Infections ostéo-articulaires : la vision du réanimateur

Pr Julien Poissy
Médecine intensive/Réanimation CHU Lille

DIU infections ostéo-articulaires
26/01/2023

Problème 1 : la sévérité de l'infection.

Reco surviving sepsis campaign *(Evans L et al. Int Care Med. 2021)*

SCREENING FOR PATIENTS WITH SEPSIS AND SEPTIC SHOCK

1 For hospitals and health systems, we **recommend** using a performance improvement programme for sepsis, including sepsis screening for acutely ill, high-risk patients and standard operating procedures for treatment.

!! MODERATE — Screening

!! VERY LOW — Standard operating procedures

2016 STATEMENT

*"We **recommend** that hospitals and hospital systems have a performance improvement programme for sepsis including sepsis screening for acutely ill, high risk patients."*

!! MODERATE — 2 We **recommend against** using qSOFA compared to SIRS, NEWS, or MEWS as a single screening tool for sepsis or septic shock.

! VERY LOW — 3 For adults suspected of having sepsis, we **suggest** measuring blood lactate.

Définition « sepsis 3 »du sepsis : réponse dérégulée de l'hôte entraînant défaillance d'organe et surmortalité (>10%) (*Singer M et al. JAMA 2016*)

			points				
Composante	**Critère**	**Unités**	**0**	**1**	**2**	**3**	**4**
Respiratoire	PaO2/FiO2		> 400	301-400	201-300	101-200 (avec VA)	≤ 100 (avec VA)
Hémodynamique	PAM amines	mm Hg type/dose (µg/kg/min)	≥ 70	< 70	dopamine < 5 dobutamine* (*toute dose)	dopamine 5-15 adrénaline ≤ 0,1 noradrénaline ≤ 0,1	dopamine >15 adrénaline > 0,1 noradrénaline > 0,1
Coagulation	Plaquettes	10^3/mL	> 150	101-150	51-100	21-50	≤ 20
Hépatique	Bilirubine,	mg/L (mmol/L)	< 12 (< 20)	12-19 (20-32)	20-59 (33-101)	60-119 (102-204)	> 120 (> 204)
Neurologique	GCS		15	13-14	10-12	6-9	< 6
Rénal	Créatininémie	mg/L (µmol/L)	< 12 (< 110)	12-19 (110-170)	20-34 (171-299)	35-49 (300-440)	> 50 (> 440)
	ou diurèse/24h	mL				<500	ou < 200

Score SOFA ≥2 ou augmentation de 2 points

Définition « sepsis 3 » du choc septique

- Atteinte circulatoire, cellulaire, et métabolique à l'origine d'une mortalité>40%
- Notion de dette en O_2 et de défaillance microcirculatoire
- Définition
  - Sepsis + les 3 critères suivants:
  - **Nécessité d'un recours à un vasopresseurs pour PAM≥65 mmHg**
  - **Malgré remplissage vasculaire**
  - **Avec lactatémie ≥2 mmol/L**

INITIAL RESUSCITATION

BEST PRACTICE

4 Sepsis and septic shock are medical emergencies, and we **recommend** that treatment and resuscitation begin immediately.

LOW

5 For patients with sepsis induced hypoperfusion or septic shock we **suggest** that at least 30 mL/kg of intravenous (IV) crystalloid fluid should be given within the first 3 hours of resuscitation.

> ***2016 STATEMENT***
>
> *"We **recommend** that in the initial resuscitation from sepsis-induced hypoperfusion, at least 30ml/kg of intravenous crystalloid fluid be given within the first 3 hours."*

VERY LOW

6 For adults with sepsis or septic shock, we **suggest** using dynamic measures to guide fluid resuscitation, over physical examination, or static parameters alone.

LOW

7 For adults with sepsis or septic shock, we **suggest** guiding resuscitation to decrease serum lactate in patients with elevated lactate level, over not using serum lactate.

LOW

8 For adults with septic shock, we **suggest** using capillary refill time to guide resuscitation as an adjunct to other measures of perfusion.

Antibiotic Timing

	Shock is present	Shock is absent
Sepsis is definite or probable	Administer antimicrobials **immediately**, ideally within 1 hour of recognition	
Sepsis is possible	Administer antimicrobials **immediately**, ideally within 1 hour of recognition	Rapid assessment* of infectious vs noninfectious causes of acute illness Administer antimicrobials **within 3 hours** if concern for infection persists

BEST PRACTICE

17 For adults with sepsis or septic shock at high risk of MRSA, we **recommend** using empiric antimicrobials with MRSA coverage over using antimicrobials without MRSA coverage.

> ***2016 STATEMENT***
>
> *"We **recommend** empiric broad-spectrum therapy with one or more antimicrobials for patients presenting with sepsis or septic shock to cover all likely pathogens (including bacterial and potentially fungal or viral coverage."*

LOW

18 For adults with sepsis or septic shock at low risk of MRSA, we **suggest against** using empiric antimicrobials with MRSA coverage, as compared with using antimicrobials without MRSA coverage.

> ***2016 STATEMENT***
>
> *"We **recommend** empiric broad-spectrum therapy with one or more antimicrobials for patients presenting with sepsis or septic shock to cover all likely pathogens (including bacterial and potentially fungal or viral coverage."*

VERY LOW

19 For adults with sepsis or septic shock and high risk for multidrug resistant (MDR) organisms, we **suggest** using two antimicrobials with gram-negative coverage for empiric treatment over one gram-negative agent.

VERY LOW

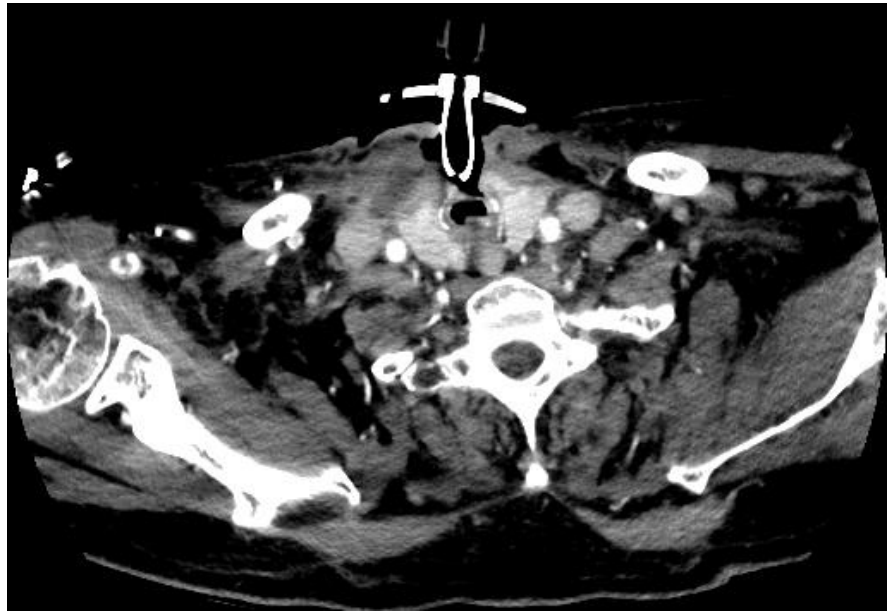
20 For adults with sepsis or septic shock and low risk for multidrug resistant (MDR) organisms, we **suggest against** using two gram-negative agents for empiric treatment, as compared to one gram-negative agent.

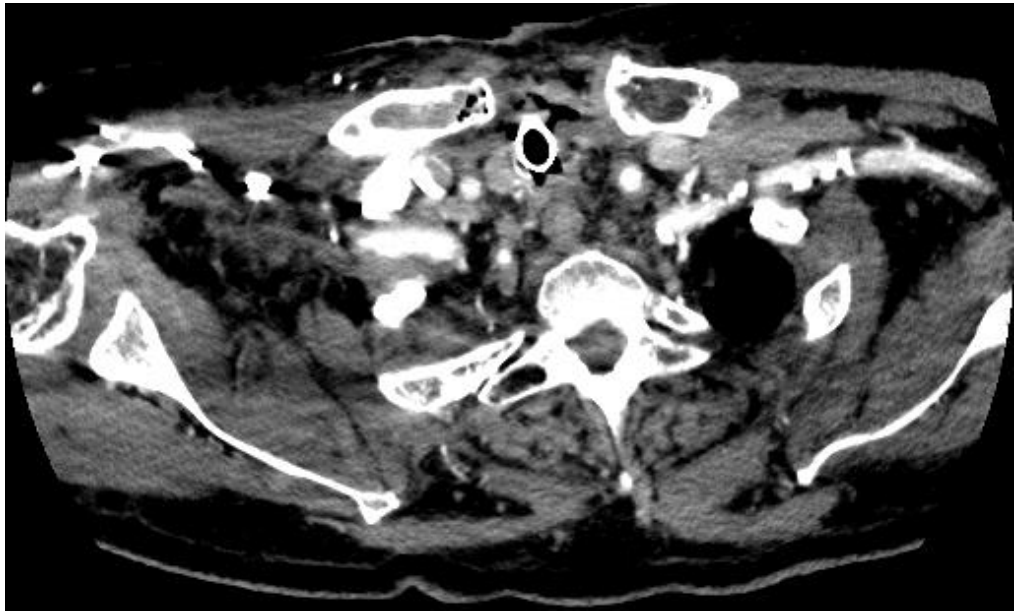
VERY LOW

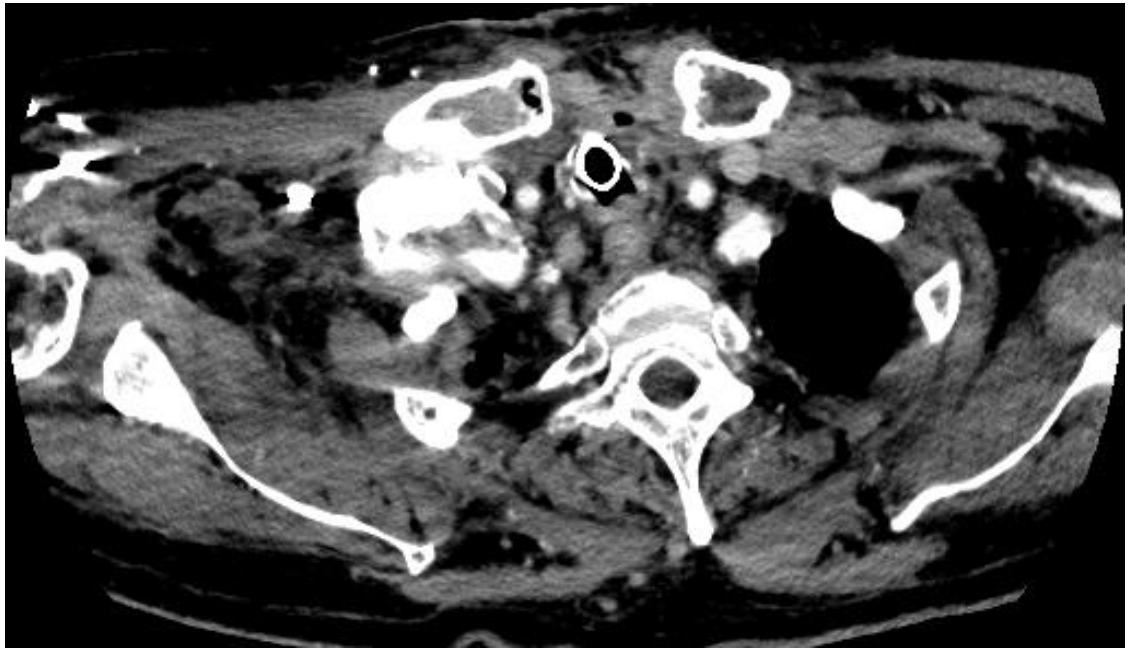
21 For adults with sepsis or septic shock, we **suggest against** using double gram-negative coverage once the causative pathogen and the susceptibilities are known.

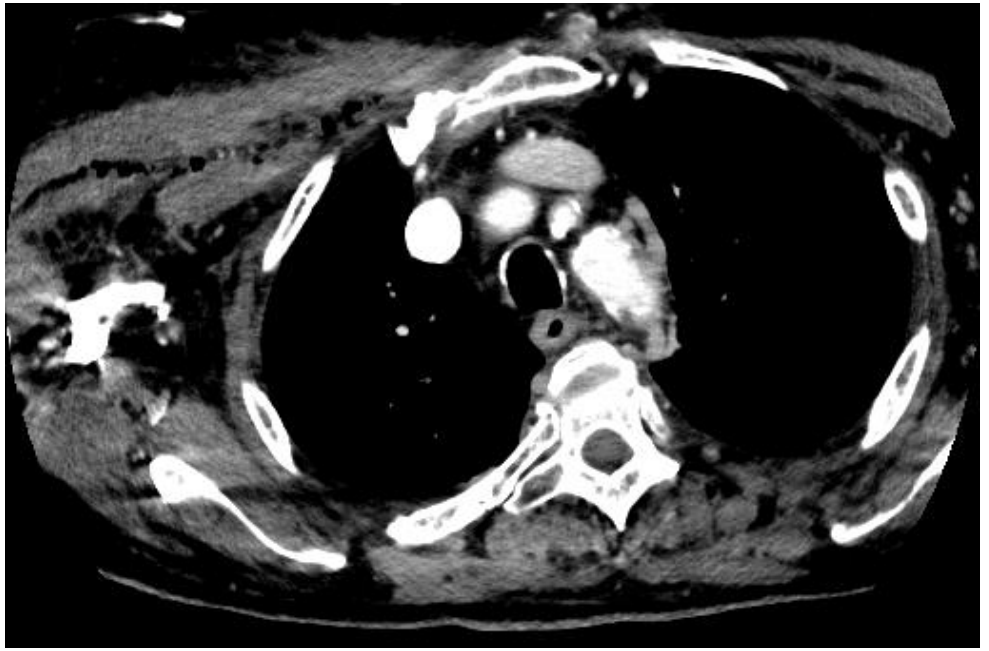
Petite histoire clinique

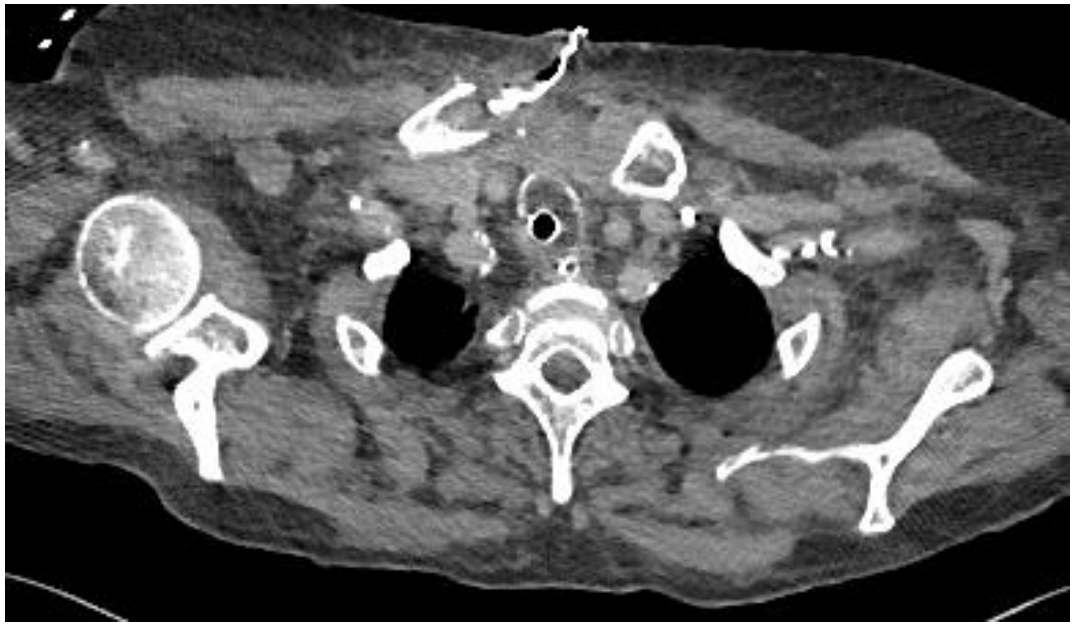
- Homme de 67 ans
- Polyvasculaire : cardiopathie ischémique stentée et hypertensive, AVC sylvien, sténose carotidienne
- BPCO post-tabagique (120 PA)
- Laryngectomie sus-glottique pour adénocarcinome ORL avec curage ganglionnaire et radiothérapie en mars 2022
- 03/09/2022 : dyspnée et douleur thoracique. Contexte de douleur d'épaule depuis 3 semaines, traitée par amoxicilline par MT
- Urgences : masse pectorale, CRP=480 mg/L, PCT=2,8 ng/mL. Ins rénale aiguë modérée
- Apparition d'un état de choc nécessitant noradré. Introduction ATB pipéracilline/tazobactam + linézolide

