Infections nécrosantes des parties molles

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DUCAI
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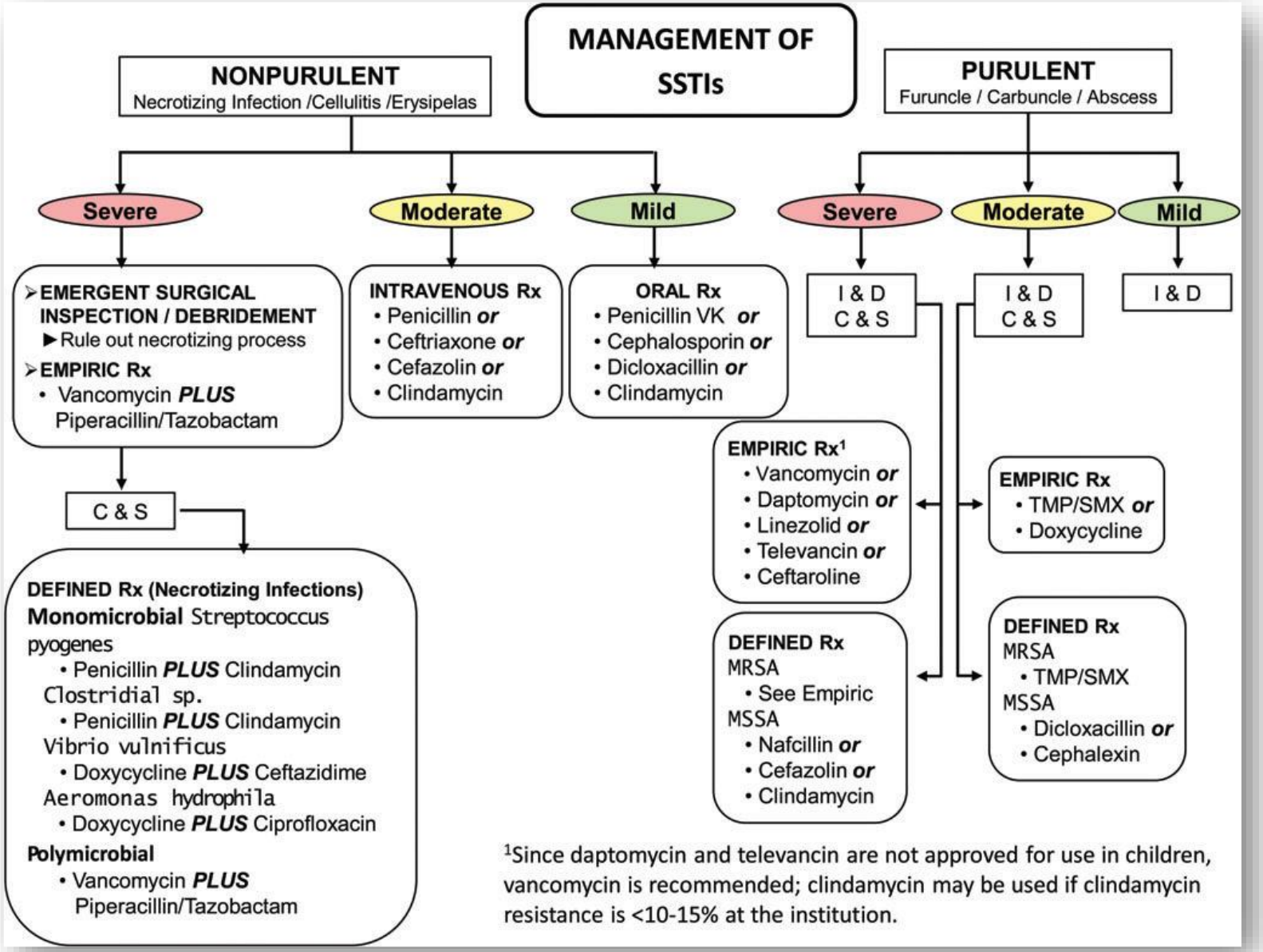
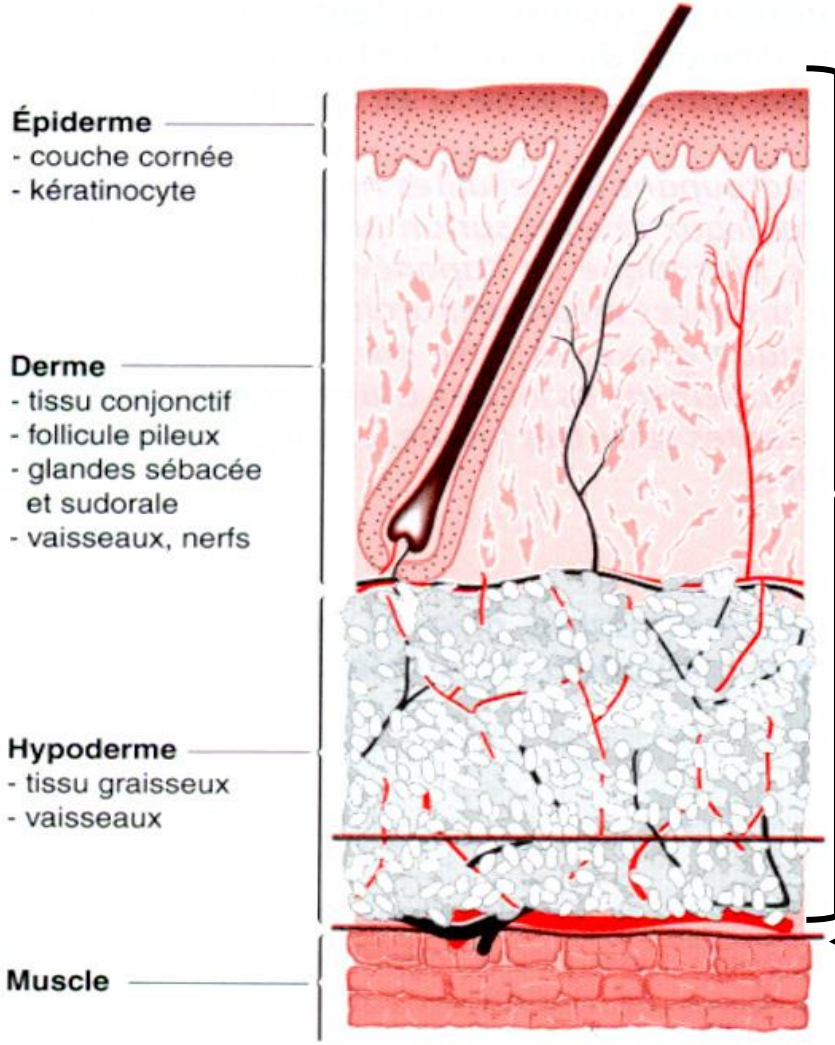
Terminologie - classification



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

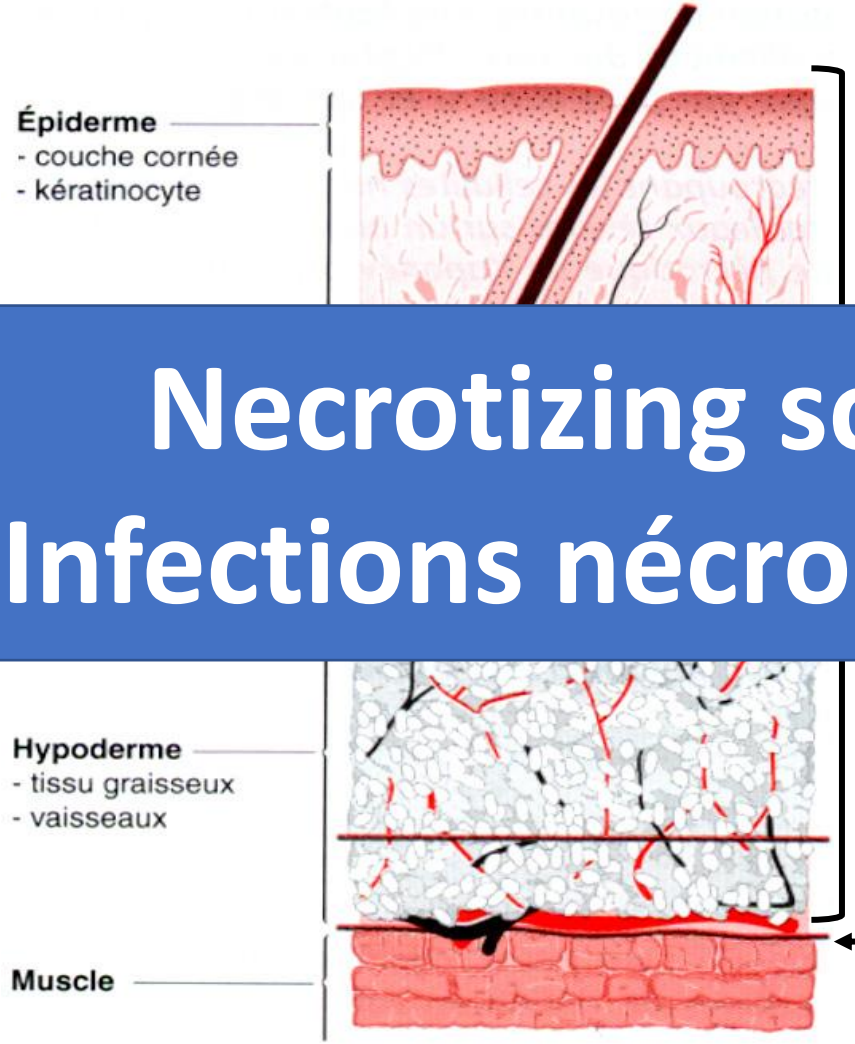
-Dermohypodermite bactérienne nécrosante (DHBN)
Necrotising cellulitis

-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**

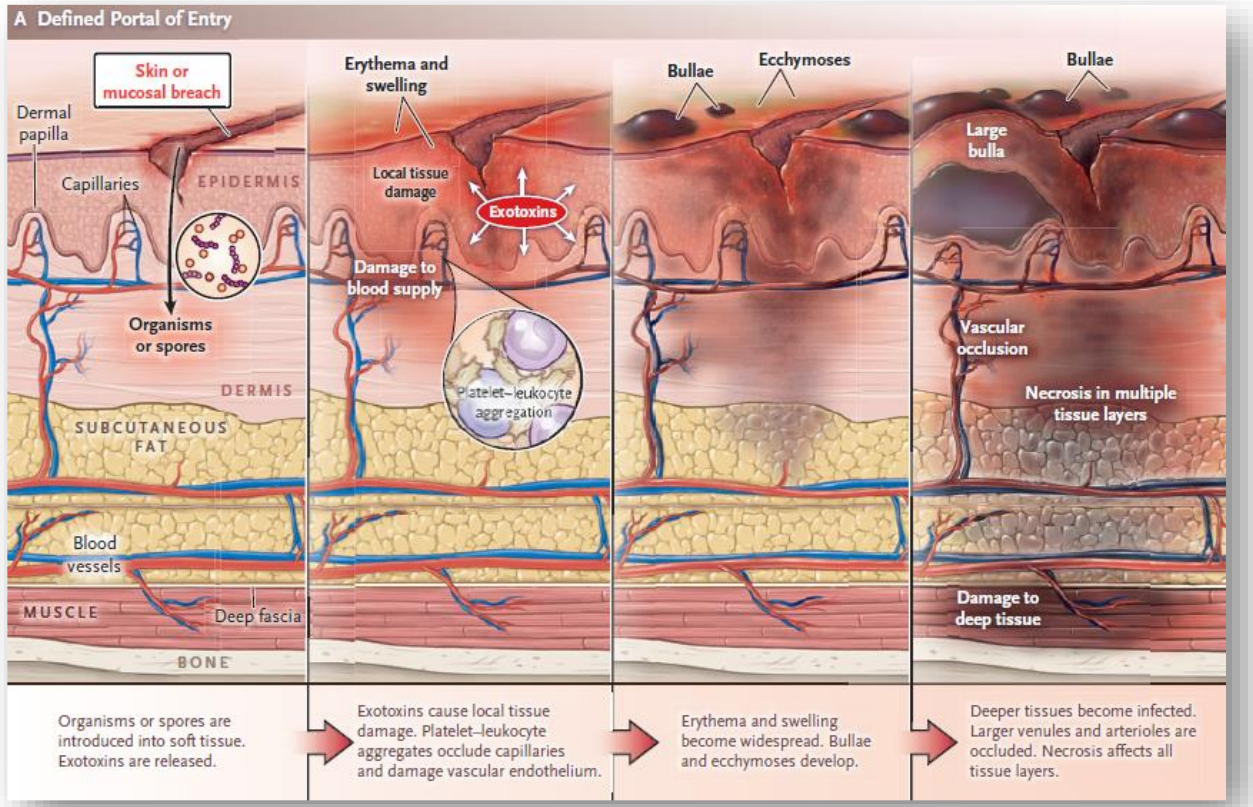


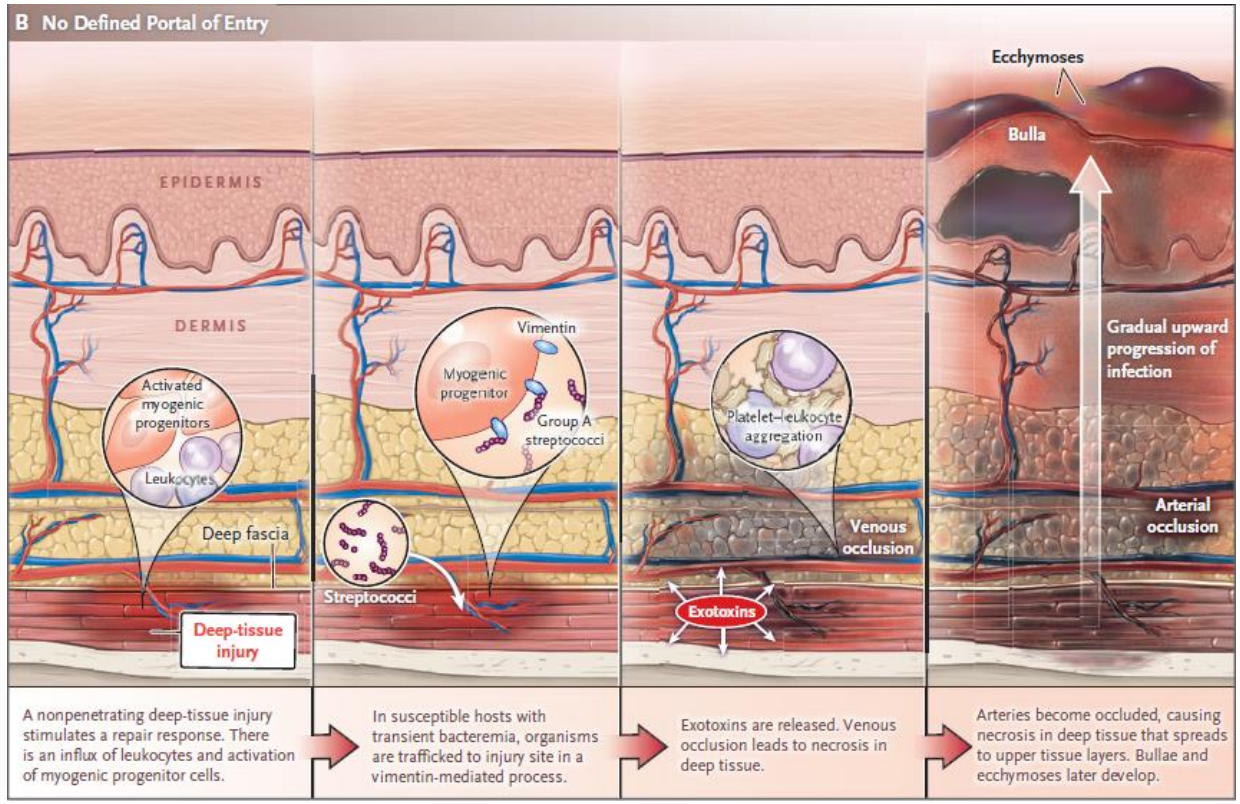
Necrotizing soft tissue infections : NSTIs
Infections nécrosantes peau et parties molles

-Myosite
Clostridiale=gangrène gazeuse
Non clostridiale

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

Différentes présentations cliniques des NSTIs selon la porte d'entrée





Porte d'entrée « connue » de type effraction
Progression de la surface vers la profondeur

Porte d'entrée « inconnue »
Progression de la profondeur vers la surface

Stevens DL, Bryant AE. NEJM. 2017

Nécrosant versus non-nécrosant : plus rare

DH non nécrosante

- Adulte de plus de 50 ans
- 10-100 nouveaux cas par an/100 000 habitants
- Facteurs de risque
  - Obésité
  - Lymphoedème/insuffisance veineuse
  - Porte d'entrée : intertrigo, ulcères etc…
  - Diabète non équilibré
  - immunodépression

DH nécrosante

- 4-8 nouveaux cas par an/100 000 habitants
- Myosite clostridiale devenue très rare
- Facteurs de risque
  - Les mêmes + :
  - Contusion
  - Effraction/plaie pénétrante
  - Cancer
  - Rôle discuté des AINS

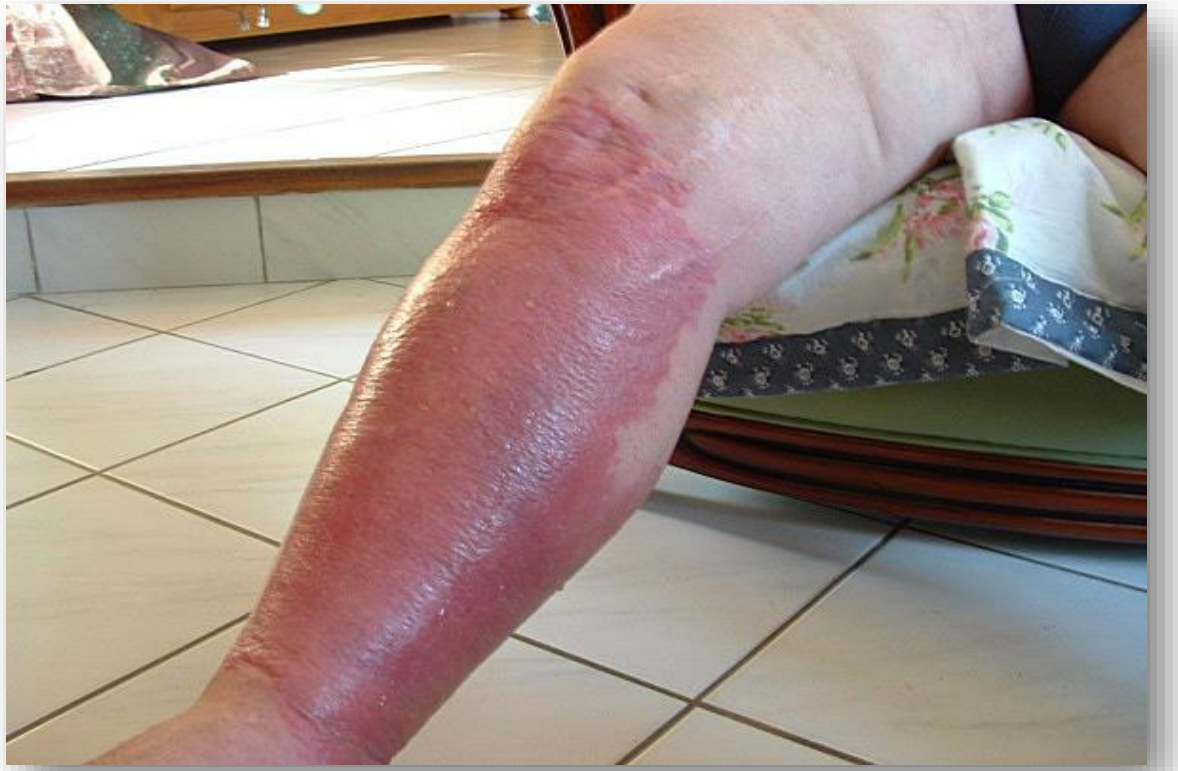
Nécrosant versus non-nécrosant : plus grave, multimicrobien

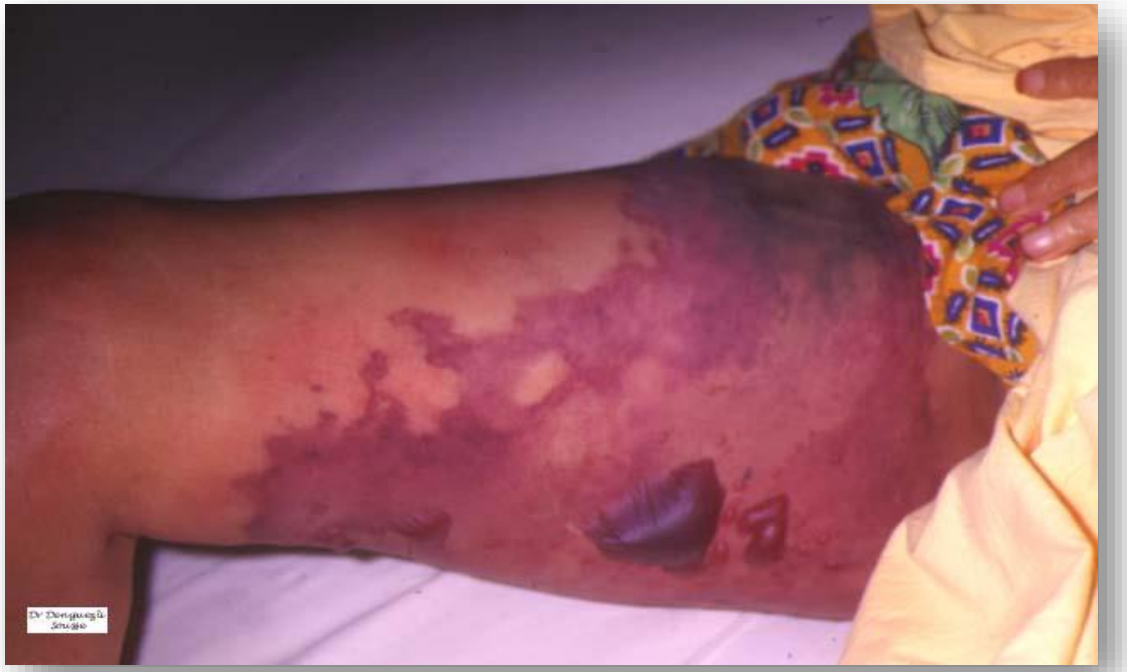
DH non nécrosante

- Monomicrobien
  - Majoritairement Streptocoque B-hémolytique du groupe A (*Streptococcus pyogenes*)
  - Plus rarement Staphylocoque doré (*Staphyloccus aureus*)
- Spécificités bactériologiques en fonction du terrain
- Gravité/retentissement général rares
  - Choc septique

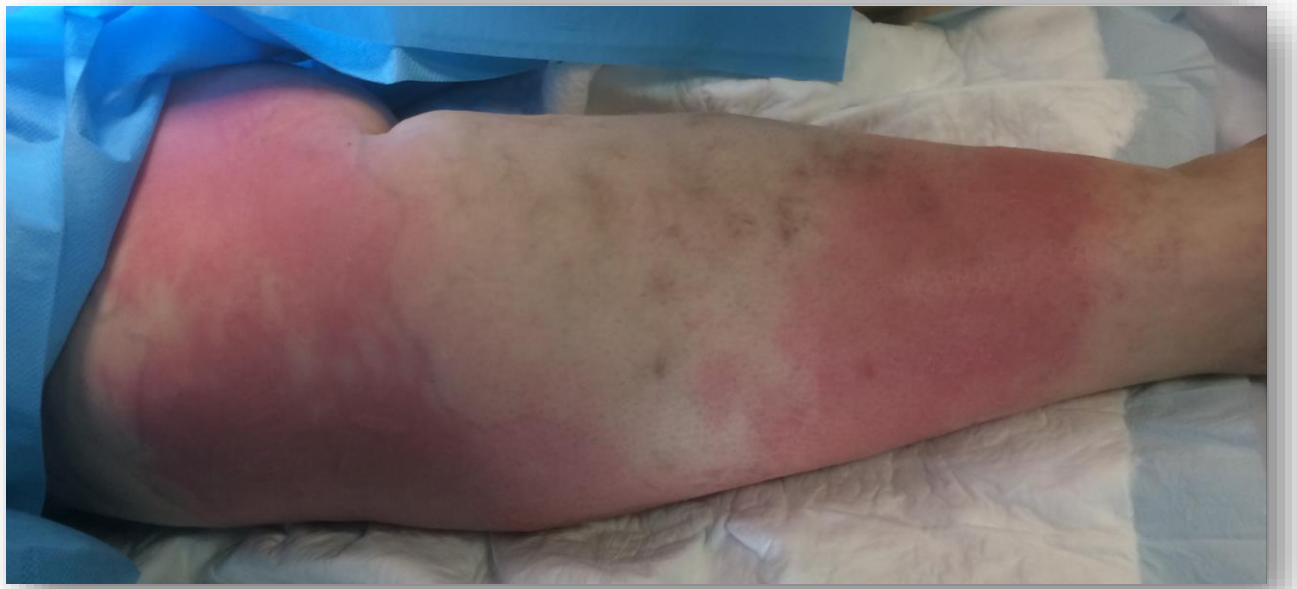
DH nécrosante

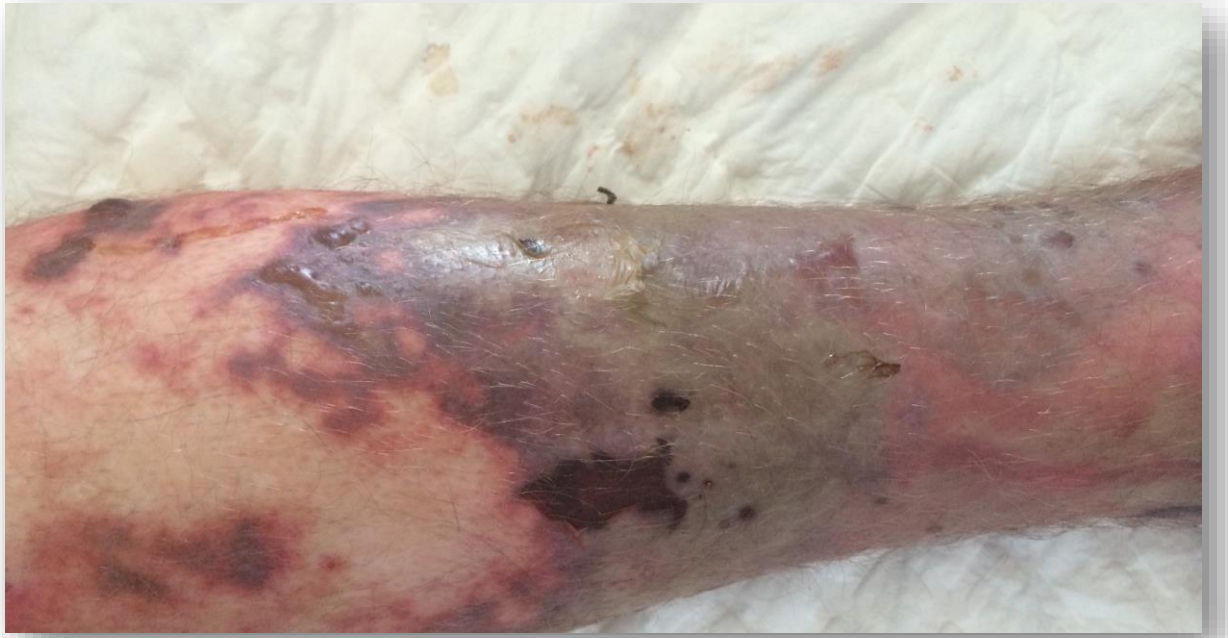
- 70-80% plurimicrobien
  - Synergie flore aérobie/anaérobie.
  - Genre et espèces en fonction des localisations (membres, périnées, face) et des circonstances de survenue
- 20-30 % monomicrobien
  - *S. pyogenes* et *S. aureus*
- Spécificités bactériologiques en fonction du terrain
- Grave :
  - Réanimation dans 50% des cas

