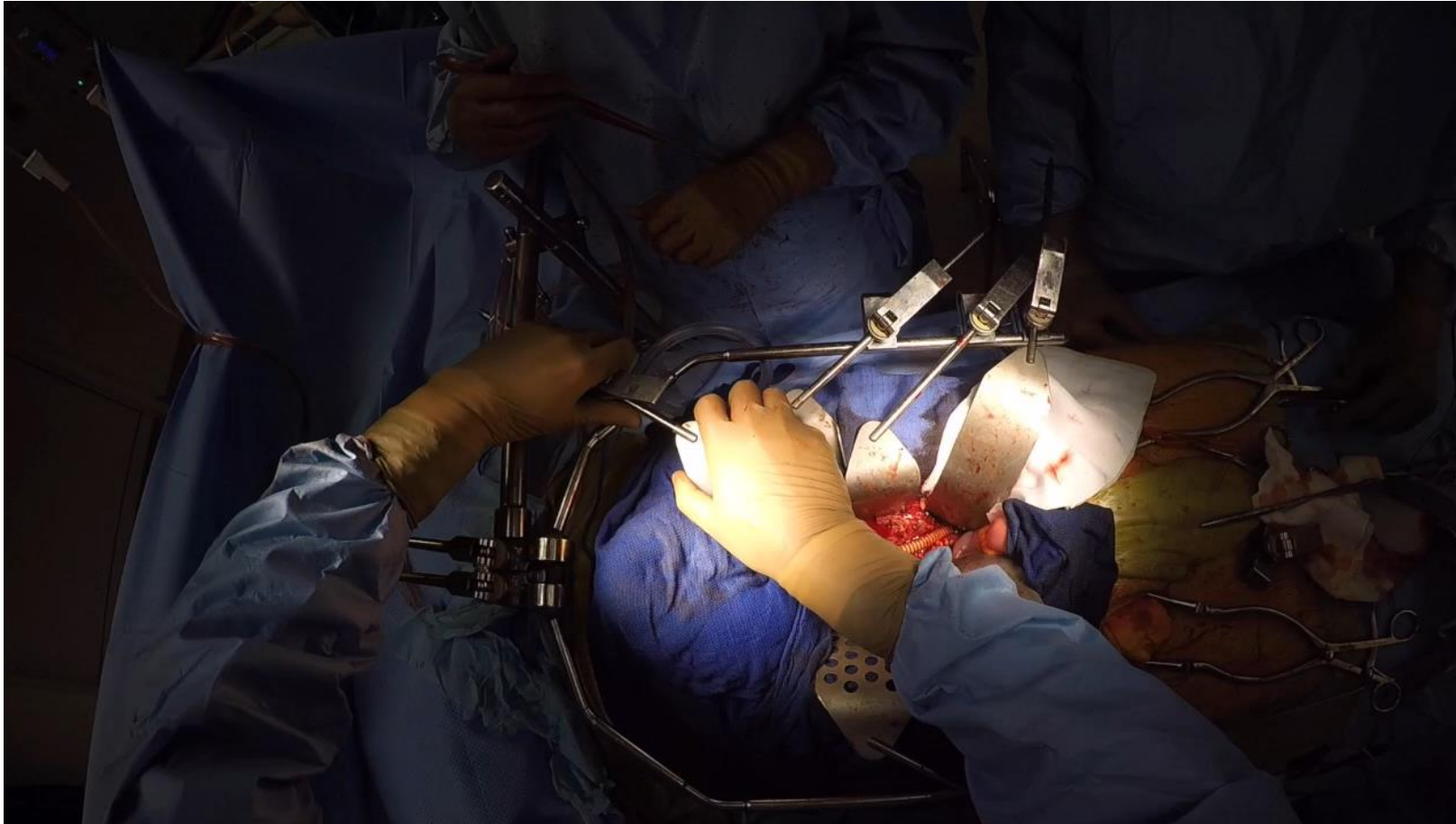


Bridge for aorto-enteric fistula with Gore C3
No difficulties in extraction at day 7
No risk of iliac damage
Tubed pericardium