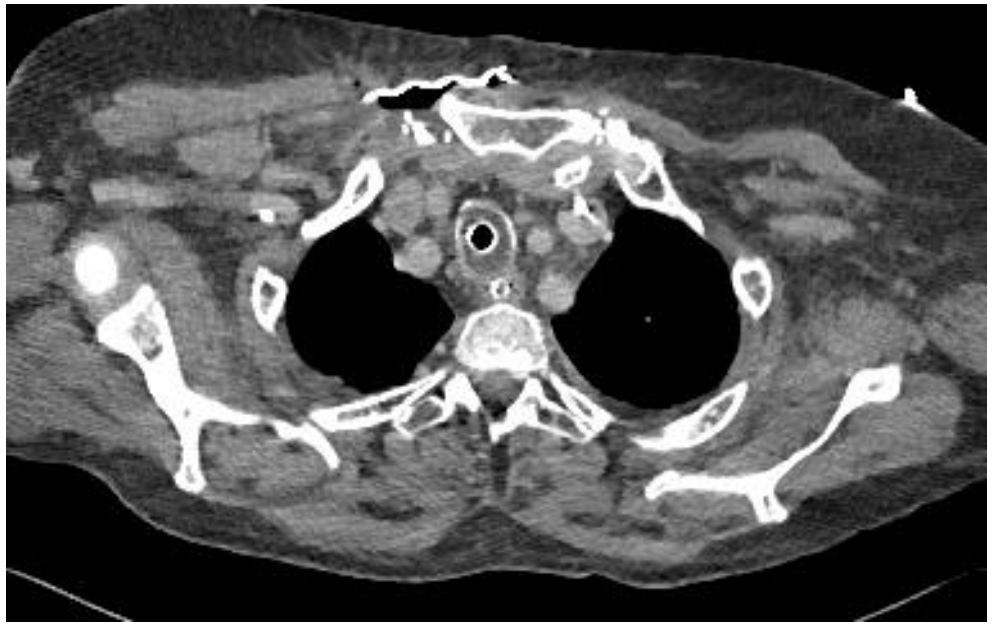


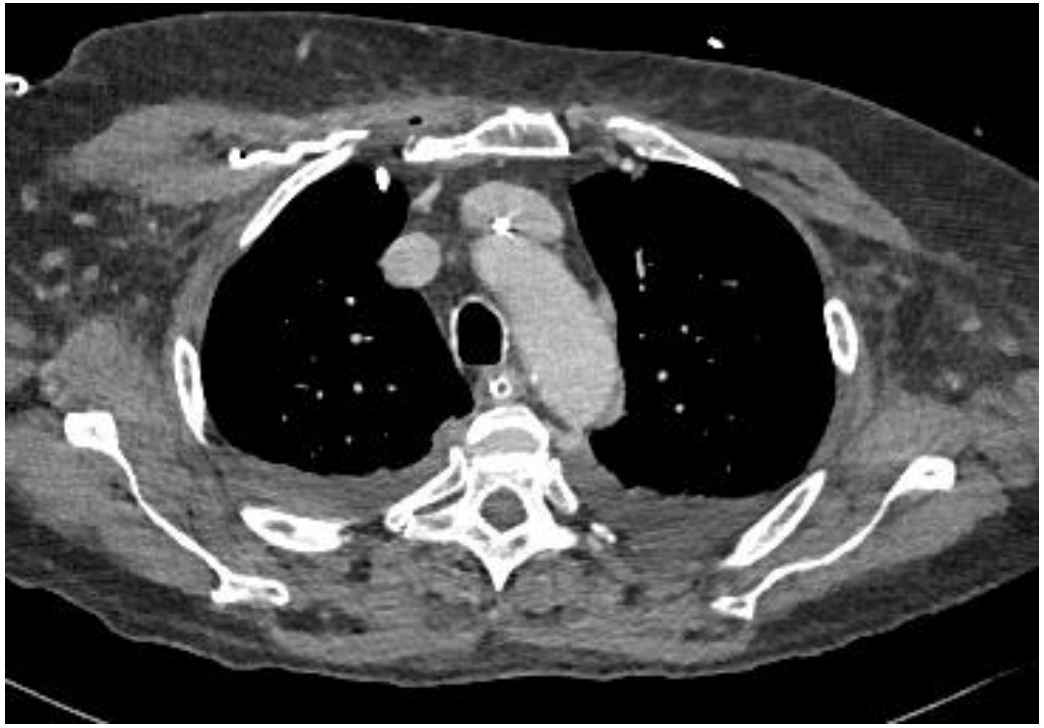


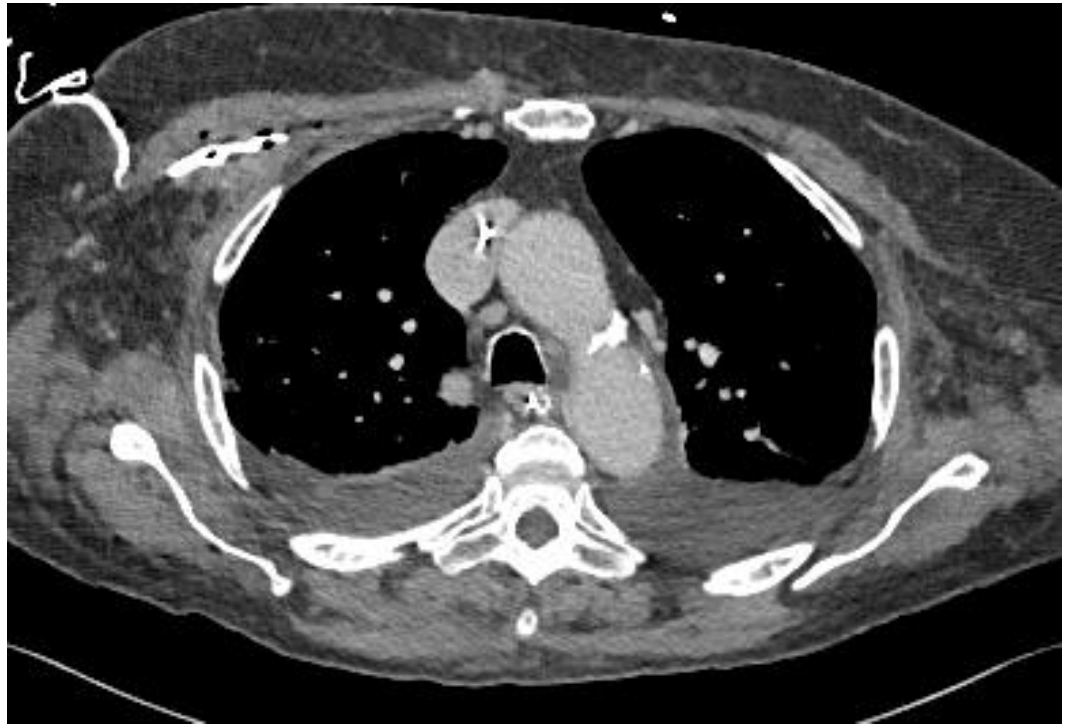


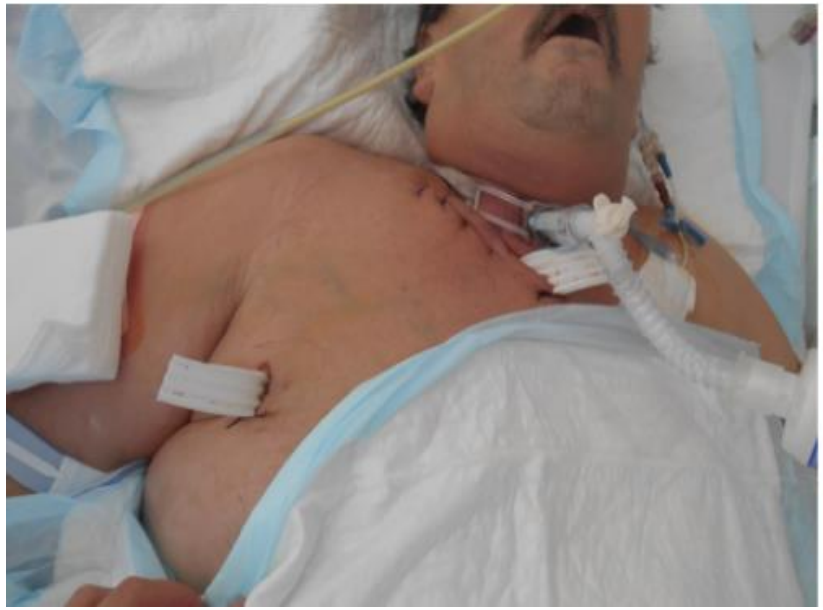
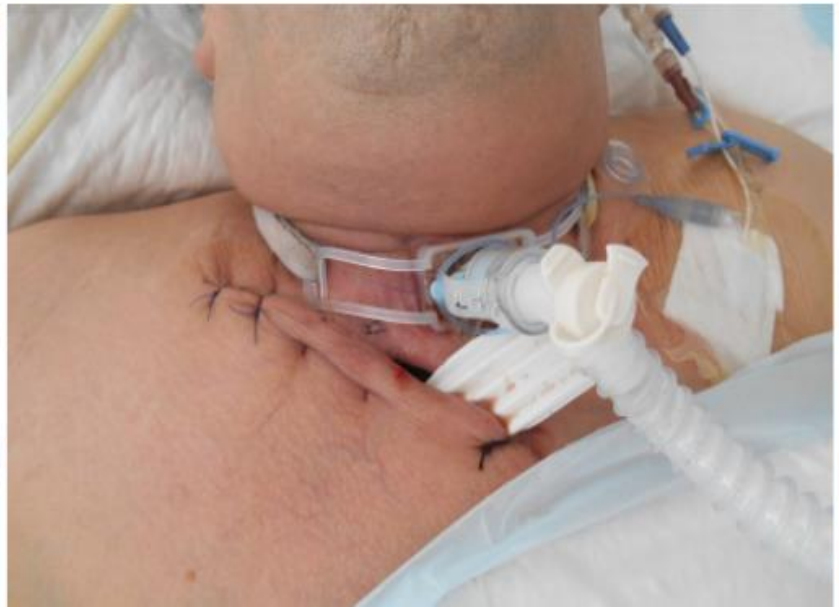
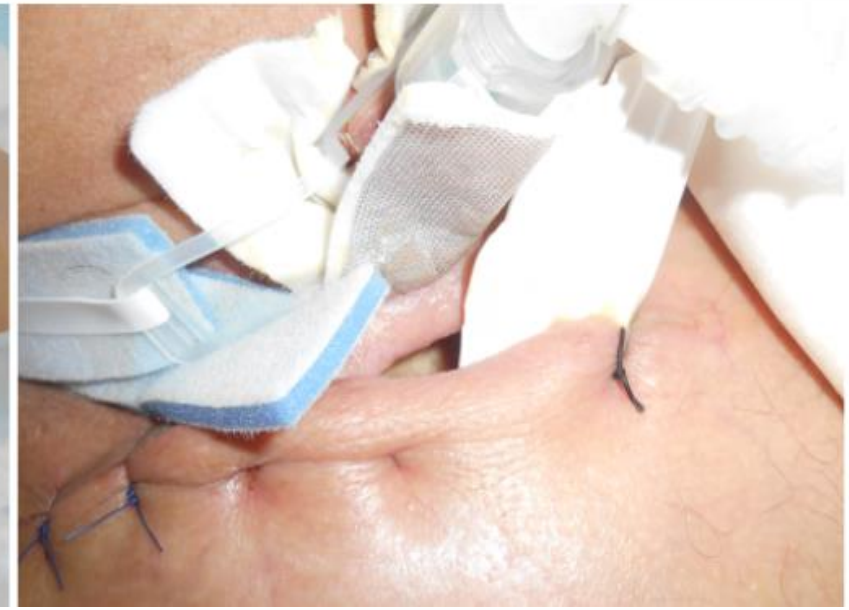




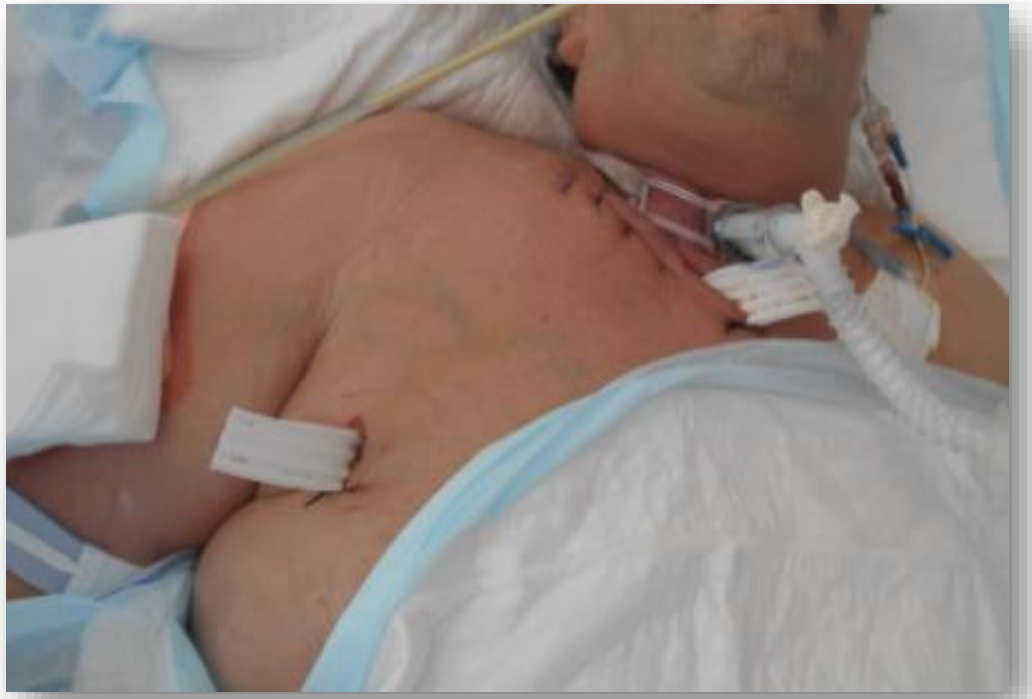






T2MR :
C.albicans/tropicalis
Prélevé le 06/09 17h30
Rendu le 07/09 13h



Per-op
C.tropicalis/krusei (07/09)
S/fluco-R (09/09)