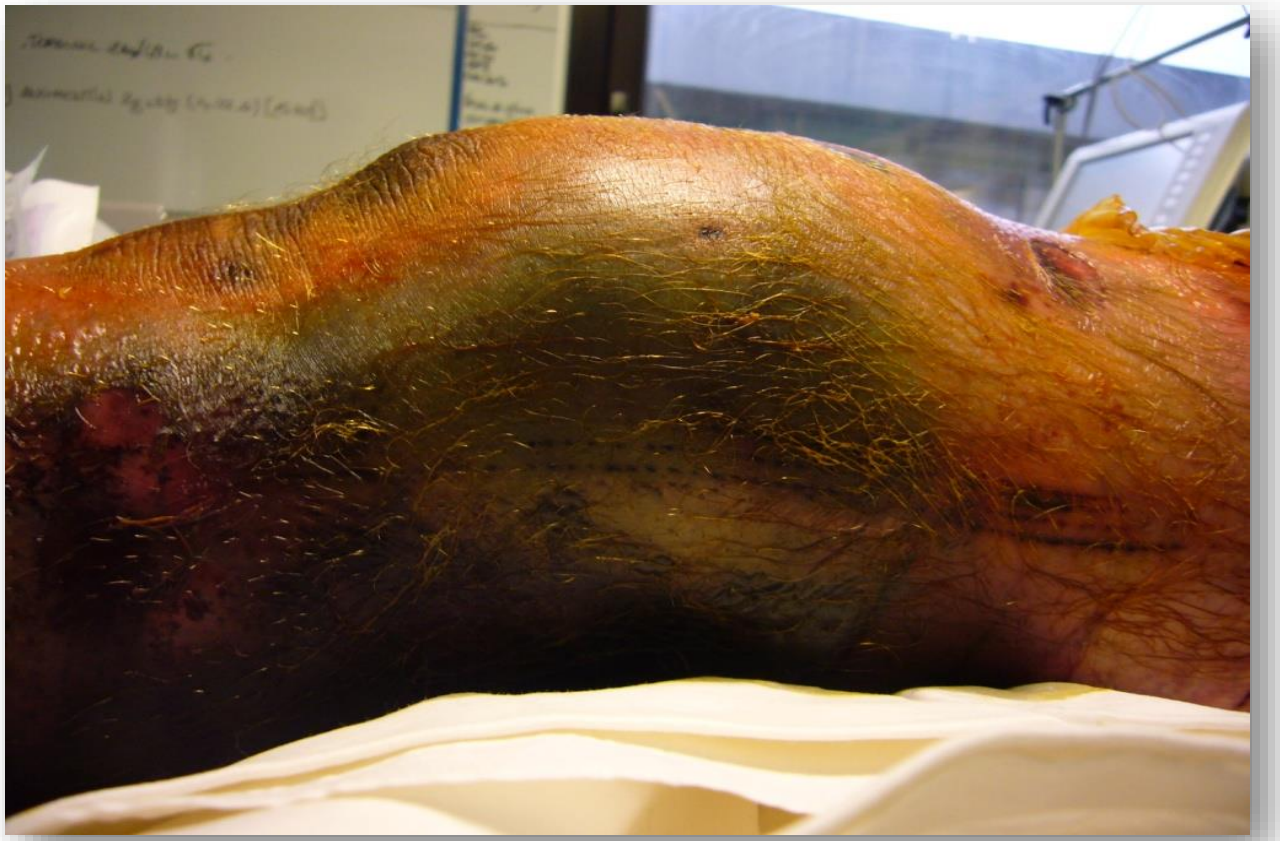


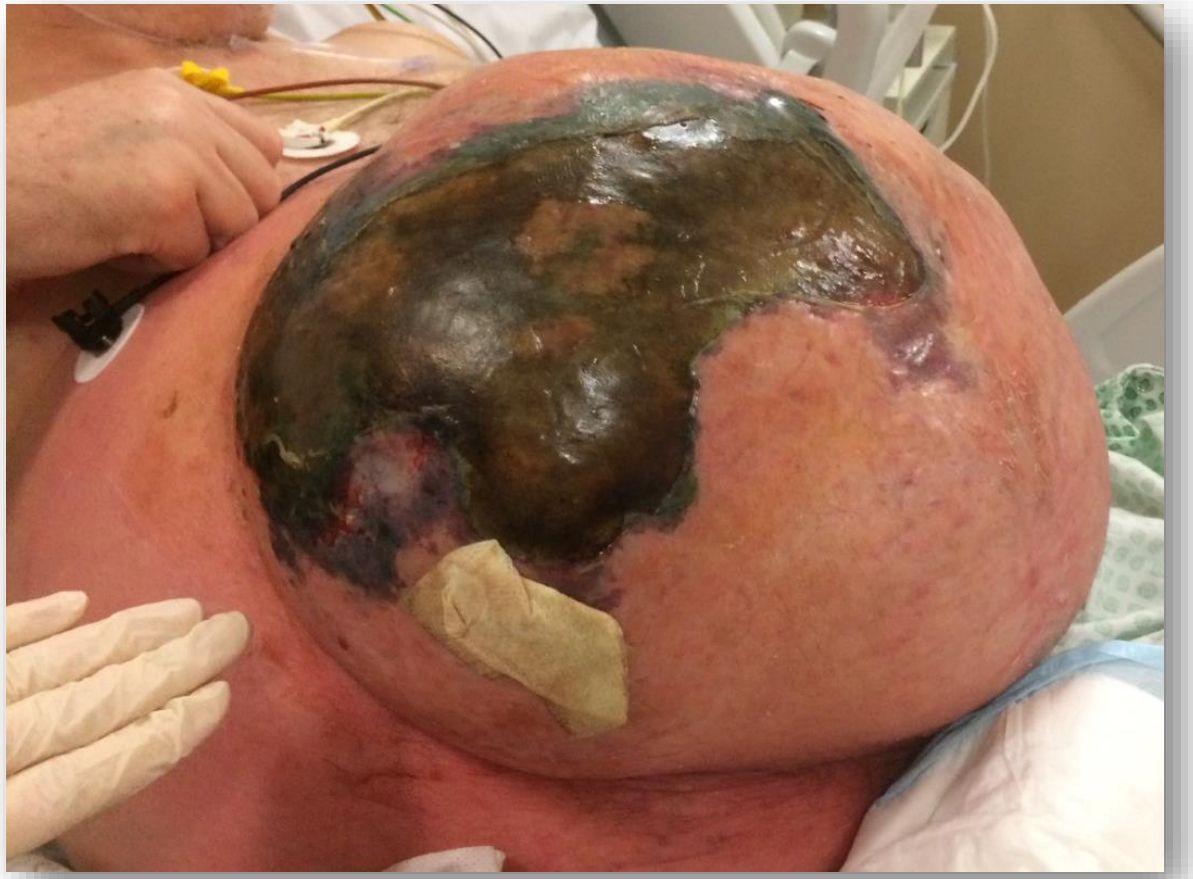


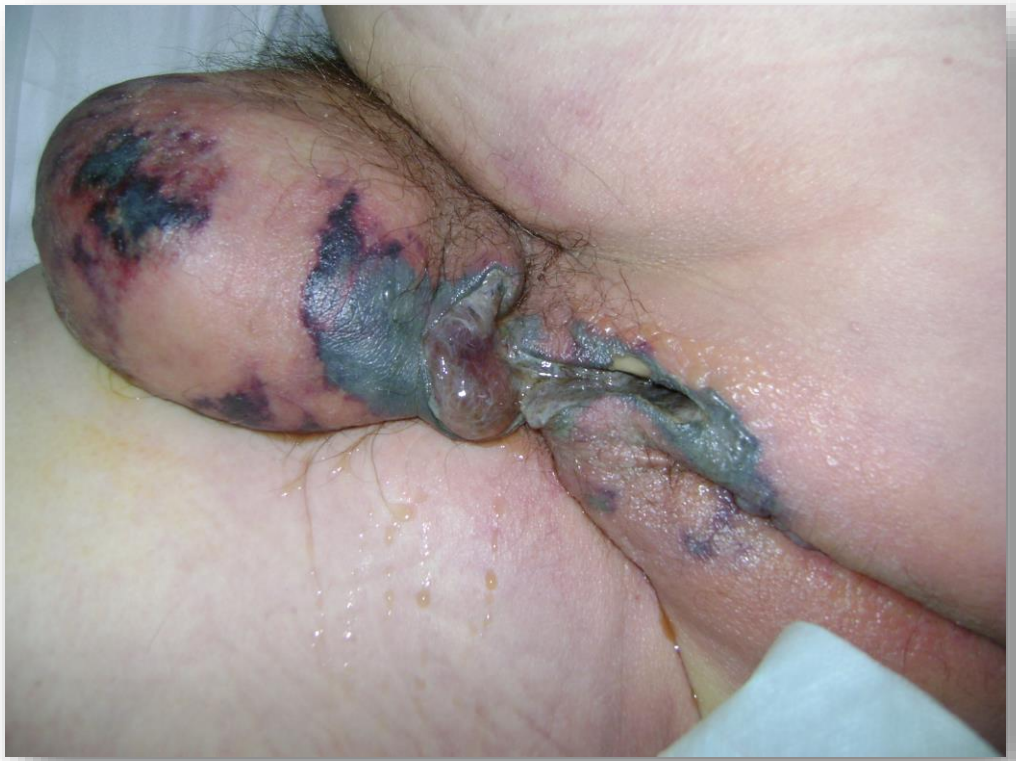
Crédit photo: www.smartfiches.fr

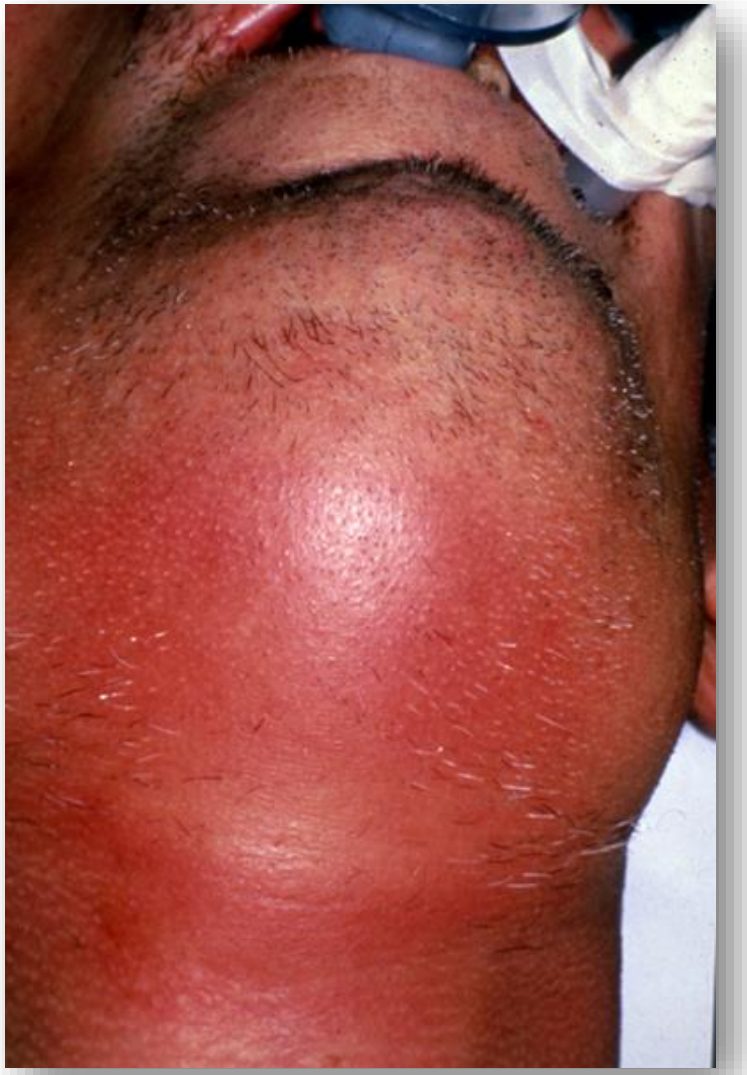


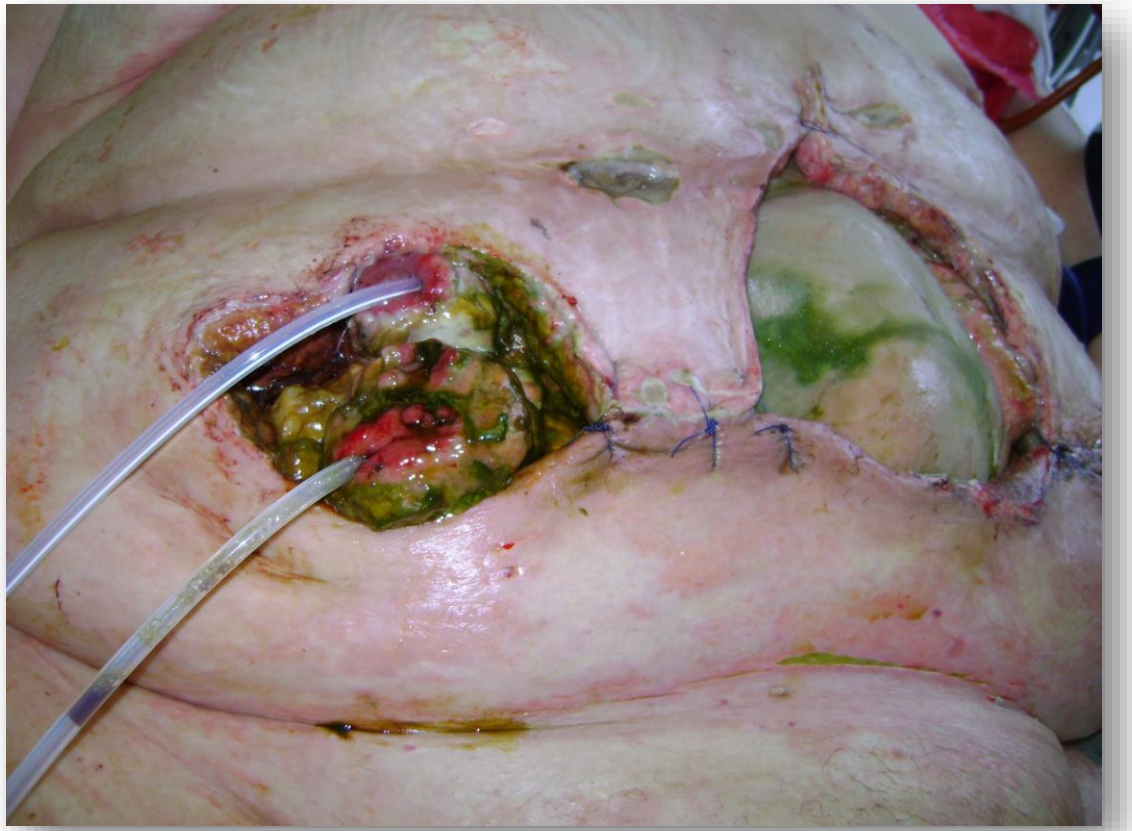


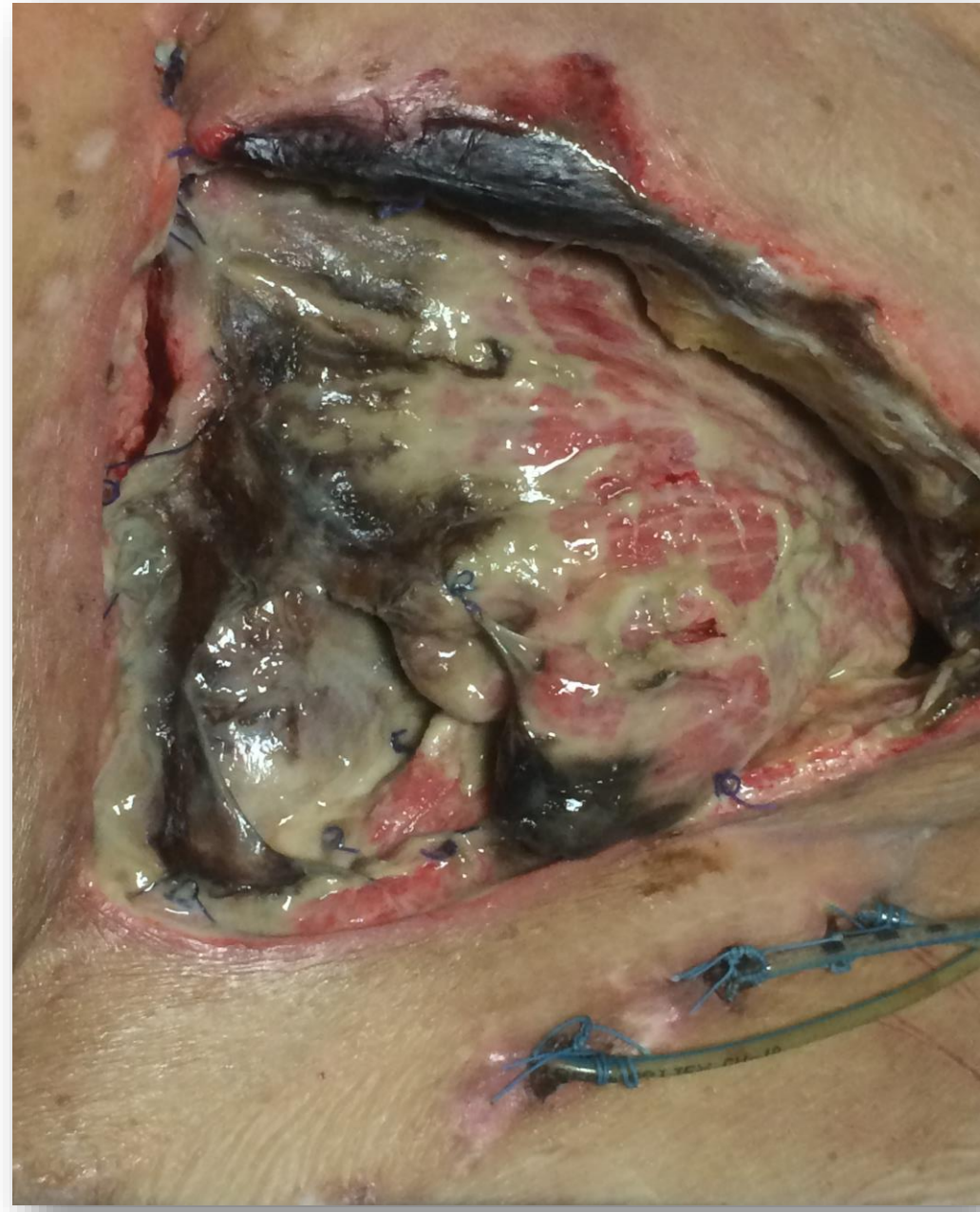


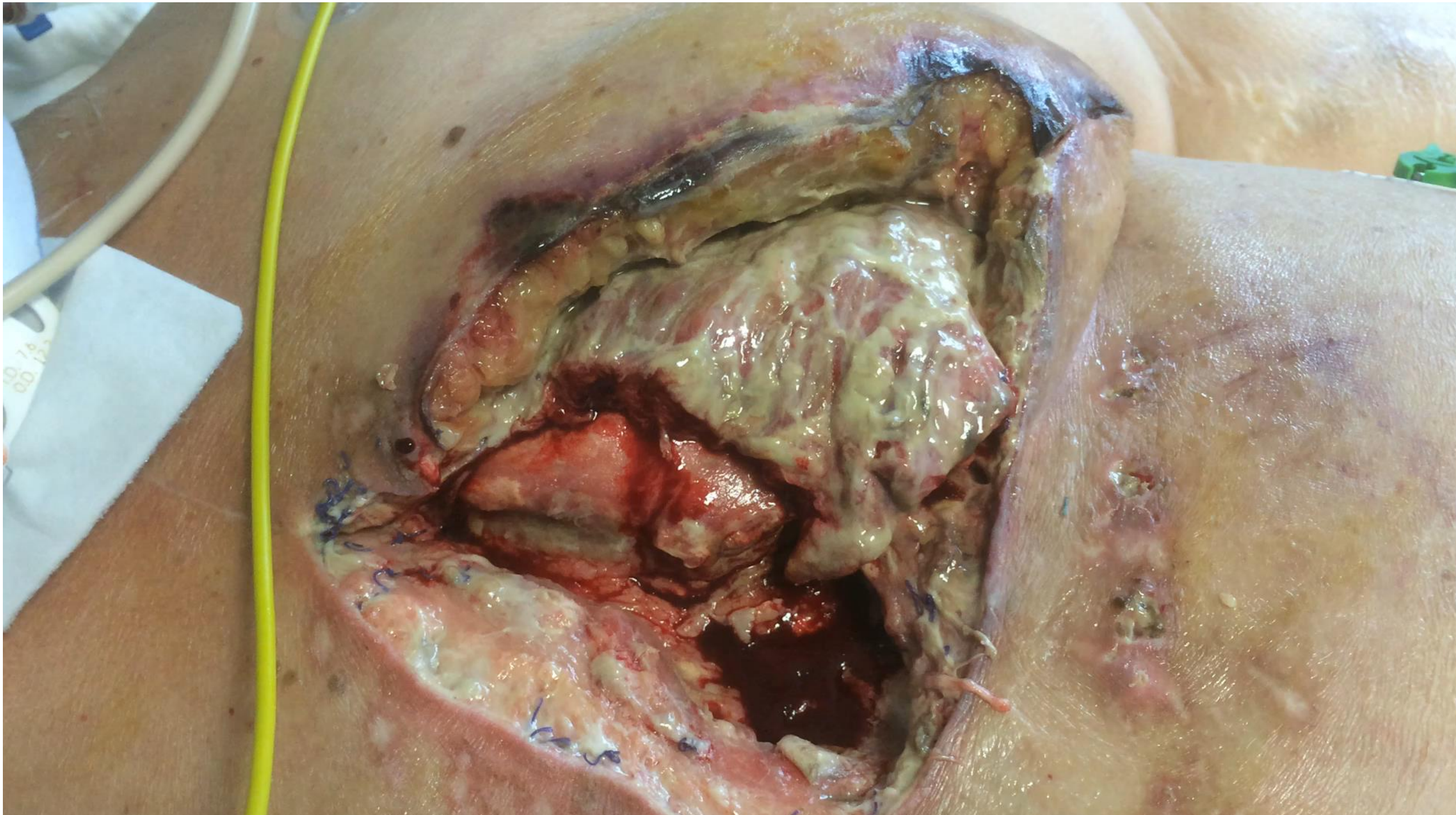












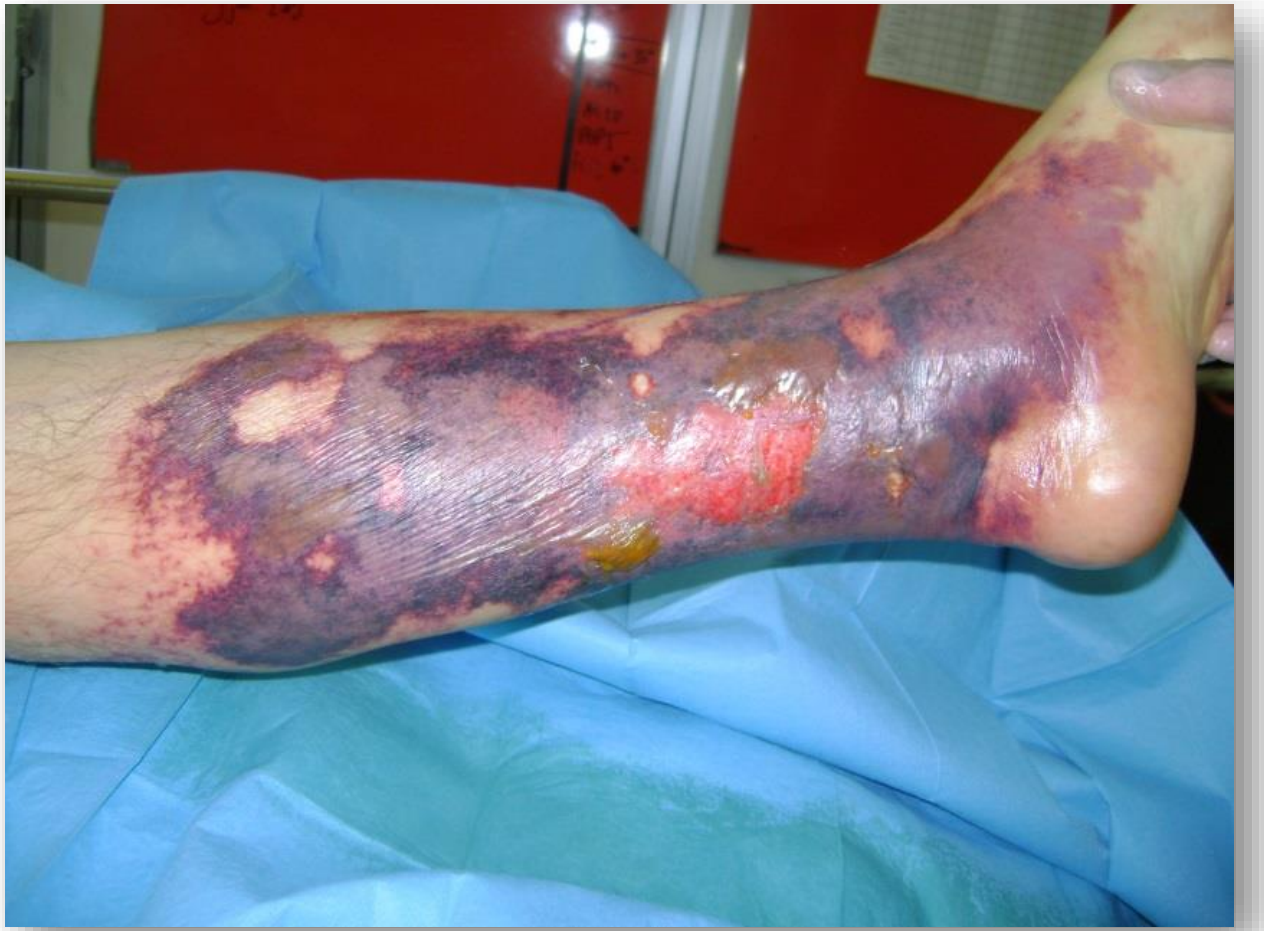
Enjeu 1 : faire le diagnostic de NSTI et poser l'indication chirurgicale

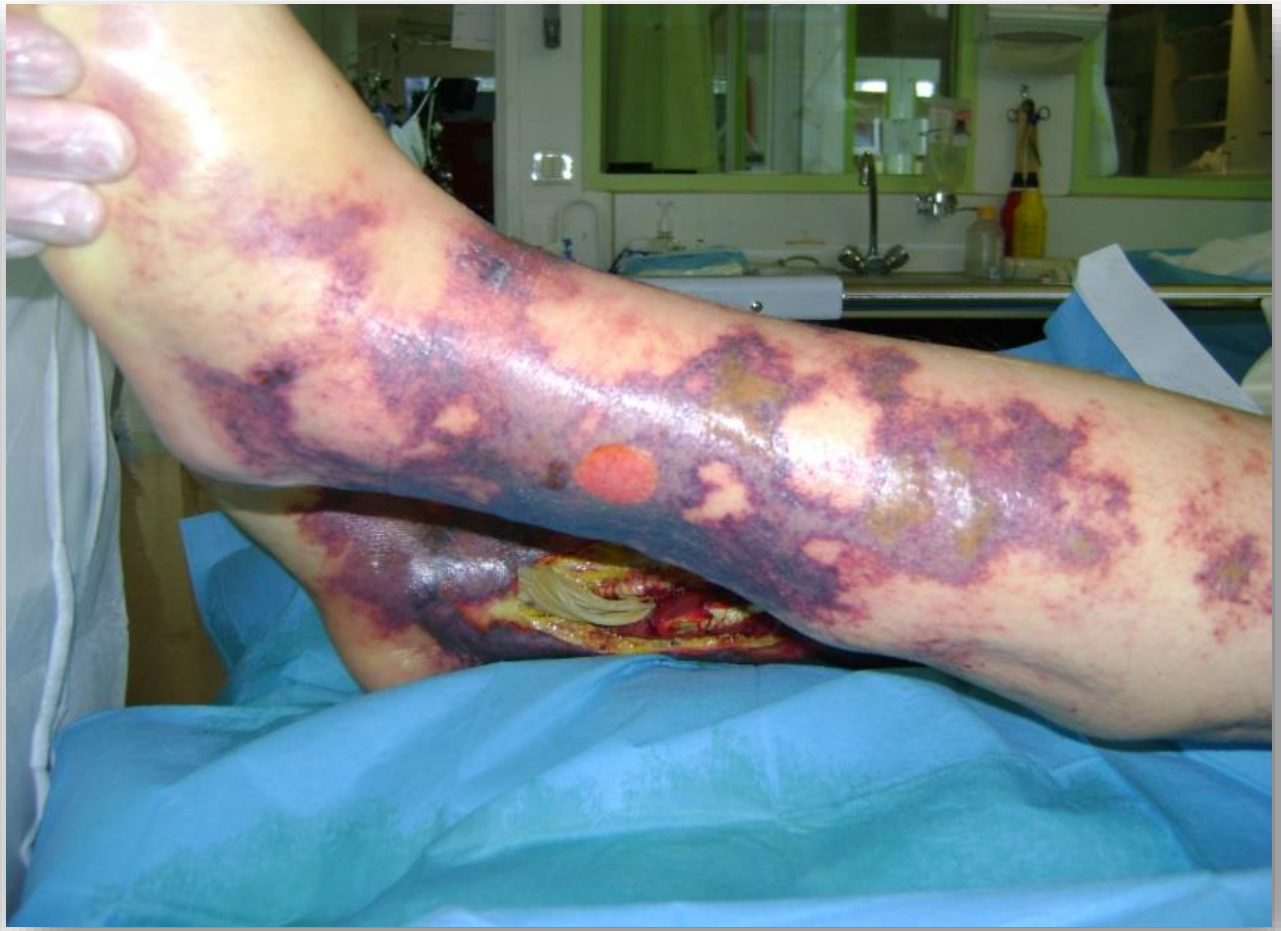
Diagnostic Accuracy of History and Physical Examination Findings in Distinguishing Necrotizing Fasciitis from Cellulitis

History	Sensitivity	Specificity	PPV	NPV	LR+	LR-
Subjective fever	0.45	0.68	0.41	0.71	1.38	0.81
Chills	0.33	0.66	0.33	0.66	0.96	1.01
Shortness of breath	0.3	0.85	0.5	0.708	2.0	0.82
Skin swelling	0.6	0.08	0.27	0.30	0.66	4.57
Pain	0.75	0.1	0.29	0.44	0.83	2.5
Pain out of proportion	0.4	0.91	0.7	0.75	4.57	0.66
Skin anesthesia	0.0	0.96	0.0	0.66	0.0	1.03
Surgery within 90 days	0.35	0.95	0.78	0.75	7.0	0.68
Nausea and vomiting	0.33	0.86	0.54	0.72	2.36	0.78
Diarrhea	0.075	0.98	0.75	0.68	6.0	0.93

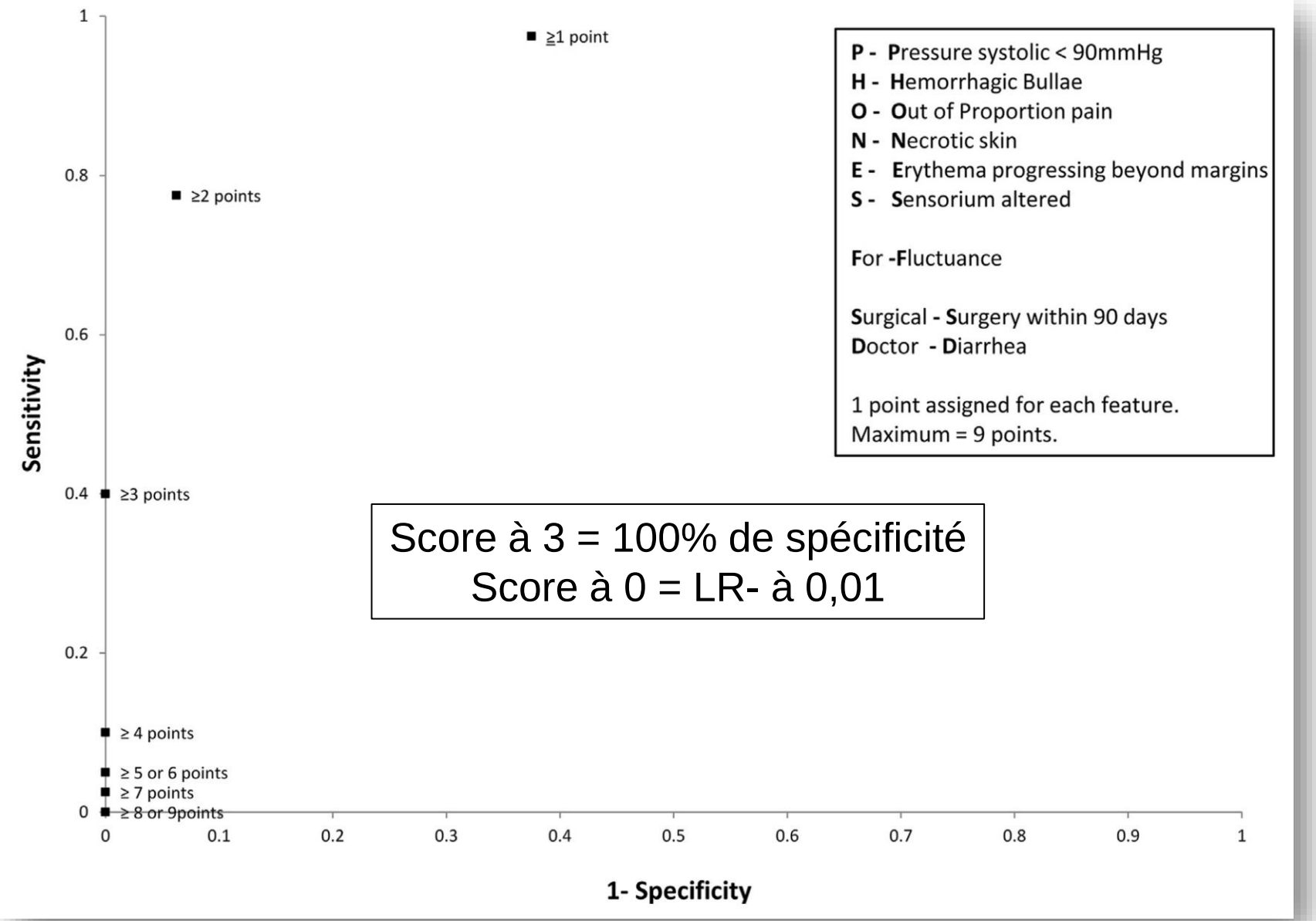
Physical examination	Sensitivity	Specificity	PPV	NPV	LR+	LR-
Erythema	0.85	0.05	0.31	0.4	0.89	3
Erythema progressive beyond margins	0.43	0.86	0.61	0.75	3.09	0.67
Tenderness	0.73	0.16	0.3	0.54	0.87	1.69
Swelling	0.7	0.05	0.27	0.25	0.74	6.0
Local warmth	0.35	0.28	0.19	0.46	0.48	2.36
Fluid-filled vesicles (ulcers, blisters, bullae)	0.3	0.75	0.38	0.68	1.2	0.93
Skin fluctuance	0.13	0.98	0.71	0.69	5.0	0.9
Skin induration	0.1	0.91	0.36	0.67	1.14	0.99
Hemorrhagic bullae	0.1	0.99	0.8	0.69	8.0	0.91
Skin anesthesia	0.0	0.98	0.0	0.66	0.0	1.01
Crepitus	0.13	1.0	1.0	0.7	N/A	0.88
Necrosis	0.38	0.99	0.94	0.76	30.0	0.63
Ischemia	0.0	1.0	N/A	0.66	N/A	1.0
Cyanosis	0.15	1.0	1.0	0.7	N/A	0.85
Purulence	0.4	0.85	0.57	0.74	2.67	0.71
Altered LOC	0.25	0.93	0.63	0.71	3.33	0.81

Al Alayed K et al. Int J of Inf Dis. 2015





Le score clinique « Phones for surgical doctor »

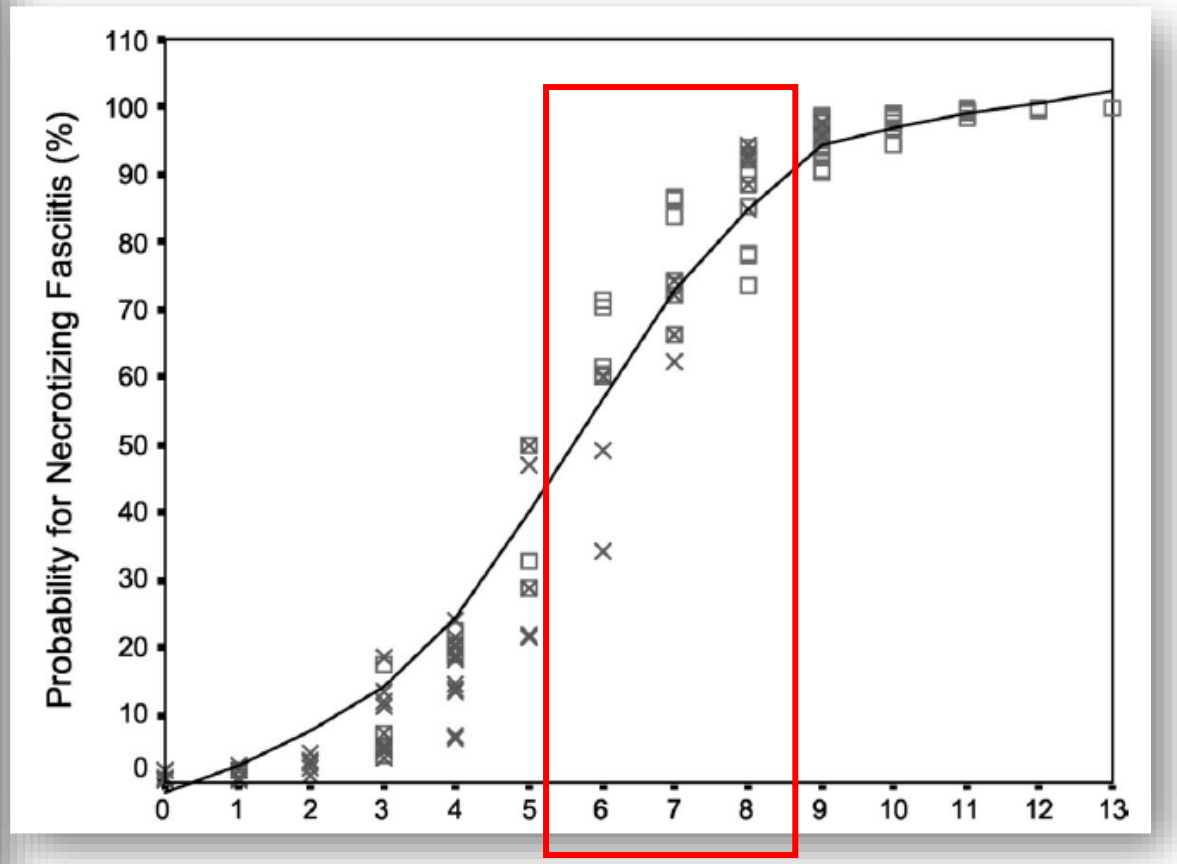


Al Alayed K et al. Int J of Inf Dis. 2015

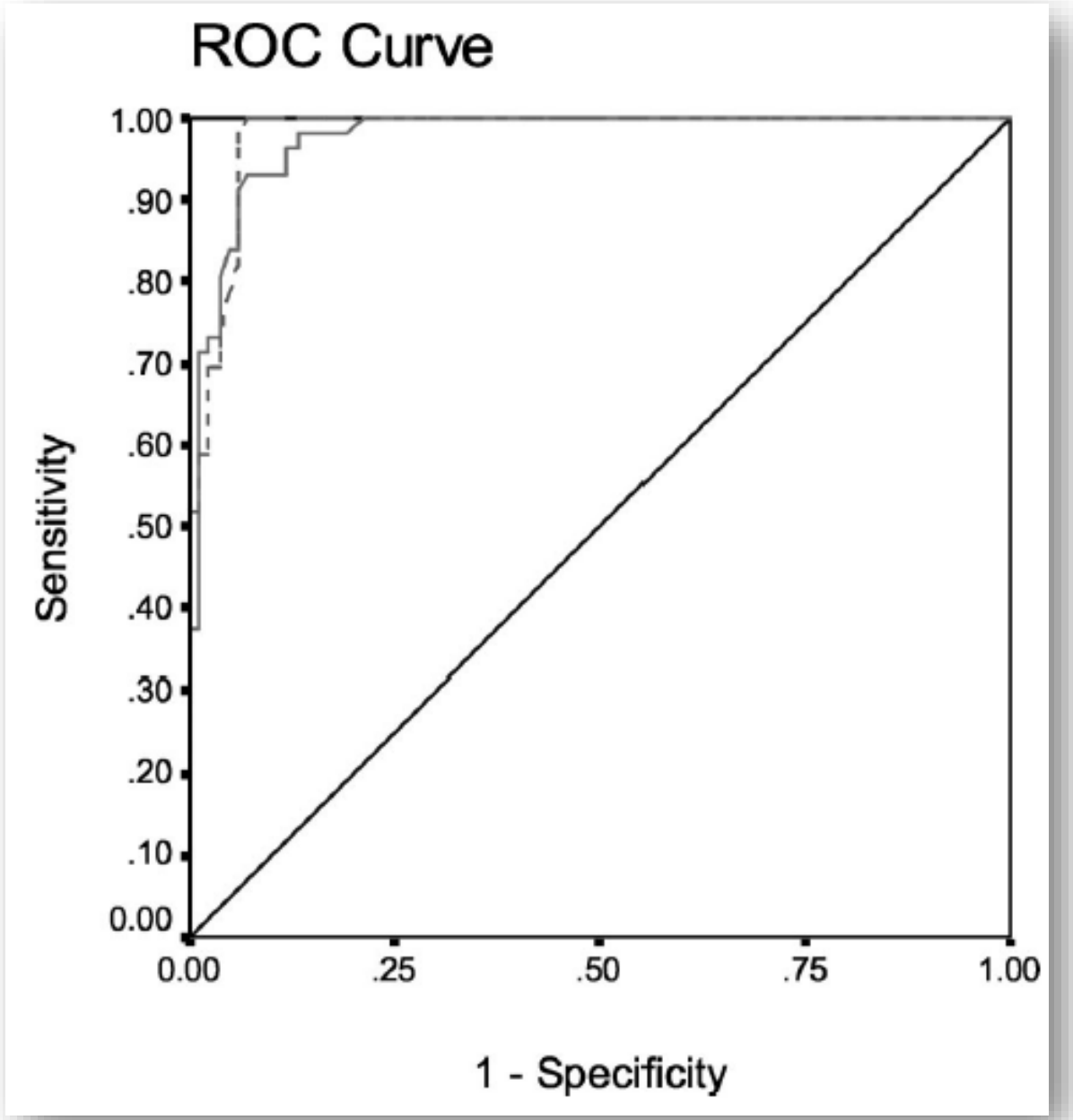
Le score biologique LRINEC

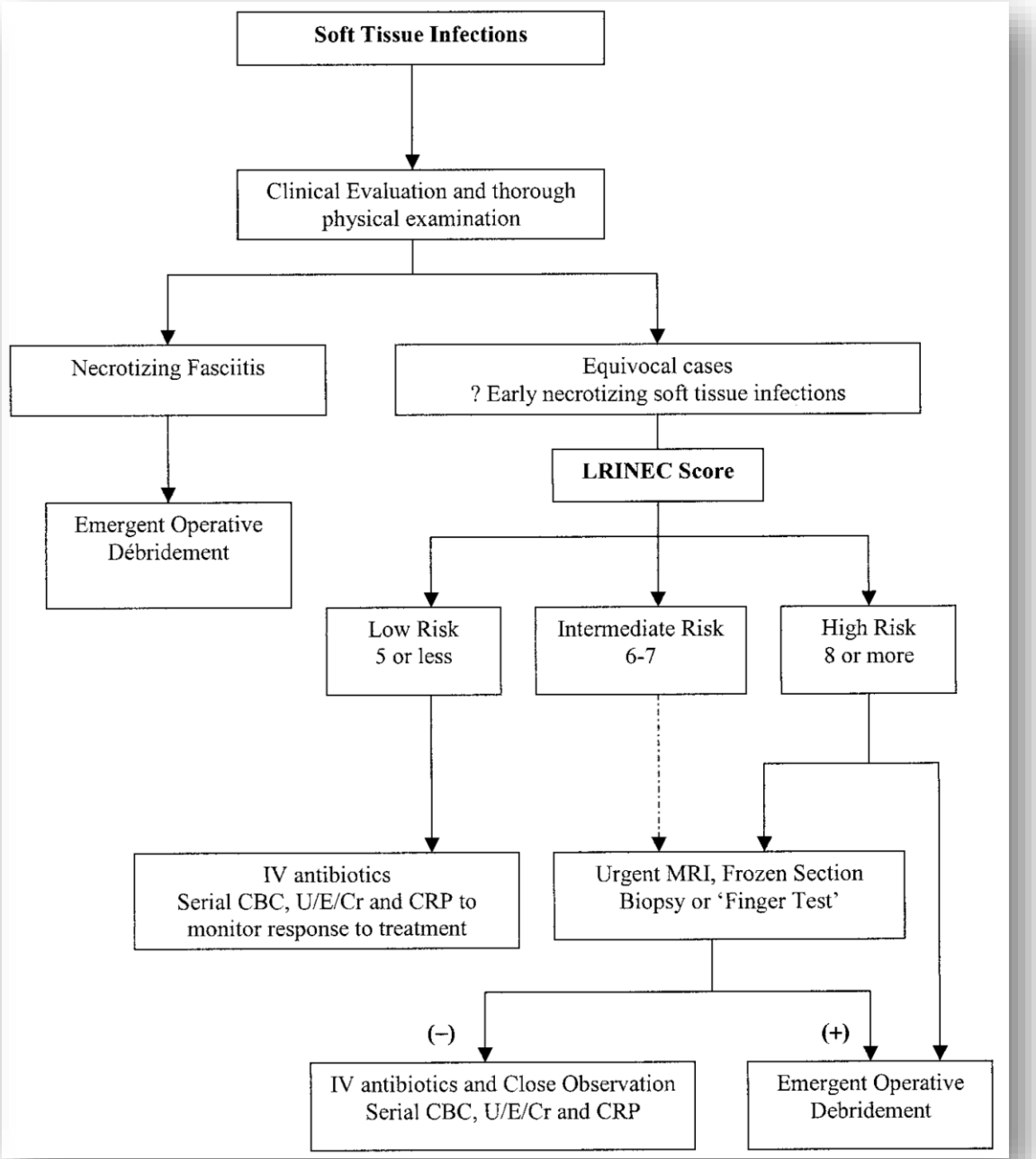
Table 2. Laboratory Risk Indicator for Necrotizing Fasciitis (LRINEC) score

Variable, Units	β	Score
C-Reactive Protein, mg/L		
<150	0	0
≥150	3.5	4
Total white cell count, per mm^3		
<15	0	0
15–25	0.5	1
>25	2.1	2
Hemoglobin, g/dL		
>13.5	0	0
11–13.5	0.6	1
<11	1.8	2
Sodium, mmol/L		
≥135	0	0
<135	1.8	2
Creatinine, μmol/L		
≤141	0	0
>141	1.8	2
Glucose, mmol/L		
≤10	0	0
>10	1.2	1