Debulking

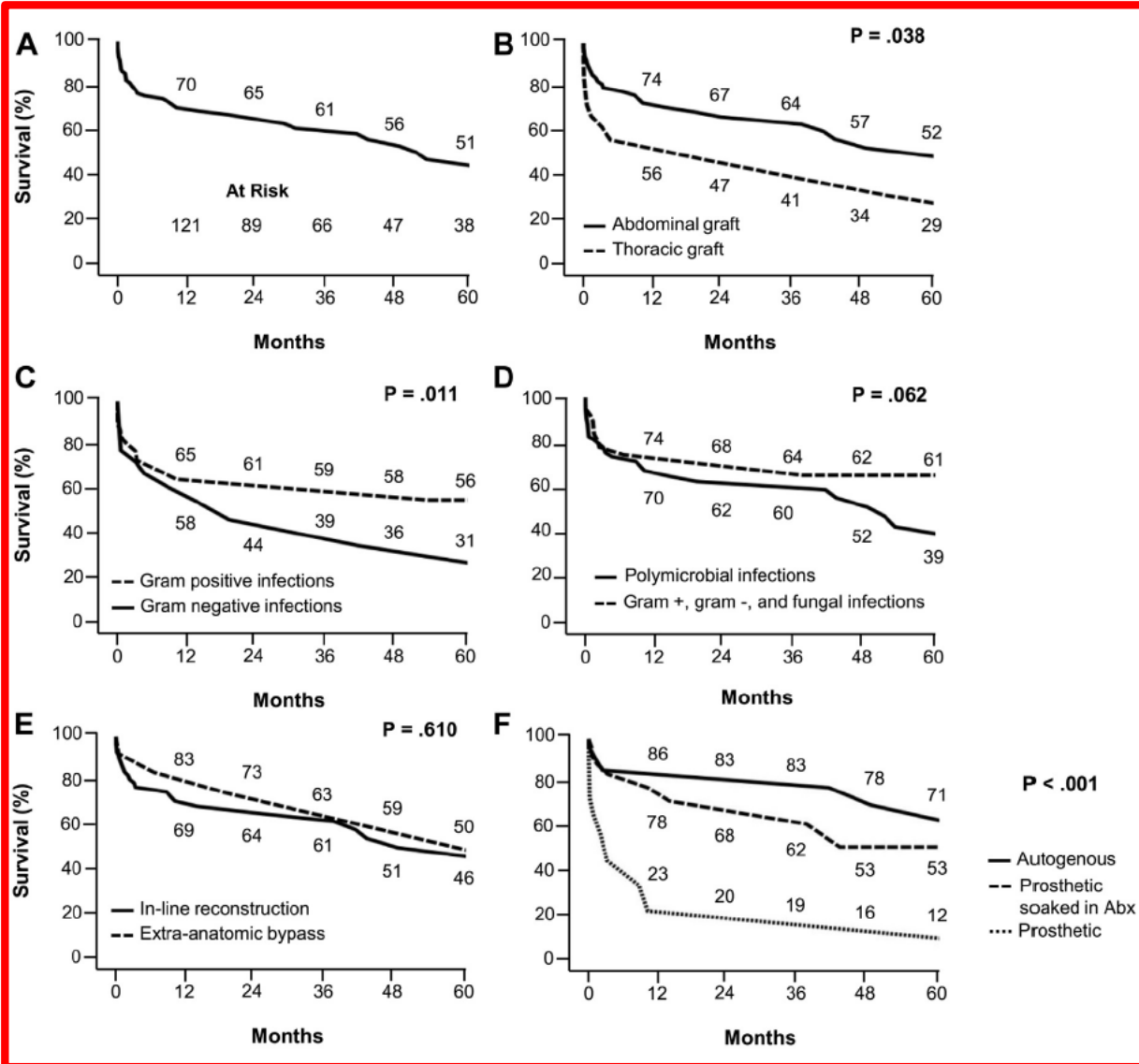


Omentoplasty



Outcomes

Smeds et al J Vasc Surg 2016



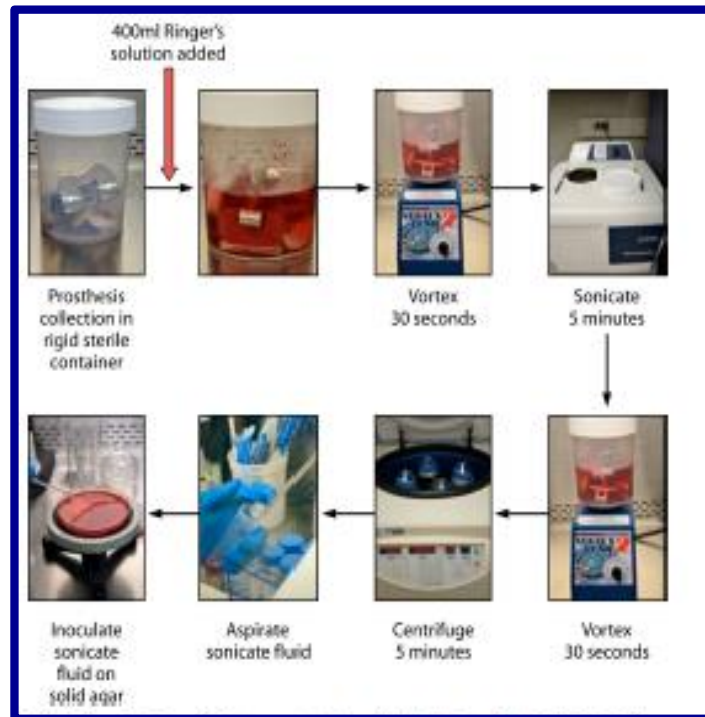
TEVAR are worse than EVAR

Polymicrobial and BGN are hard to treat

Autogenous and antimicrobial grafts do it better

Sonication of stentgrafts explanted

- First described in orthopaedic joint infection
- Ultrasound waves break the biofilm
- Maximum release of microorganisms in the sonicate fluid



Prosthetic sonication protocol used in the Mayo Clinic
Clinical Microbiology Laboratory.

Tande AJ, Patel R. Prosthetic joint infection. Clin
Microbiol Rev 2014

Sonication of explanted stentgrafts

- Sonication was started in our Bordeaux University Hospital, France, in 2011.
- Out of 29 infected graft investigated
 - 10 (34.5 %) were negative in culture without sonication
 - but only one (3.5 %) remained negative in sonicate fluid culture.

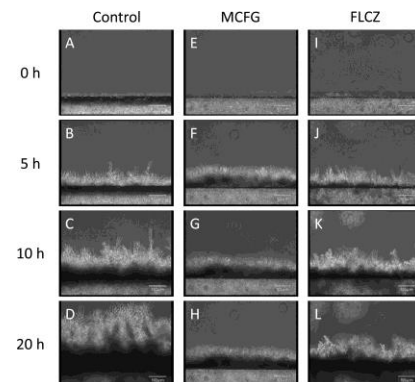
Real-Time Microscopic Observation of *Candida* Biofilm Development and Effects Due to Micafungin and Fluconazole

Yukihiro Kaneko,^a Susumu Miyagawa,^b On Takeda,^b Masateru Hakariya,^c Satoru Matsumoto,^d Hideaki Ohno,^a Yoshitsugu Miyazaki^a