Colonisation (culture) :
tropicalis posa R : gastrique/urines
krusei fluco R : gastrique/nasal

Mannane : 220 pg/mL
BDG : 92 pg/mL
(rendu le 06/09)

Hémoc mycosis
neg

Mannane : 43 pg/mL
BDG : 65 pg/mL
(rendu le 06/09)

05/09
ATB/chir

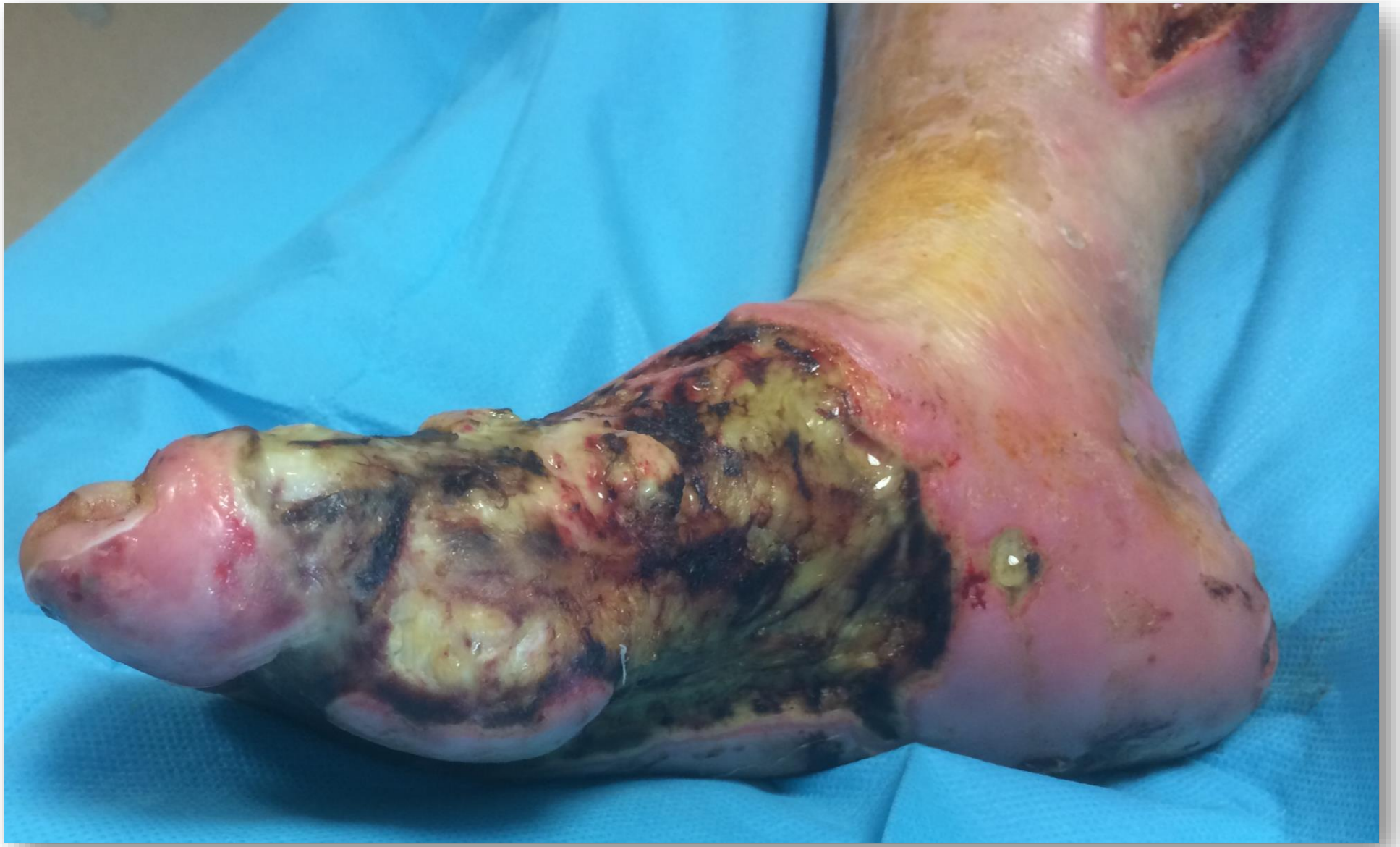
06/09
ATF

07/09

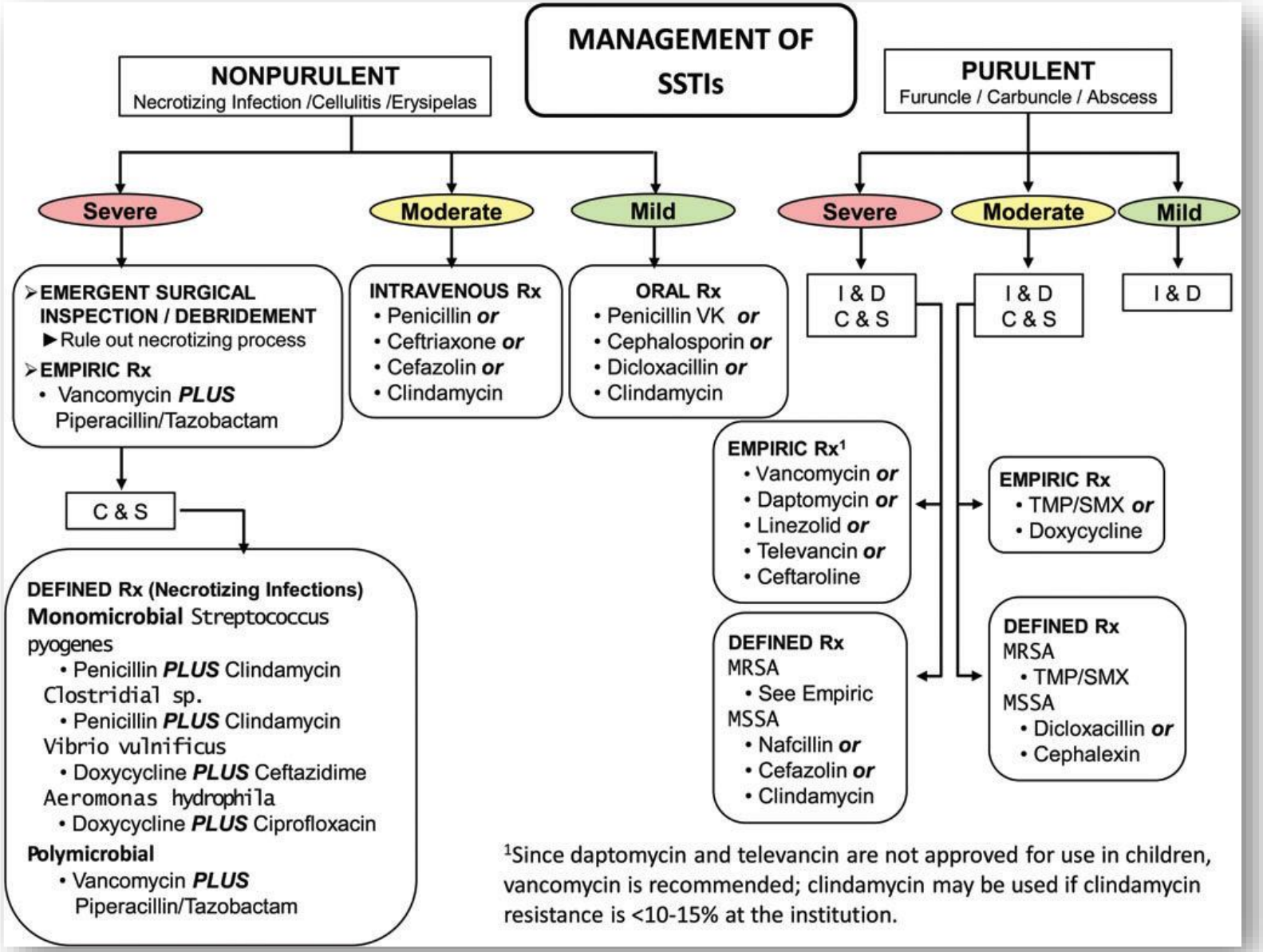
08/09

25/09
PAVM

Problème 2 : distinguer l'infection des parties molles de l'ostéite et déterminer leur rôle respectif dans la gravité du tableau

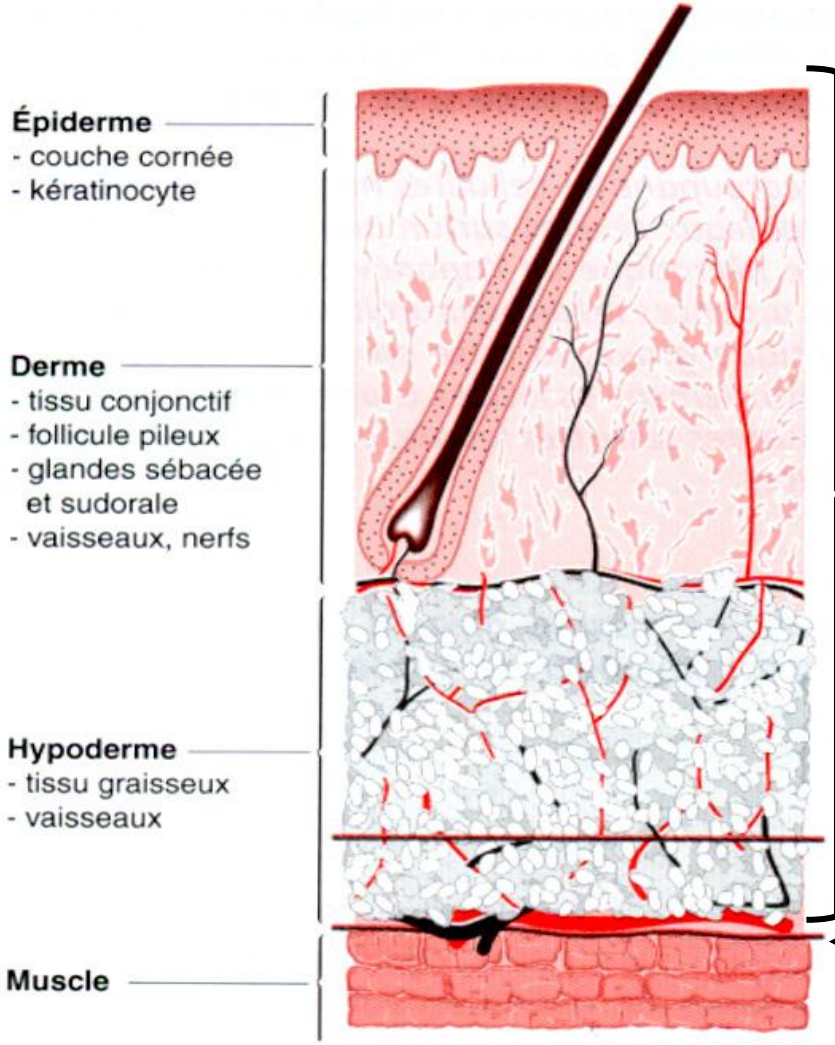


Terminologie - classification



Stevens DL et AL. IDSA guidelines for SSTIs. CID. 2014

Les infections « non purulentes »: classification selon la **profondeur de l'atteinte** et le **caractère nécrotique**



-Dermohypodermite bactérienne (DHB)
Erysipèle
Cellulitis

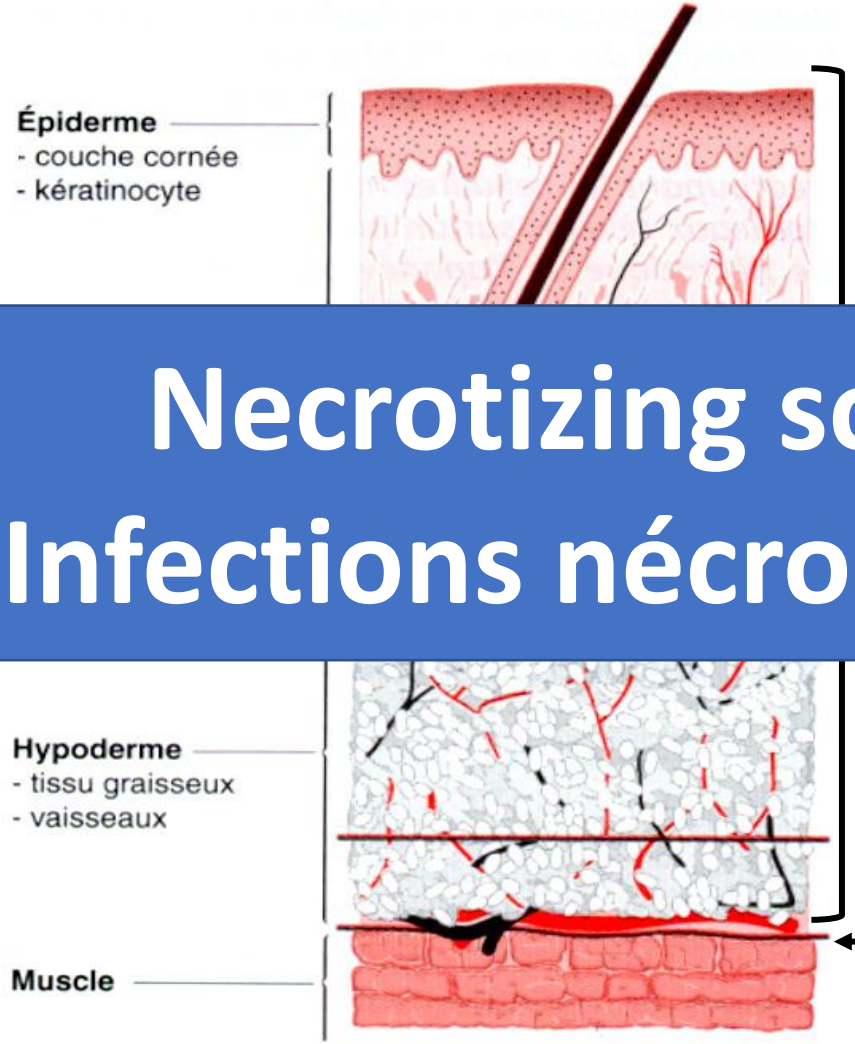
-Dermohypodermite bactérienne nécrosante (DHBN)
Necrotising cellulitis

-Fasciite nécrosante
Necrotising fasciitis

-Myosite
Clostridiale=gangrène gazeuse
Non clostridiale

D'après conférence de consensus française « Erysipèle et fasciite nécrosante ». 2000

Les infections « non purulentes »: classification selon la **profondeur de l'atteinte** et le **caractère nécrotique**



Necrotizing soft tissue infections : NSTIs
Infections nécrosantes peau et parties molles

-Myosite
Clostridiale=gangrène gazeuse
Non clostridiale

D'après conférence de consensus française « Erysipèle et fasciite nécrosante ». 2000

Le délai de réalisation de la chirurgie a un impact majeur sur le pronostic des NSTIs

Variables	Adjusted OR	95% CI	*P* value
SAPS II	1.15	1.04–1.26	0.02
Cardiovascular disease			
No	1	–	
Yes	13.9	1.8–106	0.01
Localization			
Extremities	1	–	
Abdominoperineal	15.1	1.5–149	0.002
Time from first signs to diagnosis; $n = 99$[a]			
>72 h	1	–	
≤72 h	0.09	0.01–0.68	0.02
Time from diagnosis to surgery in patients with septic shock; $n = 33$[b]			
≤14 h	1	–	
>14 h	34.5	2.05–572	0.007

Boyer A et al. ICM 2009.