Wong CH et al. Crit Care Med. 2004





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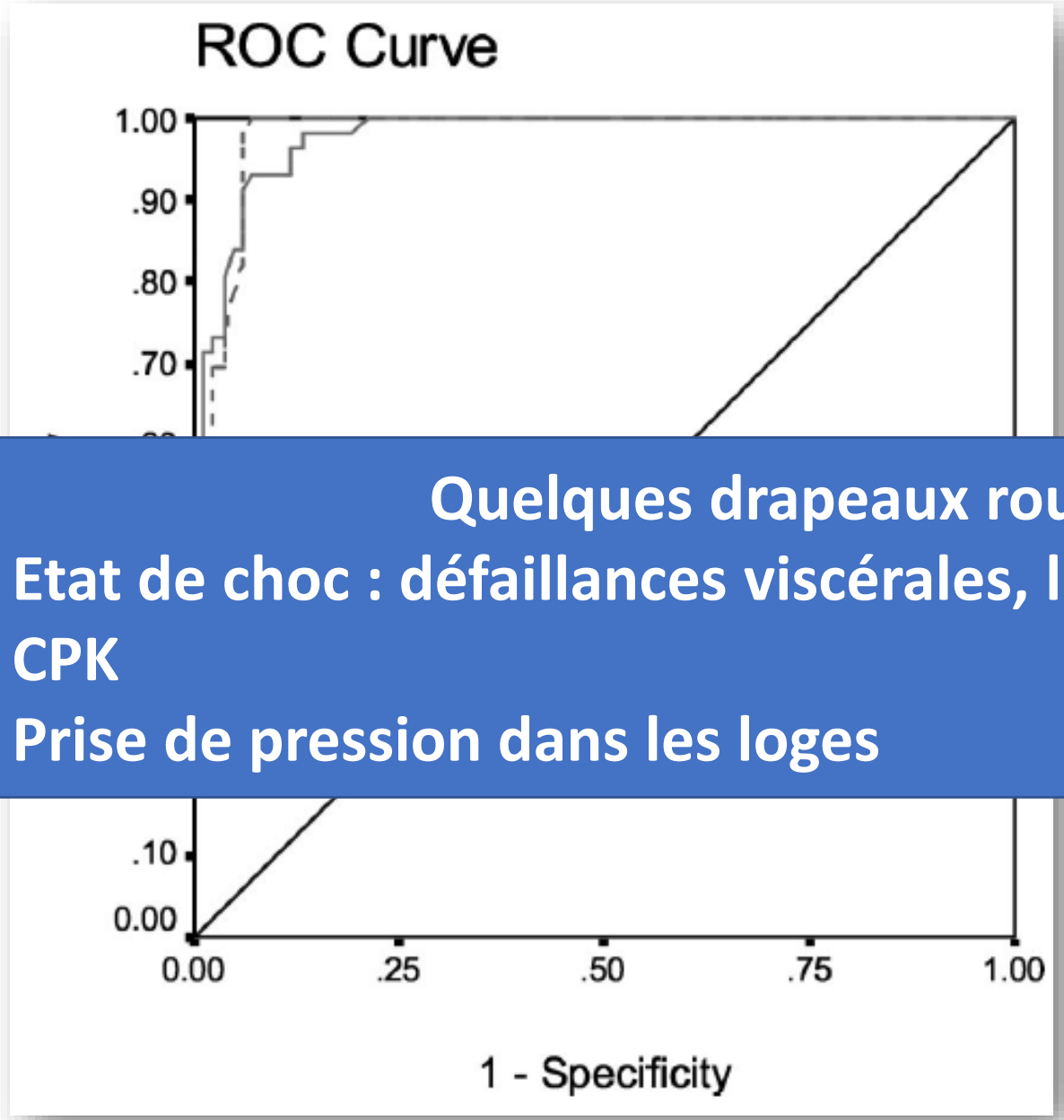
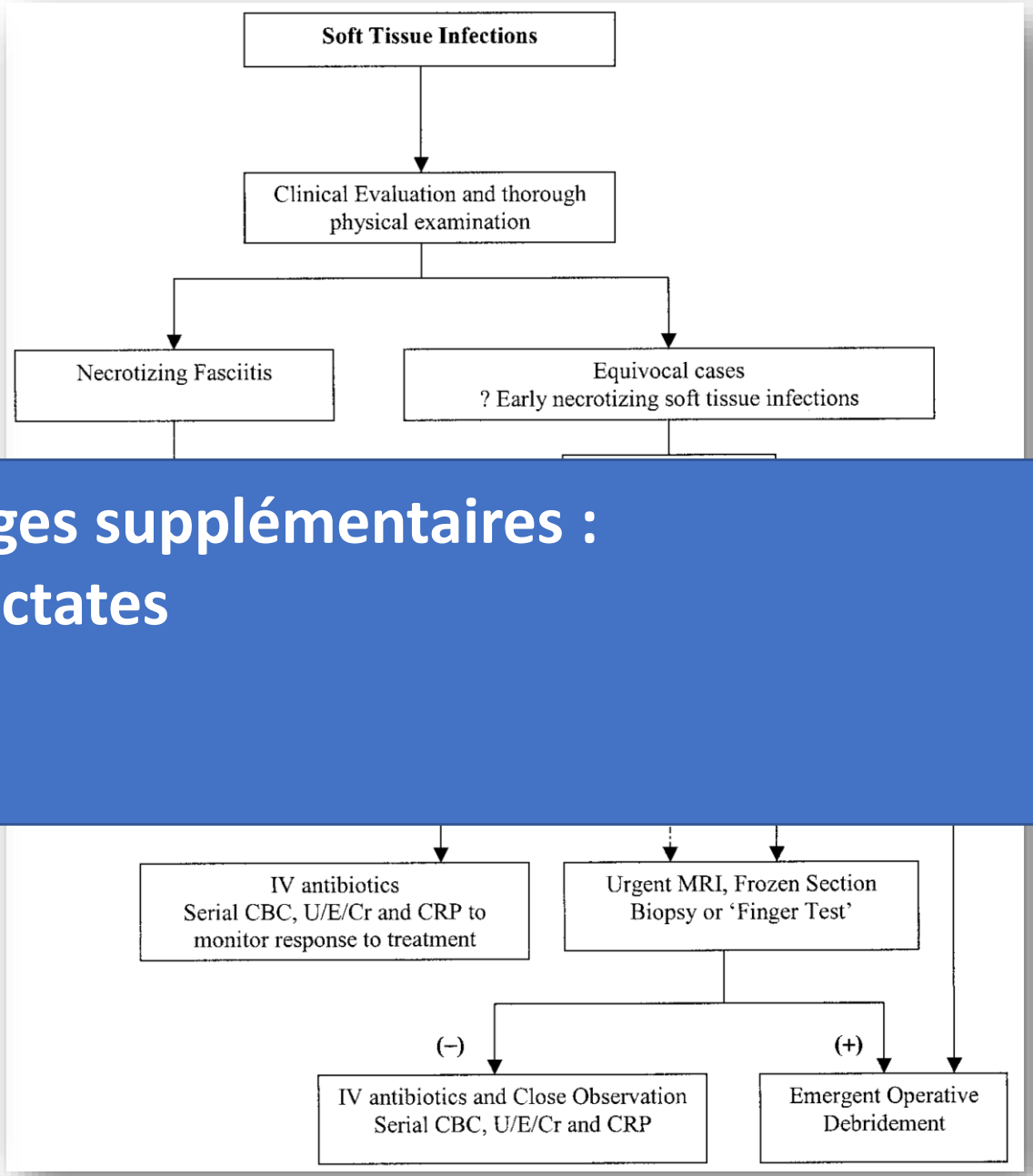


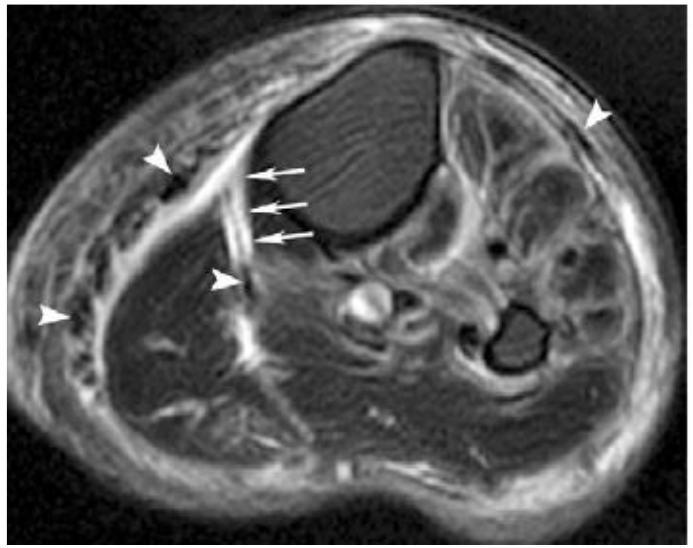


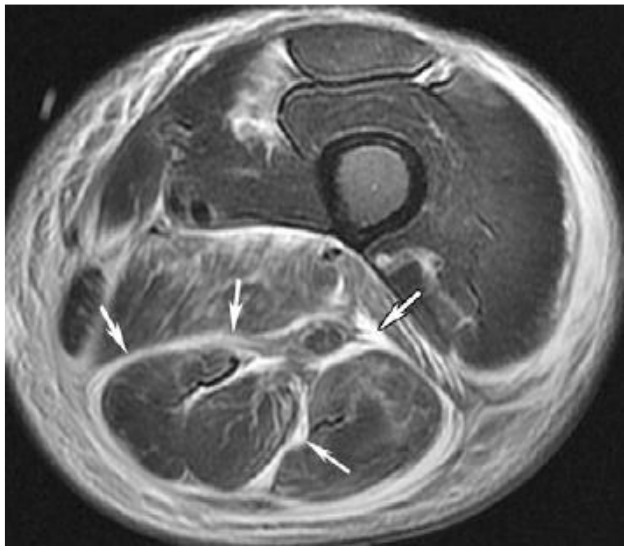
Quelques drapeaux rouges supplémentaires :

- Etat de choc : défaillances viscérales, lactates
- CPK
- Prise de pression dans les loges

Wong CH et al. Crit Care Med. 2004

Les données d'imagerie évocatrices de fasciite nécrosante





Kim KT et al. Radiology. 2011

Prevalences of MR Findings in NIF and Non-NIF Patient Groups

MR Sequence and Finding	NIF Group ($n = 7$)	Non-NIF Group ($n = 23$)	*P* Value
T2-weighted imaging*			
Signal intensity			.009†
Low	1 (14)	0 (0)	
High	4 (57)	23 (100)	
Mixed high and low	2 (29)	0 (0)	
Signal intensity thickness			.025†
Thin (<3 mm)	1 (14)	16 (70)	
Thick (≥3 mm)	6 (86)	7 (30)	
Pattern of abnormal signal intensity in muscle			.38
No abnormality	1 (14)	14 (61)	
Peripheral bandlike high signal intensity	5 (71)	5 (22)	
Patchy high signal intensity	1 (14)	4 (17)	
Degree of deep fascia involvement‡			.007†
Partial	0 (0)	14 (61)	
Extensive	7 (100)	9 (39)	
Degree of compartment involvement			.009†
Less than three compartments	1 (14)	17 (74)	
Three or more compartments	6 (86)	6 (26)	
Contrast-enhanced T1-weighted imaging§			
Contrast enhancement pattern of abnormal deep fascia			.013†
No enhancement	1 (14)	2 (9)	
Enhancement	1 (14)	17 (74)	
Enhancement with nonenhancing portion	5 (71)	4 (17)	
Contrast enhancement pattern in muscle			.397
No abnormality	4 (57)	16 (70)	
Peripheral bandlike enhancement	3 (43)	4 (17)	
Patchy enhancement	0 (0)	3 (13)	
Abscess in subcutaneous fat layer			.326
Present	2 (29)	11 (48)	
Absent	5 (71)	12 (52)	

TDM
Epaississement des fascias
Absence de réhaussement à l'injection

Carbonetti F et al. Radiol Med. 2016

Les données d'imagerie évocatrices de fasciite nécrosante

- Et les DHBN ?
- Expérience du radiologue en pratique ?
- /!\: ces infections NE SONT PAS COLLECTEES !!
- La recherche de collection n'est pas la question posée
- L'absence de collection ne doit pas faire écarter le diagnostic de NSTIs
- L'absence de collection ne doit pas faire récuser la chirurgie
- Rien ne doit retarder la chirurgie
- Le chirurgien est votre meilleur allié : soyez convaincant !!
- La clinique prime !!++
- Au moindre doute : avis chirurgical
- Au moindre doute pendant l'avis chirurgical : chirurgie !

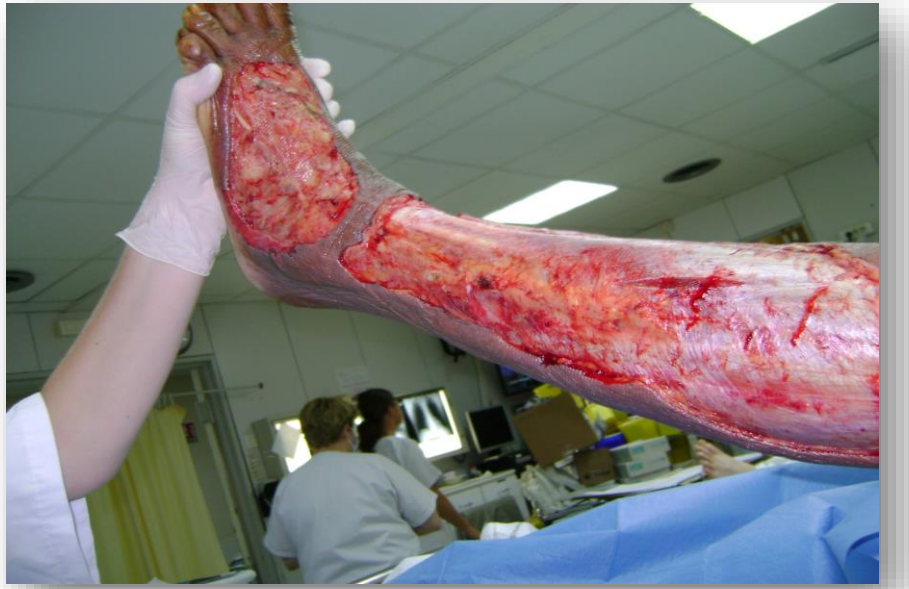
Present	2 (29)	11 (48)
Absent	5 (71)	12 (52)

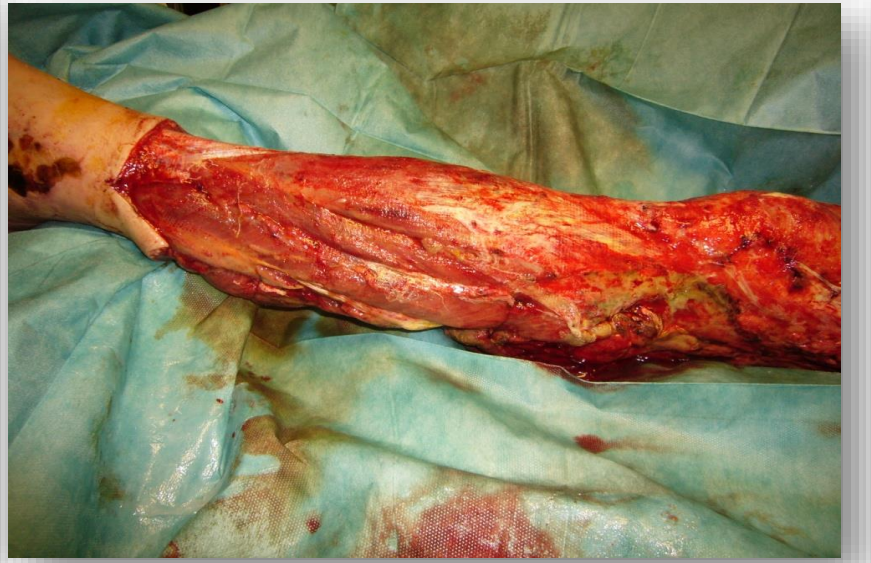
En pratique le délai de réalisation de la chirurgie a un impact majeur sur le pronostic

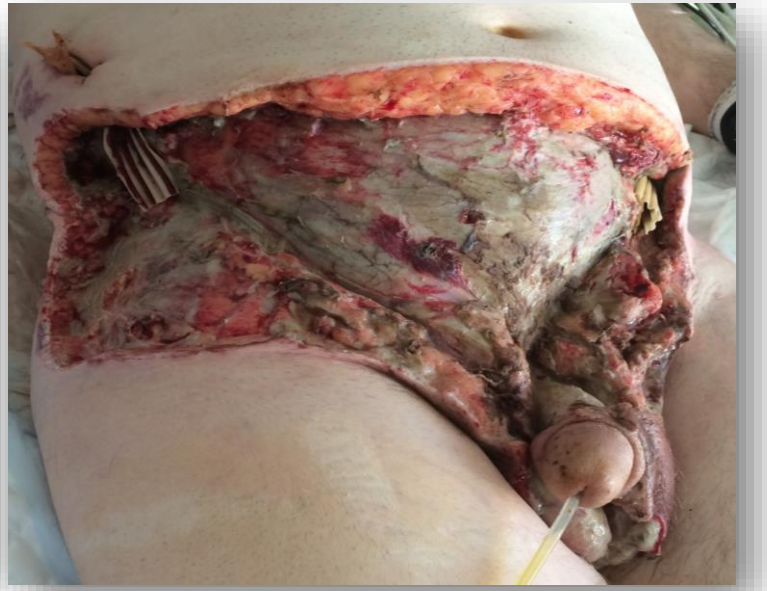
Variables	Adjusted OR	95% CI	*P* value
SAPS II	1.15	1.04–1.26	0.02
Cardiovascular disease			
No	1	–	
Yes	13.9	1.8–106	0.01
Localization			
Extremities	1	–	
Abdominoperineal	15.1	1.5–149	0.002
Time from first signs to diagnosis; $n = 99$[a]			
>72 h	1	–	
≤72 h	0.09	0.01–0.68	0.02
Time from diagnosis to 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.

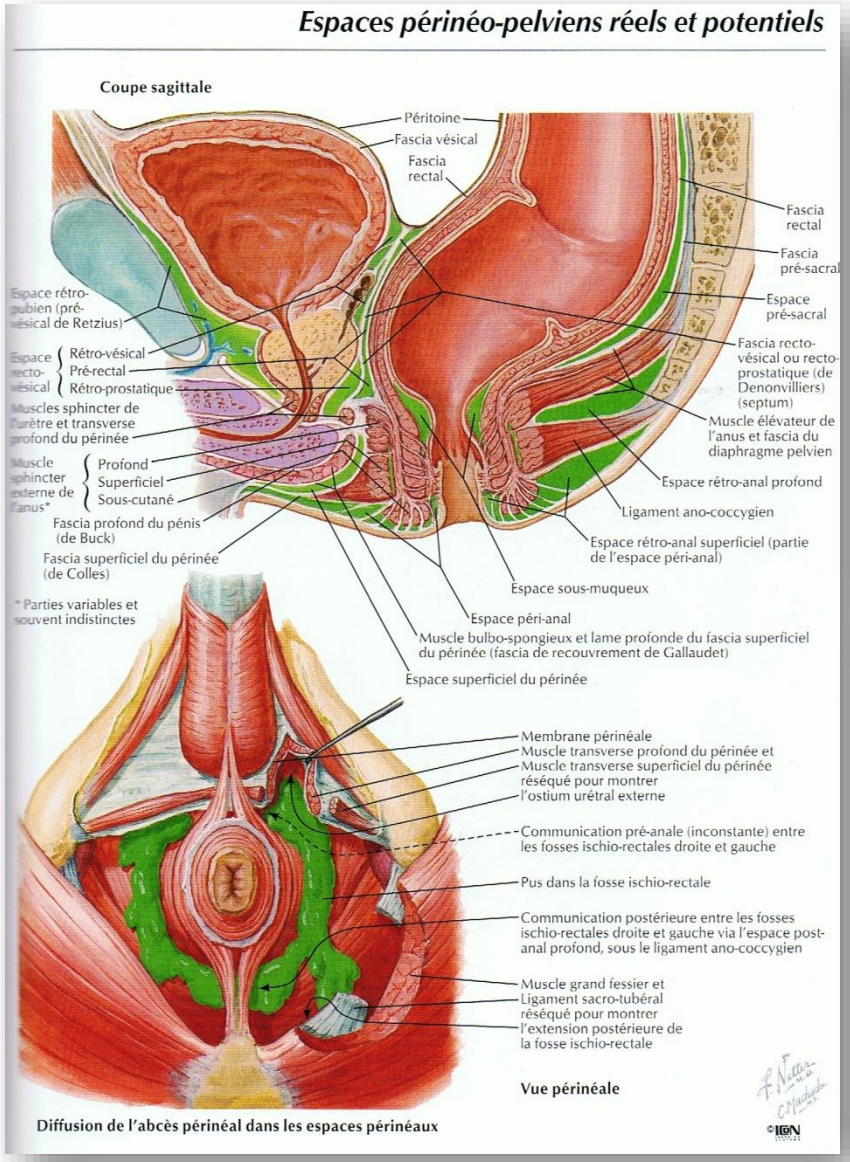
La conception classique : un geste radical « carcinologique »

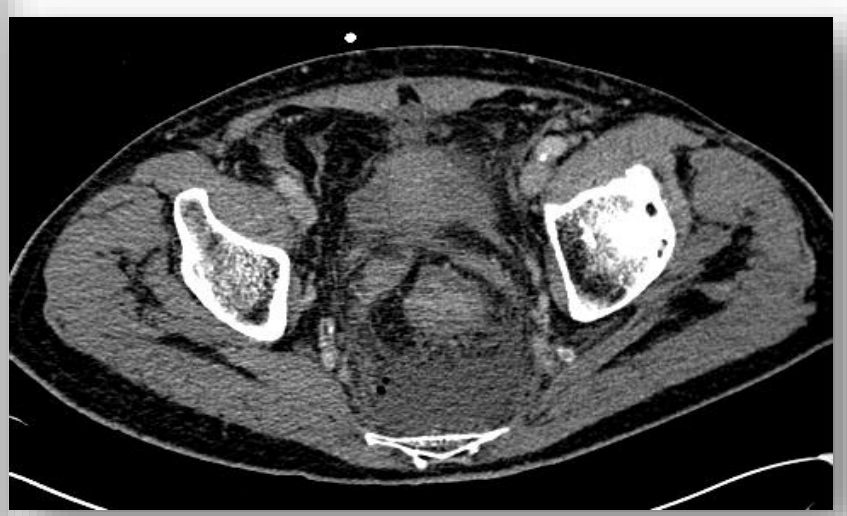


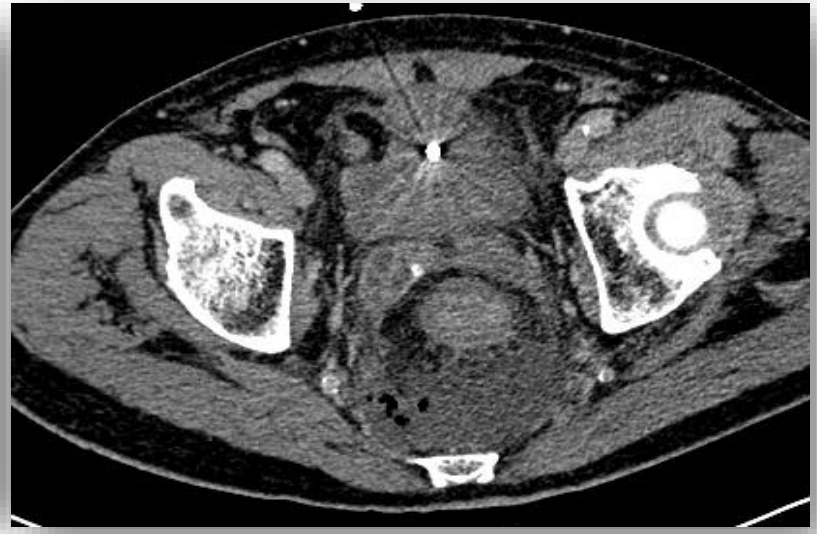


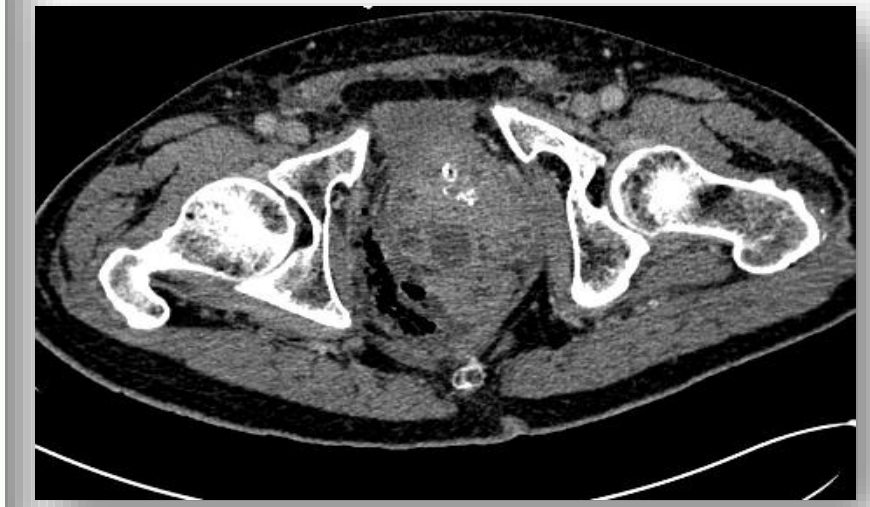


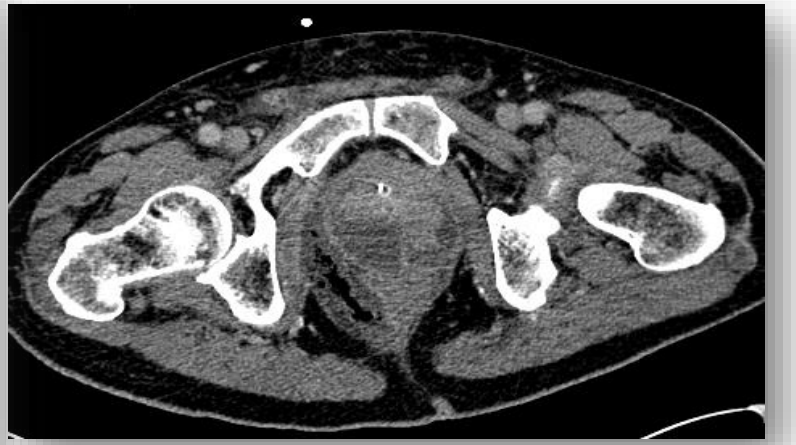
Quelques plans de clivage anatomiques à connaitre : extension/porte d'entrée