May 2013

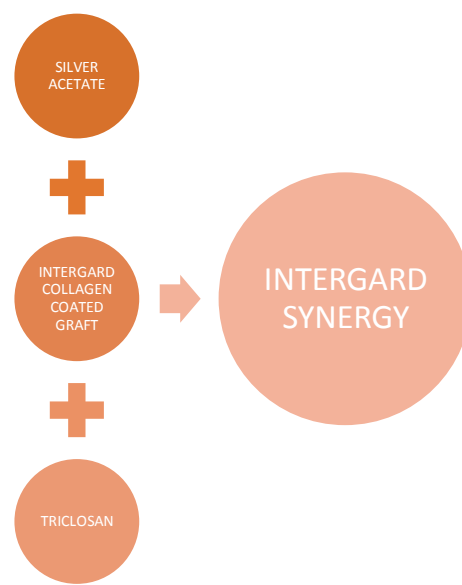
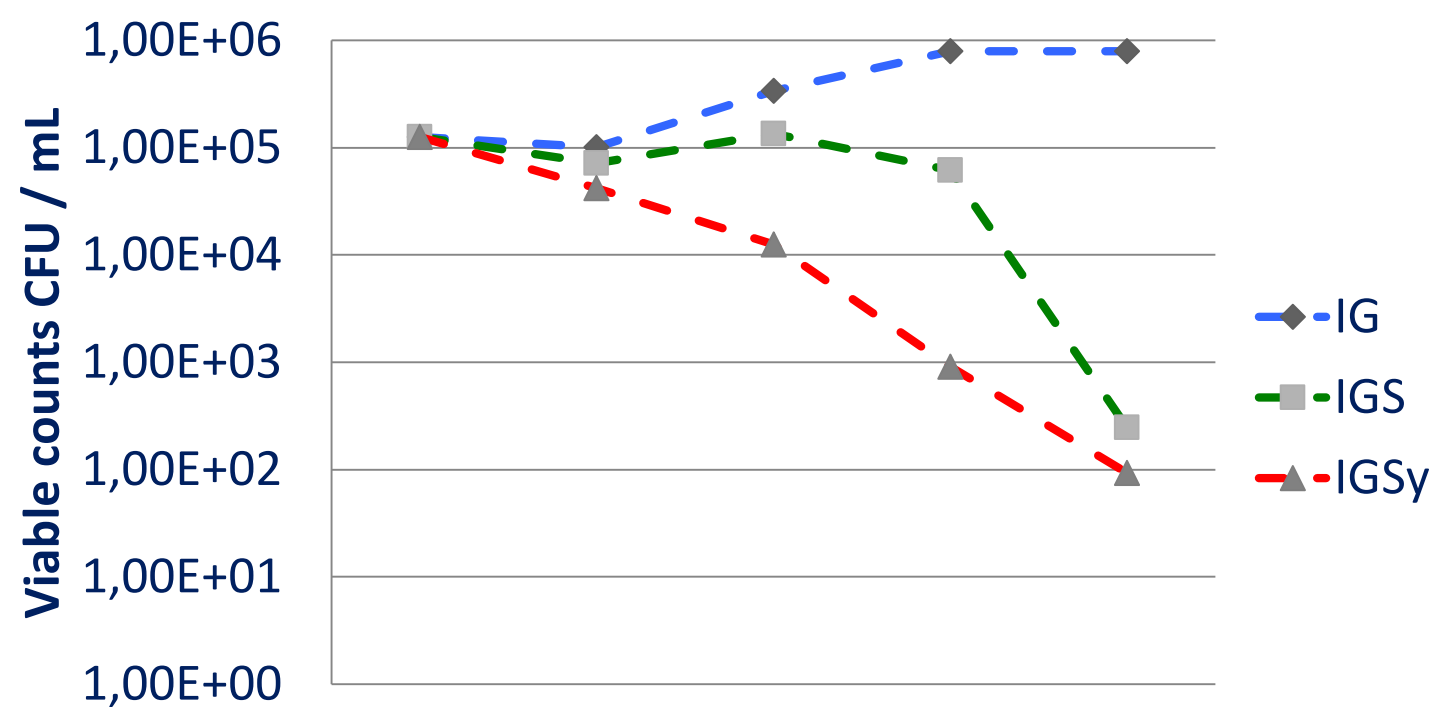