Problème 3 : prendre en charge le malade grave de manière globale et holistique/hiérarchiser les problèmes

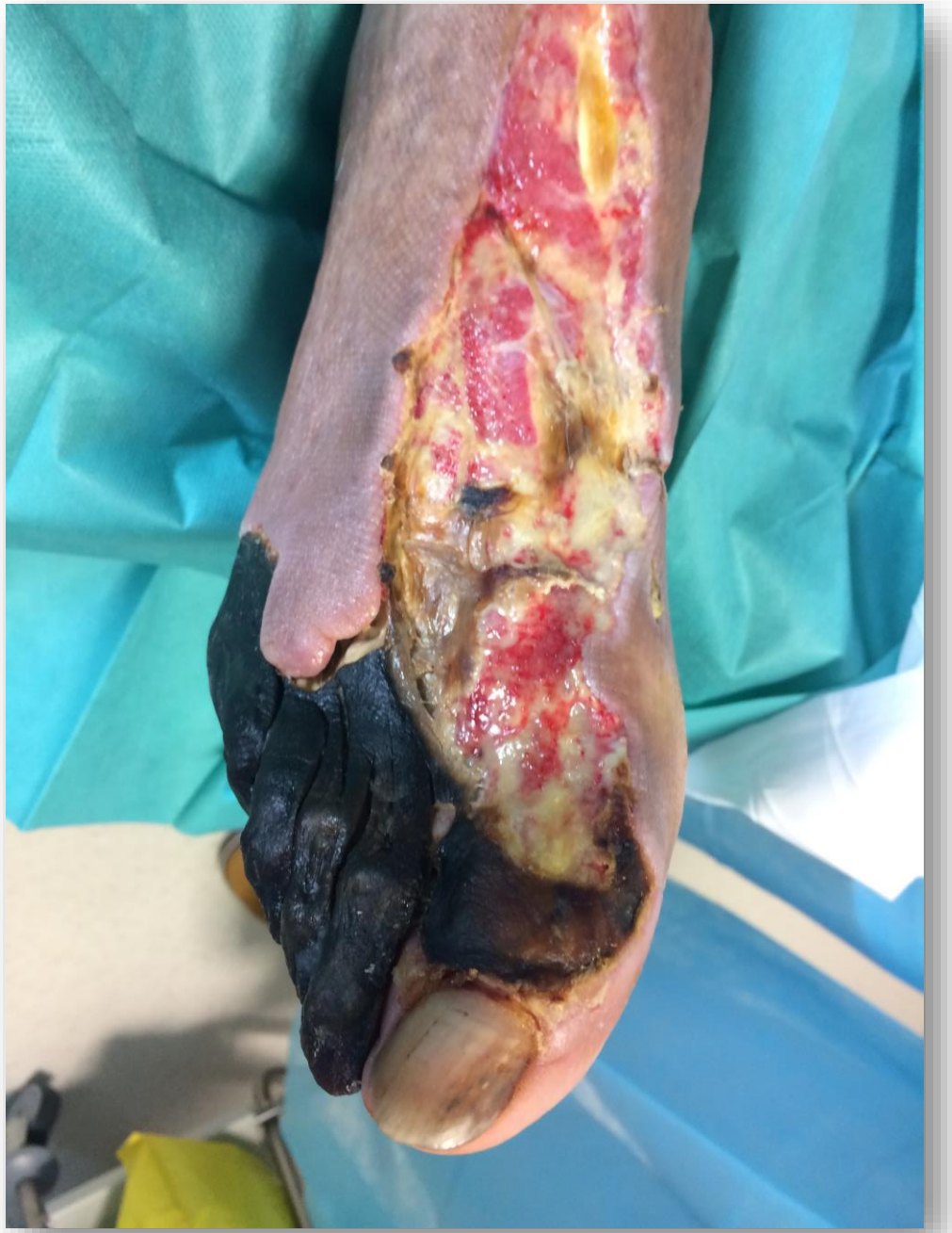
- Pied diabétique :
  - Parties molles
  - Vascularisation
  - Os secondairement

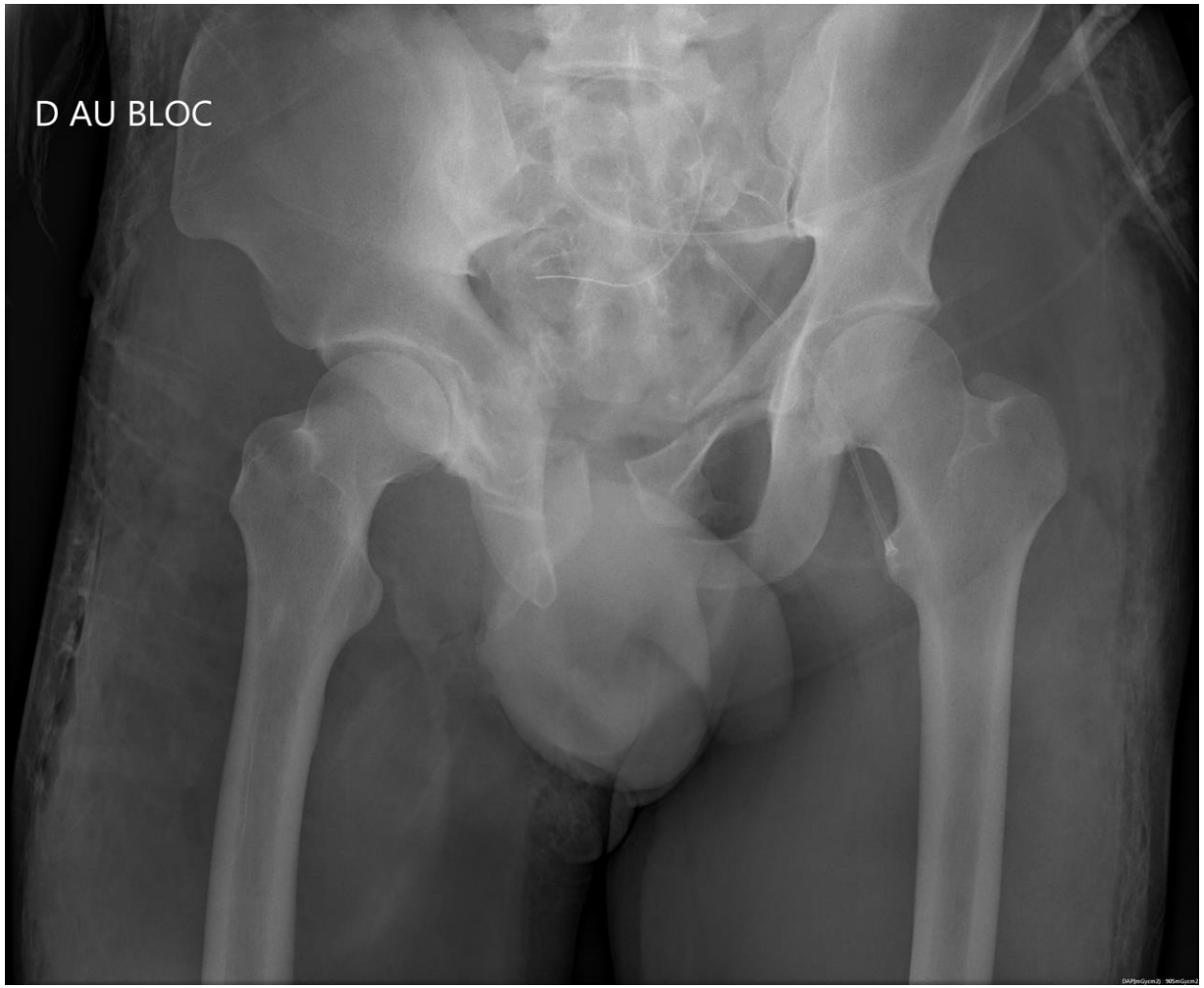
→ *Pseudomonas aeruginosa*
SARM

- Matériel infecté :
  - La gravité impacte probablement la discussion sur la stratégie dépose/repose

- Traumato :
  - Parties molles
  - Vaisseau
  - Os/fractures
  - Viscères

→ *Pseudomonas aeruginosa*
Aeromonas hydrophila
Clostridium perfringens
Champignons :
Aspergillus/Mucorales