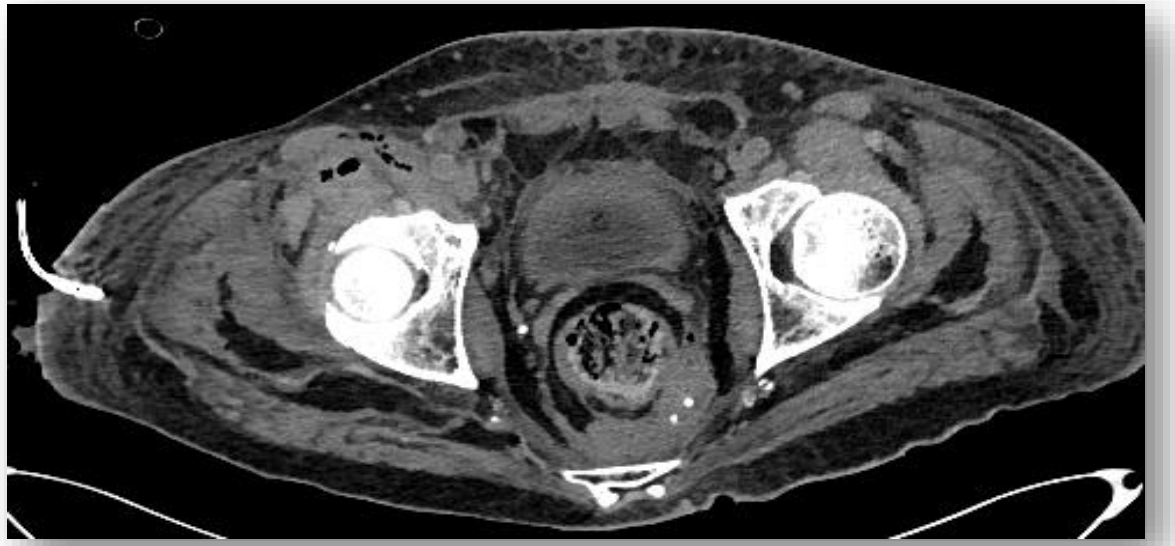


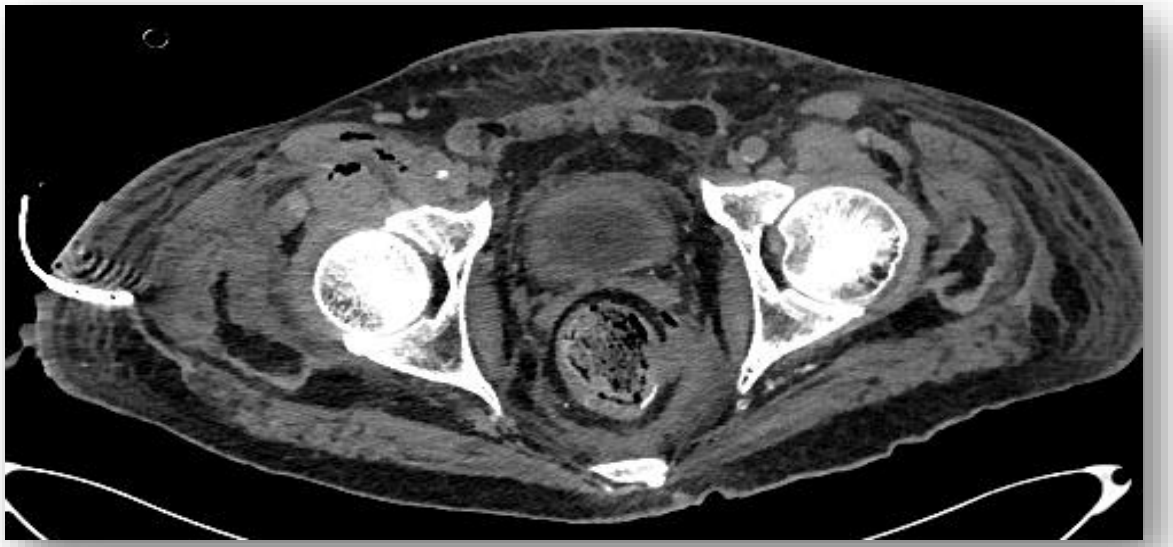


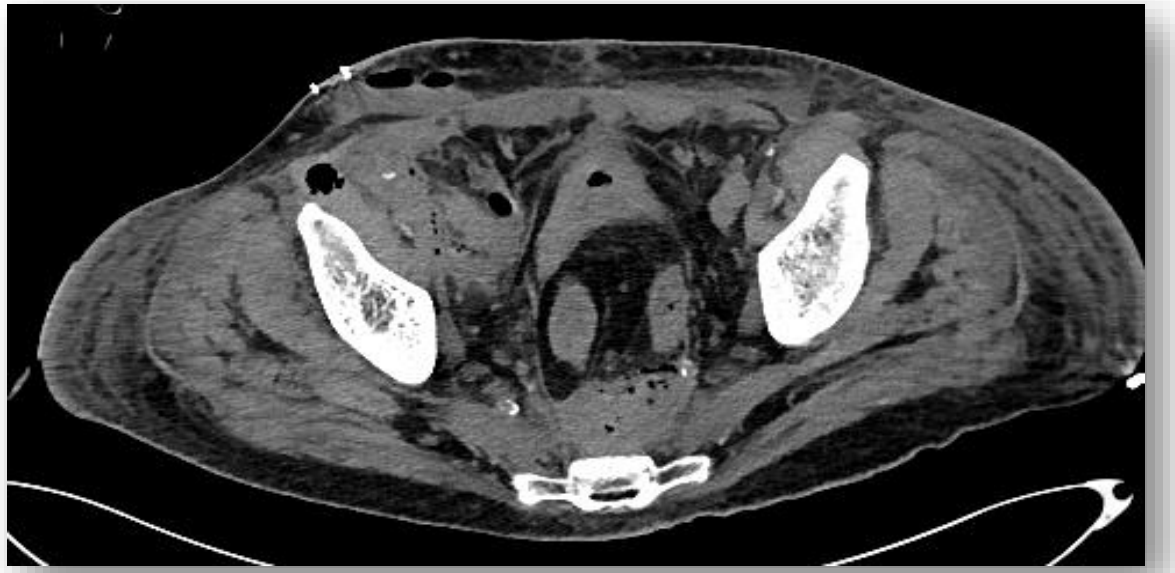


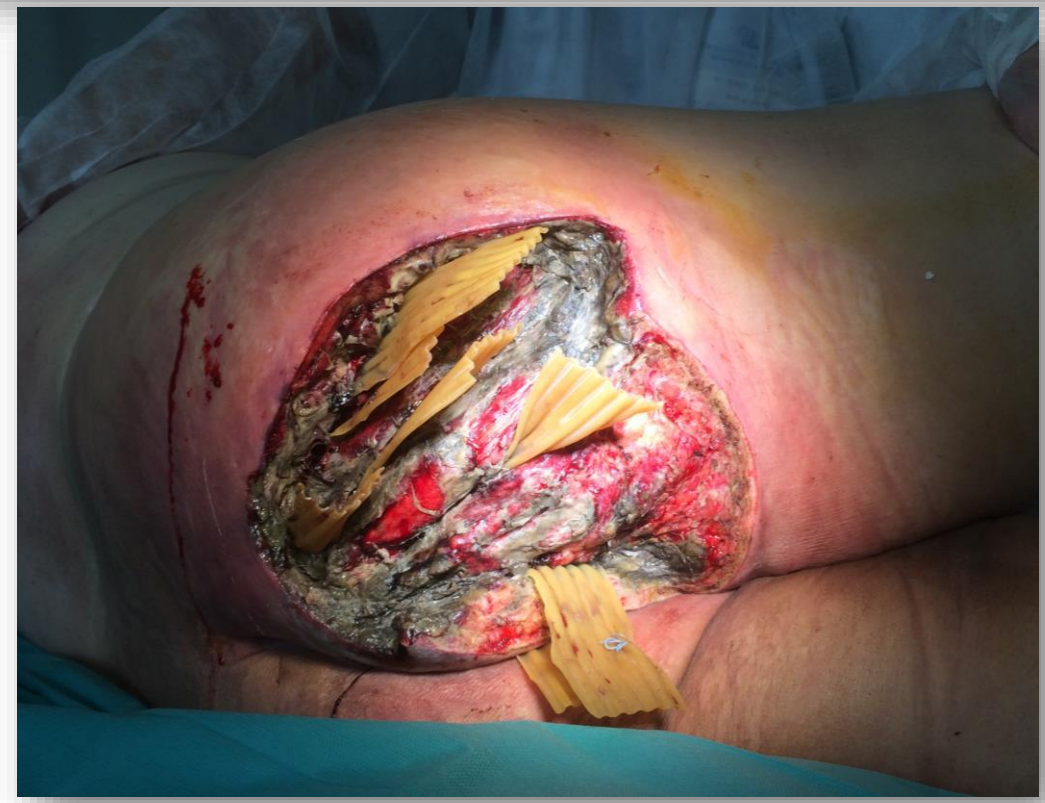


Netter FH. Atlas d'anatomie humaine. Icon

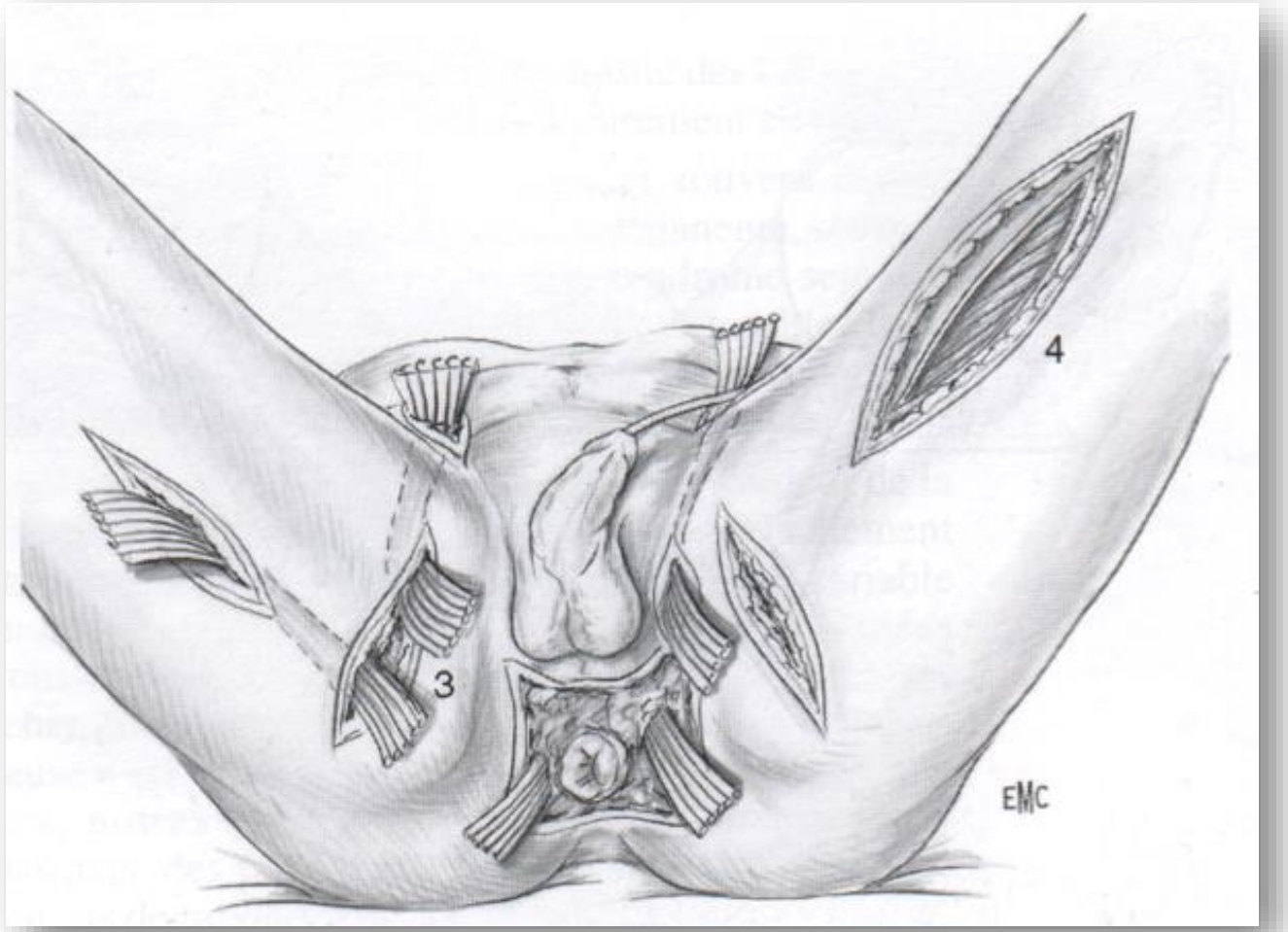




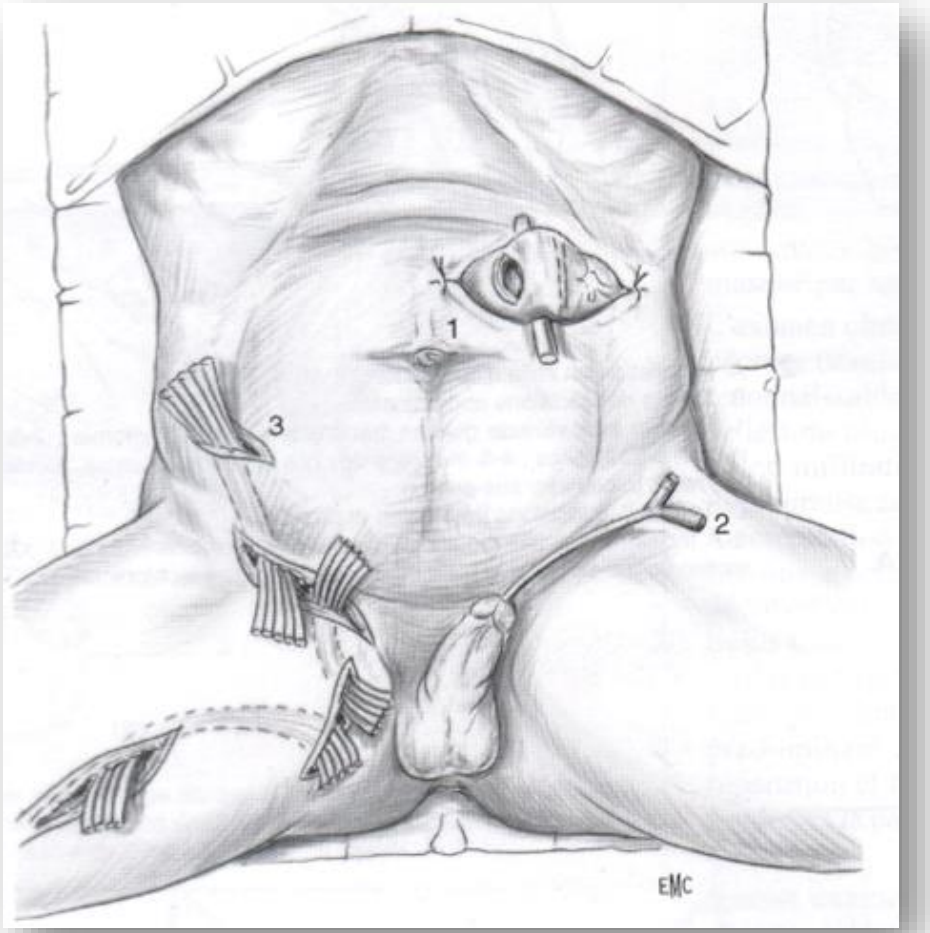




Chirurgie : localisation périnéale



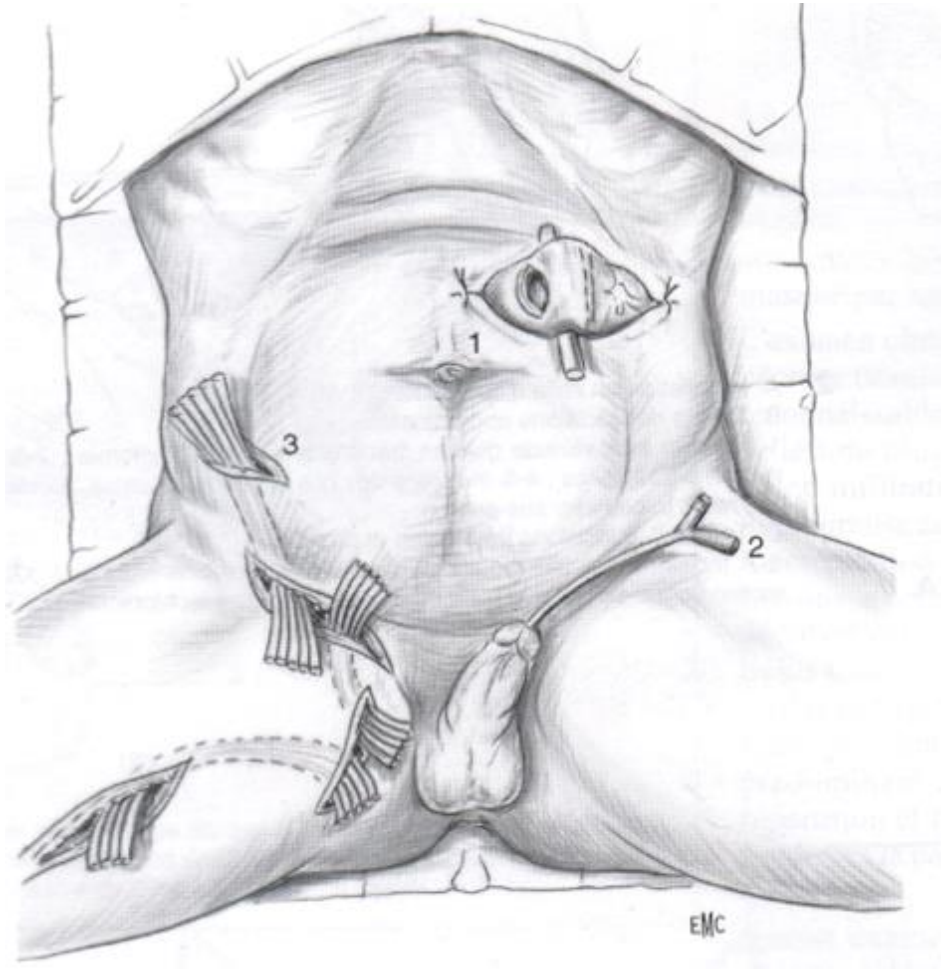
Drainage par mise en place de lames de Delbet

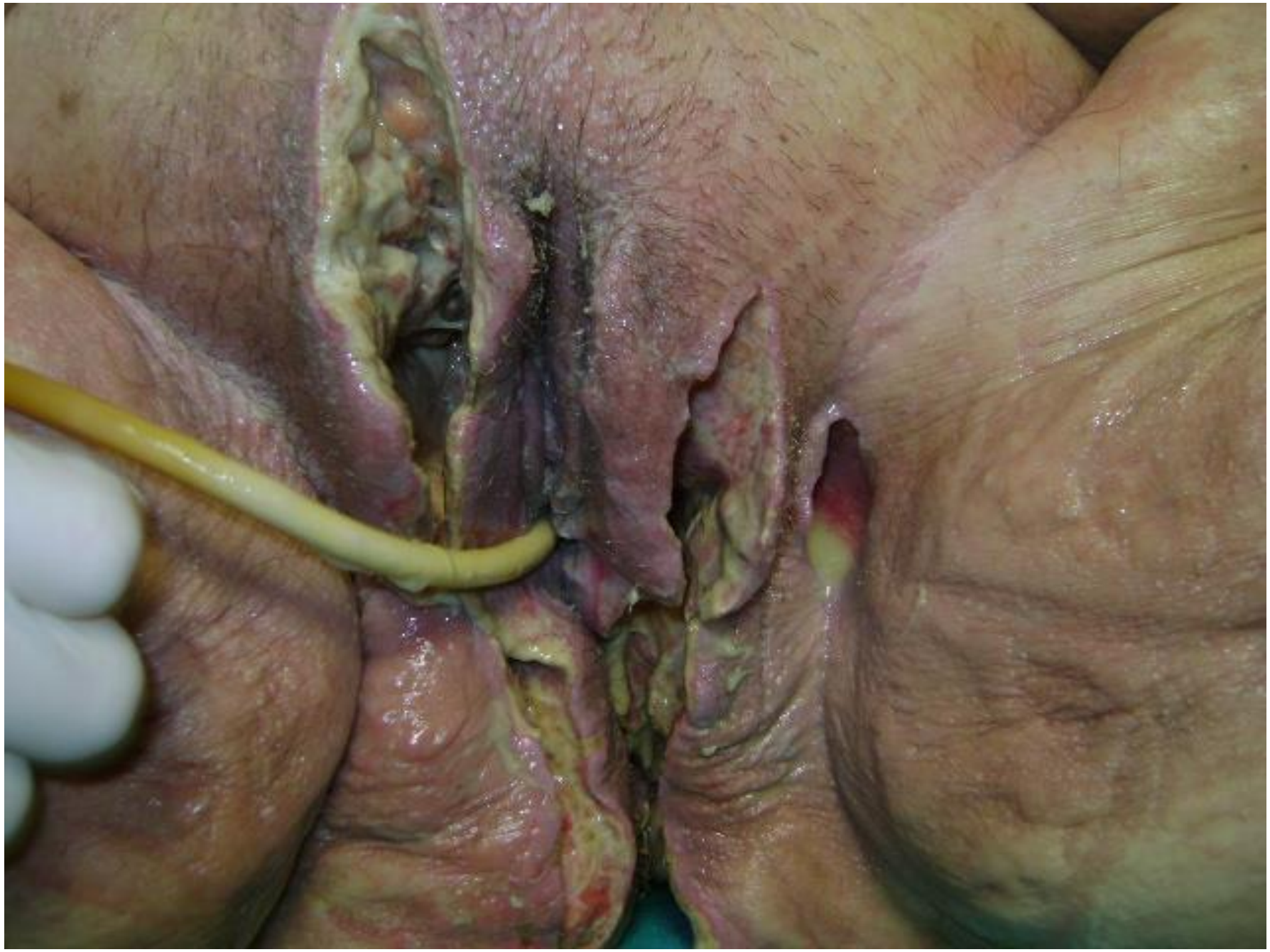


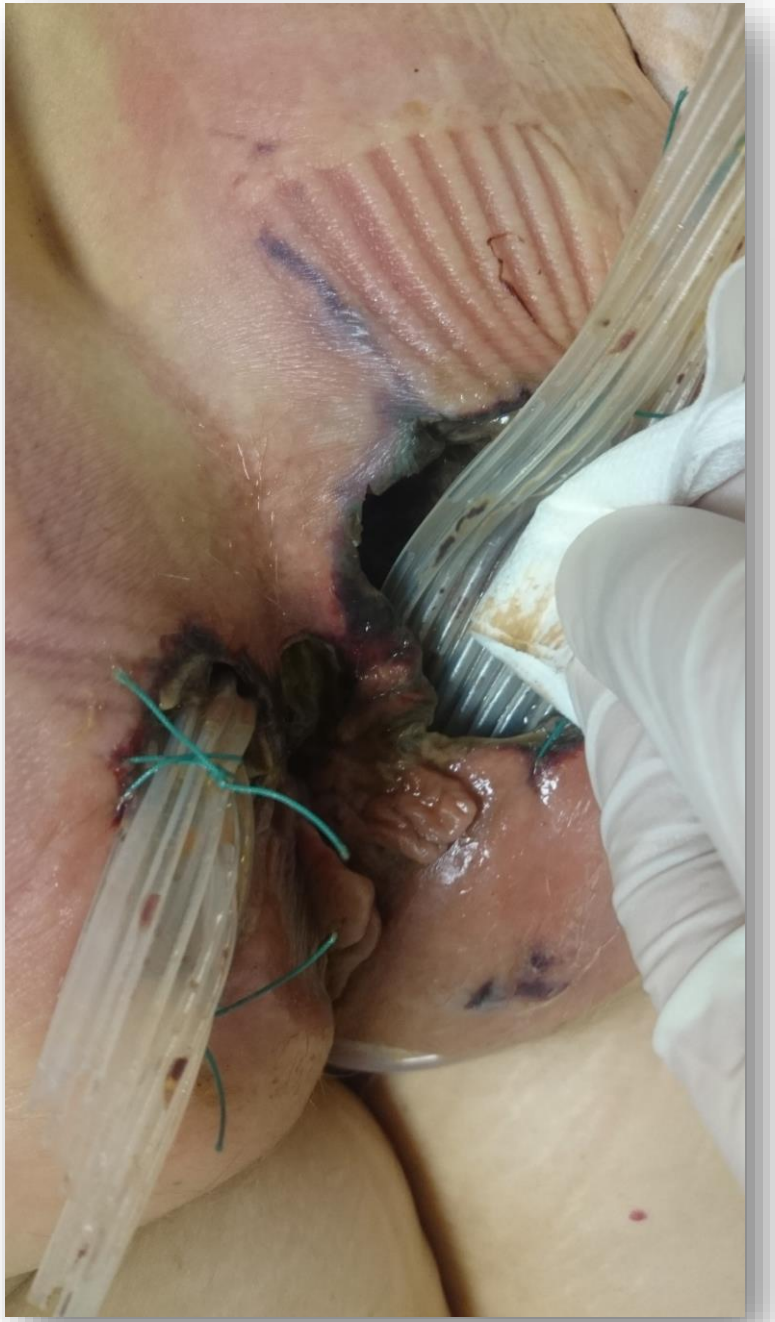
Dérivation urinaire et digestive

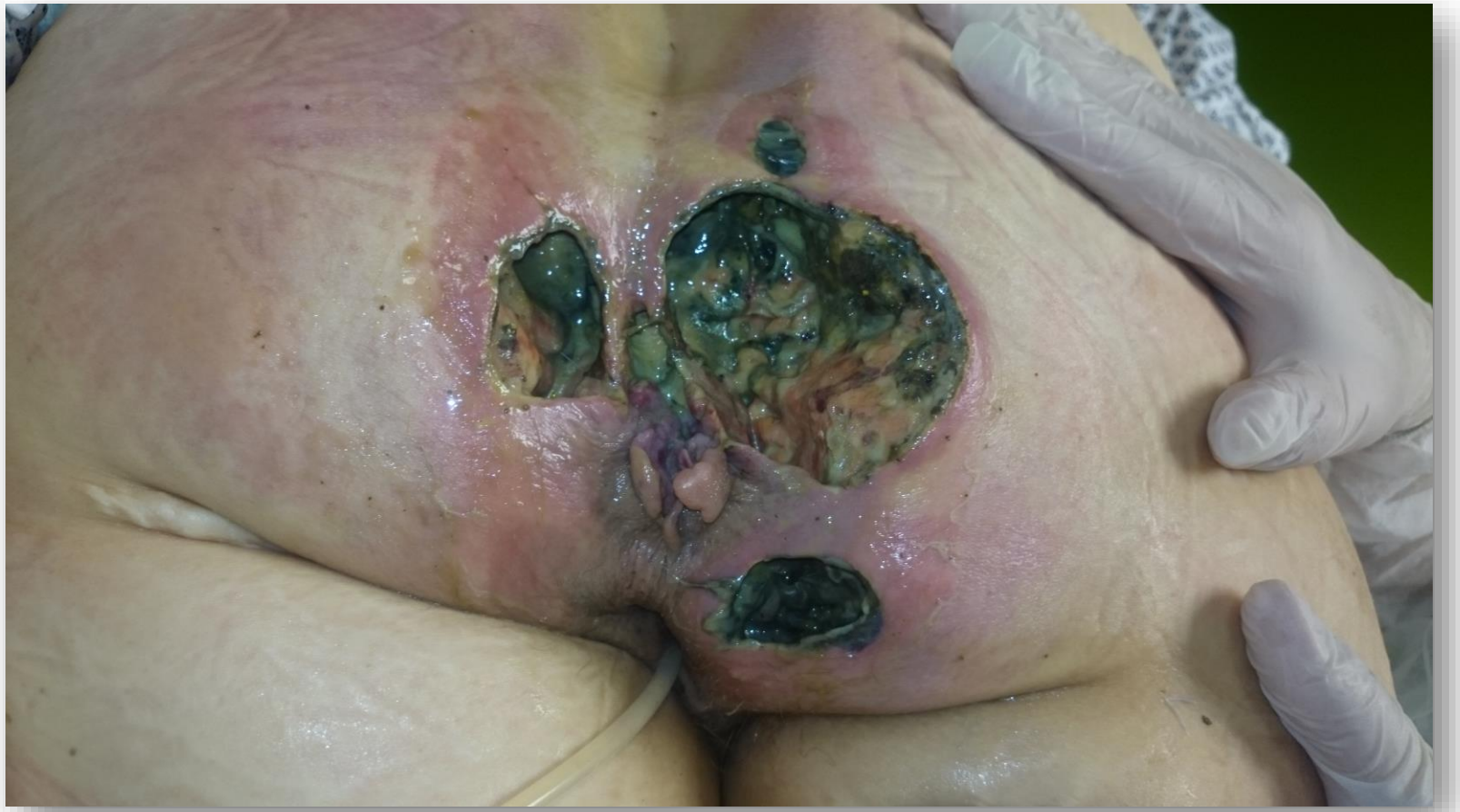
Dérivation urinaire :
- Sonde vésicale

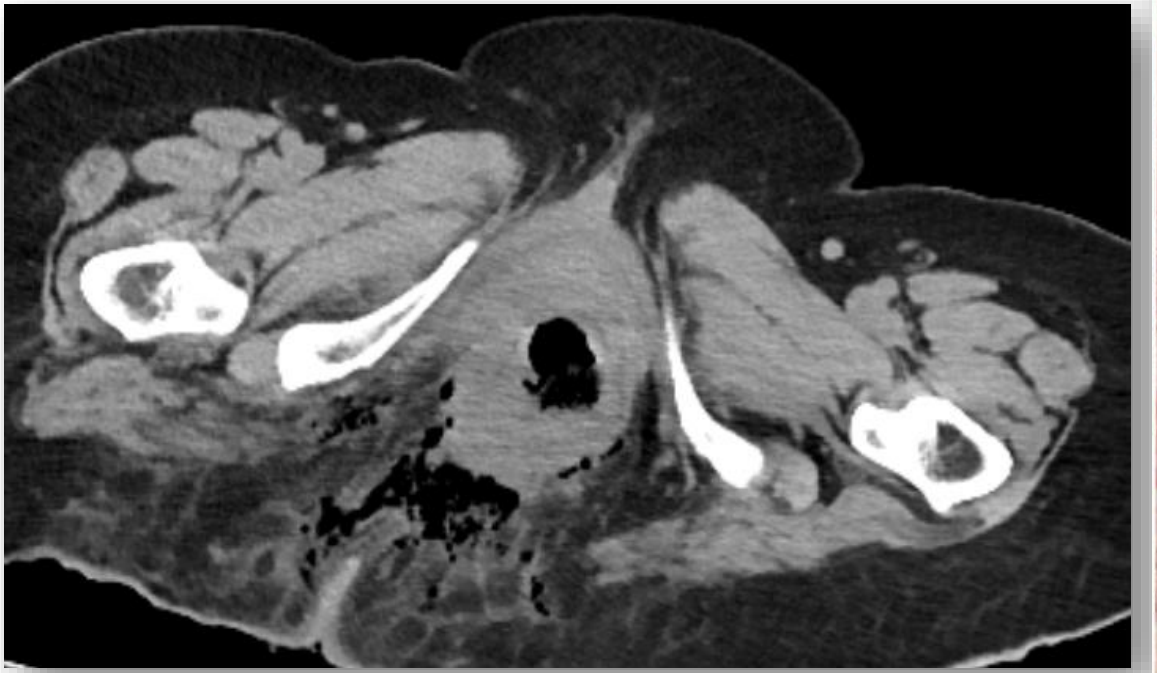
Dérivation digestive :
-Colostomie de protection (transverse gauche)
-Collecteur fécal

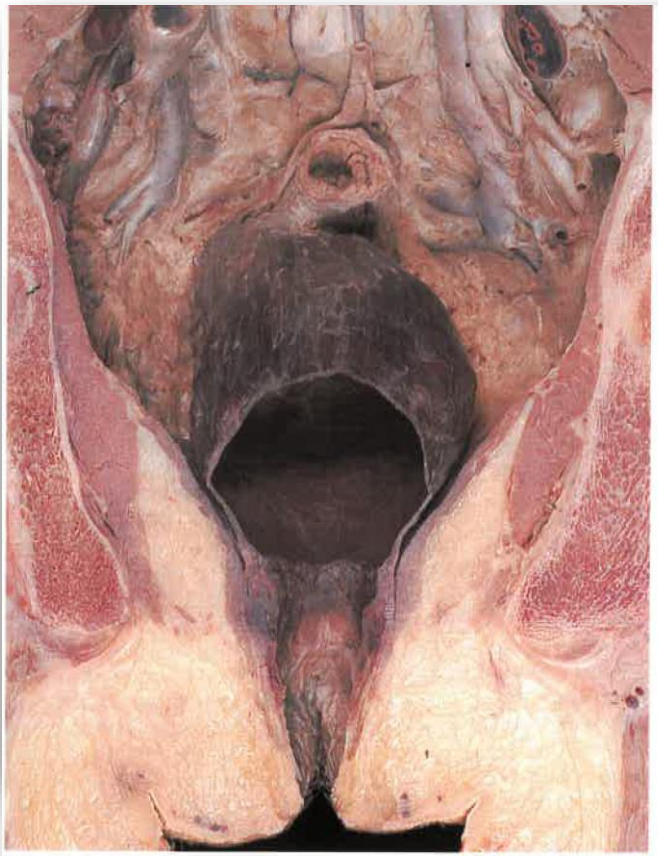












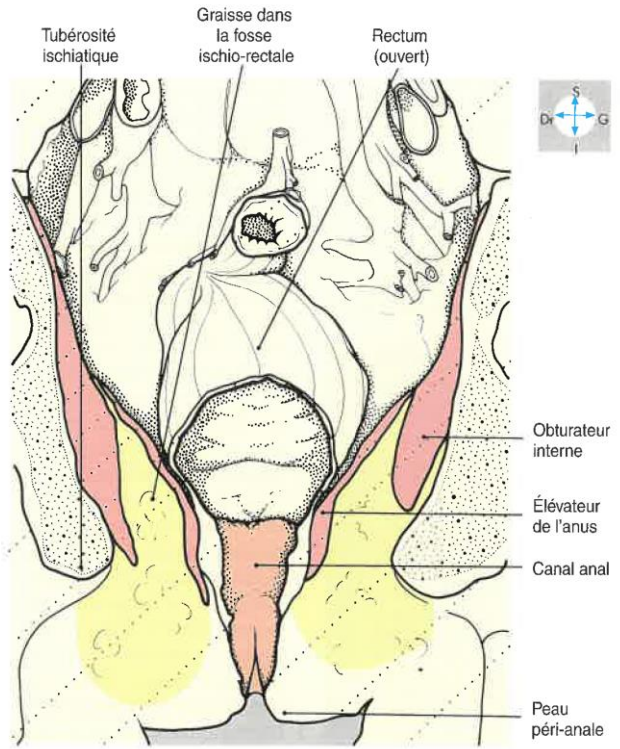
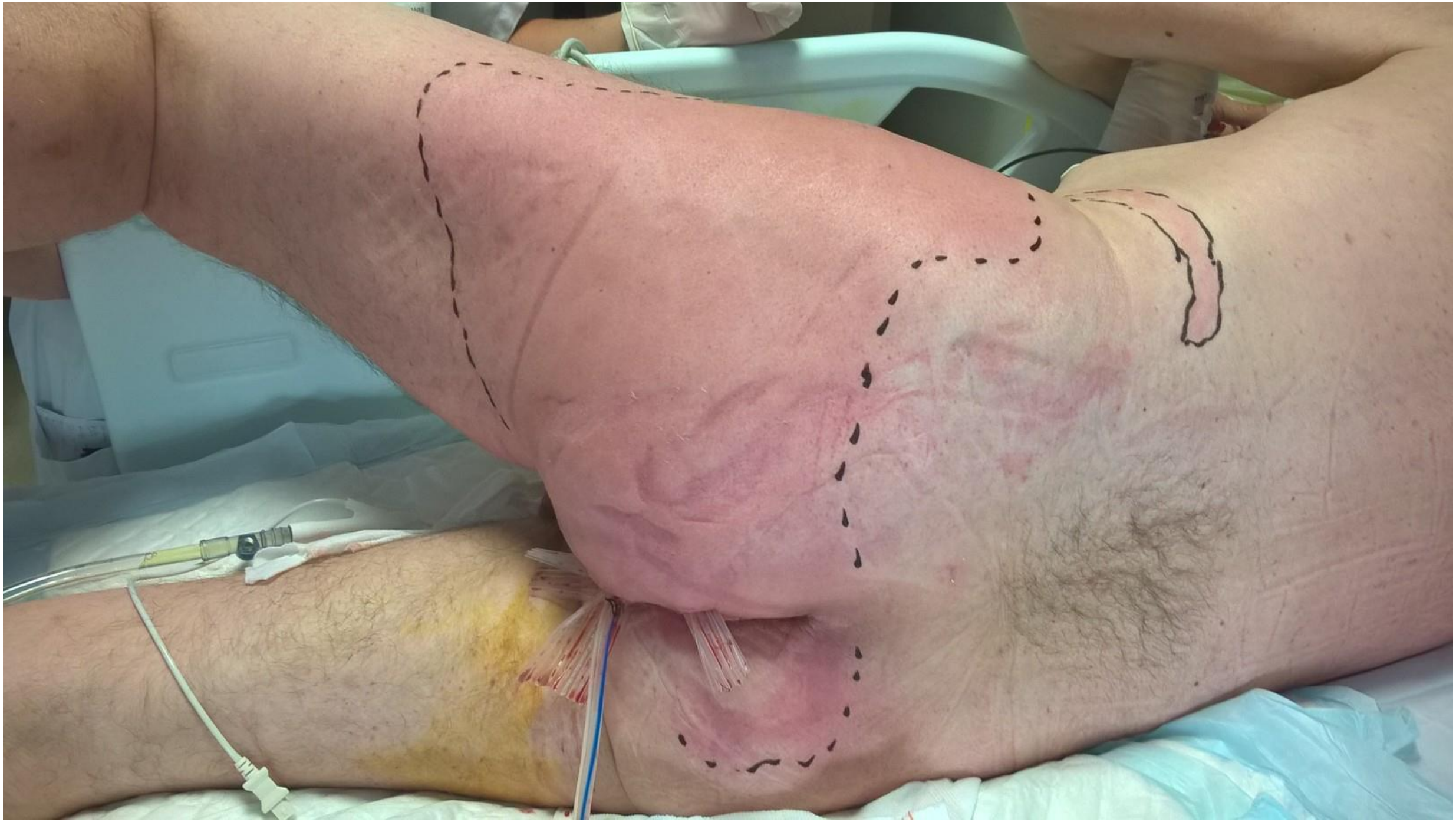
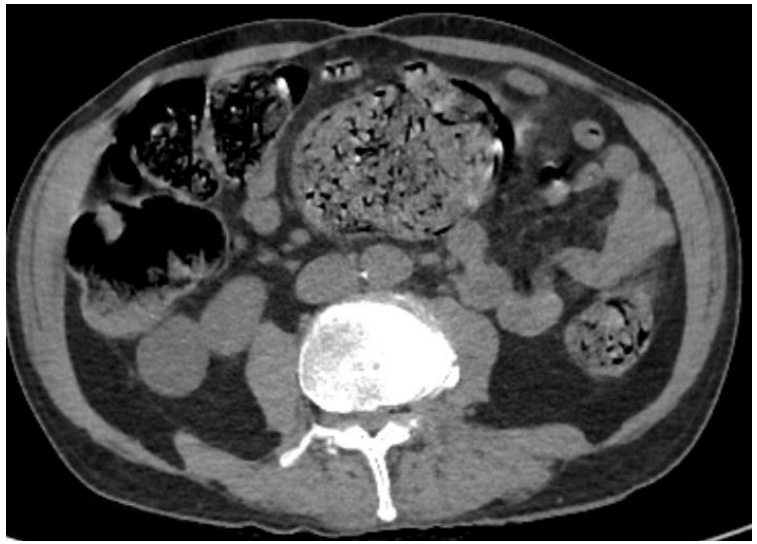
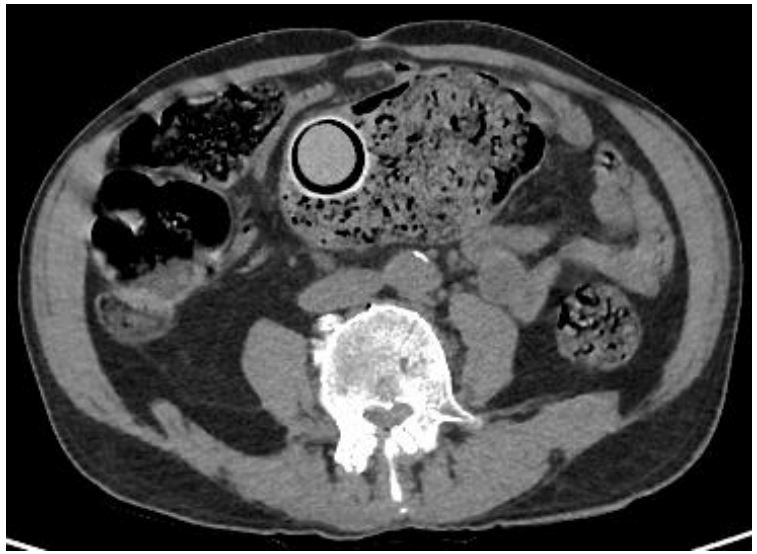
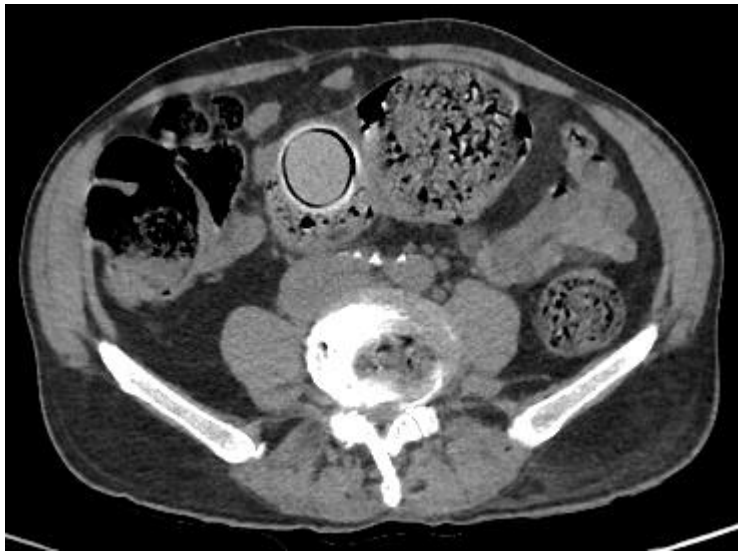
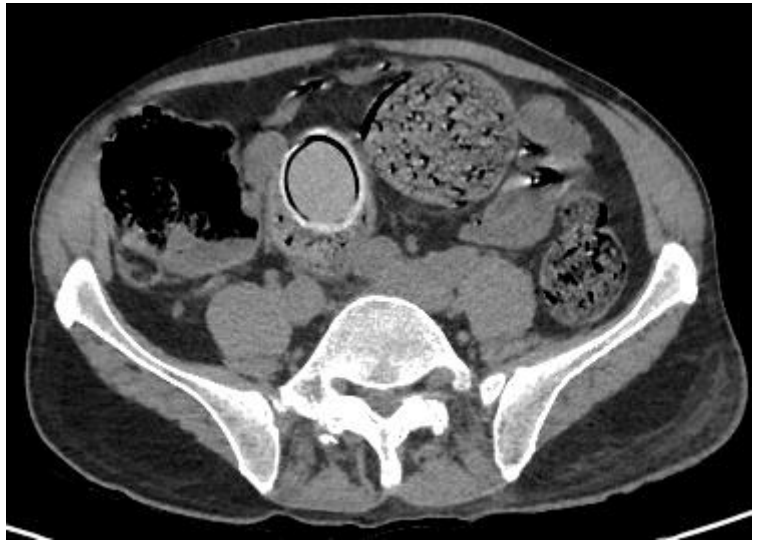
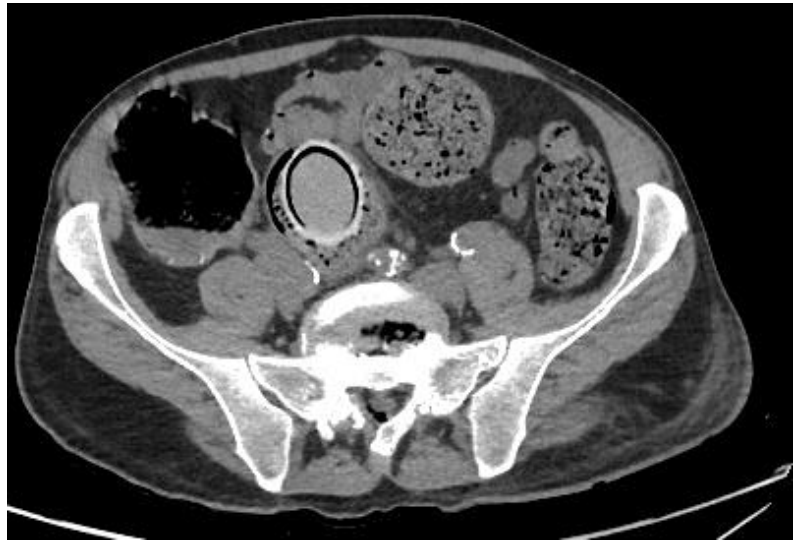
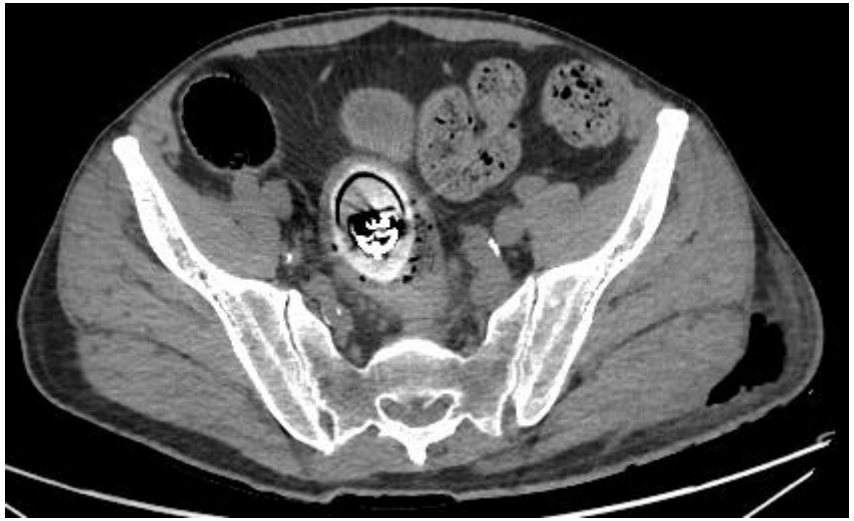
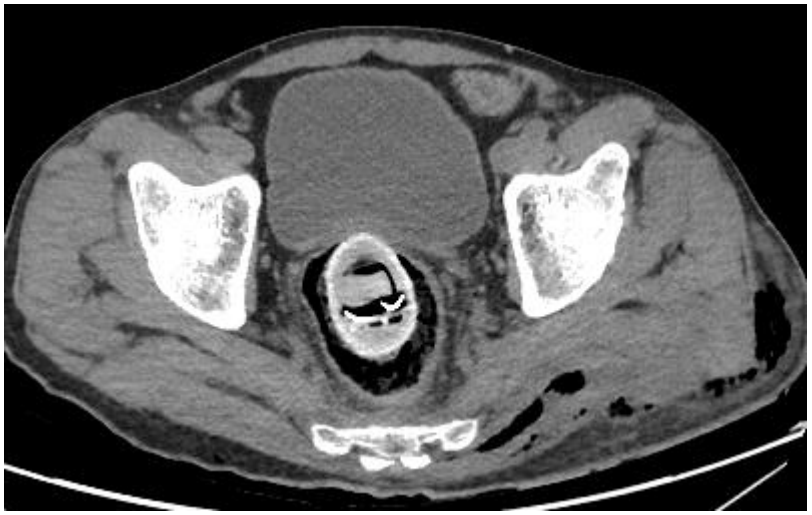
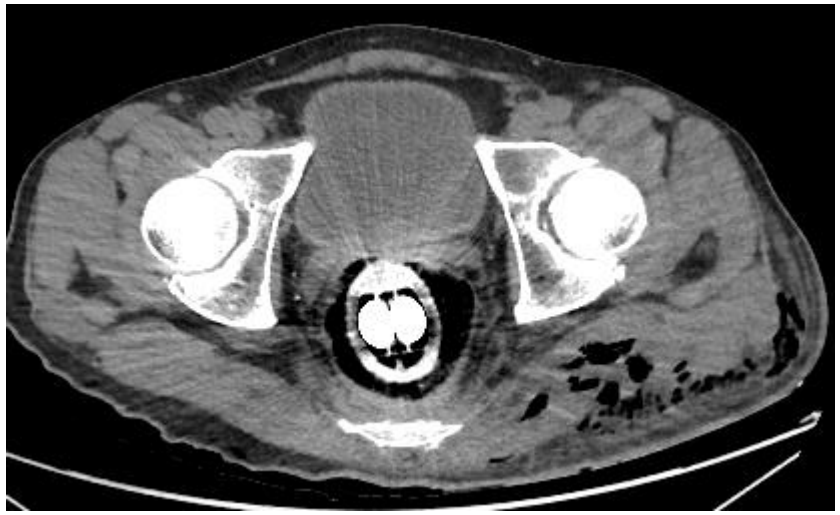
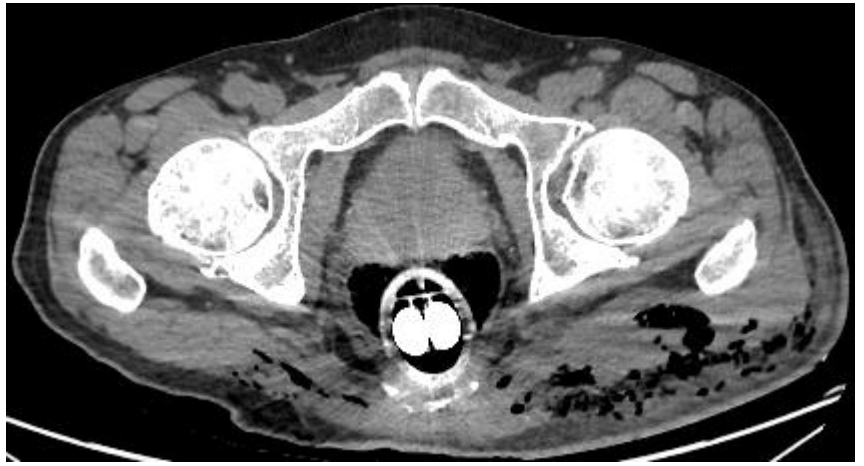
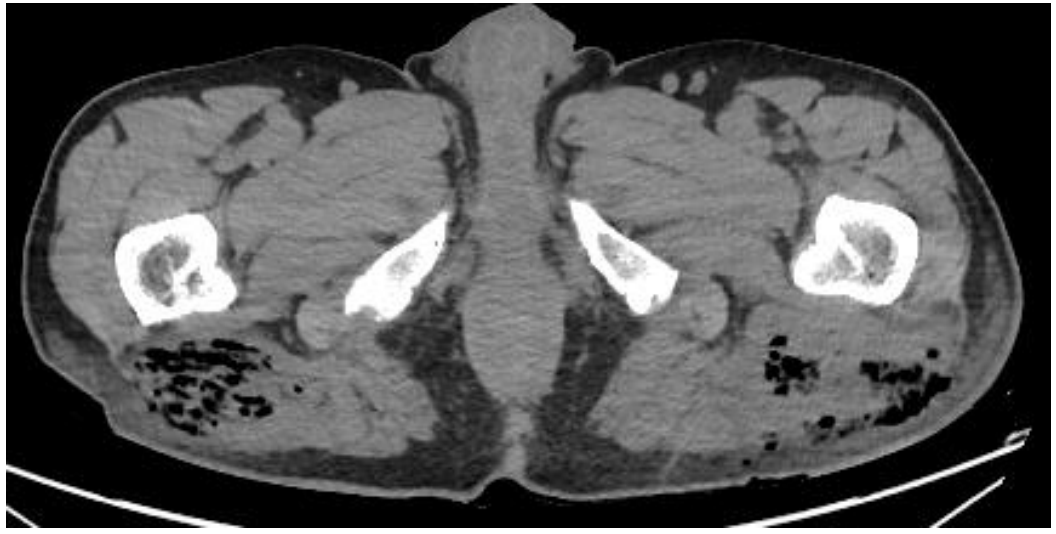
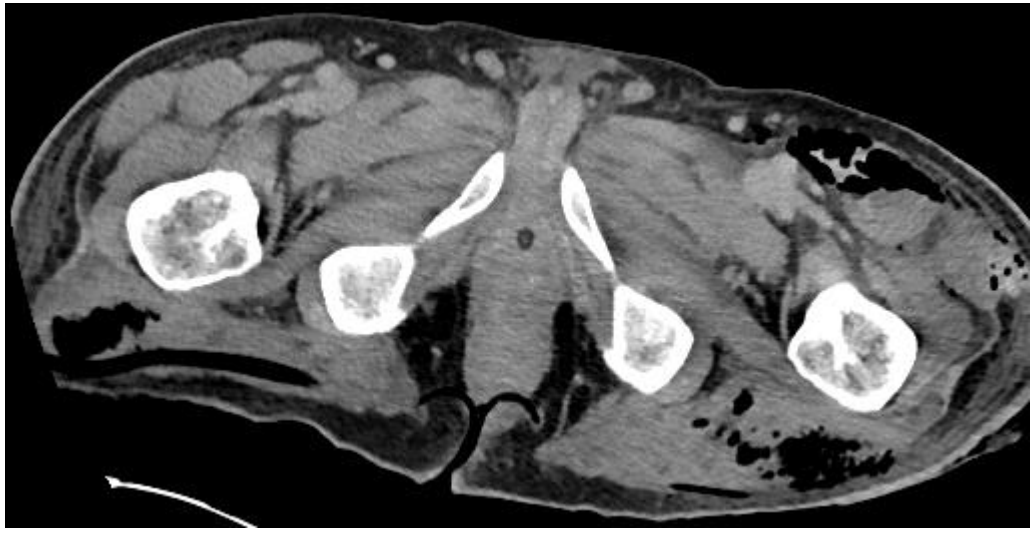


Fig. 5.34 Coupe frontale dans le canal anal et les fosses ischio-rectales.