Anti-fungal at 5th hour



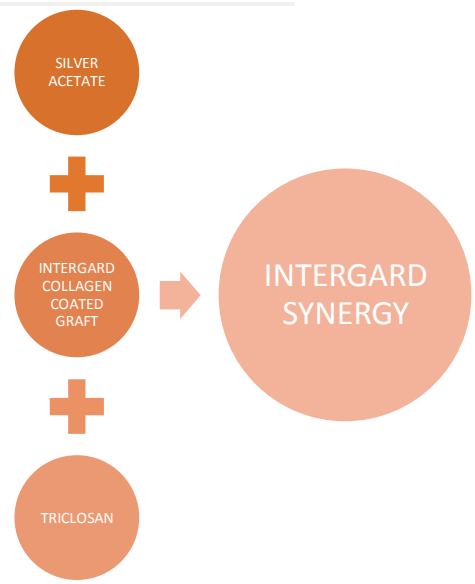
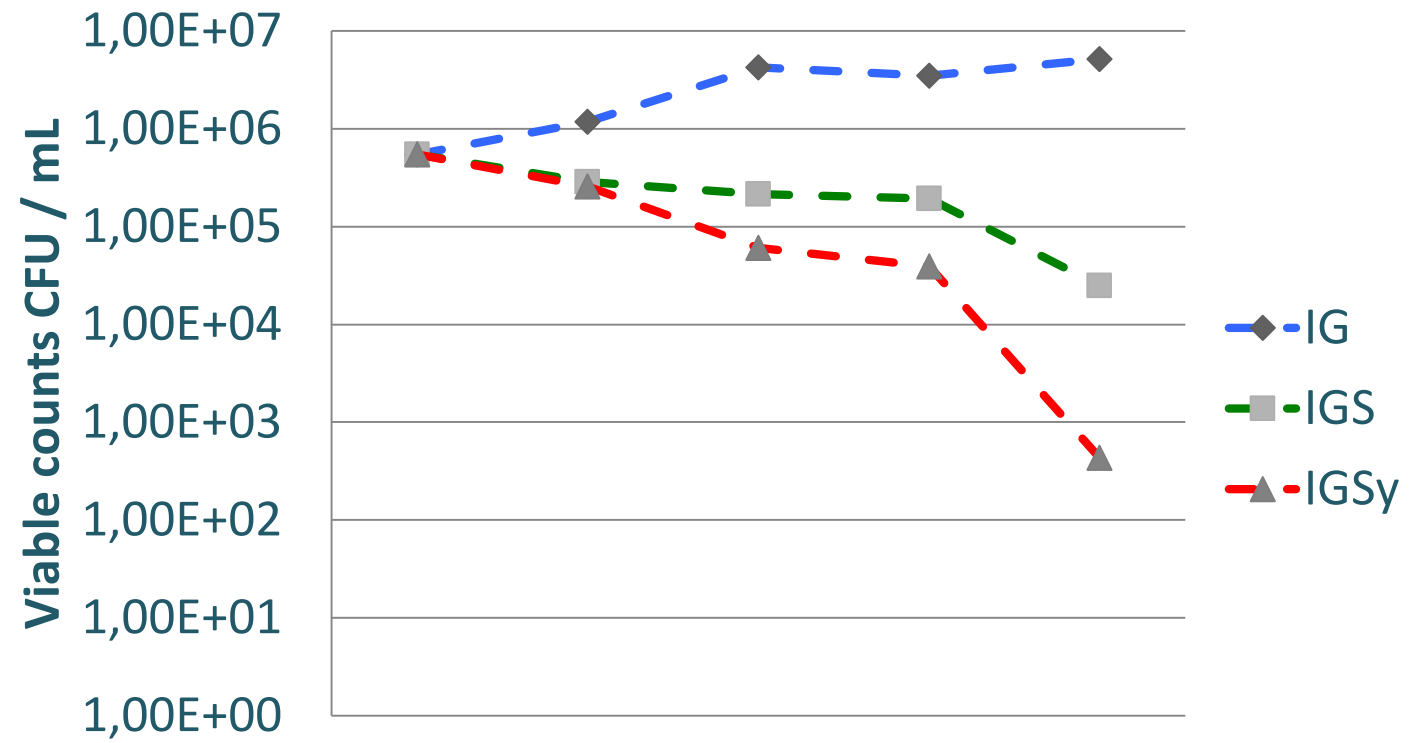
SAEF Bordeaux Protocol : per-operative treatment
Carbapenem + Daptomycin + Candine