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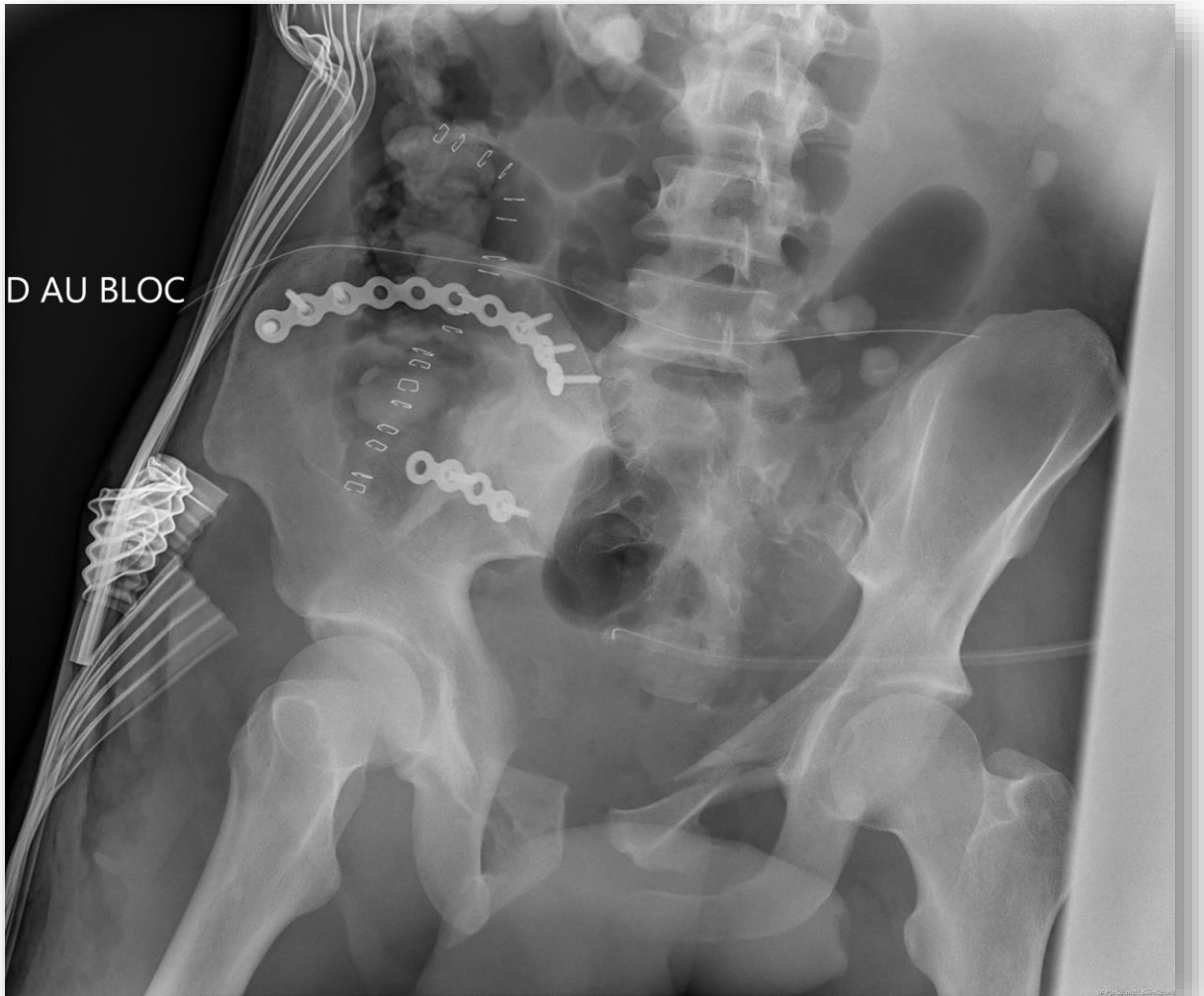
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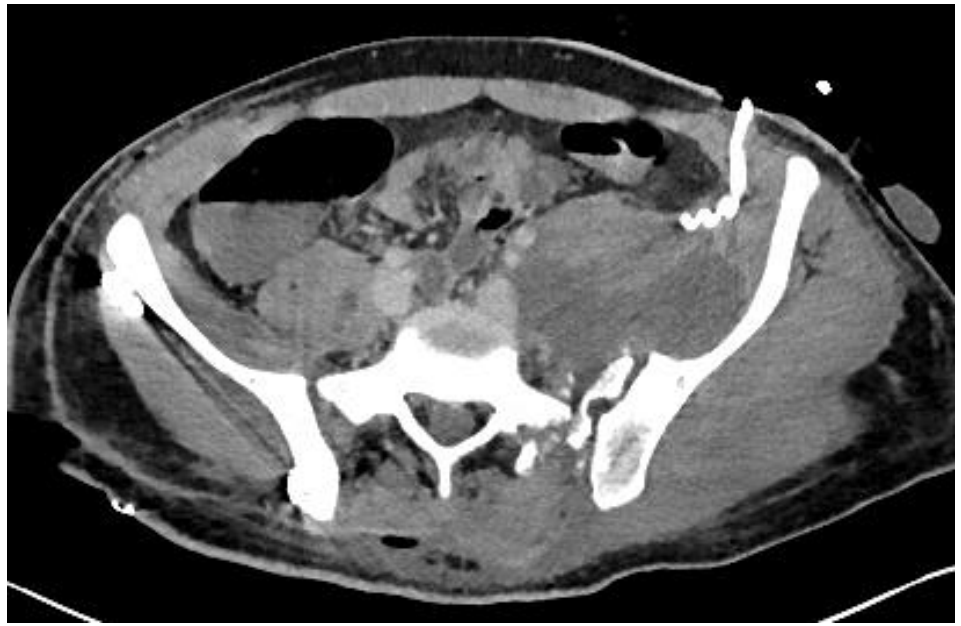
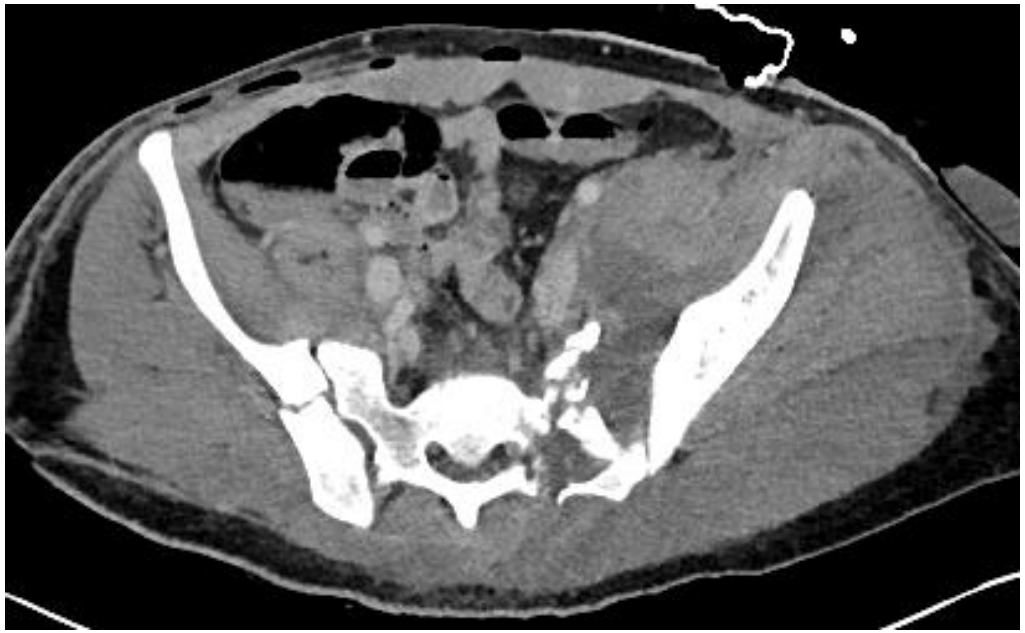
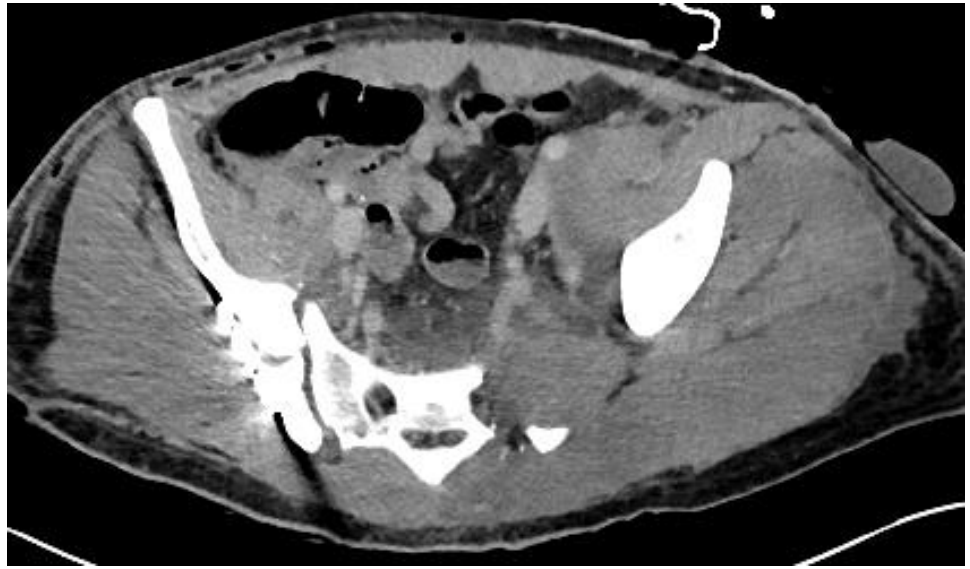
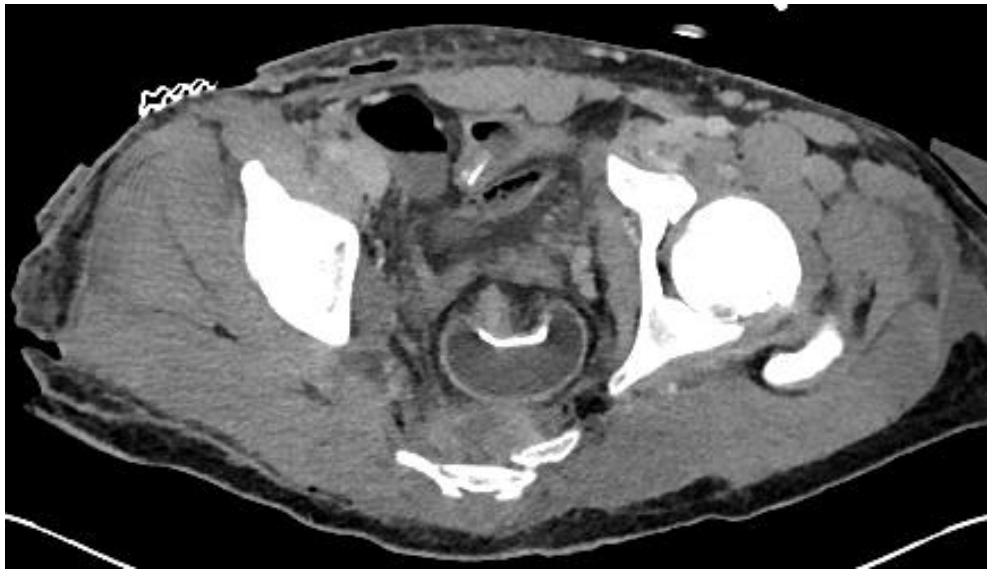
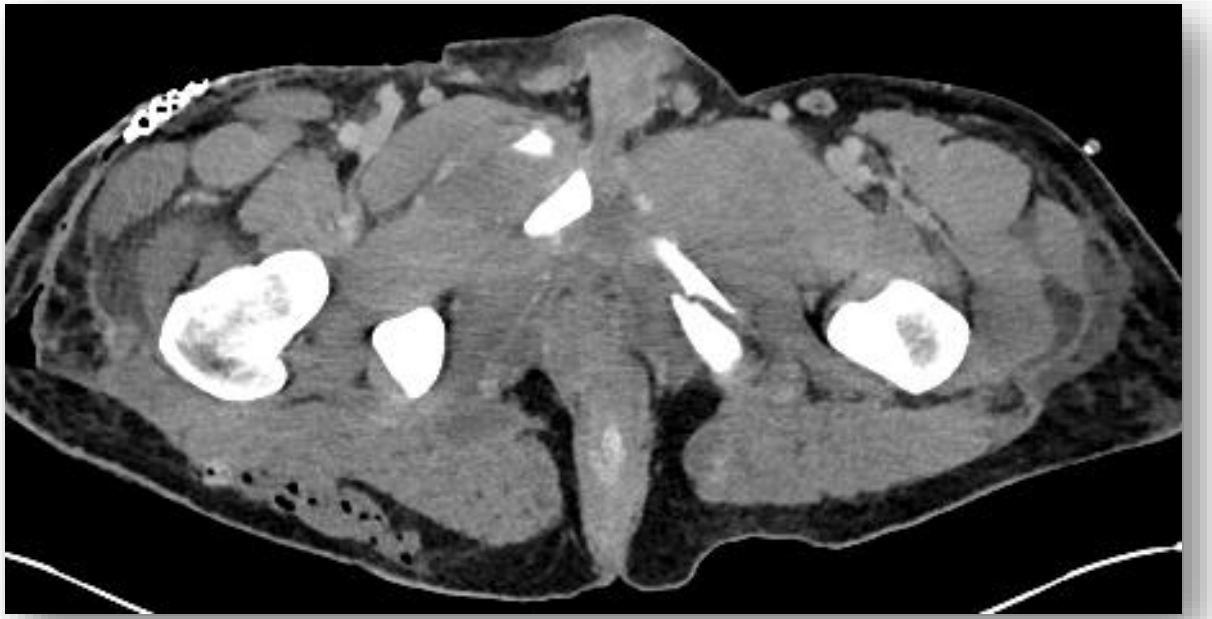
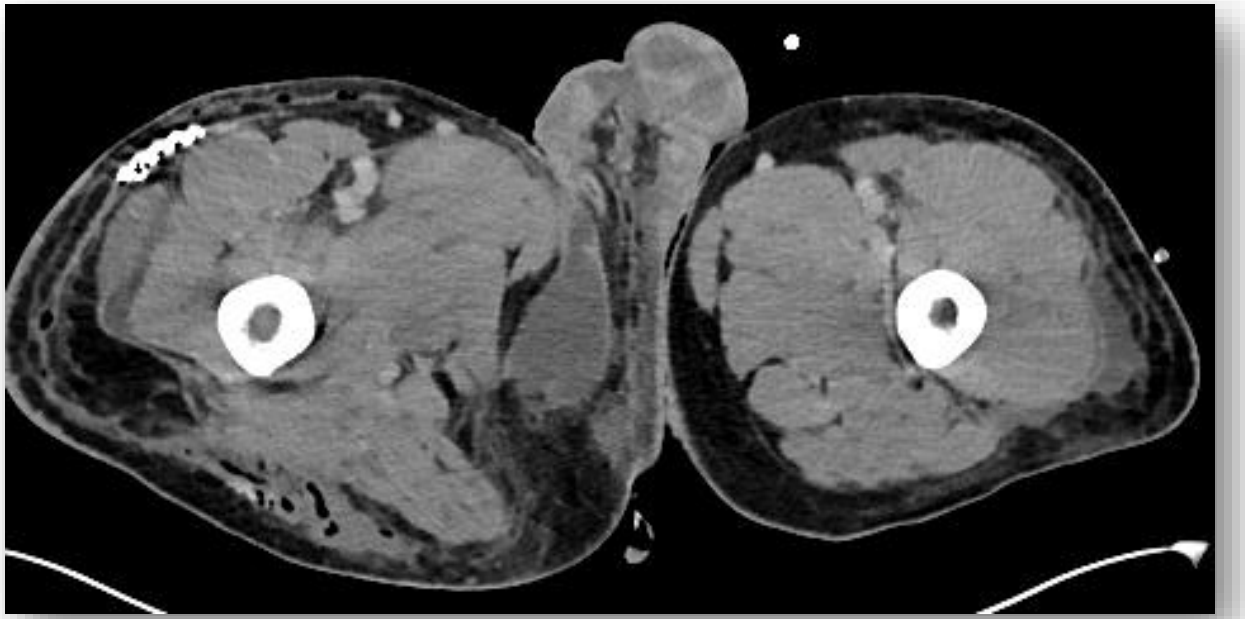


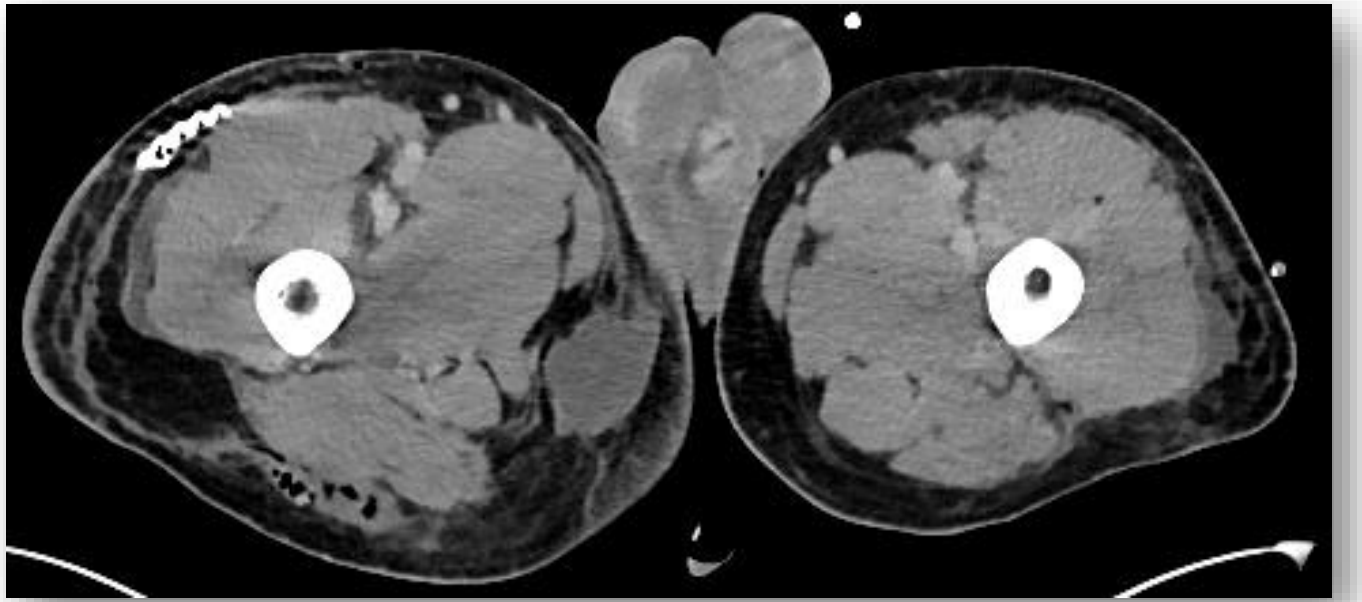












Cornely OA et al. LID 2019.