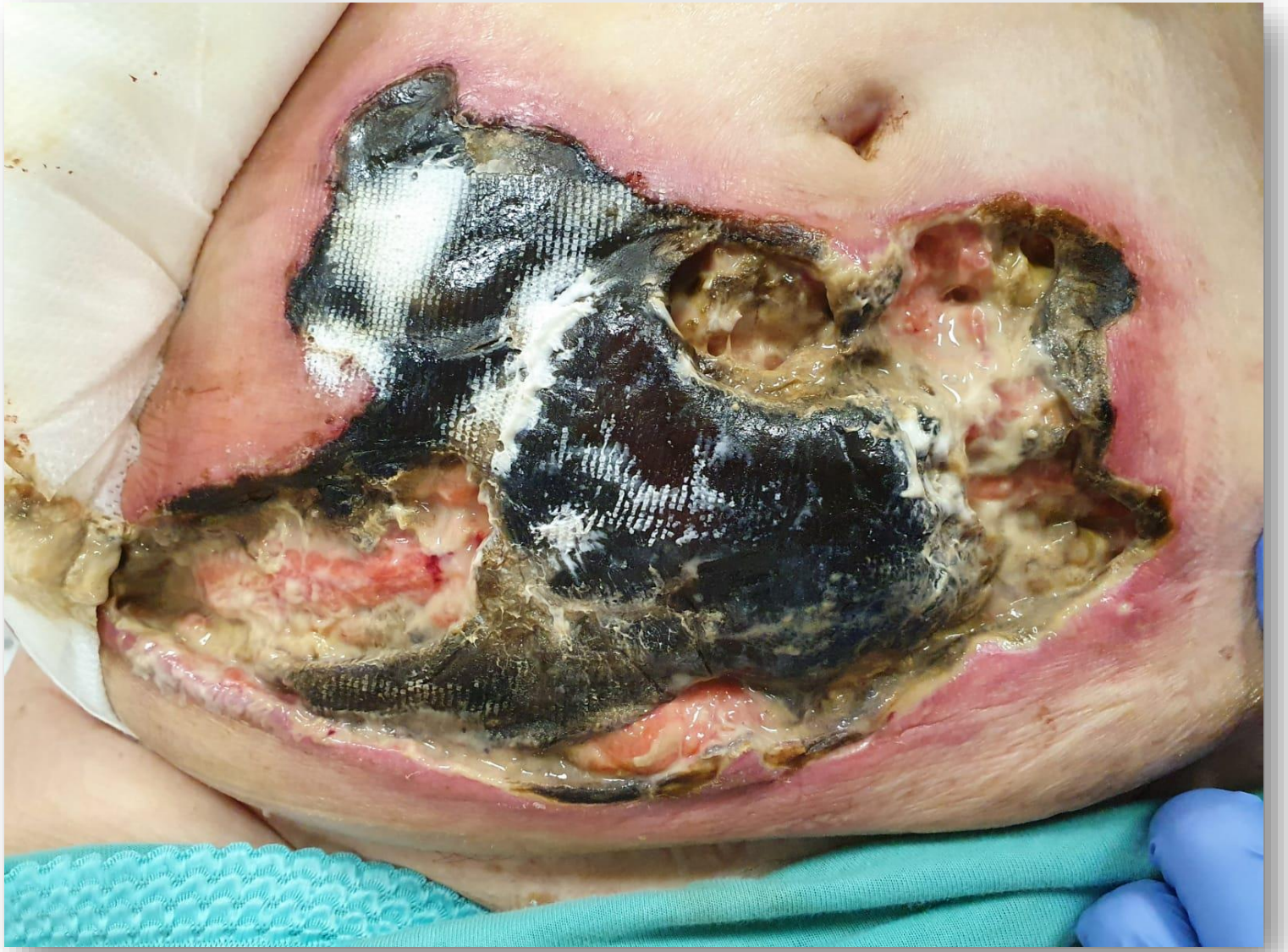
In Anatomie humaine. Gosling et al. Éd De Boeck

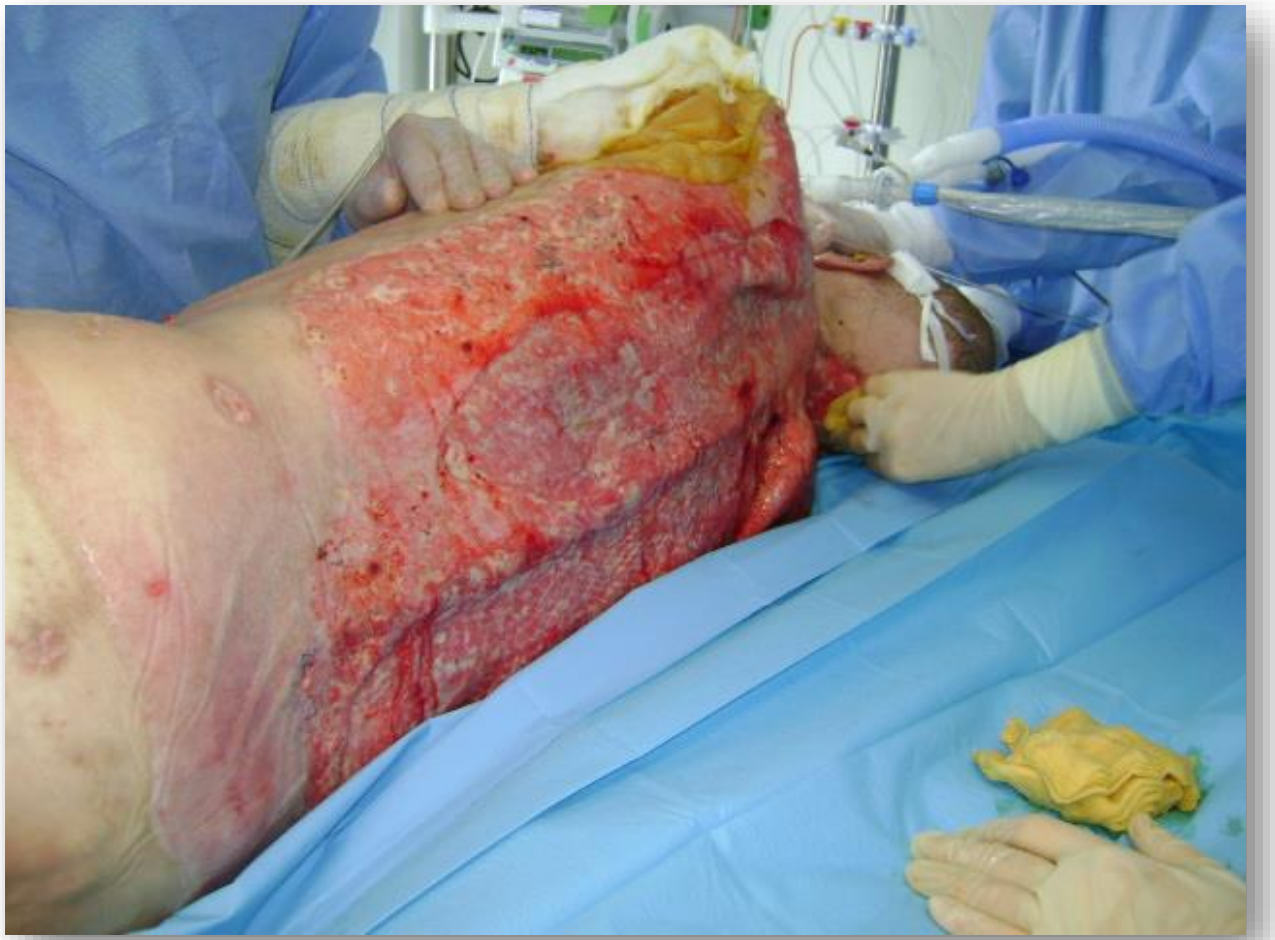


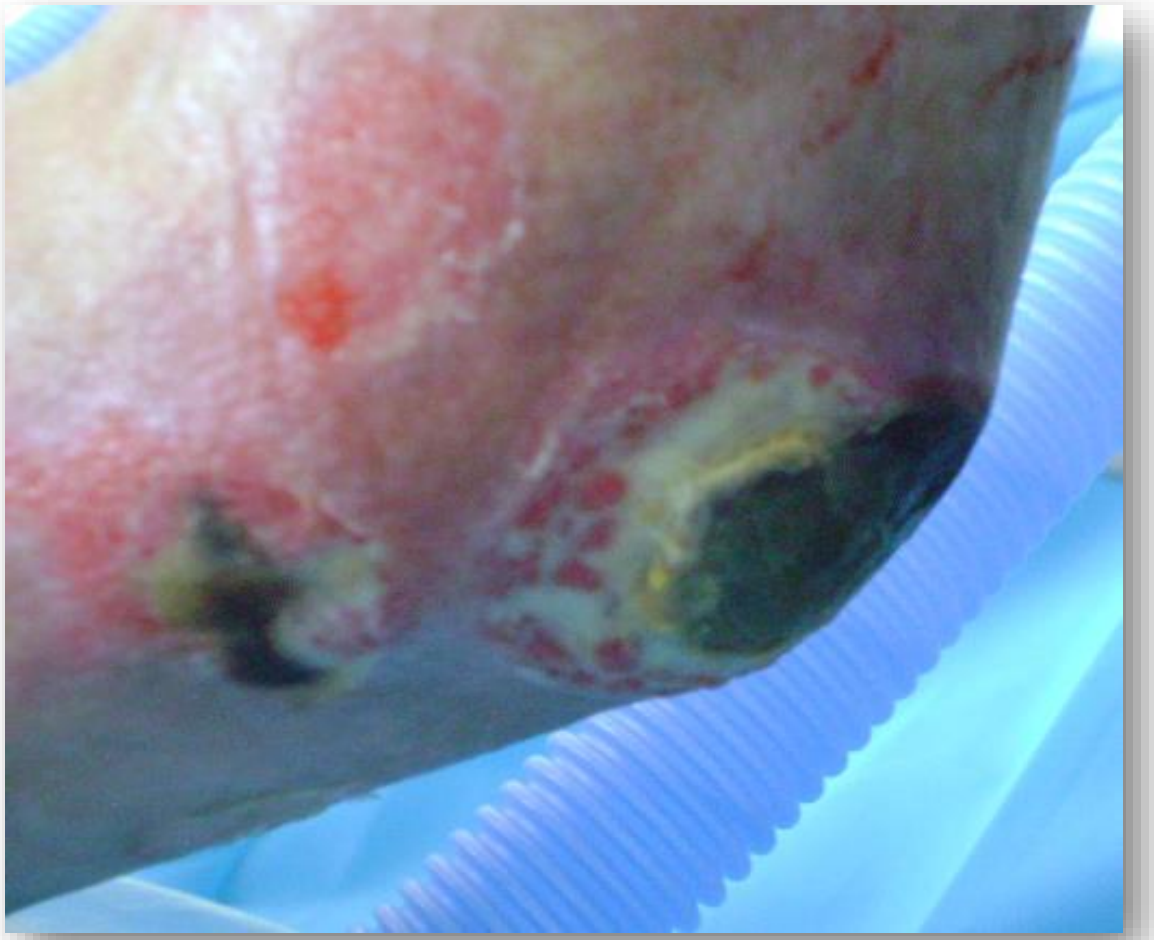







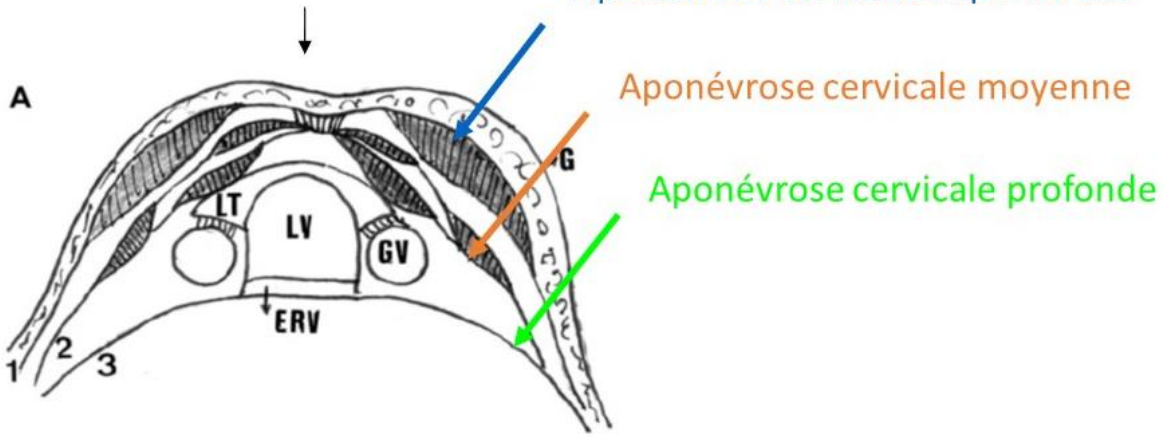
Diagnostic différentiel







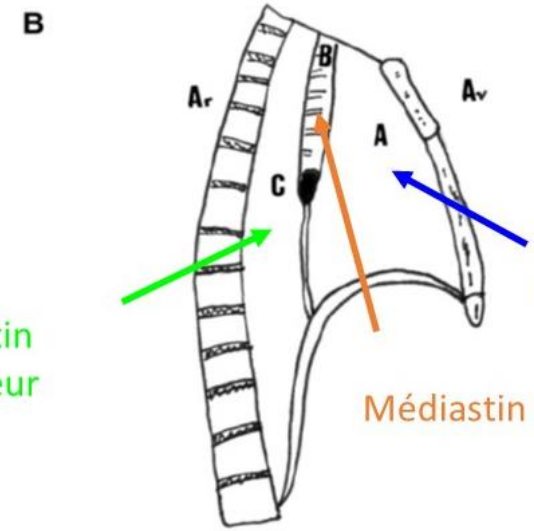
Les multiples extensions possibles en cervical



Aponévrose cervicale superficielle

Aponévrose cervicale moyenne

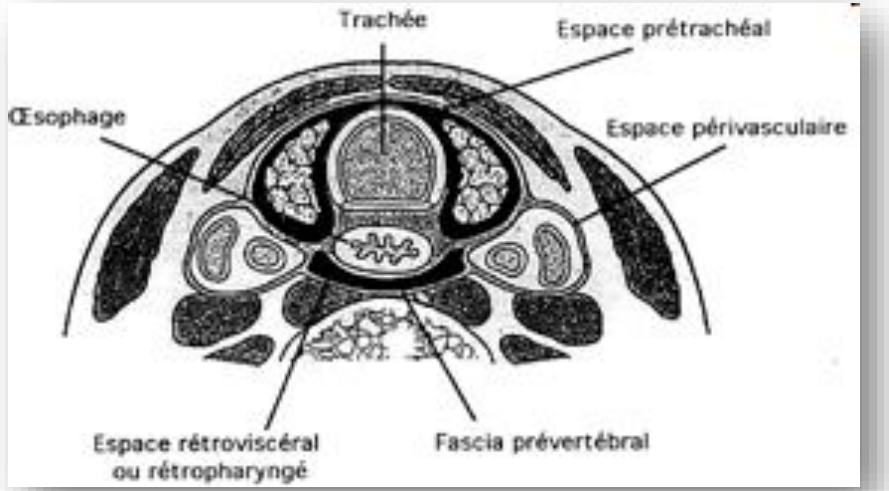
Aponévrose cervicale profonde

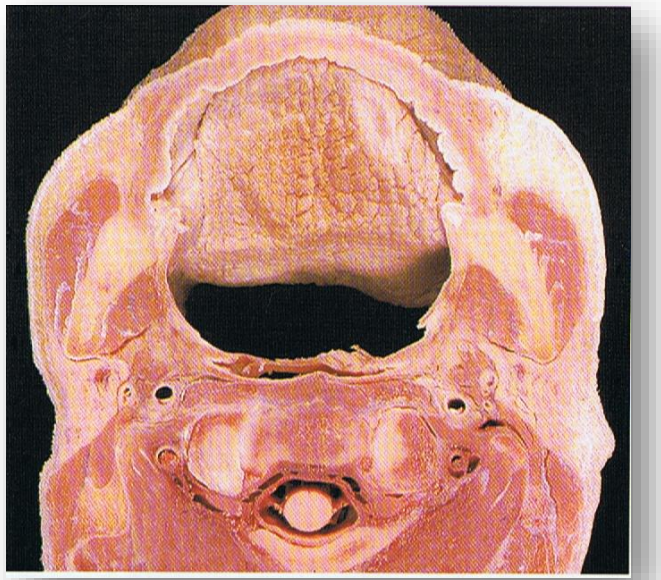


Médiastin antérieur

Médiastin postérieur

Médiastin moyen





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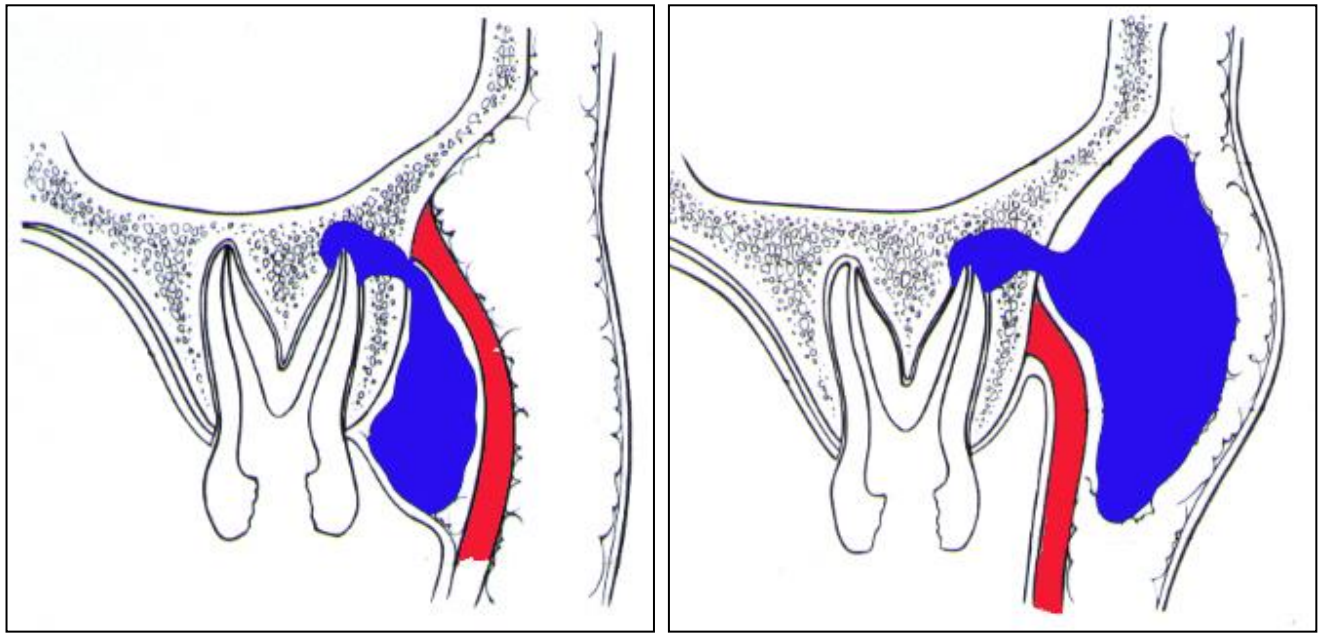
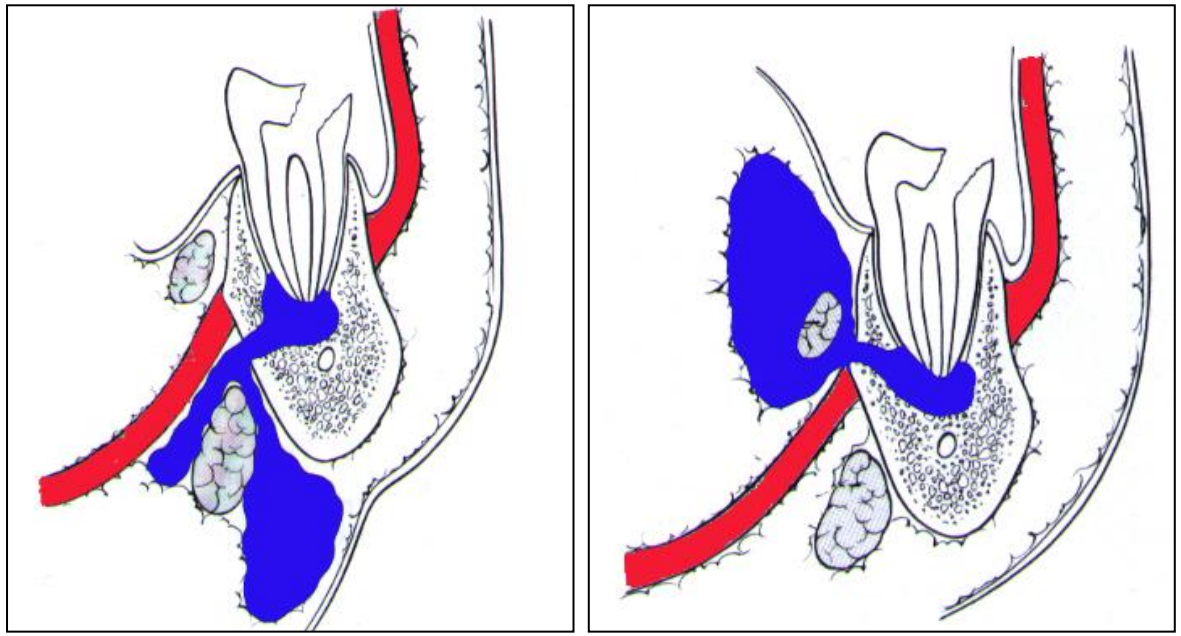
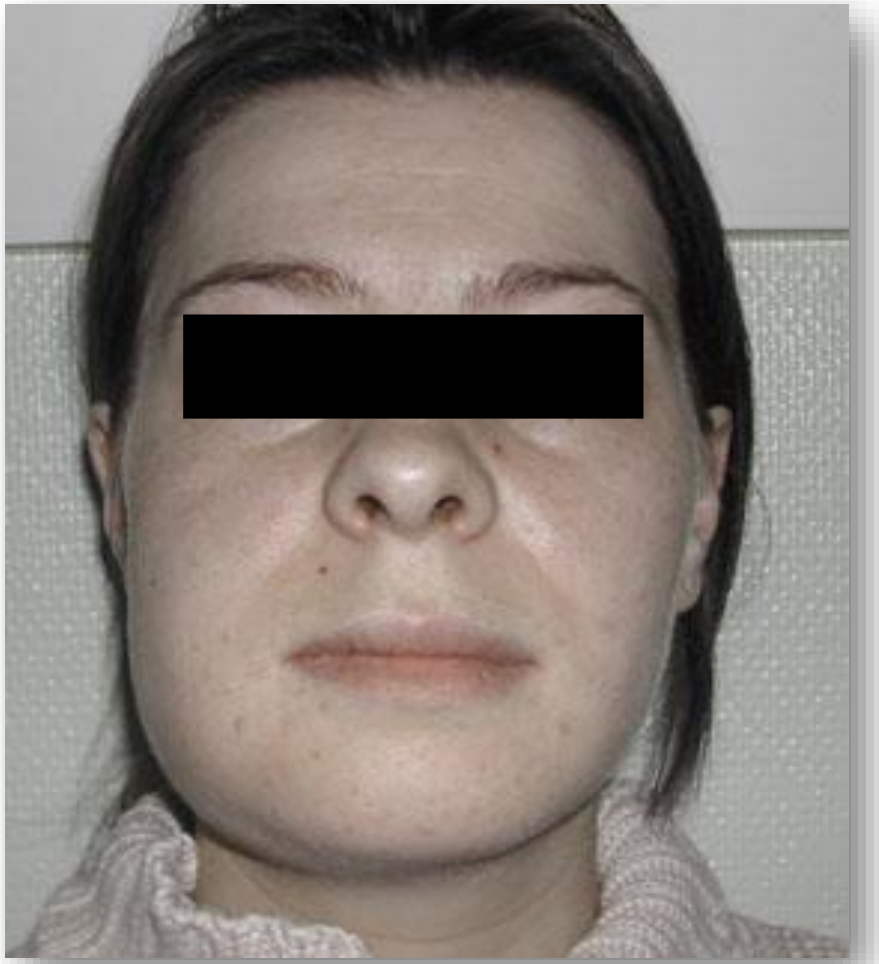
Diffusion vestibulaire ou génienne
La limite du muscle buccinateur

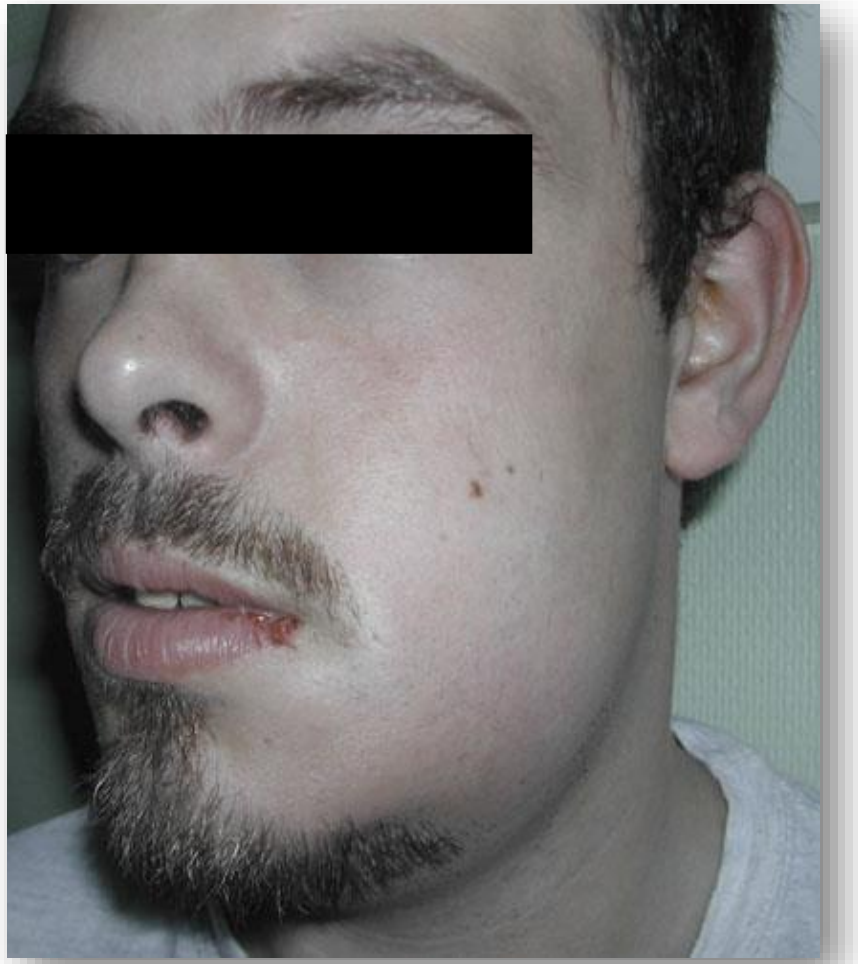


Diffusion sus ou sous mylohyïdiene
Cellulites péri-mandibulaires



Infections collectées vs infections « séreuses » : pas toujours évident cliniquement