Candida Albicans infection



	1 hour	4 hours	8 hours	24 hours
Variable	Log ₁₀ RF	Log ₁₀ RF	Log ₁₀ RF	Log ₁₀ RF
IGS vs IG	0.15	0.40	1.11	3.51*
IGSy vs IG	0.38	1.43	2.94	3.93*

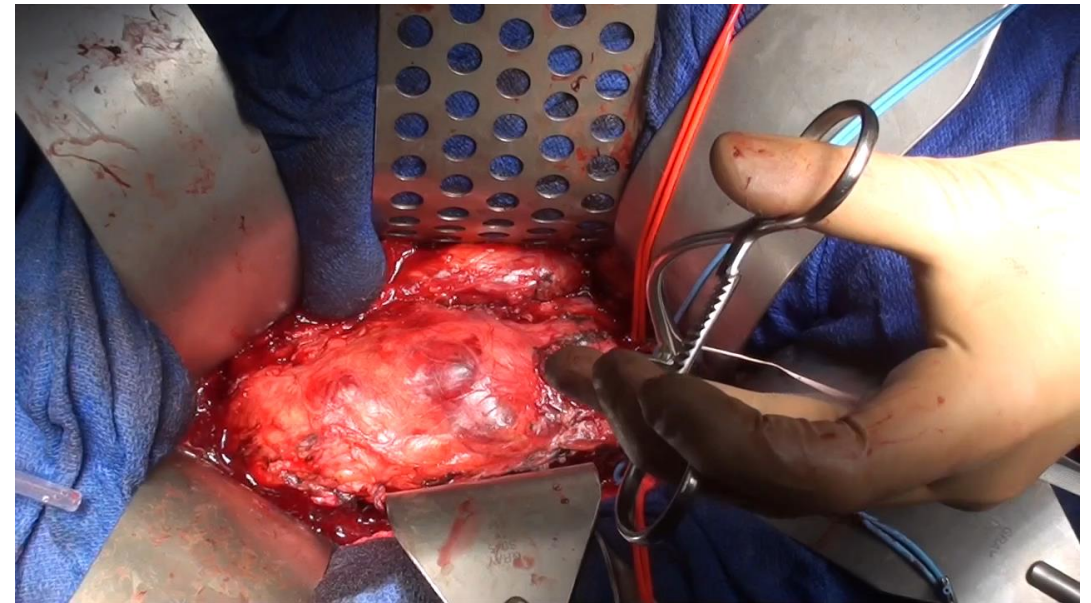
Staphylococcus Aureus meticillin resistant



	1 hour	4 hours	8 hours	24 hours
Variable	Log ₁₀ RF	Log ₁₀ RF	Log ₁₀ RF	Log ₁₀ RF
IGS vs IG	0.61	1.29	1.26	2.32
IGSy vs IG	0.66	1.84	1.95	4.08*

Conclusions

- **Rapid Identification of microorganisms to target drug therapy**
 - Sonication of explanted material
- **Multidisciplinary approach**
 - Close surveillance
 - Adequate Imaging
- **Find Solutions to reduce Reinfections**
 - Biological conduit
 - **Use of Synergy graft when prosthetic**
 - Adapted pre-operative antibiotic





Thank you for your attention

xavier.berard@chu-bordeaux.fr