Strongly recommended Moderately recommended

Suspected and confirmed mucormycosis are emergencies and require rapid action

Neutropenic, HSCT or SOT
Persistent fever or respiratory symptoms

Diabetic
Facial pain, sinusitis, proptosis, amaurosis

Trauma
Persistent fever or respiratory symptoms

Trauma
Eschar

Asia, specifically China and India
No underlying diseases: flank pain, fever, haematuria with sterile urine, and blood cultures

Asia, specifically India
Diabetic adult on dialysis or malnourished/premature child with broad-spectrum antibiotic therapy with abdominal mass, distension or bilious vomting, with or without gastrointestinal bleeding

Chest CT
Typical findings:
Reverse Halo >10 nodules
pleural effusion

Cranial CT
Typical finding:
Bone destruction

Cranial MRI
Typical finding: orbit, brain involvement

Chest CT
If persistent fever or respiratory symptoms

Imaging of injured regions as appropriate

Ultrasound/abdominal CT
Typical findings: enlarged, non-hydronephrotic kidneys with hypodensities, cortical rim sign

Abdominal CT or MRI
Typical finding: isolated abdominal mass

Staging
CT sinuses, chest, abdomen, pelvis

Sampling
Biopsy (eg, endoscopic, or CT-guided)
Grinding samples causes non-viability

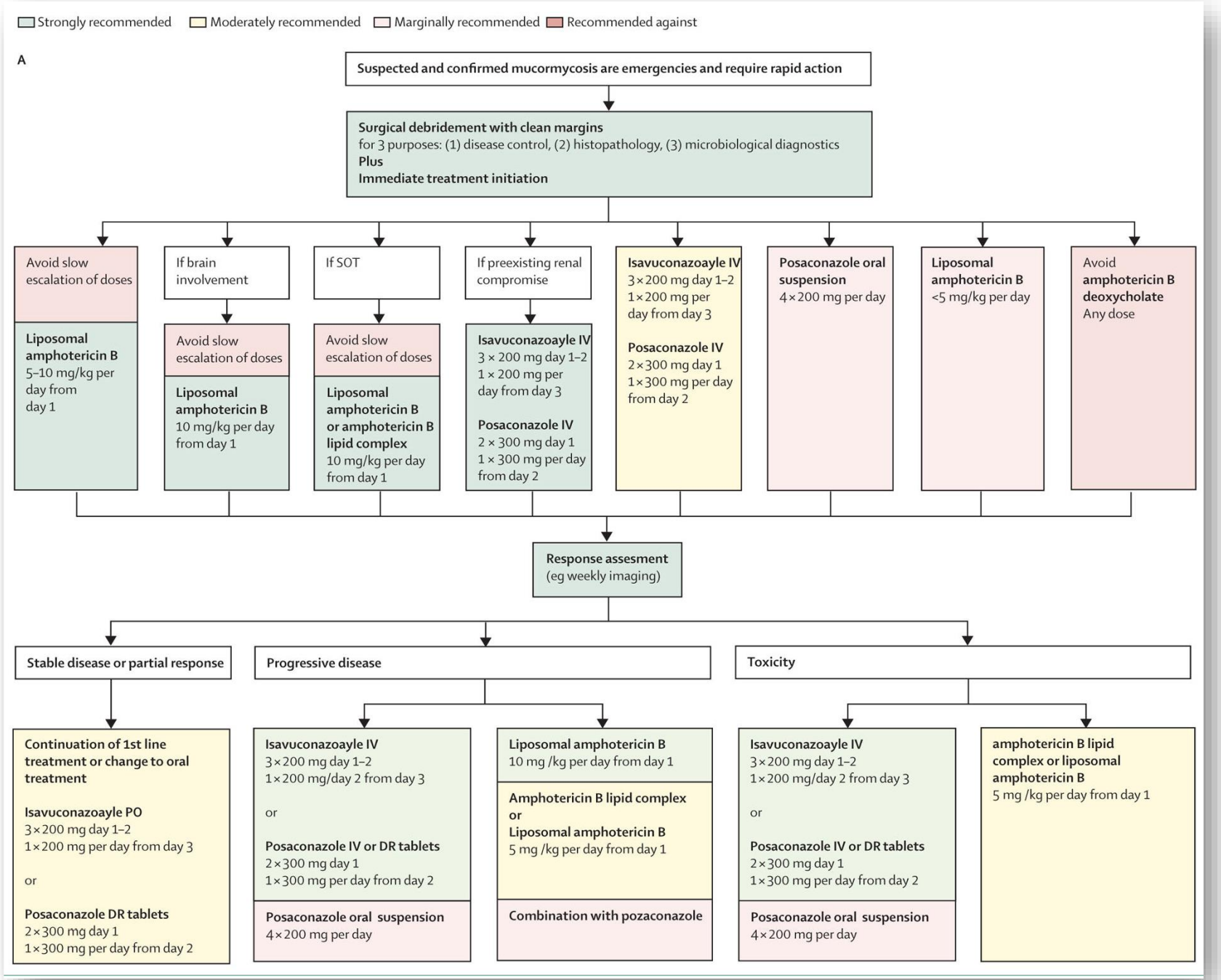
Serology
Galactomannan, 1,3-β-D-glucan
Positive assays support differential diagnosis or mixed invasive fungal infection

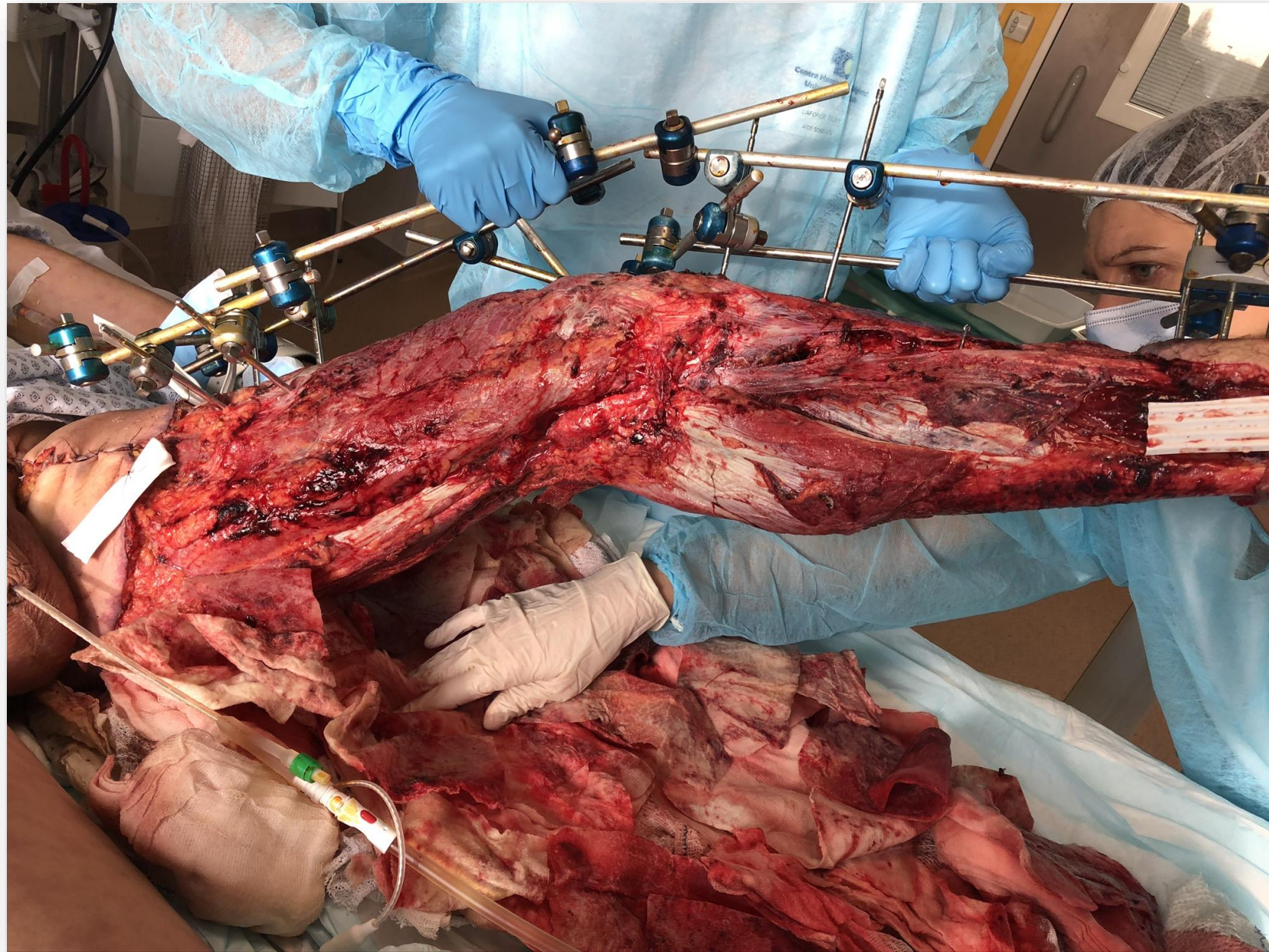
Direct microscopy using flourescent brightener and histopathology with special stains (eg PAS and GMS)
Typical findings:
non-septate/
pauci-septate, ribbon-like hyphae (at least 6–16 µm wide)
Vessel occlusion

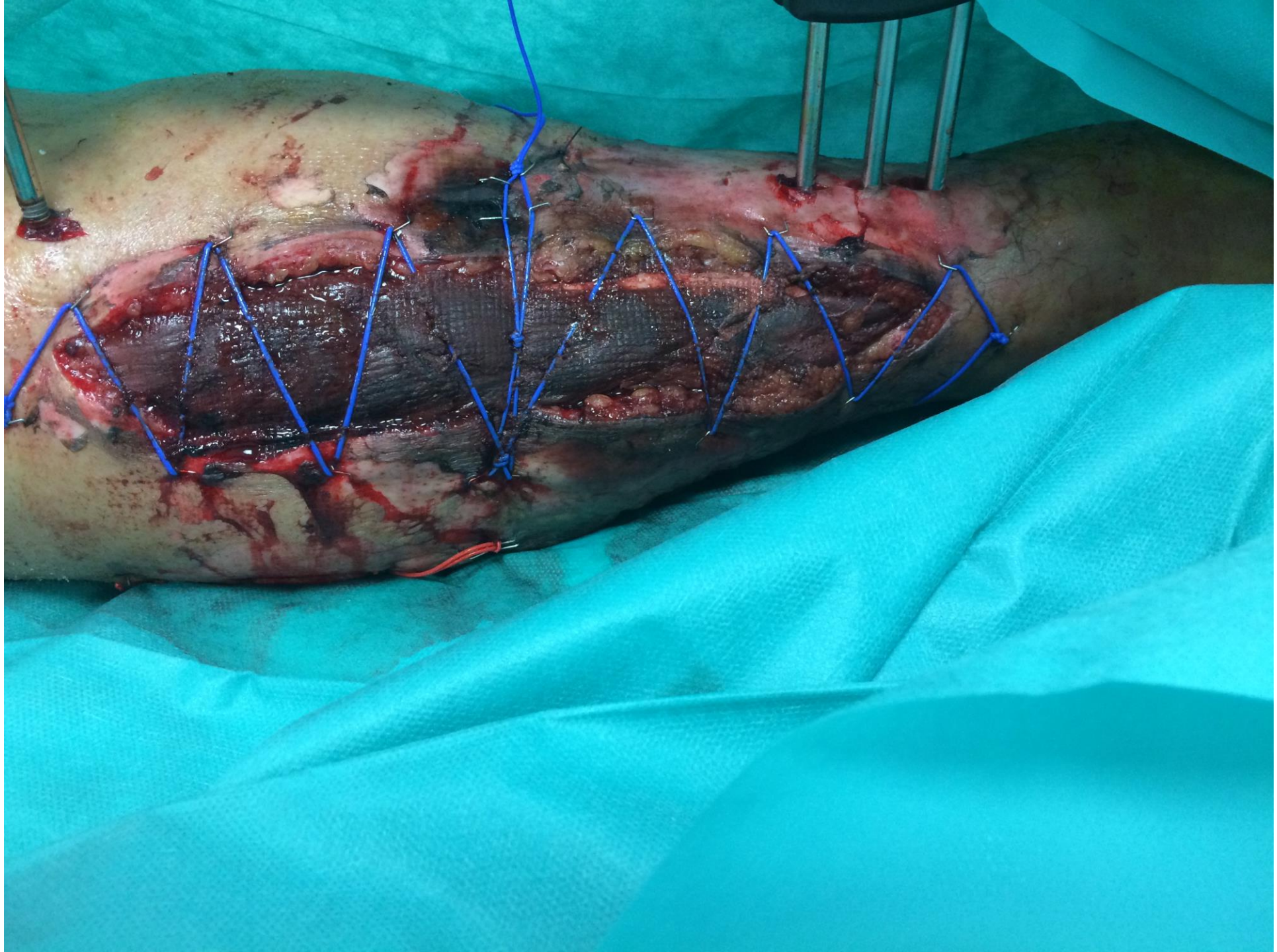
Culture
Routine media at 30°C and 37°C
Typical findings:
cottony white or greyish black colony

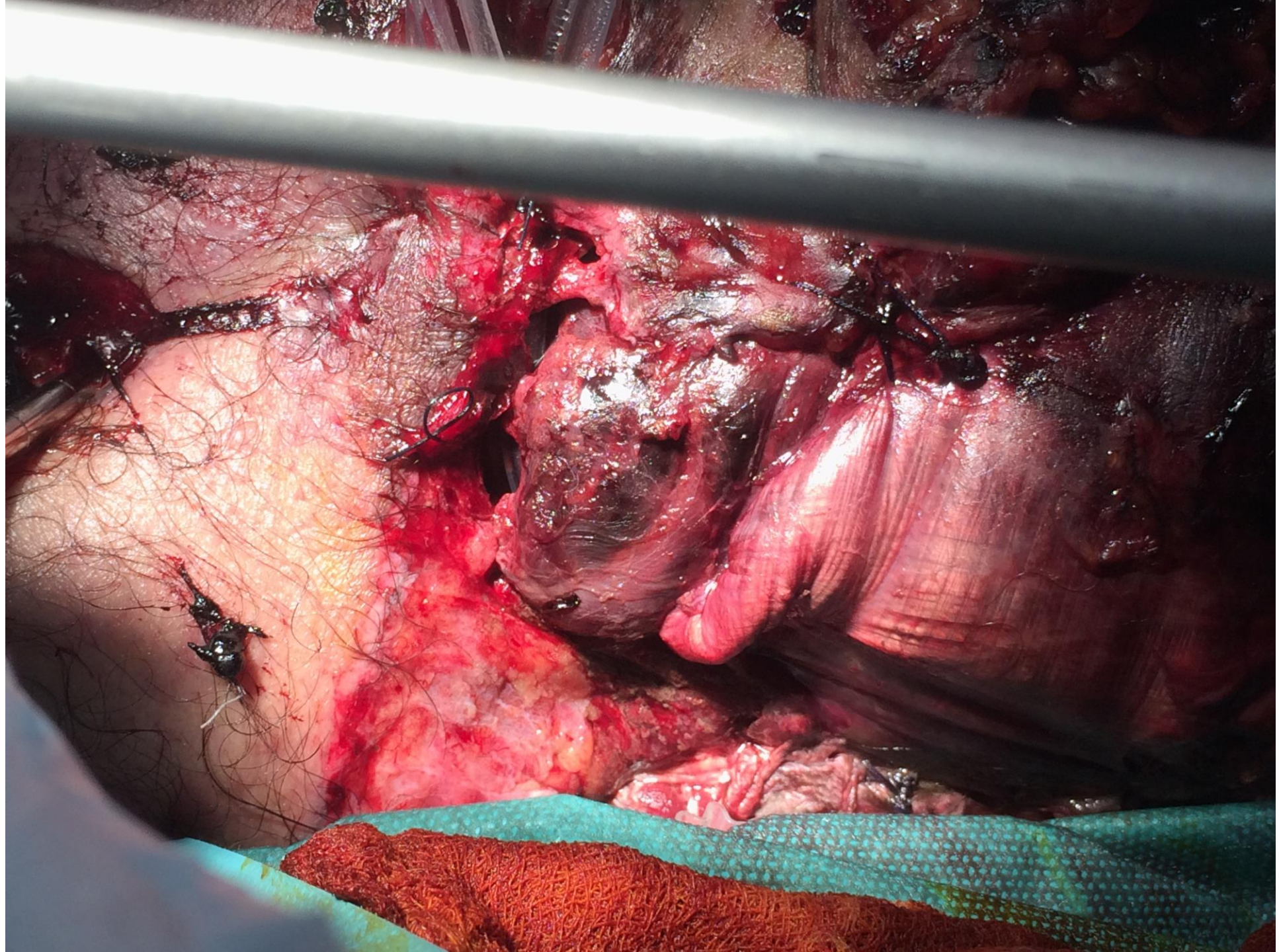
Molecular identification
Preferably semi-nested qPCR, HRM, Multiplex
Target: 18s, ITS, 28s or rDNA
Immunohistochemical staining with specific primary reagents