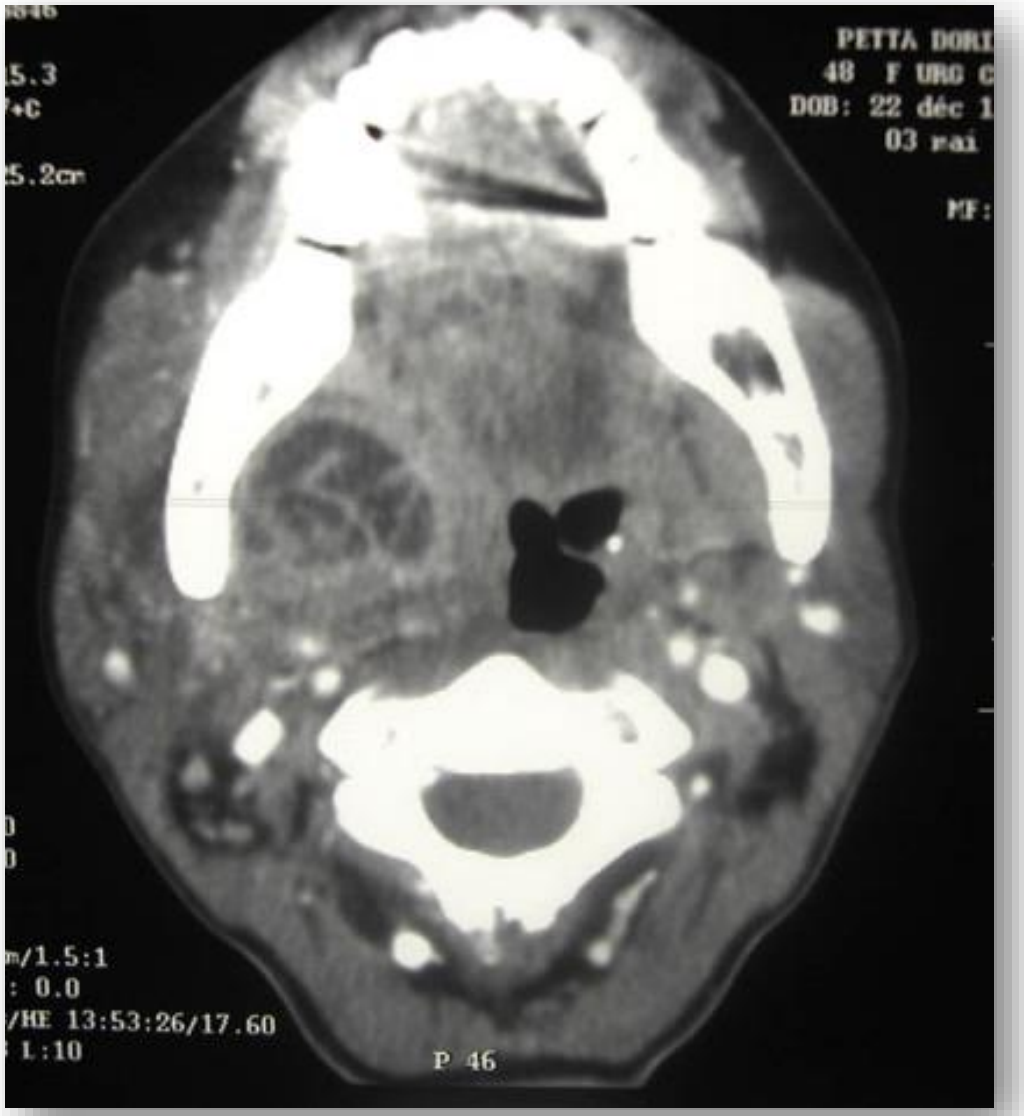


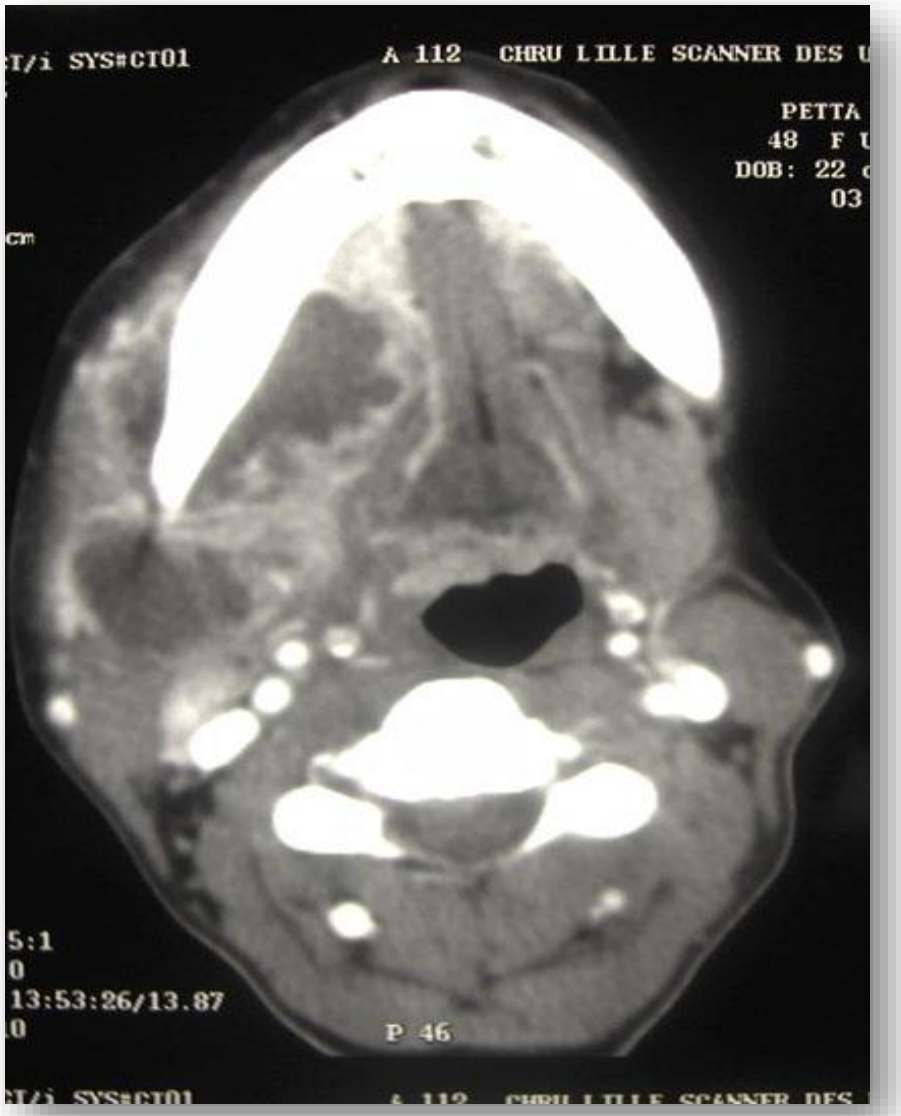


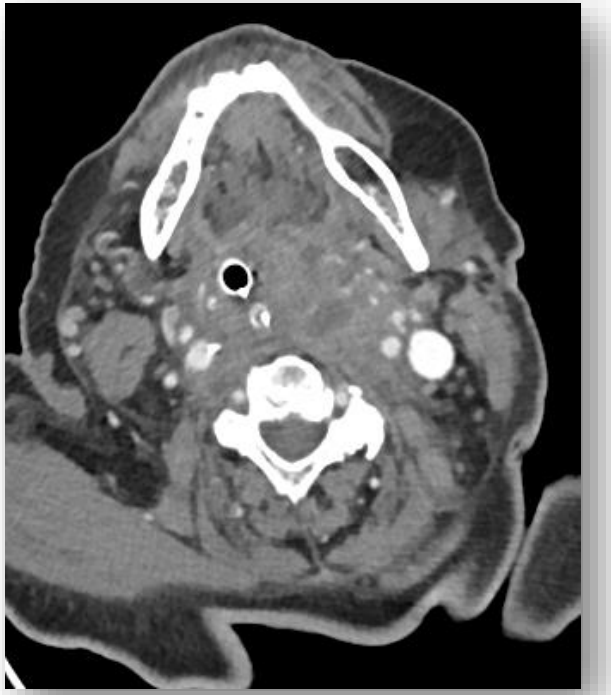
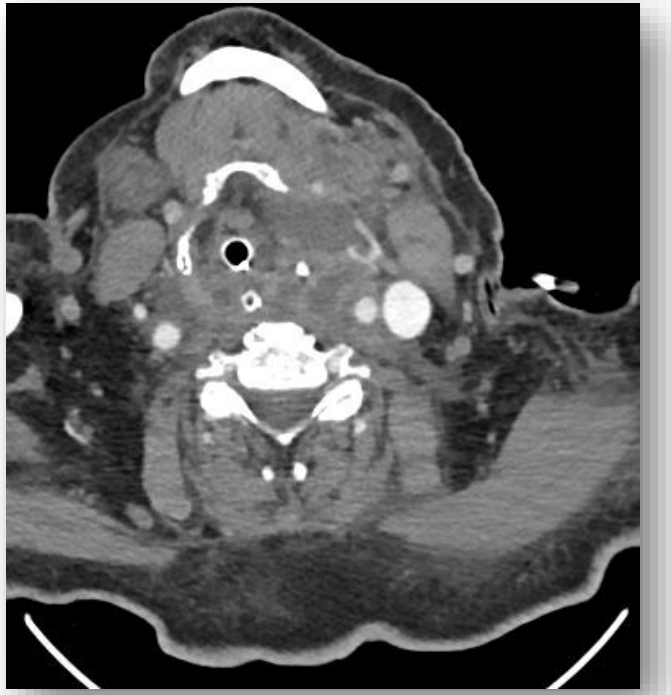
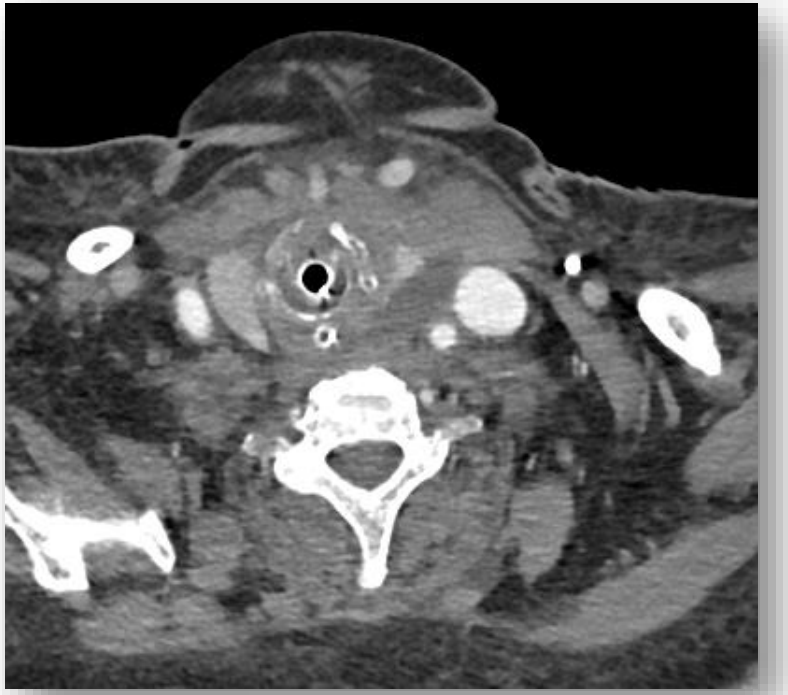
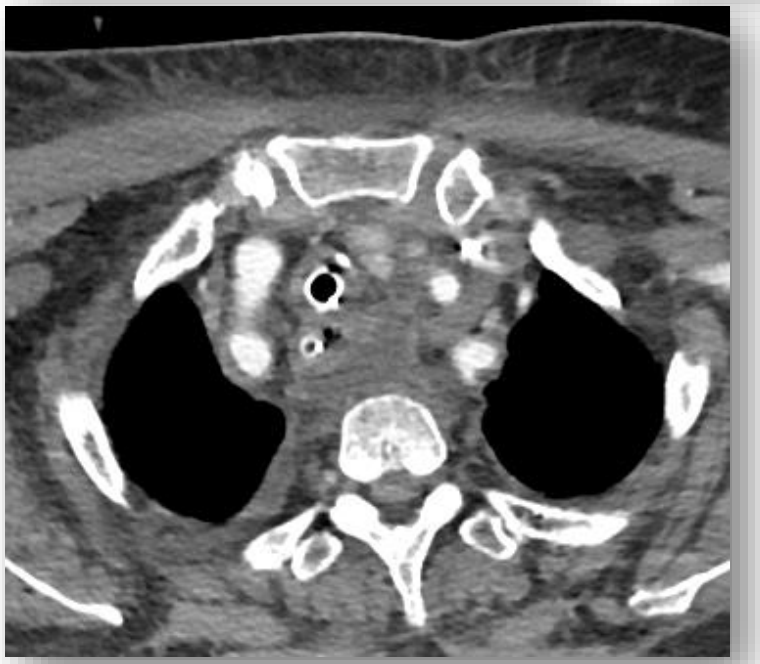
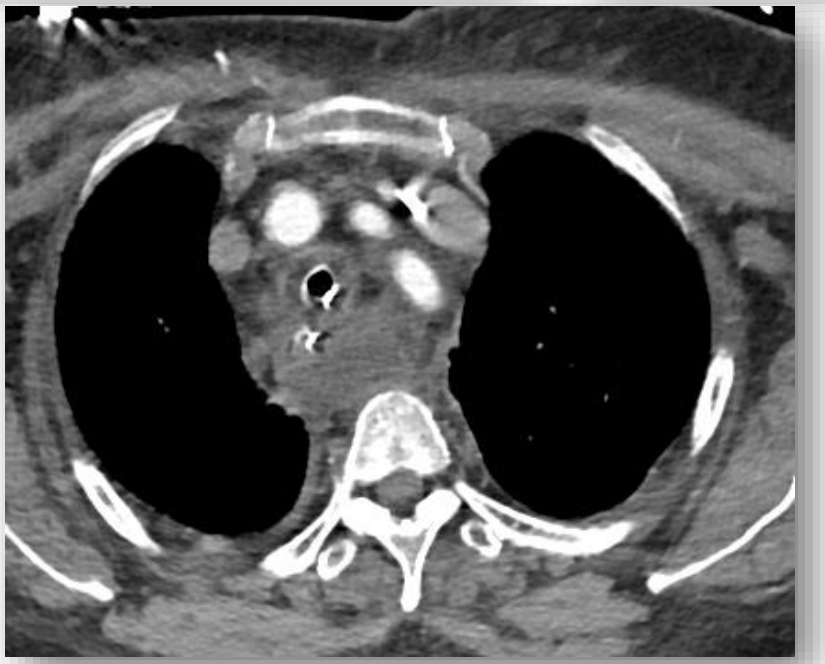
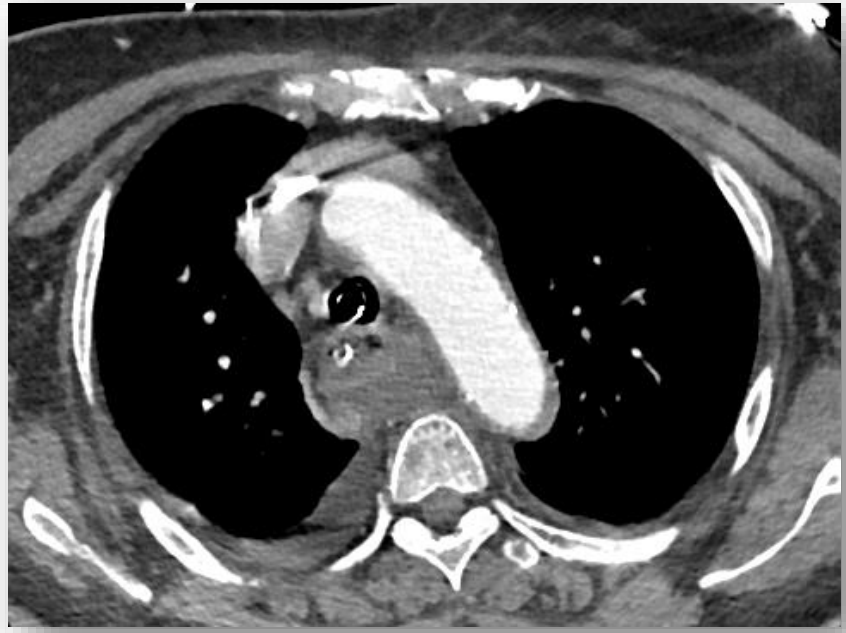
Les signes cliniques à rechercher/évaluation de la gravité

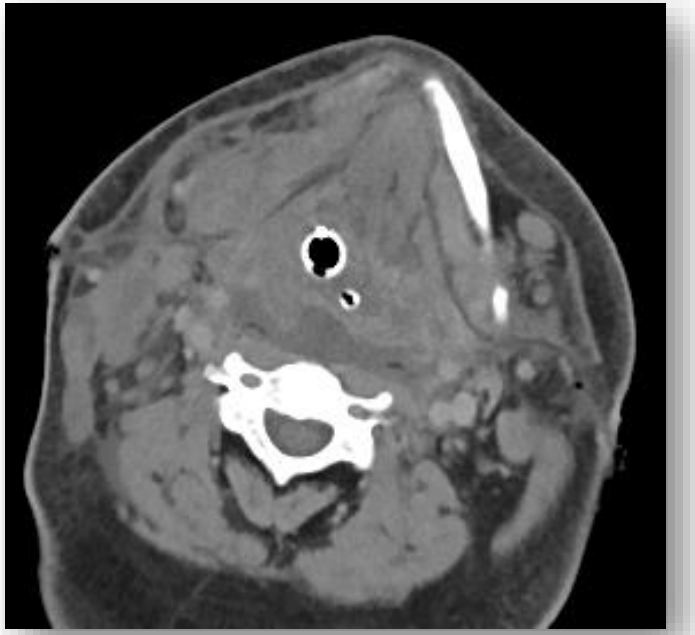
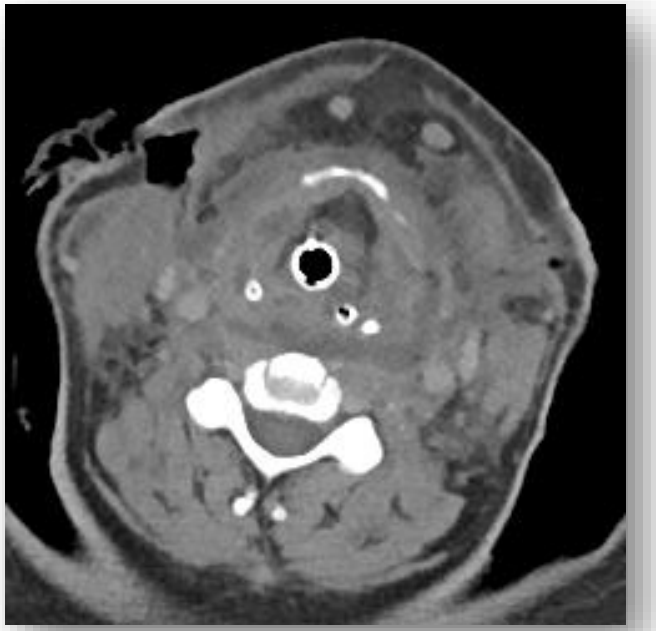
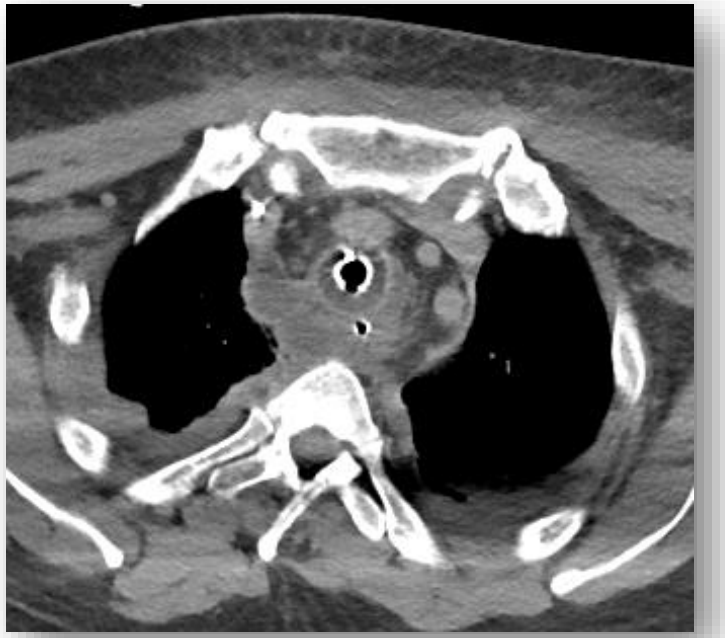
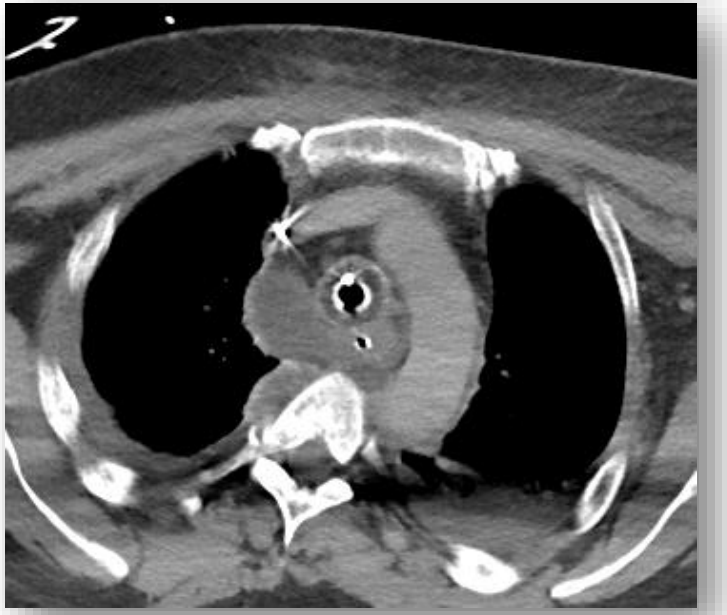
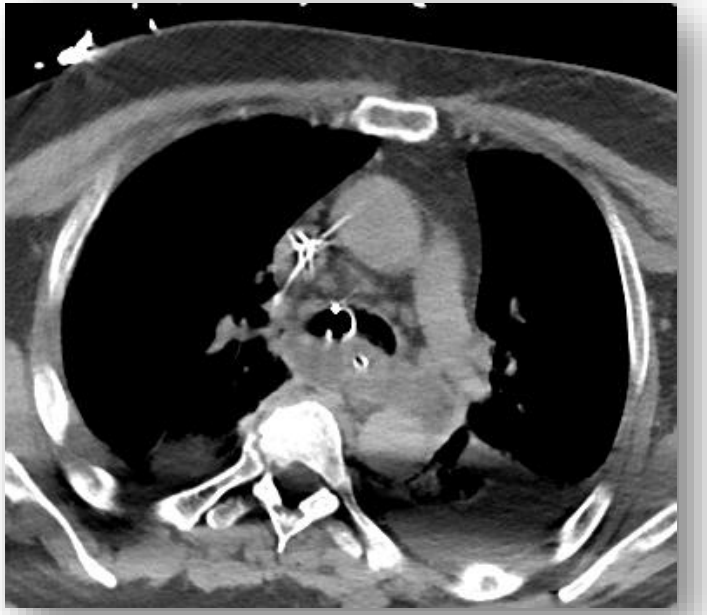
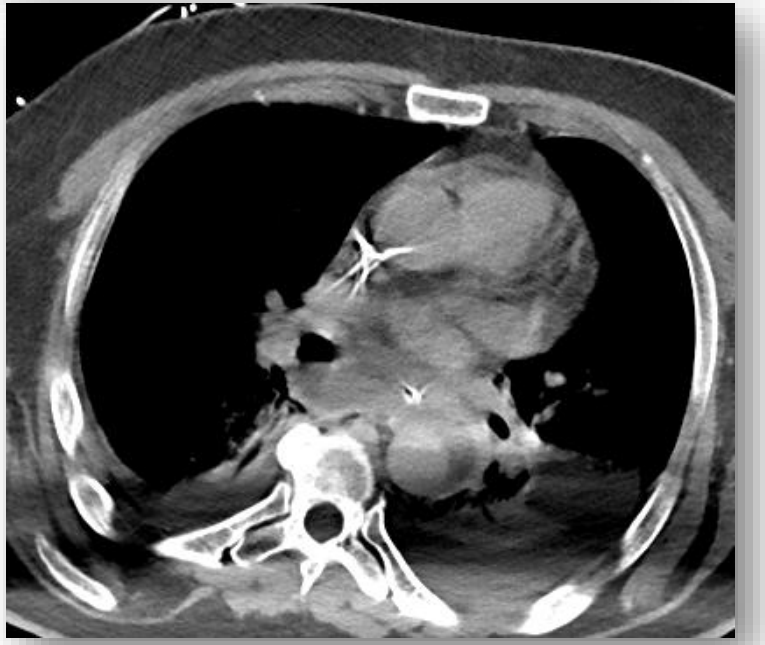
- Recherche de la porte d'entrée
  - Examen buco dentaire
  - Examen ORL amygdales/pharynx
  - Guidé par les plaintes fonctionnels et la topographie de la diffusion
- Complications « locales », en fonction de la localisation
  - Trismus : attention intubation /!\
  - Dyspnée-Dysphagie : attention espace rétro pharyngé (cf cours physiopath/diffusion)
  - Thromboses vasculaires
    - Staphylococcie maligne et thrombose de sinus caverneux
    - Angine de Lemierre et thrombose jugulaire
- Retentissement général du sepsis
  - Plutôt rare par rapport aux complications locales (cf cours spécifique)

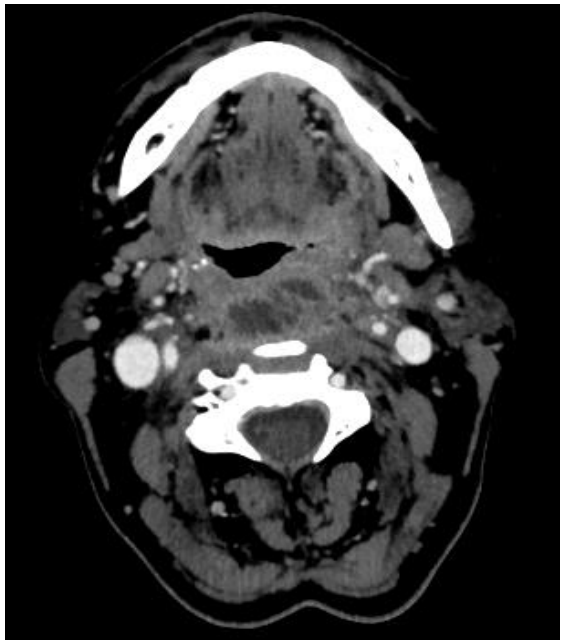
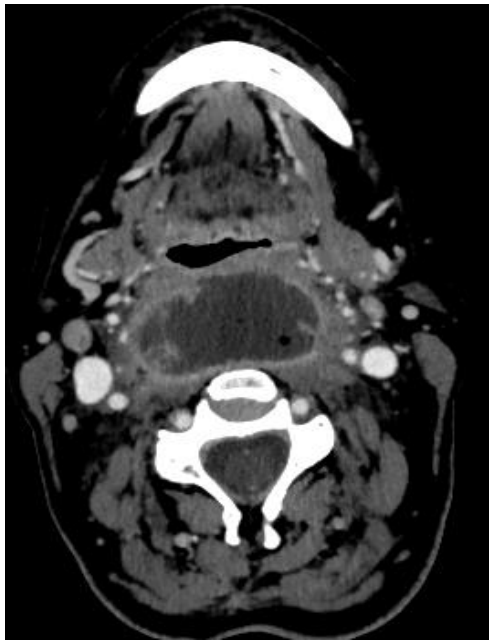
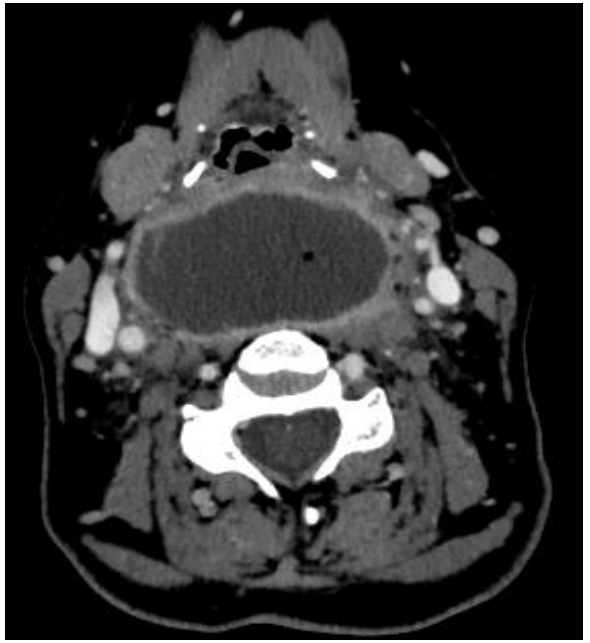
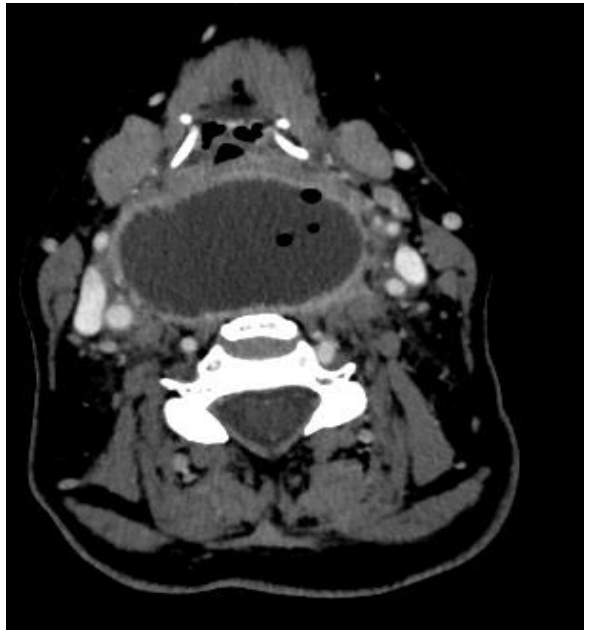
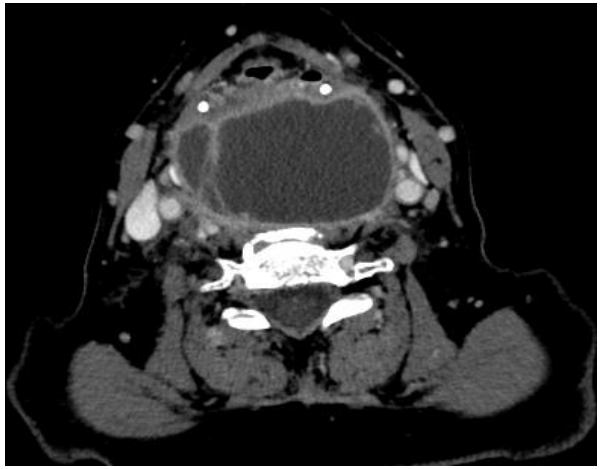
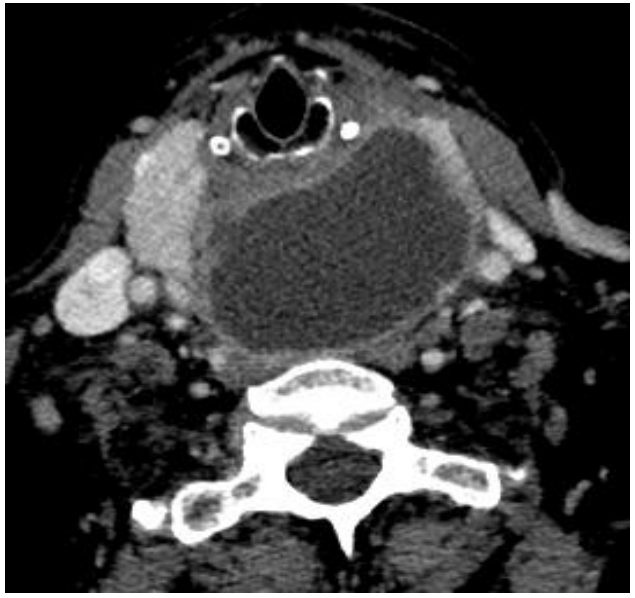
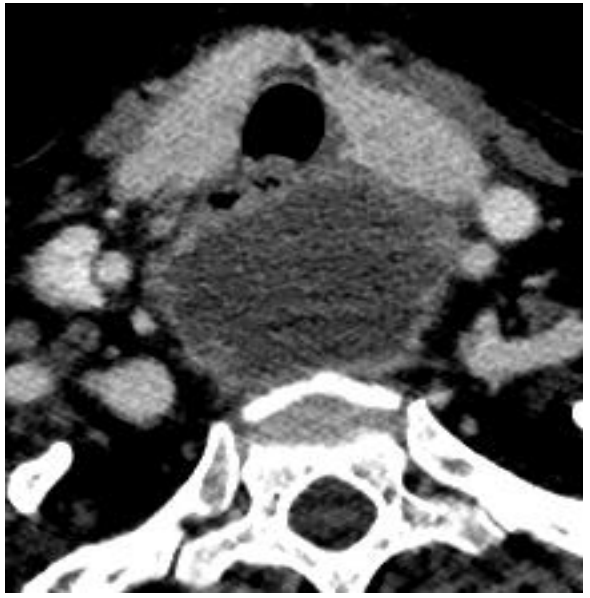
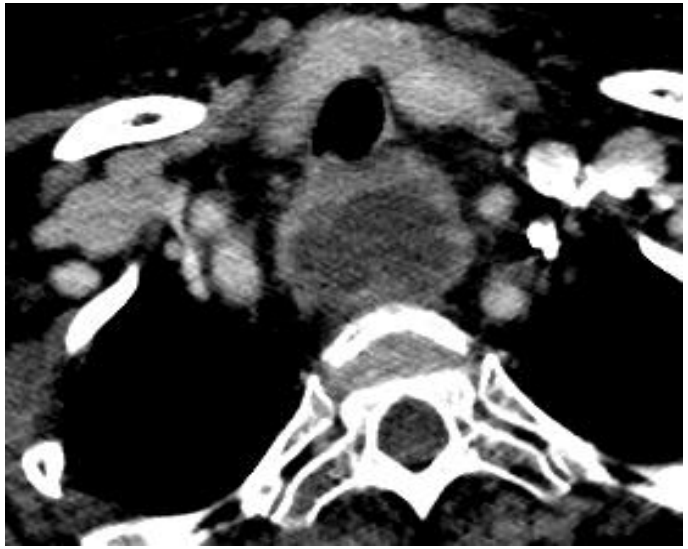
Importance du scanner cervico thoracique : porte d'entrée, collection, extension, thromboses