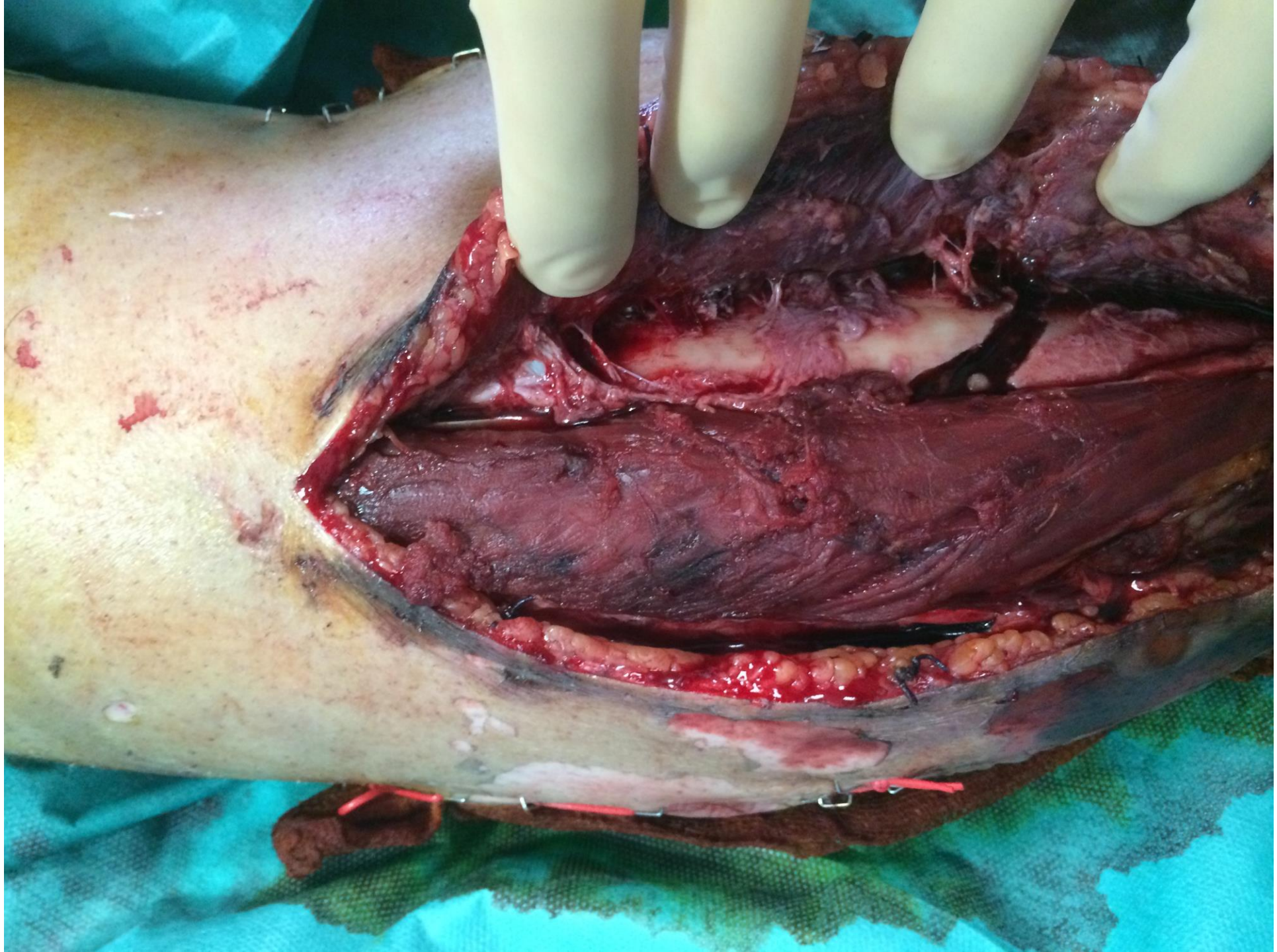
Susceptibility testing

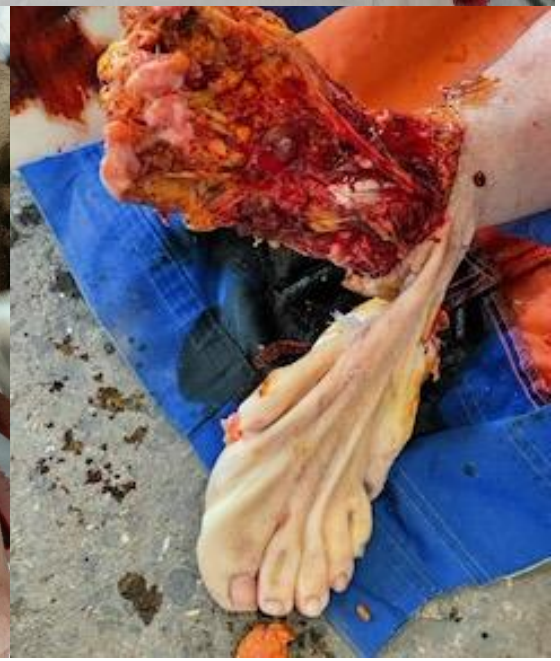

Strongly recommended
Moderately recommended
Marginally recommended
Recommended against
A
Suspected and confirmed mucormycosis are emergencies and require rapid action
Surgical debridement with clean margins
for 3 purposes: (1) disease control, (2) histopathology, (3) microbiological diagnostics
Plus
Immediate treatment initiation
Avoid slow escalation of doses
Liposomal amphotericin B
5–10 mg/kg per day from day 1
If brain involvement
Avoid slow escalation of doses
Liposomal amphotericin B
10 mg/kg per day from day 1
If SOT
Avoid slow escalation of doses
Liposomal amphotericin B or amphotericin B lipid complex
10 mg/kg per day from day 1
If preexisting renal compromise
Isavuconazoayle IV
3 × 200 mg day 1–2
1 × 200 mg per day from day 3
Posaconazole IV
2 × 300 mg day 1
1 × 300 mg per day from day 2
Isavuconazoayle IV
3×200 mg day 1–2
1×200 mg per day from day 3
Posaconazole IV
2×300 mg day 1
1×300 mg per day from day 2
Posaconazole oral suspension
4×200 mg per day
Liposomal amphotericin B
<5 mg/kg per day
Avoid amphotericin B deoxycholate
Any dose
Response assesment
(eg weekly imaging)
Stable disease or partial response
Progressive disease
Toxicity
Continuation of 1st line treatment or change to oral treatment
Isavuconazoayle PO
3×200 mg day 1–2
1×200 mg per day from day 3
or
Posaconazole DR tablets
2×300 mg day 1
1×300 mg per day from day 2
Isavuconazoayle IV
3×200 mg day 1–2
1×200 mg/day 2 from day 3
or
Posaconazole IV or DR tablets
2×300 mg day 1
1×300 mg per day from day 2
Posaconazole oral suspension
4×200 mg per day
Liposomal amphotericin B
10 mg /kg per day from day 1
Amphotericin B lipid complex
or
Liposomal amphotericin B
5 mg /kg per day from day 1
Combination with pozaconazole
Isavuconazoayle IV
3×200 mg day 1–2
1×200 mg/day 2 from day 3
or
Posaconazole IV or DR tablets
2×300 mg day 1
1×300 mg per day from day 2
Posaconazole oral suspension
4×200 mg per day
amphotericin B lipid complex or liposomal amphotericin B
5 mg /kg per day from day 1







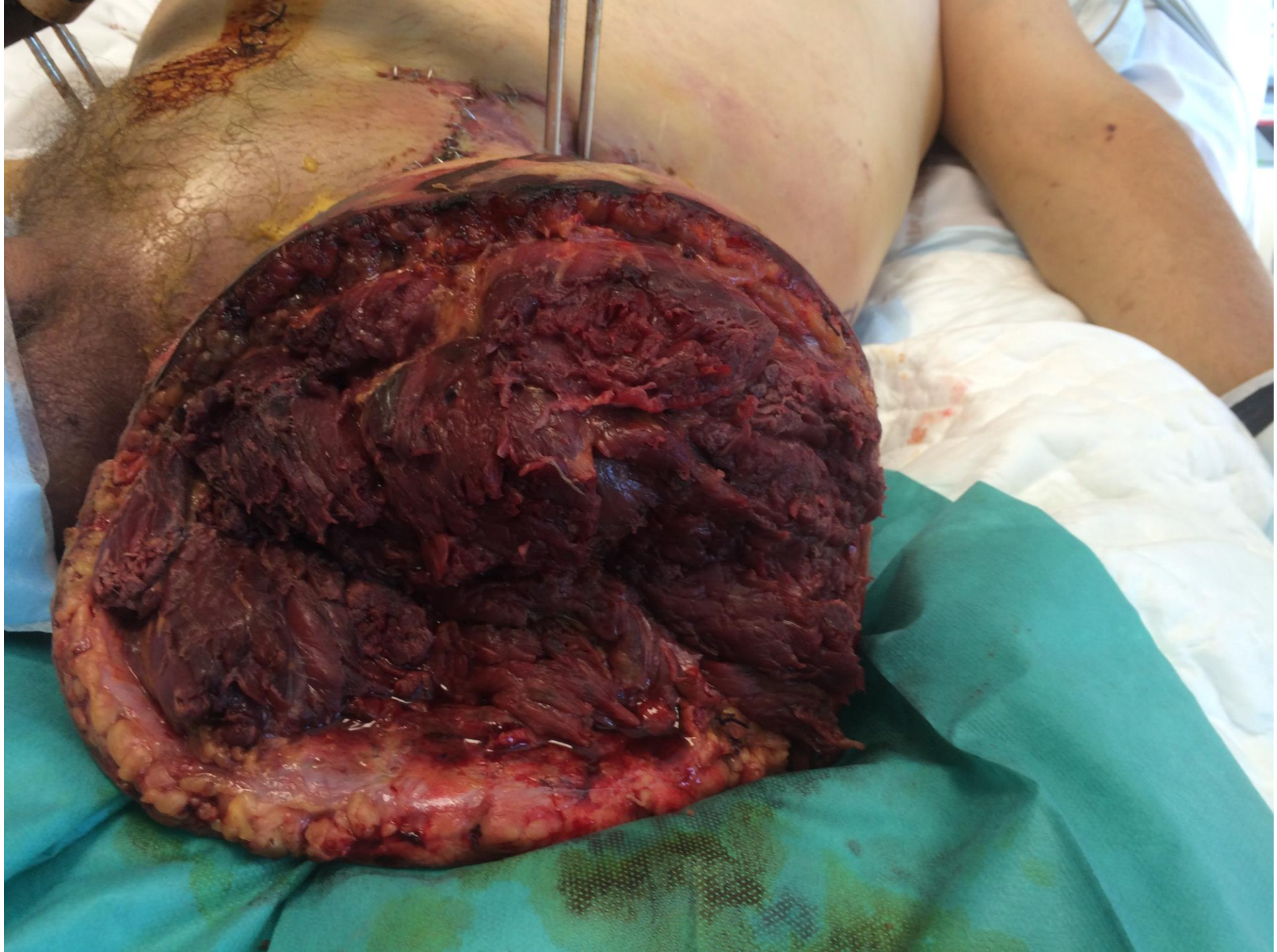




LE PLUS TÔT POSSIBLE

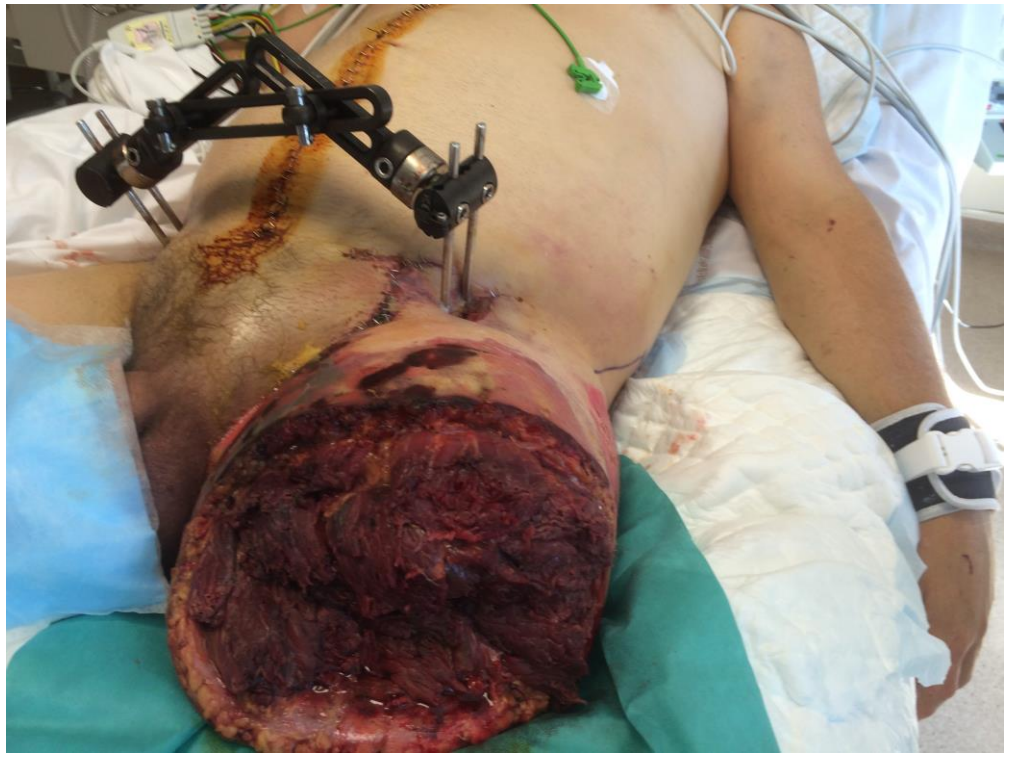
1. Antiobioprophylaxie systématique active sur les cocci Gram Positifs et les anaérobies :
    - Amoxicilline + ac clavulanique ou céphalosporines (RFE SFAR 2018)
    - si allergie : clindamycine ± gentamicine
2. Lavage abondant de la plaie
3. Emballage dans un pansement stérile humide
4. Immobilisation de la fracture
5. Vérification du statut antitétanique par test immunochromatographique et SAT/VAT selon HAS 2013
6. Prise en charge chirurgicale
    - Irrigation
    - Débridement ± parage
    - Stabilisation de la fracture
    - Recherche de lésions associées vasculo-nerveuses
    - Couverture cutanée