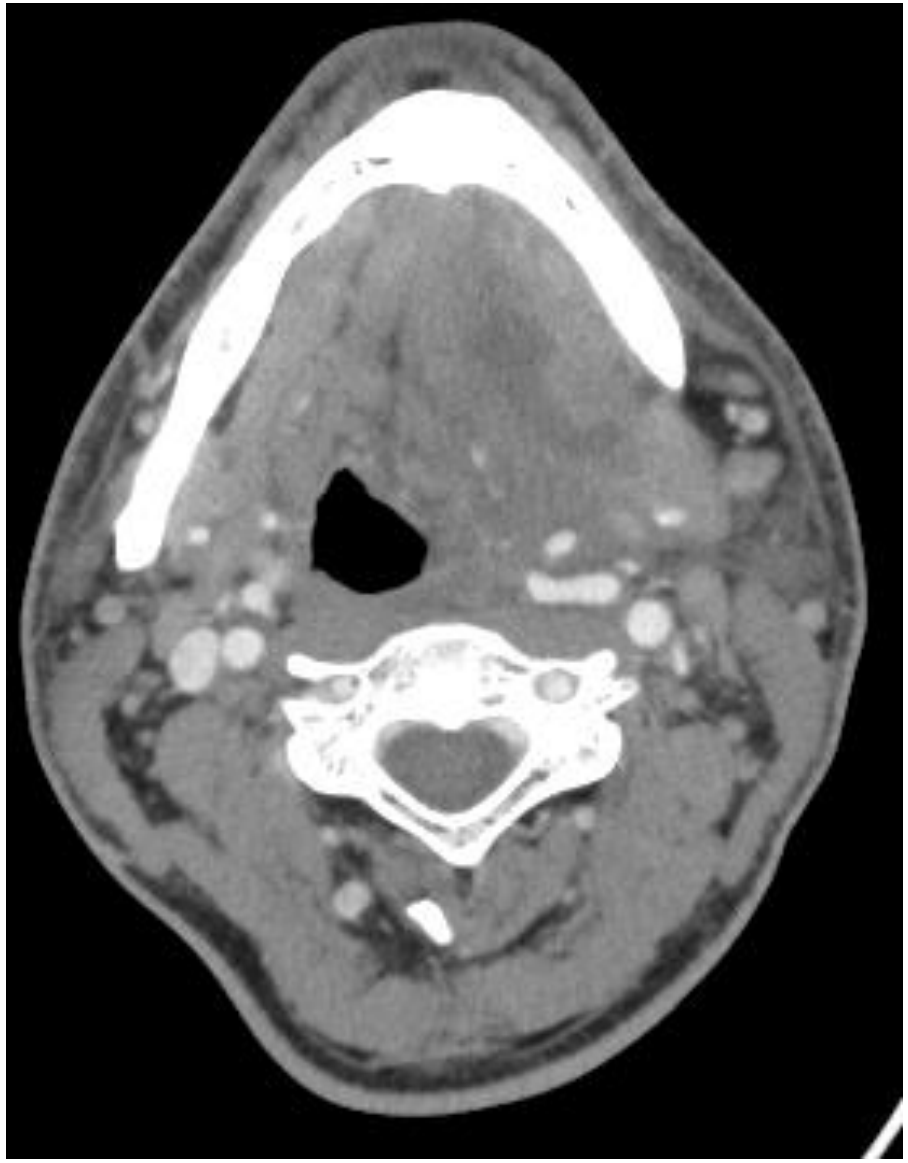


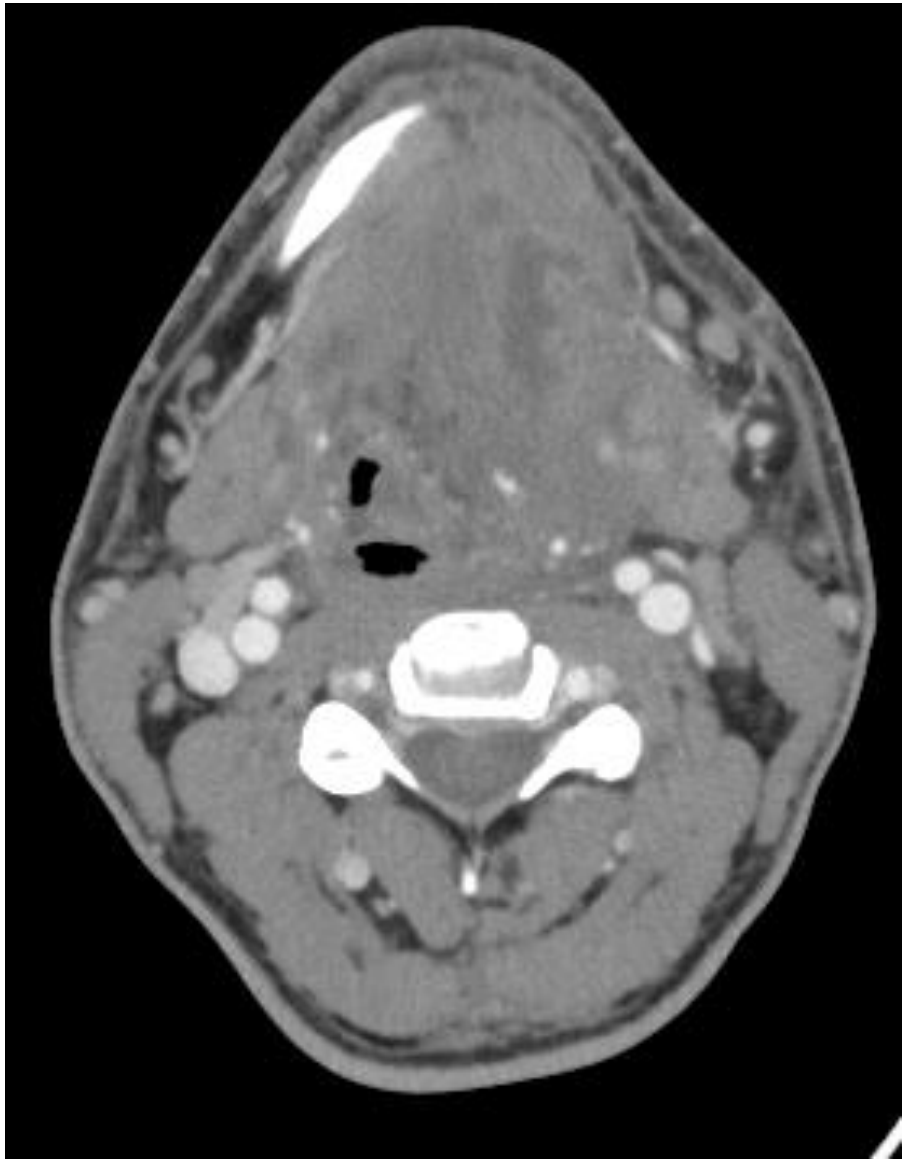


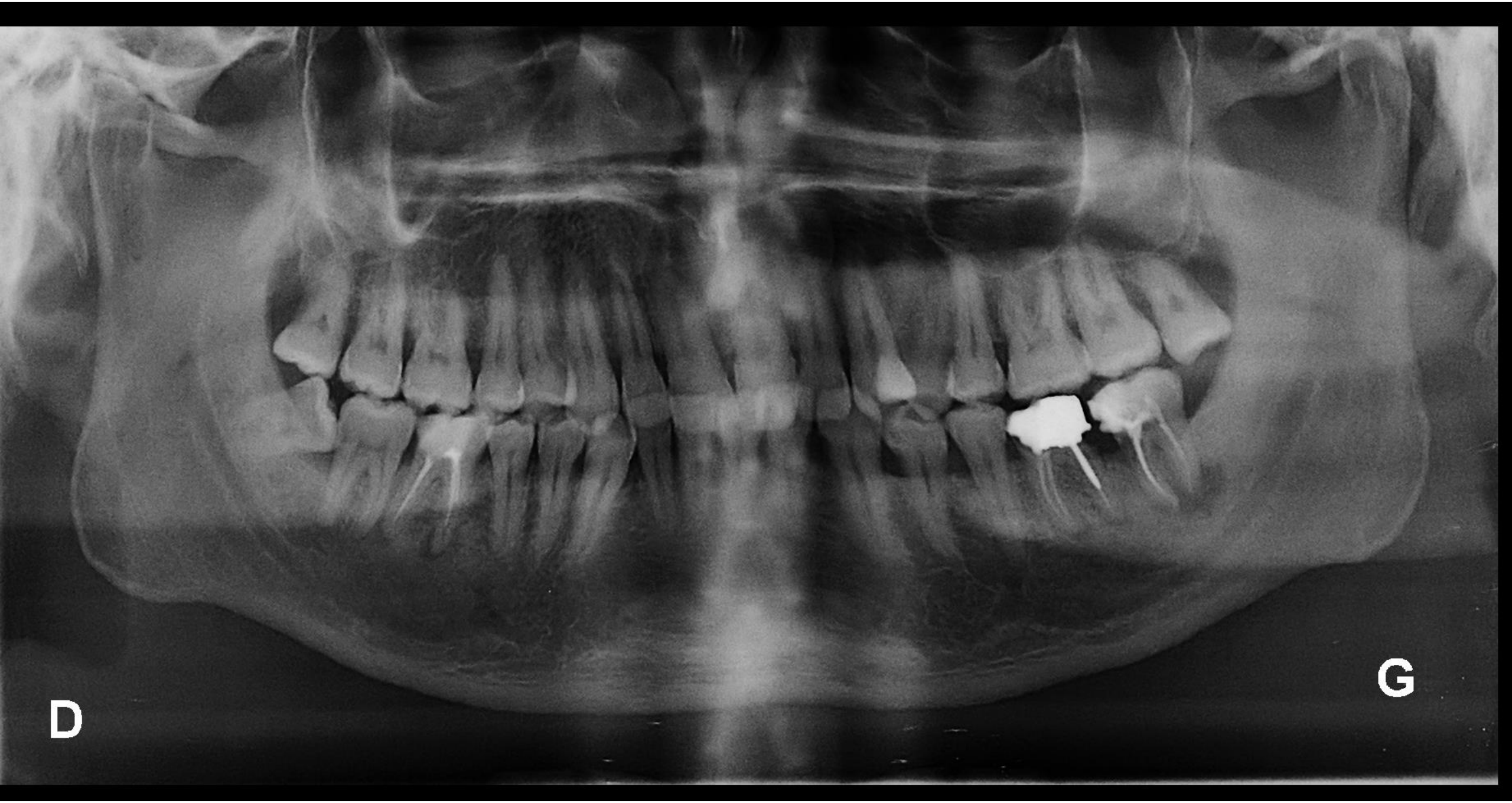









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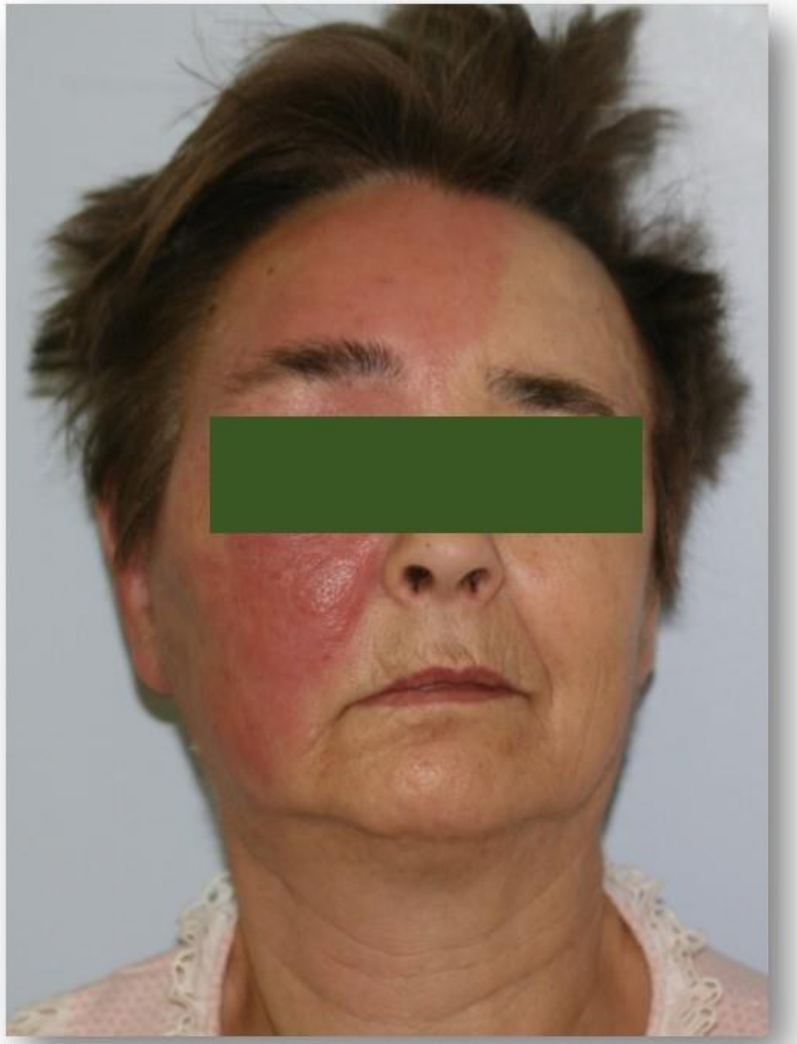
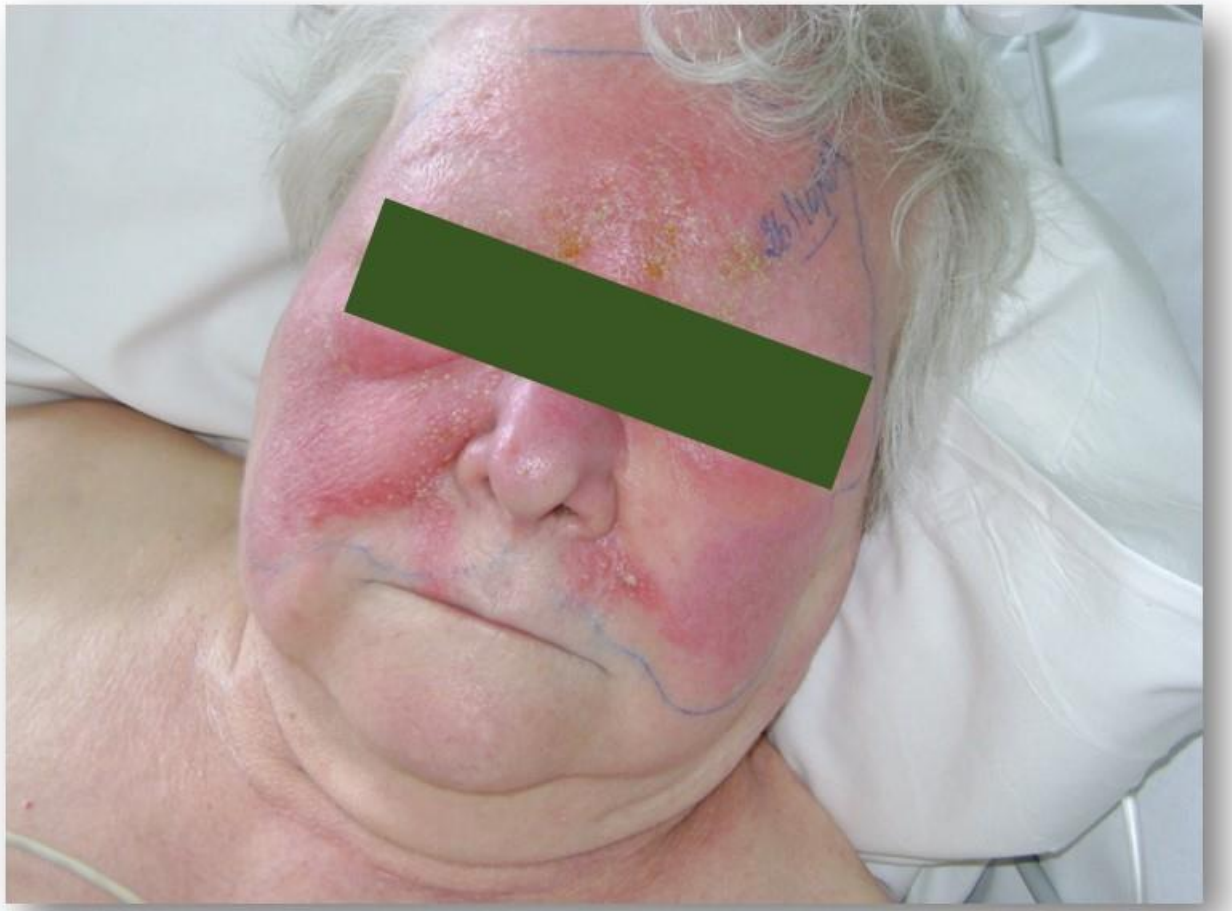
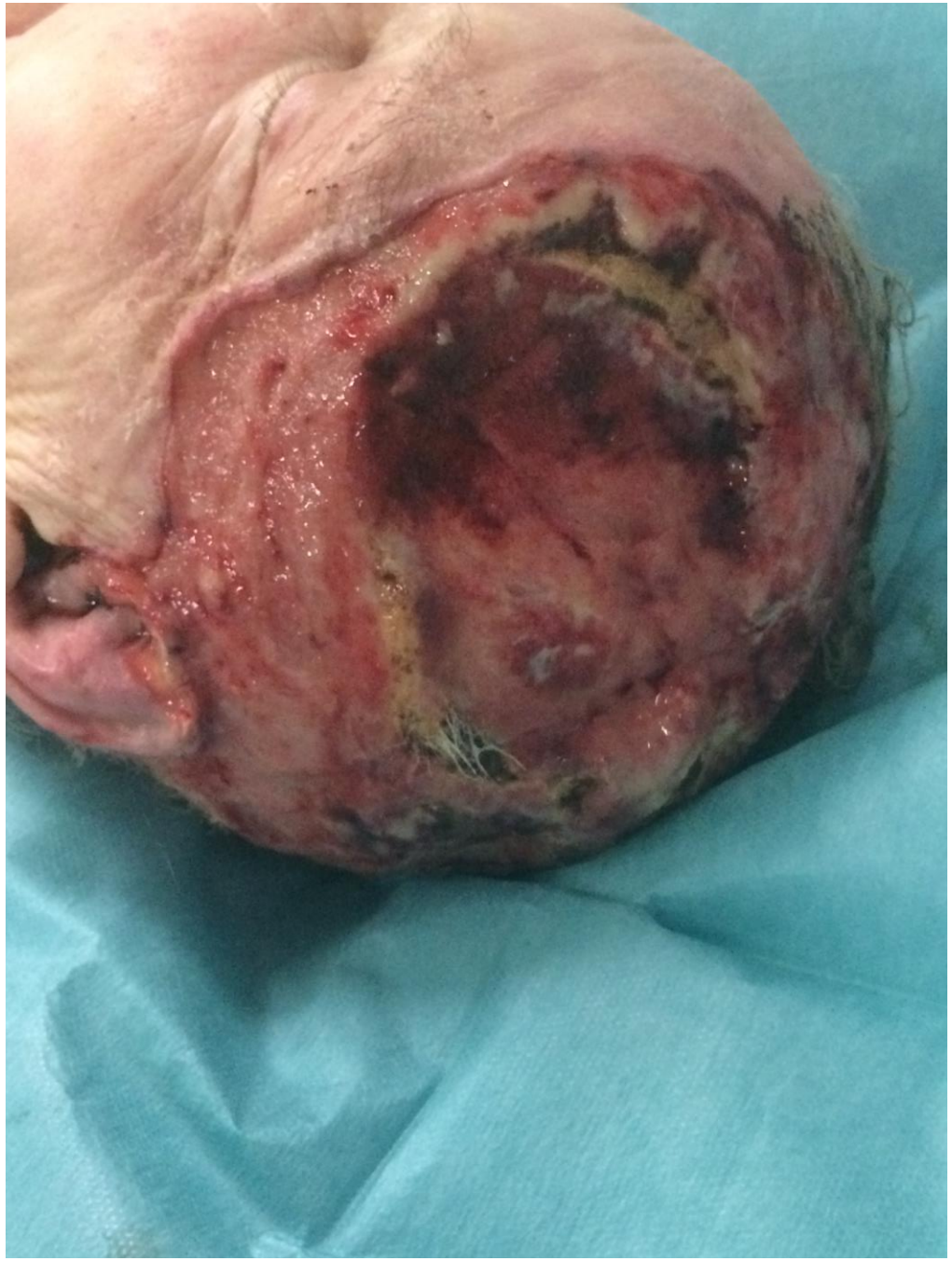
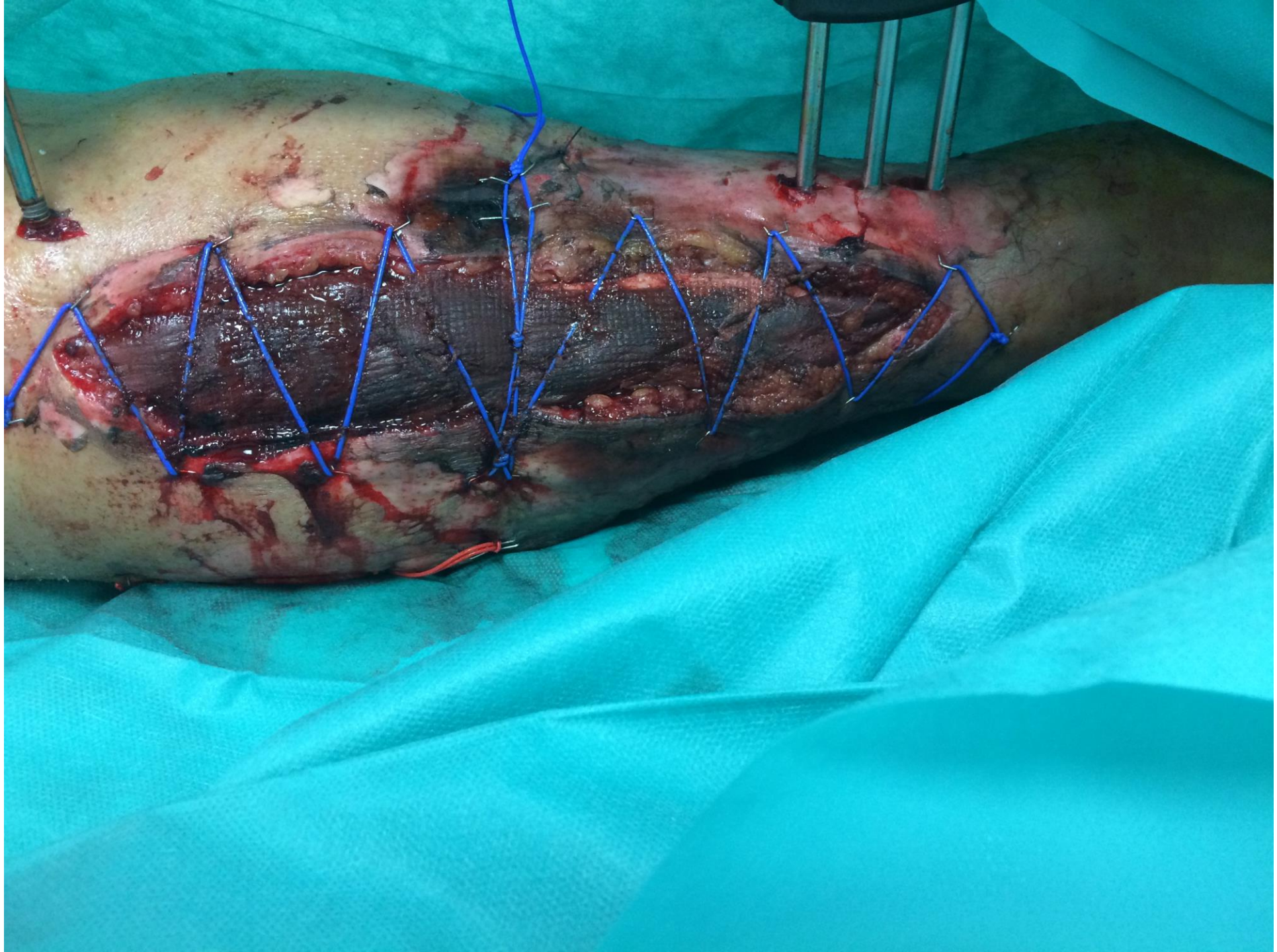
Erysipèle vs staphylococcie maligne de la face

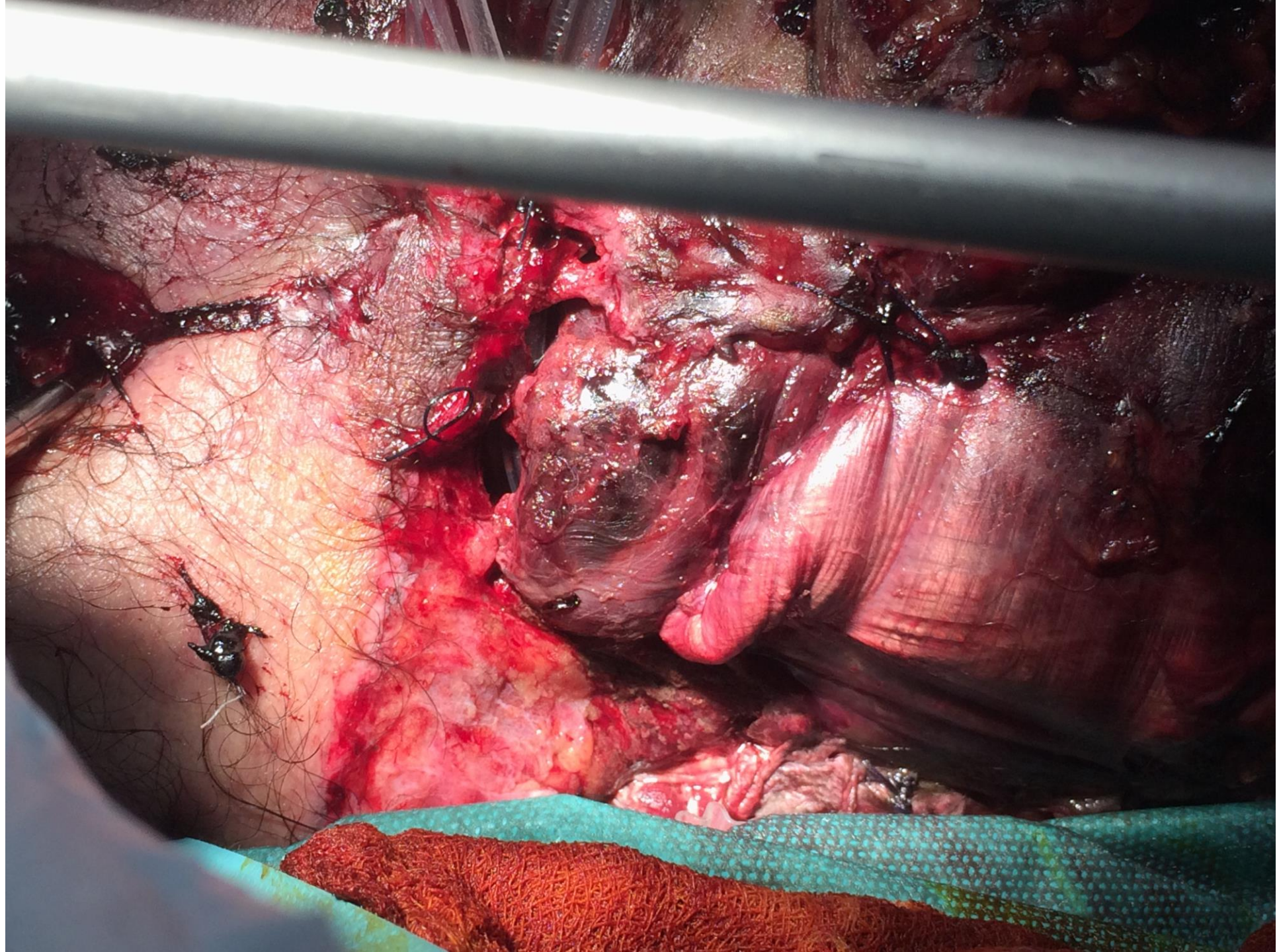


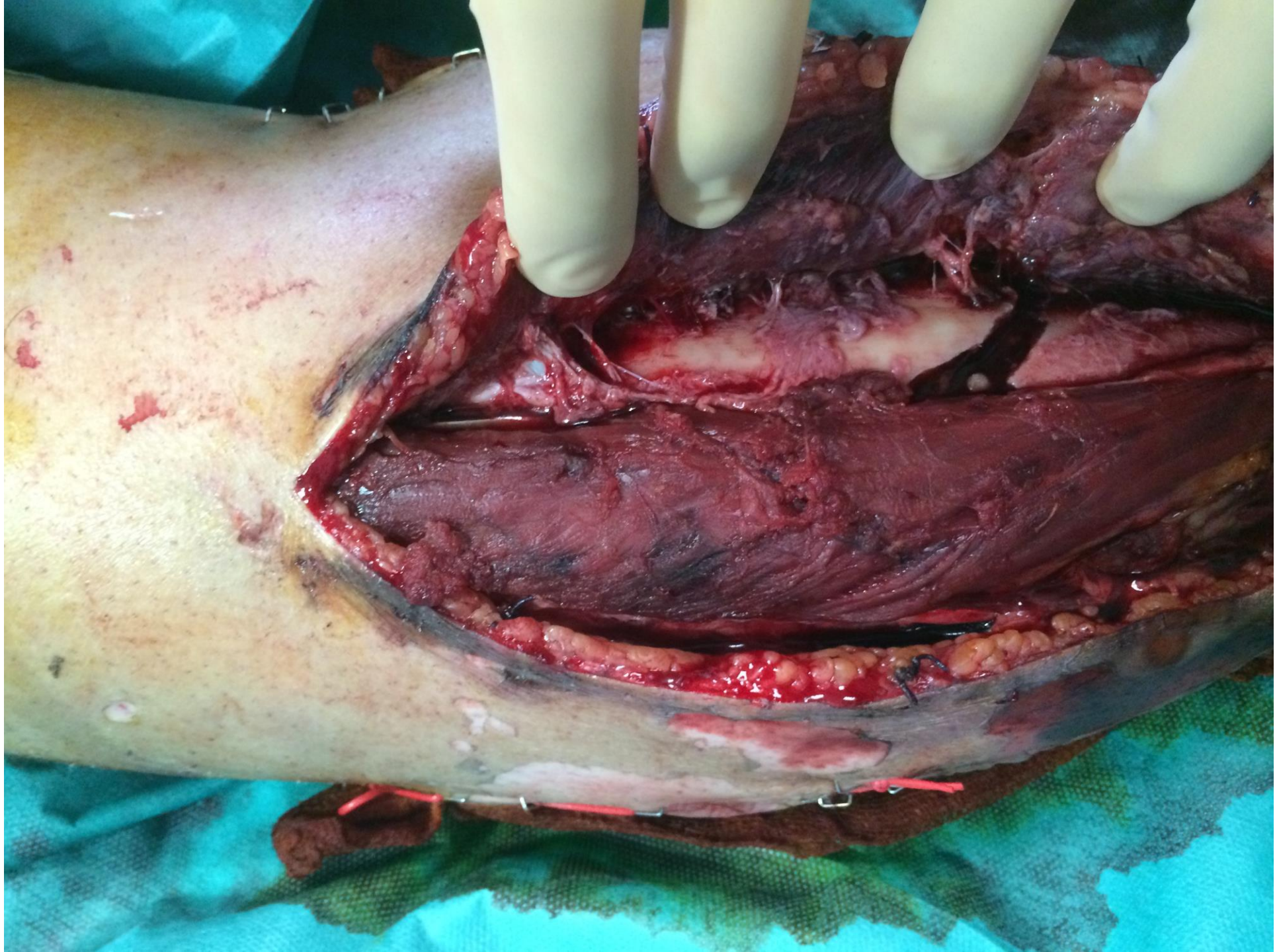


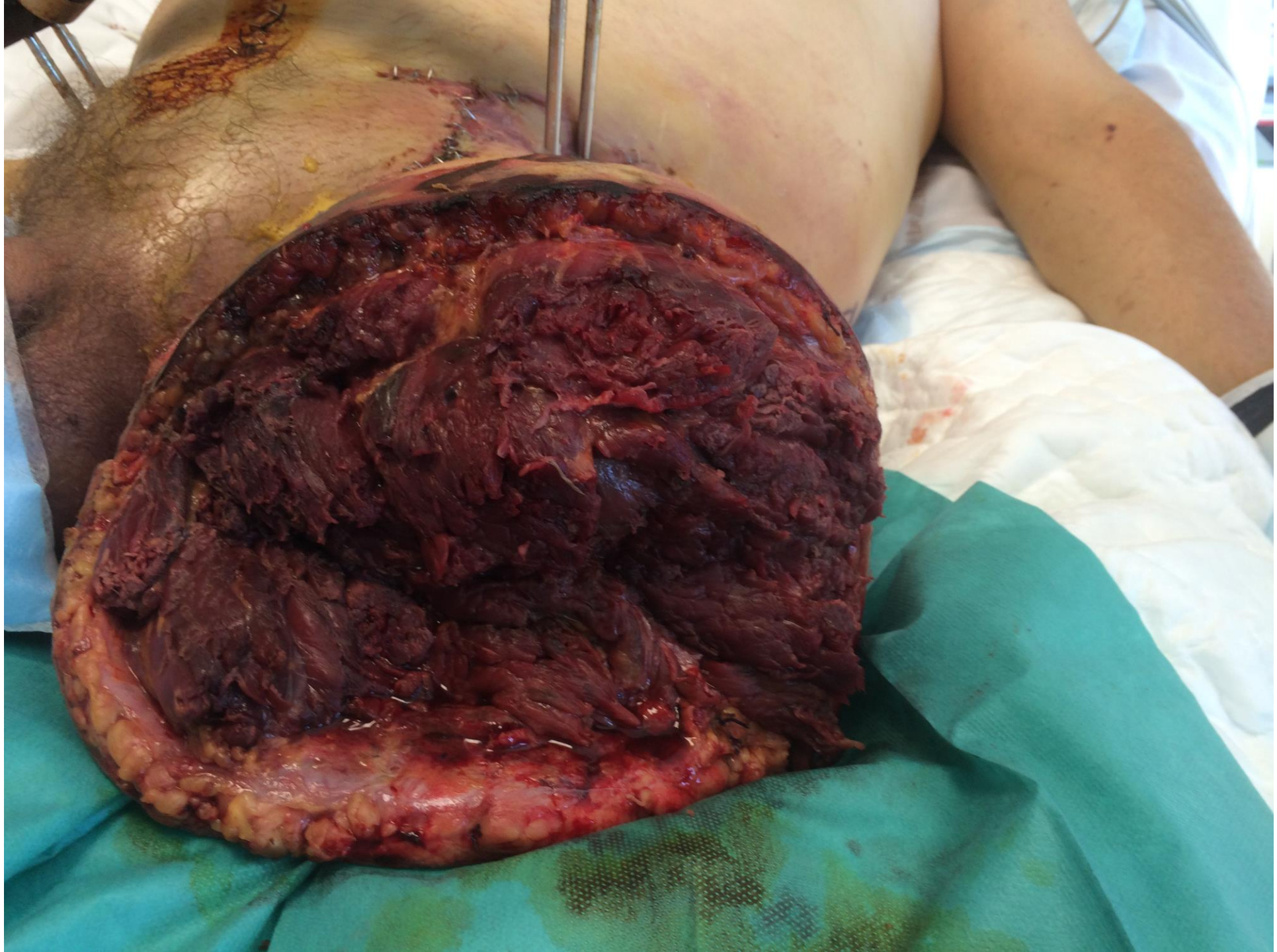
Crédit photo. Pr D Staumont-Salle. Dermato Lille



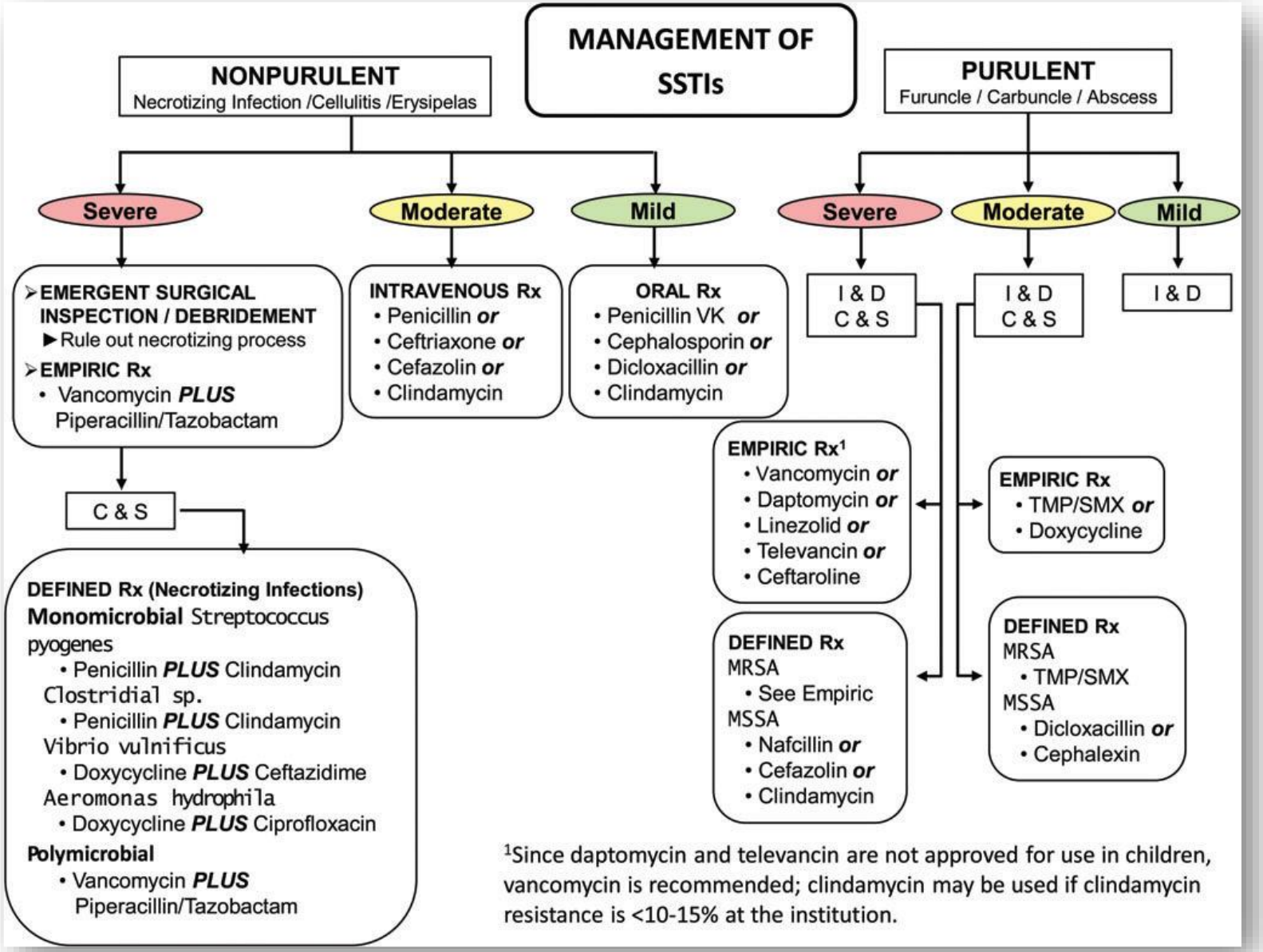








Antibiothérapie : les recommandations de l'IDSA « polluées » par le staphylocoque



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

Rank order of bacterial pathogens producing SSTI by region for the years 1998 to 2004, as determined by the SENTRY Program

Region/rank	7 years total (%)	Occurrence (%) by year					
		1998	1999	2000	2002	2003	2004
North America							
1. *S. aureus*	2602 (44.6)	535 (42.5)	178 (40.4)	644 (45.9)	606 (40.5)	–[a]	639 (51.6)
2. *P. aeruginosa*	648 (11.1)	160 (12.7)	48 (10.9)	152 (10.8)	186 (12.4)	–	102 (8.2)
3. *Enterococcus* spp.	542 (9.3)	105 (8.3)	47 (10.7)	115 (8.2)	153 (10.2)	–	122 (9.8)
4. *E. coli*	422 (7.2)	85 (6.8)	42 (9.5)	98 (7.0)	111 (7.4)	–	86 (6.9)
5. *Enterobacter* spp.	282 (4.8)	49 (3.9)	22 (5.0)	81 (5.8)	79 (5.3)	–	51 (4.1)
6. *Klebsiella* spp.	248 (4.2)	41 (3.3)	18 (4.1)	71 (5.1)	69 (4.6)	–	49 (4.0)
7. β-Streptococcus	237 (4.1)	57 (4.5)	15 (3.4)	32 (2.3)	67 (4.5)	–	66 (5.3)
8. *P. mirabilis*	166 (2.8)	45 (3.6)	5 (1.1)	42 (3.0)	42 (2.8)	–	32 (2.6)
9. CoNS[b]	161 (2.8)	30 (2.4)	16 (3.6)	48 (3.4)	44 (2.9)	–	23 (1.9)
10. *Serratia* spp.	125 (2.1)	30 (2.4)	9 (2.0)	28 (2.0)	41 (2.7)	–	17 (1.4)
Total isolates tested (% of top 10)	5837 (93.1)	1258 (90.4)	441 (90.7)	1403 (93.4)	1496 (93.4)	0	1239 (95.8)
Latin America							
1. *S. aureus*	824 (33.5)	142 (33.3)	157 (34.3)	153 (35.0)	197 (33.6)	–[a]	175 (31.6)
2. *E. coli*	344 (14.0)	61 (14.3)	60 (13.1)	54 (12.4)	79 (13.5)	–	90 (16.3)
3. *P. aeruginosa*	308 (12.5)	40 (9.4)	57 (12.4)	58 (13.3)	98 (16.7)	–	55 (9.9)
4. *Klebsiella* spp.	173 (7.0)	31 (7.3)	21 (4.6)	36 (8.2)	40 (6.8)	–	45 (8.1)
5. *Enterococcus* spp.	168 (6.8)	41 (9.6)	31 (6.8)	29 (6.6)	32 (5.5)	–	35 (6.3)
6. *Enterobacter* spp.	127 (5.2)	21 (4.9)	23 (5.0)	20 (4.6)	32 (5.5)	–	31 (5.6)
7. CoNS[b]	125 (5.1)	25 (5.9)	27 (5.9)	25 (5.7)	19 (3.2)	–	29 (5.2)
8. *P. mirabilis*	83 (3.4)	13 (3.1)	16 (3.5)	14 (3.2)	15 (2.6)	–	25 (4.5)
9. *Acinetobacter* spp.	81 (3.3)	21 (4.9)	16 (3.5)	11 (2.5)	16 (2.7)	–	17 (3.1)
10. β-Streptococcus	53 (2.2)	3 (0.7)	19 (4.1)	4 (0.9)	20 (3.4)	–	7 (1.3)
Total isolates tested (% of top 10)	2461 (92.9)	426 (93.4)	458 (93.2)	437 (92.4)	587 (93.4)	0	553 (92.0)
Europe							
1. *S. aureus*	1732 (37.5)	437 (35.7)	16 (15.8)	216 (31.0)	40 (34.8)	550 (41.8)	473 (40.5)
2. *P. aeruginosa*	555 (12.0)	179 (14.6)	24 (23.8)	97 (13.9)	14 (12.2)	131 (9.9)	110 (9.4)
3. *E. coli*	501 (10.8)	123 (10.0)	23 (22.8)	94 (13.5)	11 (9.6)	119 (9.0)	133 (11.4)
4. *Enterococcus* spp.	281 (6.1)	84 (6.9)	3 (3.0)	51 (7.3)	8 (7.0)	70 (5.3)	65 (5.6)
5. *Enterobacter* spp.	243 (5.3)	53 (4.3)	12 (11.9)	40 (5.7)	6 (5.2)	70 (5.3)	62 (5.3)
6. CoNS	235 (5.1)	69 (5.6)	4 (4.0)	34 (4.9)	2 (1.7)	69 (5.2)	57 (4.9)
7. β-Streptococcus	215 (4.7)	31 (2.5)	1 (1.0)	12 (1.7)	12 (10.4)	65 (4.9)	62 (5.3)
8. *Klebsiella* spp.	205 (4.4)	59 (4.8)	7 (6.9)	40 (5.7)	5 (4.3)	44 (3.3)	50 (4.3)
9. *P. mirabilis*	145 (3.1)	39 (3.2)	1 (1.0)	23 (3.3)	3 (2.6)	35 (2.7)	44 (3.8)
10. *Acinetobacter* spp.	87 (1.5)	30 (2.4)	5 (5.0)	21 (3.0)	2 (1.7)	31 (2.4)	18 (1.5)
Total isolates tested (% of top 10)	4622 (90.8)	1225 (90.1)	101 (95.0)	697 (90.1)	115 (89.6)	1317 (89.9)	1167 (92.0)

Longitudinal trends in key antimicrobial resistance occurring in different regions (SENTRY Program, 1998–2004)