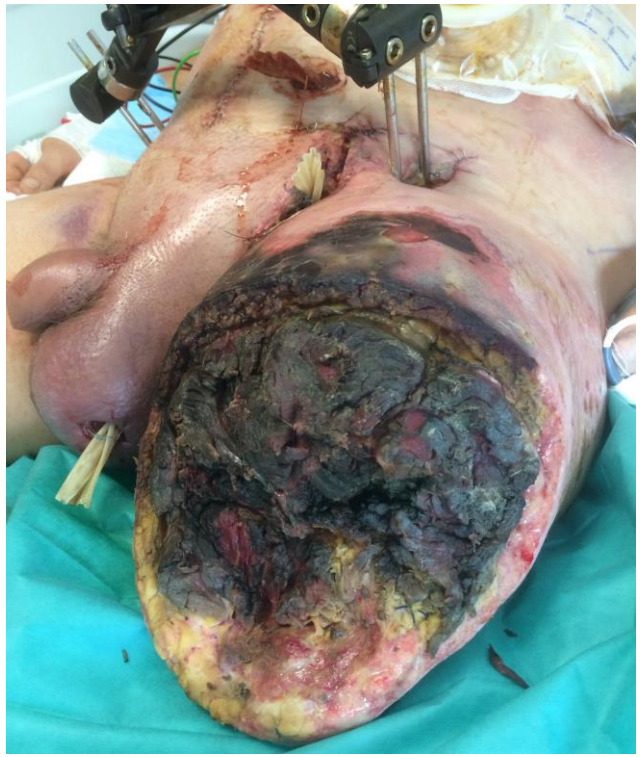
RFE polytrau SFAR/SOFCOT/SFMU

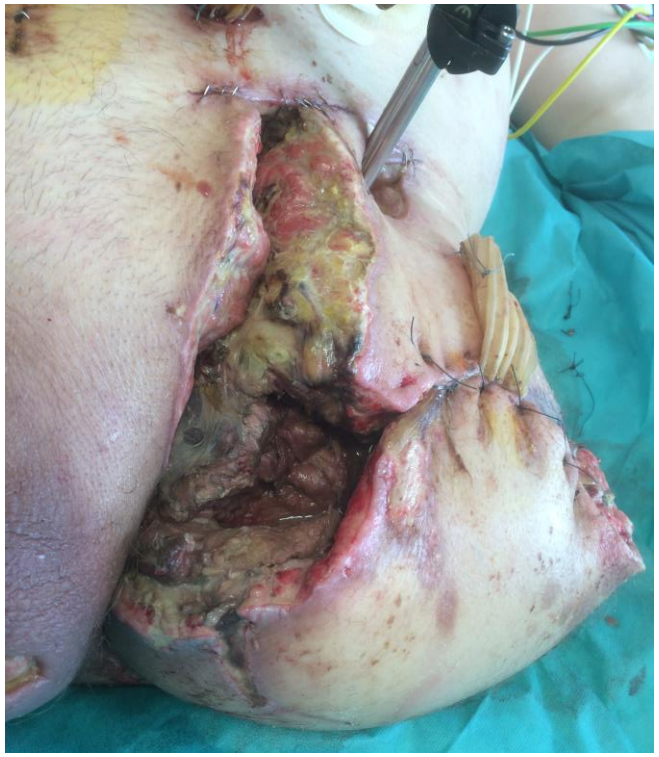


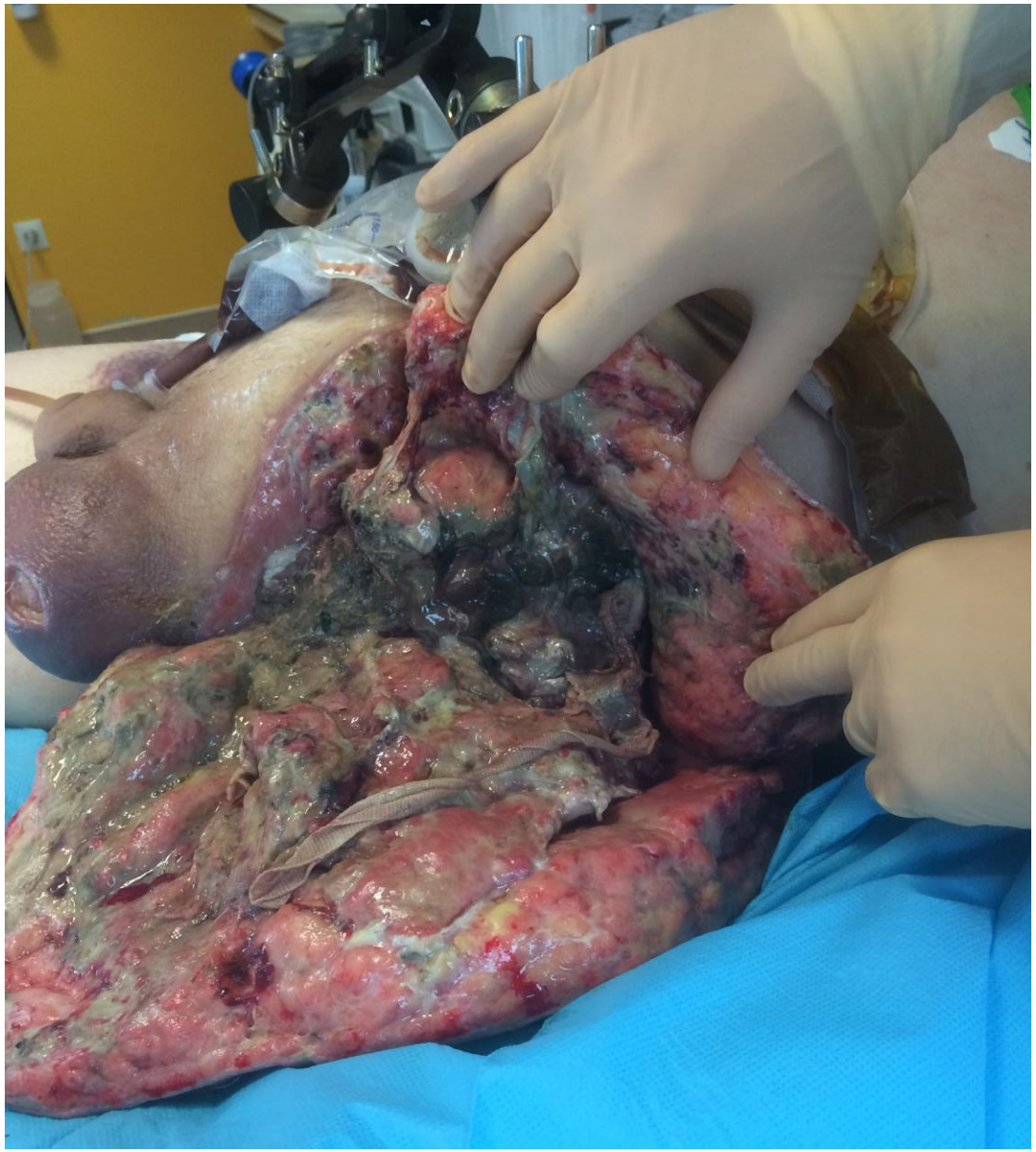

POSEIDON

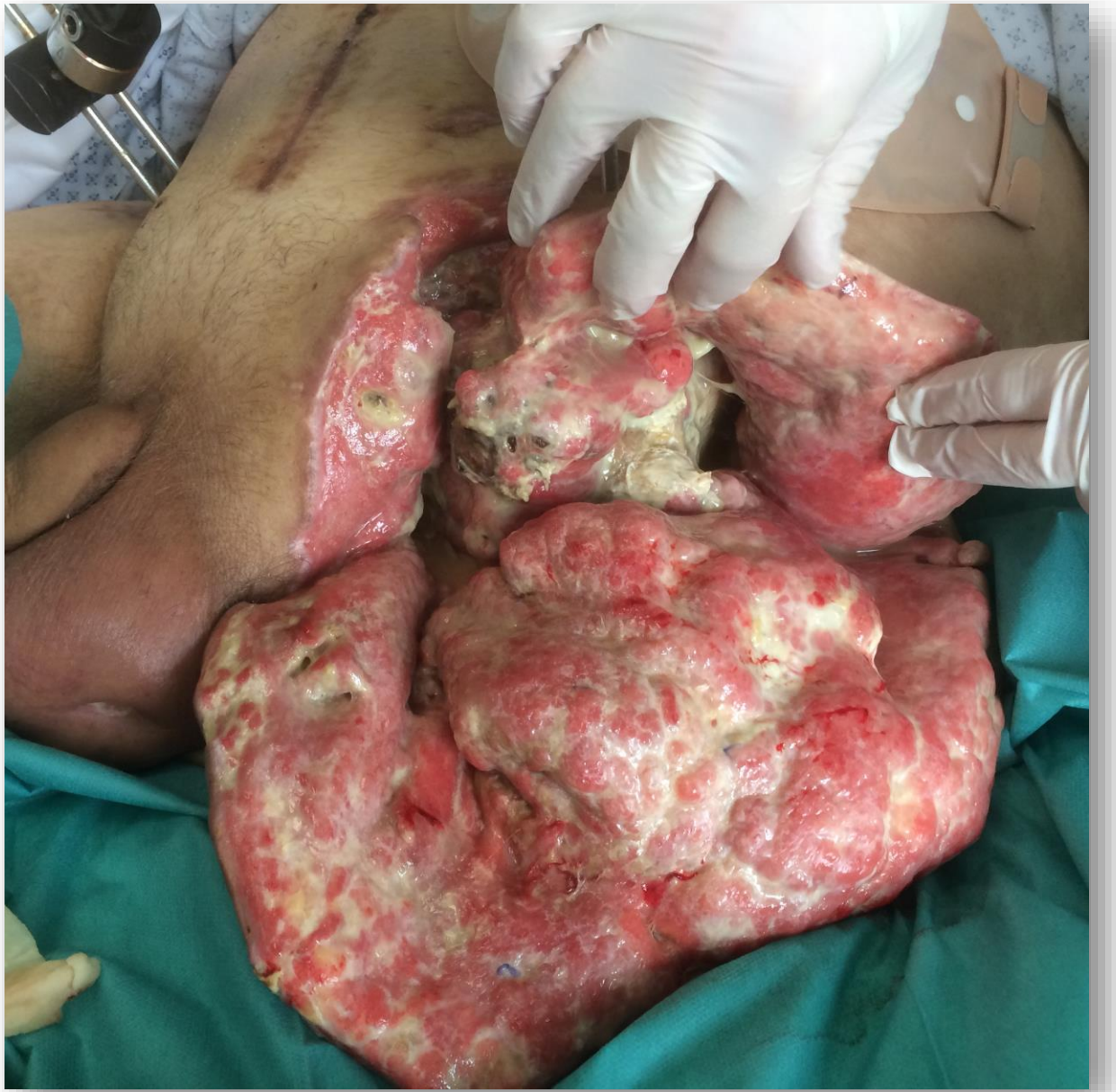

EUROPE

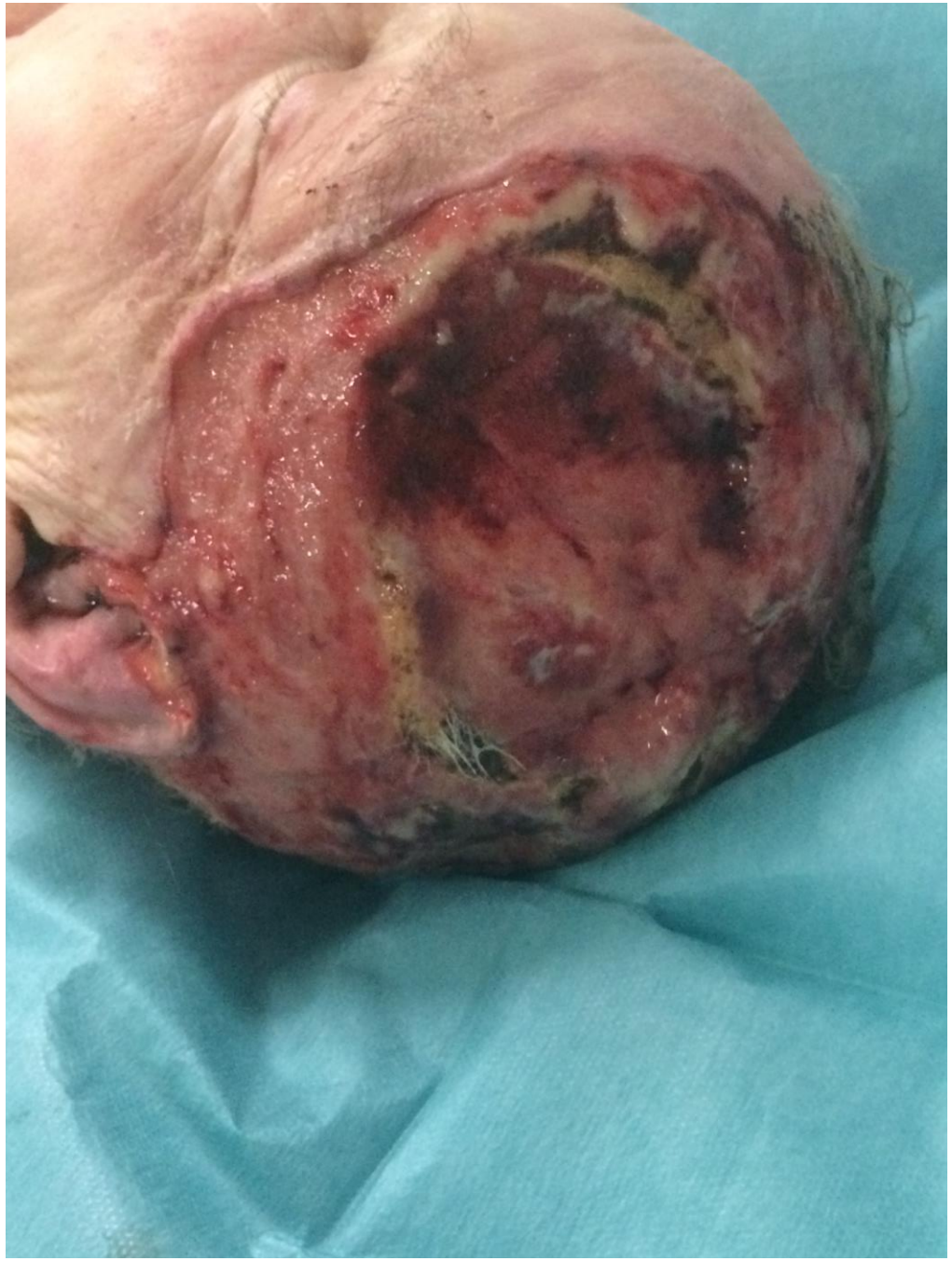












Conclusion

- Choc septique et arthrite
  - Bundles « Surviving Sepsis Campaign »
  - Antibiothérapie probabiliste
    - Après prélèvement
    - Avant bloc, par ailleurs urgent
    - Désescalade dès documentation

- Hiérarchisation des problèmes en polytraumato (RFE SFAR et sociétés partenaires)
    - Vaisseaux/viscères/parties molles/os
    - L’infection ostéo-articulaire ne doit pas éclipser le reste et n’est pas un problème aigu
    - L’urgence infectieuse est souvent en lien avec les parties molles
    - Se référer à la problématique de l’infection sur matériel
    - En prenant en compte les circonstances de l’accident