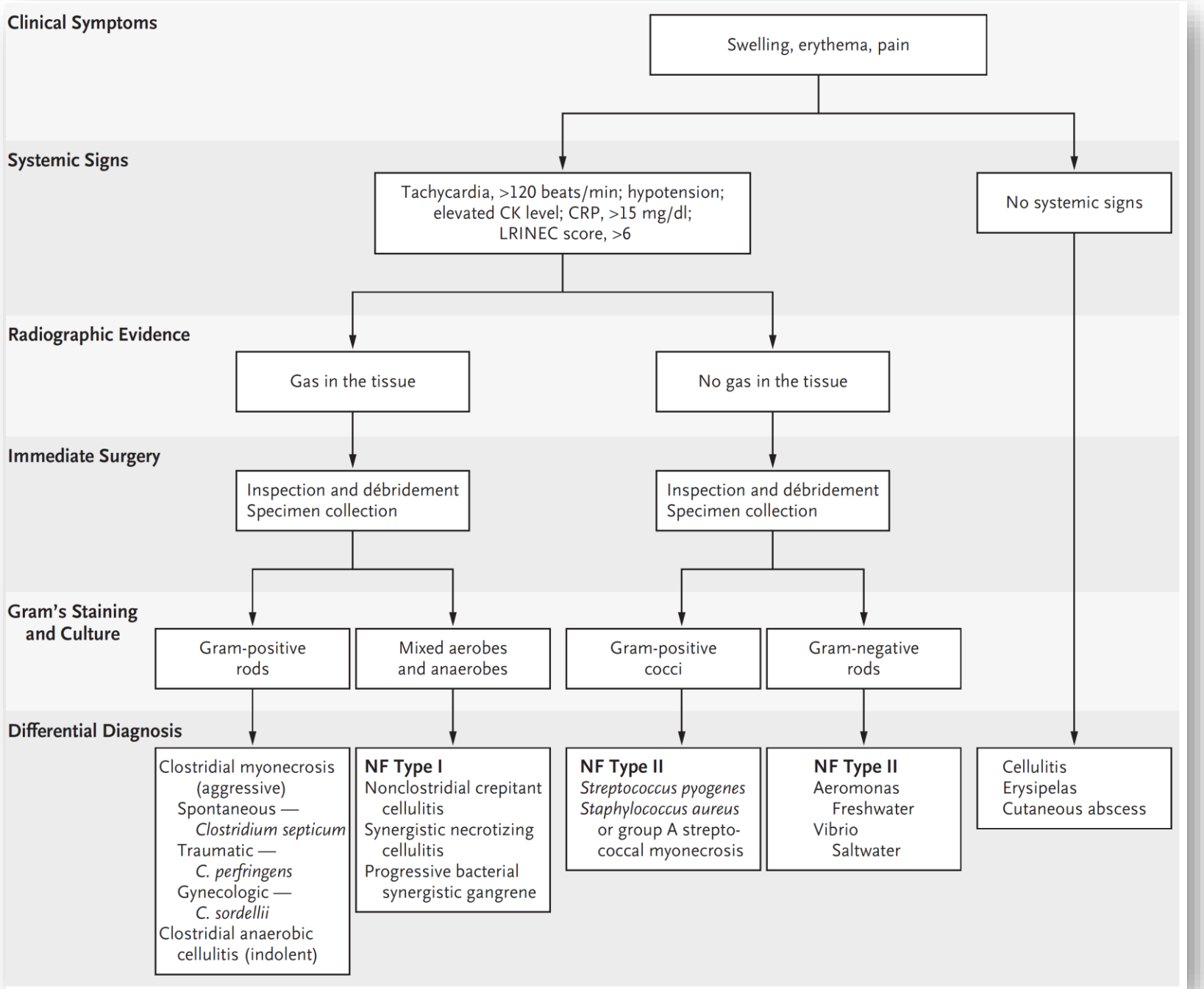
Organism/continent	No. of isolates (% resistant)[a] by year						
	Total	1998	1999	2000	2002	2003	2004
Oxacillin-resistant S. aureus							
North America	2602 (35.9)	535 (26.2)	178 (36.0)	644 (29.5)	606 (39.1)	–	639 (47.4)
Latin America	824 (29.4)	142 (30.3)	157 (28.0)	153 (24.8)	197 (25.4)	–	175 (38.3)
Europe	1732 (22.8)	437 (24.3)	16 (43.8)	216 (22.2)	40 (30.0)	550 (21.1)	473 (22.4)
VREs[b]							
North America	542 (12.2)	105 (8.6)	47 (12.8)	115 (9.6)	153 (14.4)	–	122 (14.8)
Latin America	168 (4.2)	41 (0.0)	31 (3.2)	29 (3.4)	32 (12.5)	–	35 (2.9)
Europe	281 (3.6)	84 (3.6)	3 (0.0)	51 (2.0)	8 (0.0)	70 (1.4)	65 (7.7)
Multidrug-resistant P. aeruginosa[c]							
North America	648 (3.2)	160 (1.3)	48 (2.1)	152 (4.6)	186 (3.8)	–	102 (3.9)
Latin America	308 (24.7)	40 (20.0)	57 (19.3)	58 (24.1)	98 (32.7)	–	55 (20.0)
Europe	555 (10.8)	179 (10.1)	24 (20.8)	97 (11.3)	14 (35.7)	131 (9.2)	110 (8.2)
ESBL-phenotype E.coli[d]							
North America	422 (6.6)	85 (3.5)	42 (7.1)	98 (6.1)	111 (4.5)	–	86 (12.8)
Latin America	344 (15.1)	61 (11.5)	60 (9.5)	54 (5.6)	79 (20.3)	–	90 (24.4)
Europe	501 (12.4)	123 (8.1)	23 (13.0)	94 (9.6)	11 (0.0)	119 (11.8)	133 (19.5)
ESBL-phenotype Klebsiella spp.[d]							
North America	248 (11.3)	41 (4.9)	18 (0.0)	71 (11.3)	69 (7.2)	–	49 (16.3)
Latin America	173 (48.0)	31 (35.5)	21 (42.9)	36 (44.4)	40 (47.5)	–	45 (62.2)
Europe	205 (24.9)	59 (25.4)	7 (28.6)	40 (25.0)	5 (40.0)	44 (22.7)	50 (24.0)

Moet GJ et al. Diag Microb and Inf Dis. 2007

Table 1. Factors Conferring a Predisposition to Specific Necrotizing Soft-Tissue Infections.*

Predisposing Factor	Clinical Syndrome	Etiologic Agent
Major penetrating trauma: crush or deeply penetrating wound	Gas gangrene	*Clostridium perfringens*, *C. histolyticum*, or *C. novyi*
Minor penetrating trauma	NF type II	
Freshwater laceration		*Aeromonas hydrophila*
Saltwater laceration		*Vibrio vulnificus*
Minor nonpenetrating trauma: muscle strain, sprain, or contusion	NF type II or streptococcal myonecrosis	*Streptococcus pyogenes*
Mucosal breach: mucosal tear (rectal, vaginal, urethral); gastrointestinal, genitourinary or gynecologic surgery	NF type I	Mixed aerobic and anaerobic organisms
Skin breach		
Varicella lesions	NF type II or streptococcal myonecrosis	*S. pyogenes*
Insect bites	NF type II or streptococcal myonecrosis	*S. pyogenes*
Injection drugs	Gas gangrene	*C. perfringens*, *C. histolyticum*, *C. novyi*, or *C. sordellii*
Immunocompromised state		
Diabetes with peripheral vascular disease	NF type I	Mixed aerobic and anaerobic organisms
Cirrhosis and ingestion of raw oysters	NF type II	*V. vulnificus*
Neutropenia	Gas gangrene	*C. septicum*
In women: pregnancy, childbirth, abortion (spontaneous or medically induced), gynecologic procedures or surgery	NF type II, streptococcal myonecrosis, or clostridial myonecrosis	*S. pyogenes*, *C. perfringens*, or *C. sordellii*
Occult factors: colonic lesions, including carcinoma	Spontaneous gas gangrene	*C. septicum*

Stevens DL, Bryant AE. NEJM. 2017

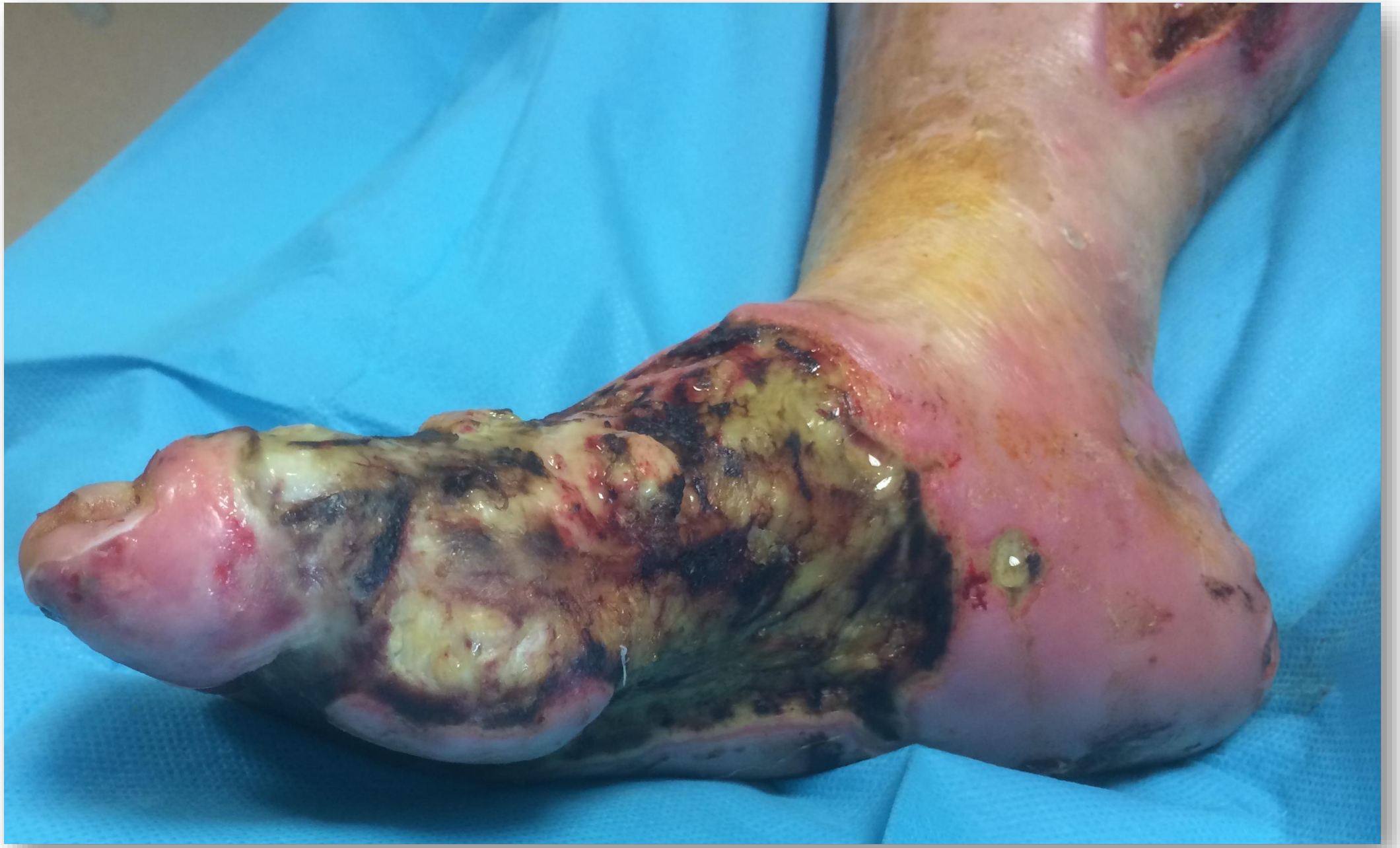


Stevens JL et al. NEJM, 2017

Sites	Concentrations bactériennes par ml ou g	Rapport anaérobies/aérobies
Voies aériennes supérieures		
Narine	10^3 - 10^4	3 - 5 / 1
Salive	10^8 - 10^9	1 / 1
Plaque dentaire	10^{10} - 10^{11}	1 / 1
Gencive	10^{11} - 10^{12}	1000 / 1
Tube digestif		
Estomac	10^2 - 10^5	1/ 1
Duodénum	10^2 - 10^4	1/ 1
Iléon	10^4 - 10^7	1/ 1
Colon	10^{11} - 10^{12}	1000 / 1
Tractus Génital Féminin		
Vagin	10^8 - 10^9	3 - 5 / 1
Endocol	10^8 - 10^9	3 - 5 / 1

Pour faire simple

- Tête et cou : amoxicilline + acide clavulanique
- Membres : amoxicilline + acide clavulanique
- Périnée/OGE : pipéracilline/tazobactam
- Pied diabétique/contexte particulier : penser au *Pseudomonas/Staph/*ostéite/vascularisation
- SARM : en fonction terrain/circonstances



Et si un jour ça résiste

Antimicrobial activity of ceftazidime/avibactam, ceftolozane/tazobactam, meropenem/vaborbactam, imipenem/relebactam, and comparators against resistant subsets of *P. aeruginosa* isolates from patients with SSTI.

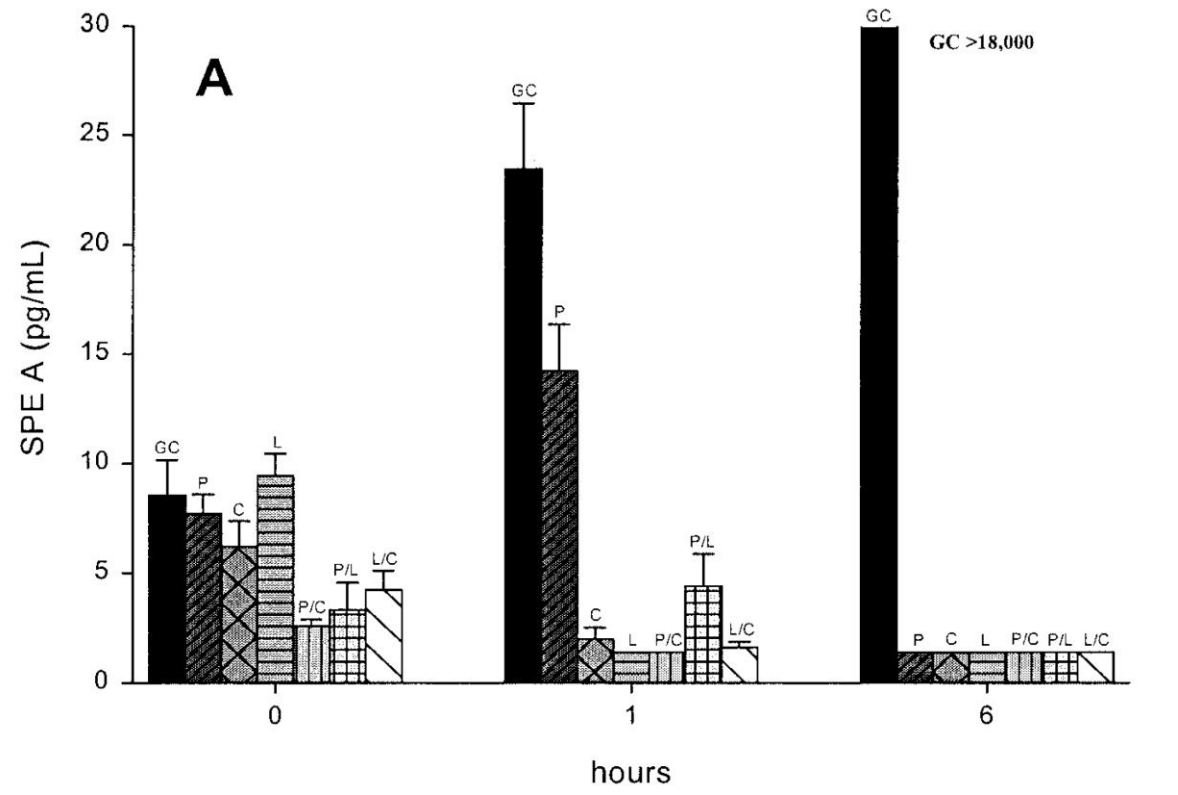
Resistant phenotype (no. of isolates)	% Susceptible per EUCAST			
	Ceftazidime/avibactam	Ceftolozane/tazobactam	Imipenem/relebactam	Meropenem/vaborbactam
Meropenem-nonsusceptible (MIC >2 mg/L; n=54)	92.6	90.6	88.9	61.1
Imipenem-resistant (MIC >4 mg/L; n=48)	93.8	91.5	87.5	56.3
Piperacillin/tazobactam-resistant (MIC >16 mg/L; n=57)	89.5	91.1	89.5	69.6
Ceftazidime-resistant (MIC >8 mg/L; n=48)	87.5	91.7	89.6	76.6
β-lactam-resistant[a] (n=17)	82.4	82.4	70.6	35.3

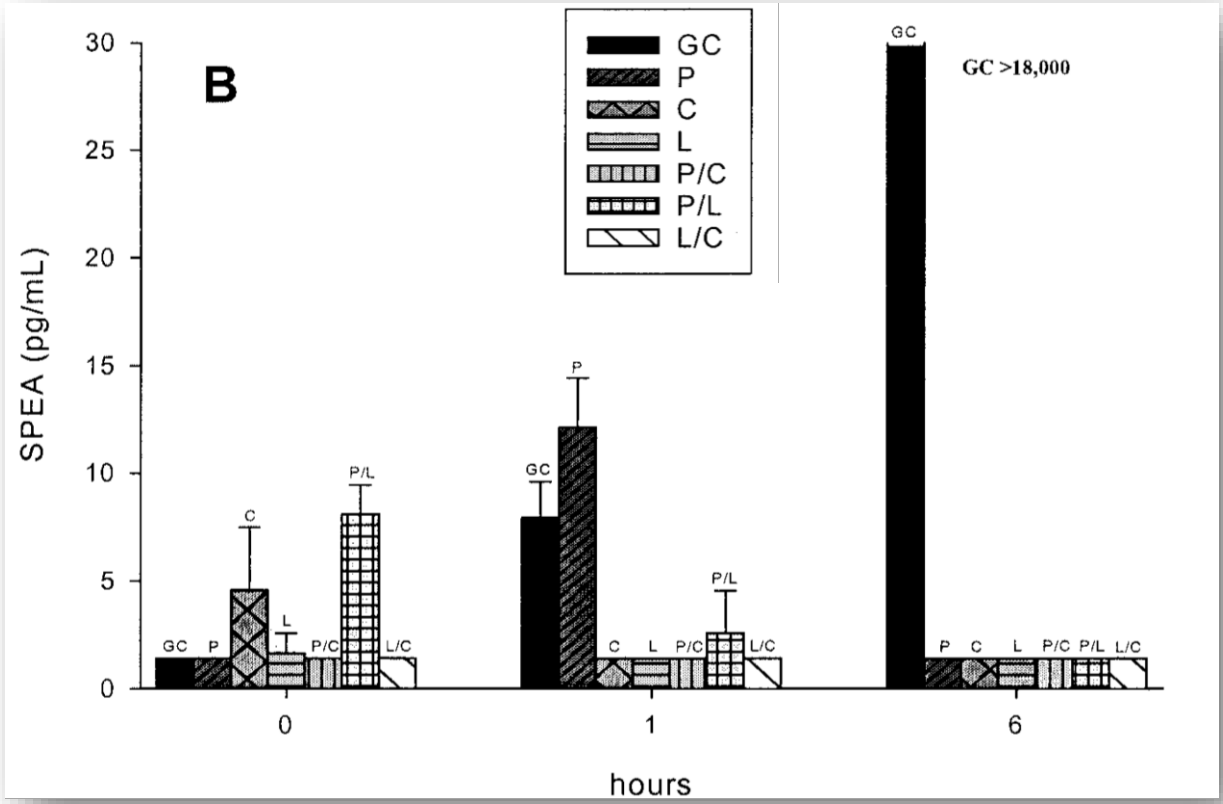
[a] Isolates resistant to piperacillin/tazobactam (MIC >16 mg/L), imipenem (MIC >4 mg/L), and ceftazidime (MIC >8 mg/L) and nonsusceptible to meropenem (MIC >2 mg/L) per EUCAST criteria (EUCAST, 2021).

Sader HS et al. Int J Inf Dis. 2021

Antibiotique	BLSE classe A, classe C et classe D non carbapénémases	Carbapénémases		Metallobétalactamase classe B	Pyo	Acinéto
		KPC	Oxa			
ceftolozane/tazobactam	+	-	-	-	+	-
ceftazidime/avibactam	+ (/!\ AmpC)	+	+/-	-	+	-
Imipénème-cilastatine/relebactam	+	+	-	-	+	-
Méropénème/vaborbactam	+	+	-	-	+/-	-
Aztréonam	-	-	-	+	+	-
céfidérocol	+	+	+	+	+	+

Approche antitoxinique

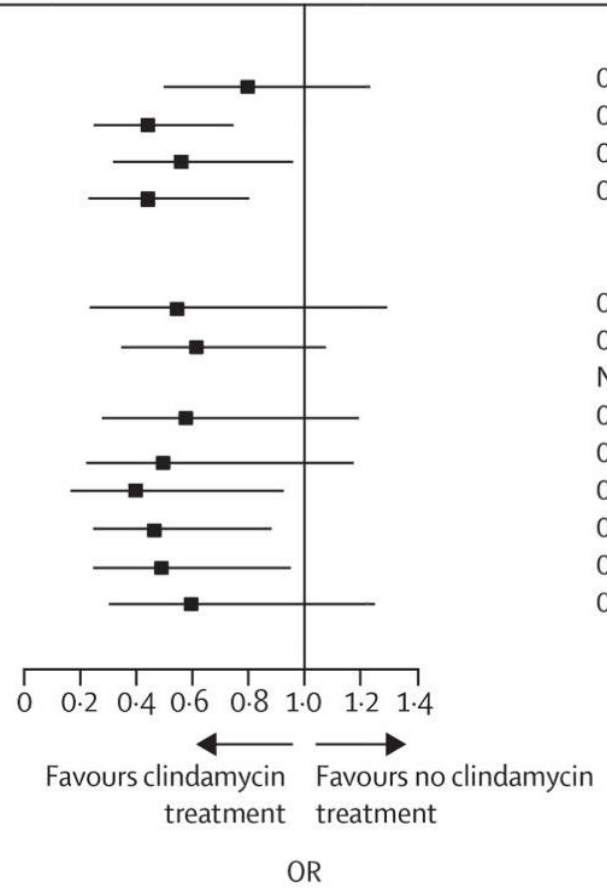




Coyle EA et al. AAC. 2003

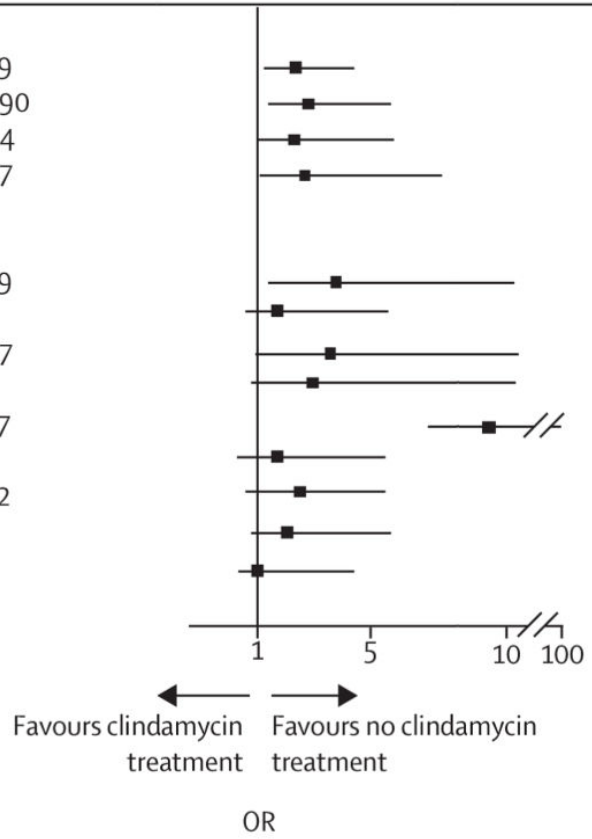
Effet positif de la clinda dans les infections à SBA, y compris sans choc et sans nécrose

	Clindamycin treatment		No clindamycin treatment		p value	OR (95% CI)
	Patients	Mortality (%)	Patients	Mortality (%)		
Primary analysis						
Unmatched, unadjusted	343	28 (8·2%)	736	74 (10·1%)	0·32	0·80 (0·50–1·24)
Unmatched, adjusted*					0·0031	0·44 (0·25–0·75)
Propensity-matched (1:2), unadjusted	277	18 (6·5%)	500	55 (11·0%)	0·042	0·56 (0·32–0·96)
Propensity-matched (1:2), adjusted*					0·011	0·44 (0·23–0·81)
Subgroup analysis†						
Early clindamycin treatment	97	6 (6·2%)	500	55 (11·0%)	0·16	0·53 (0·22–1·28)
Proven invasive β-haemolytic streptococcal infection	153	18 (11·8%)	282	51 (18·1%)	0·087	0·60 (0·33–1·06)
Probable invasive β-haemolytic streptococcal infection	124	0	218	4 (1·8%)	1·00	NA‡
Intensive care unit patients	55	13 (23·6%)	90	32 (35·6%)	0·13	0·56 (0·26–1·18)
Without vasopressor-dependent shock or necrotising fasciitis	37	12 (32·4%)	57	28 (49·1%)	0·11	0·48 (0·21–1·16)
Without vasopressor-dependent shock	239	6 (2·6%)	442	27 (6·1%)	0·043	0·40 (0·15–0·91)
Clindamycin treatment for >1 days	226	12 (5·3%)	500	55 (11·0%)	0·016	0·45 (0·23–0·87)
Clindamycin treatment for >2 days	183	10 (5·5%)	500	55 (11·0%)	0·032	0·47 (0·23–0·94)
Clindamycin treatment for >3 days	122	9 (6·9%)	500	55 (11·0%)	0·17	0·58 (0·29–1·24)



Résultats inverses dans les infections non à groupe A/B

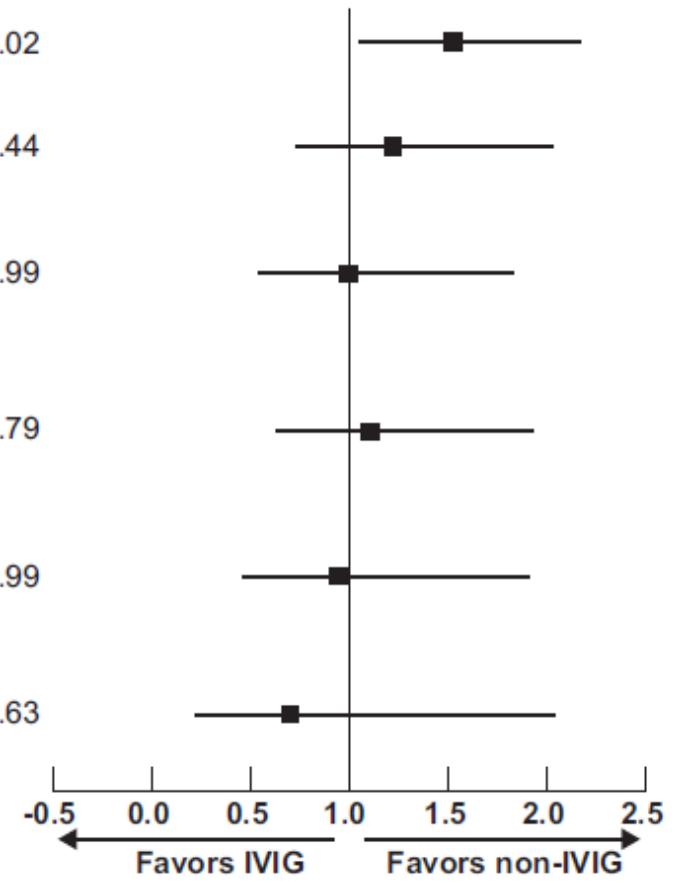
	Clindamycin treatment		No clindamycin treatment		p value	OR (95% CI)
	Patients	Mortality (%)	Patients	Mortality (%)		
Primary analysis						
Unmatched, unadjusted	116	12 (10%)	761	37 (5%)	0·019	2·26 (1·10–4·35)
Unmatched, adjusted*					0·0090	2·73 (1·24–5·67)
Propensity-matched (1:2), unadjusted	102	10 (10%)	193	9 (5%)	0·094	2·22 (0·87–5·78)
Propensity-matched (1:2), adjusted*					0·067	2·60 (0·94–7·52)
Subgroup analysis†						
Early clindamycin treatment	39	6 (15%)	193	9 (5%)	0·019	3·72 (1·23–11·14)
Proven invasive β-haemolytic streptococcal infection	57	5 (9%)	106	6 (6%)	0·45	1·60 (0·44–5·56)
Probable invasive β-haemolytic streptococcal infection	45	5 (11%)	87	3 (4%)	0·097	3·50 (0·82–17·75)
Intensive care unit patients	19	5 (26%)	36	4 (11%)	0·16	2·86 (0·66–13·14)
Vasopressor-dependent shock	7	5 (71%)	14	3 (21%)	0·037	9·17 (1·29–93·76)
Without vasopressor-dependent shock or necrotising fasciitis	95	5 (5%)	177	6 (3%)	0·45	1·60 (0·15–5·46)
Clindamycin treatment for >1 days	85	9 (1%)	193	9 (5%)	0·072	2·42 (0·93–6·33)
Clindamycin treatment for >2 days	69	6 (9%)	193	9 (5%)	0·22	1·95 (0·67–5·69)
Clindamycin treatment for >3 days	47	2 (4%)	193	9 (5%)	0·90	0·91 (0·19–4·35)



Babiker A et al. LID. 2021

Les immunoglobulines polyvalentes n'ont pas d'impact sur la mortalité des fasciites nécrosantes sous vasopresseurs

Comparison of NF shock cases	IVIG Cases No.	IVIG Cases Mortality (%)	Non-IVIG Cases No.	Non-IVIG Cases Mortality (%)	*P* Value
All cases; unadjusted	164	26.8	3963	19.4	.02
Matched pairs, unadjusted	161	27.3	161	23.6	.44
Matched pairs adjusted by multivariable logistic regression*	161	27.3	161	23.6	.99
Matched pairs, treated with clindamycin†	153	26.3	153	25	.79
Matched pairs receiving IVIG within 2 days†	90	28.9	90	30	.99
Matched pairs coded for TSS, GAS, and/or SA†	56	16.1	56	21.4	.63



Kadri SS et al. CID. 2017

Les immunoglobulines polyvalentes n'améliorent pas le score fonctionnel à 6 mois dans les fasciites non sélectionnées

Primary outcome	IVIG group	Placebo group	Mean difference (95% CI)[a]	*P* value
PCS score adjusted for site of infection[b]	36 (0 to 43) [29]	31 (0 to 47) [28]	1 (-7 to 10)	0.81[c]
Secondary outcomes	**IVIG group**	**Placebo group**	**Relative risk (95% CI)**	***P* value**
Mortality				
Mortality, day 28	6/50 (12%)	6/50 (12%)	1.00 (0.35 to 2.89)	>0.99
Mortality, day 90	9/50 (18%)	11/50 (22%)	0.82 (0.37 to 1.80)	0.80
Mortality, day 180[d]	11/49 (22%)	14/50 (28%)	0.80 (0.40 to 1.59)	0.65
Serious adverse reactions in the ICU				
All serious adverse reactions[e]	8/50 (16%)	11/50 (22%)	0.72 (0.32 to 1.65)	0.61
Acute kidney injury	6/45 (13%)	8/49 (16%)	0.82 (0.31 to 2.17)	0.78
Thrombi	2/50 (4%)	3/50 (6%)	0.67 (0.12 to 3.82)	>0.99
Use of life-support in the ICU				
Mechanical ventilation	49/50 (98%)	50/50 (100%)	0.98 (0.94 to 1.02)	>0.99
Vasopressor/inotrope	46/50 (92%)	47/50(94%)	0.98 (0.88 to 1.09)	>0.99
Renal replacement therapy	11/50 (22%)	6/50 (12%)	1.83 (0.73 to 4.57)	0.29
Bleeding and amputation				
Any bleeding in the ICU	5/50 (10%)	5/50 (10%)	1.00 (0.31 to 3.24)	>0.99
Severe bleeding in the ICU	4/50 (8%)	2/50 (4%)	2.00 (0.38 to 10.43)	0.68
Amputation in the 180 days after randomisation	4/50 (8%)	6/50 (12%)	0.67 (0.20 to 2.22)	0.74
Secondary outcomes continued	**IVIG group**	**Placebo group**	**Mean difference (95% CI)**	**P value**
SOFA score day 1 to 7[f]	NA	NA	0.15 (-1.70 to 2.00)	0.90[g]
Blood products given in the ICU, ml	1529 (498 to 2559)	1712 (681 to 2742)	-183 (-1641 to 1275)	0.80
Time to resolution of shock in the 28 days after randomisation, days[h]	8.4 (6.1 to 10.8)	8.7 (6.4 to 11.1)	NA	0.69
Alive and off life-support in the 90 days after randomisation, days	70 (61 to 79)	67 (59 to 76)	NA	0.41
Alive and out of hospital in the 180 days after randomisation, days[i]	107 (90 to 124)	99 (82 to 117)	NA	0.50

Microbiological findings		
Polymicrobial infection[i]	31/47 (66%)	31/44 (70%)
Group A streptococcus	4/31 (13%)	1/31 (3%)
S. aureus	5/31 (16%)	3/31 (10%)
Other aerobic bacteria[j]	29/31 (94%)	31/31 (100%)
Anaerobic bacteria[k]	18/31 (58%)	20/31 (65%)
Fungi	4/31 (13%)	3/31 (10%)
Monomicrobial infection[i]	16/47 (34%)	13/44 (30%)
Group A streptococcus	9/16 (56%)	4/13 (31%)

Madsen MB et al. ICM. 2017

Un intérêt dans les infections à Strepto A ?

Table 3. Primary and secondary end points of a study assessing the efficacy of administration of high-dose intravenous polyspecific IgG.

	All included patients		Patients with GAS only	
End point	IVIG group (n = 10)	Placebo group (n = 11)	IVIG group (n = 8)	Placebo group (n = 10)
Primary: mortality day 28, no. (%) of patients	1 (10)	4 (36)	1 (12.5)	3 (30)
Secondary				
Time to resolution of shock,[a] h				
Mean	88	122	100	122
Median (range)	96 (2–159)	108 (47–294)	108 (2–159)	108 (47–294)
Time to no further progression of NF/cellulitis, h				
Mean	68[b]	36[c]	69[c]	36[c]
Median (range)	20 (2–168)[b]	24 (19–72)[c]	20 (2–168)[c]	24 (19–72)[c]
Mortality day 180, no. (%) of patients	2 (20)	4 (36)	1 (12.5)	3 (30)

Darenberg J et al. CID. 2013


POSEIDON


EUROPE

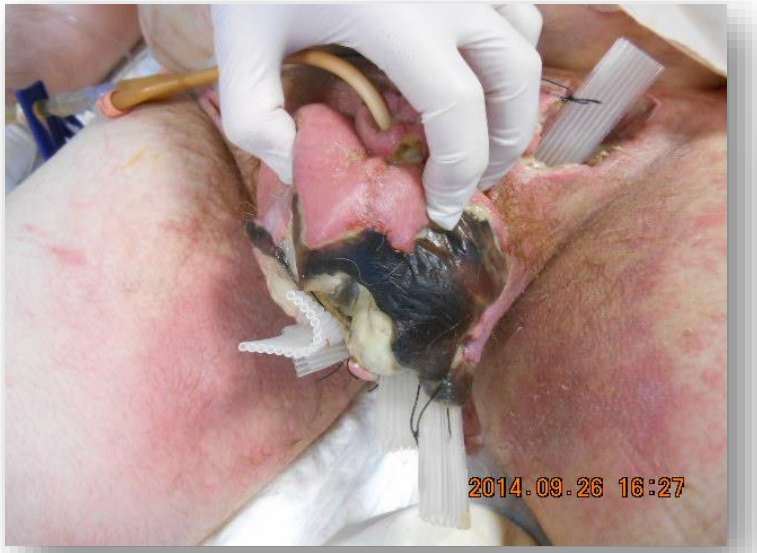
Peu d'évidence pour l'OHB. Mais des séries de cas et des registres plutôt en faveur, malgré le surcoût

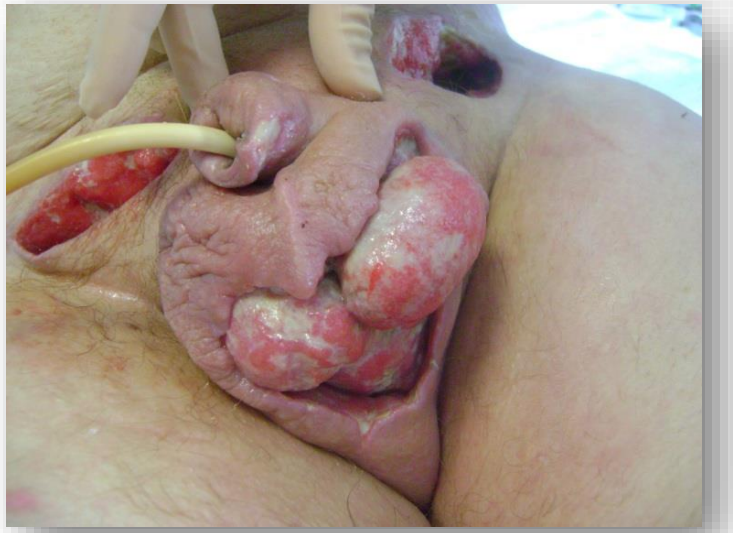
	HBOT (n = 405)	Control (n = 45,508)	p value
Mean age, years (95 % CI)	54.6 (53.2–56.1)	53.7 (53.6–53.9)	0.23
Gender			0.03*
Male	243 (60.0)	29,612 (65.1)	
Female	162 (40.0)	15,885 (34.9)	
Hospital bed size			0.02*
Small	33 (8.2)	5,359 (11.8)	
Medium	124 (30.6)	11,818 (26.0)	
Large	248 (61.2)	28,219 (62.2)	
Location/teaching status of hospital			<0.001*
Rural	16 (4.0)	4,865 (10.7)	
Urban non-teaching	222 (54.8)	18,621 (41.0)	
Urban teaching	167 (41.2)	21,910 (48.3)	
Deyo category [12]			0.05*
0	144 (35.6)	18,925 (41.6)	
1	129 (31.9)	12,808 (28.1)	
>1	132 (32.6)	13,775 (30.3)	
Admission type			<0.001*
Emergency	162 (43.4)	23,705 (59.9)	
Urgent	111 (29.8)	9,316 (23.5)	
Elective	92 (24.7)	6,344 (16.0)	
Newborn	0	81 (0.2)	
Others	≤10[b]	122 (0.3)	
Admission source			<0.001*
Emergency room	147 (39.4)	21,976 (57.6)	
Another hospital	47 (12.6)	3,411 (8.9)	
Another facility including long-term care	19 (5.1)	969 (2.5)	
Court/law enforcement	0	36 (0.1)	
Routine/birth/other[a]	160 (42.9)	11,750 (30.8)	
Site of NSTI			
Truncal	19 (4.7)	1,491 (3.3)	0.10
Extremity	57 (14.1)	6,681 (14.7)	0.73
Mechanism of NSTI			0.75
Traumatic	≤10[b]	1,018 (2.2)	
Non-traumatic	395 (97.5)	44,490 (97.8)	
Pathogen for NSTI			0.005*
Clostridial myonecrosis	66 (16.3)	10,032 (22.0)	
Non-clostridial myonecrosis	339 (83.7)	35,476 (78.0)	

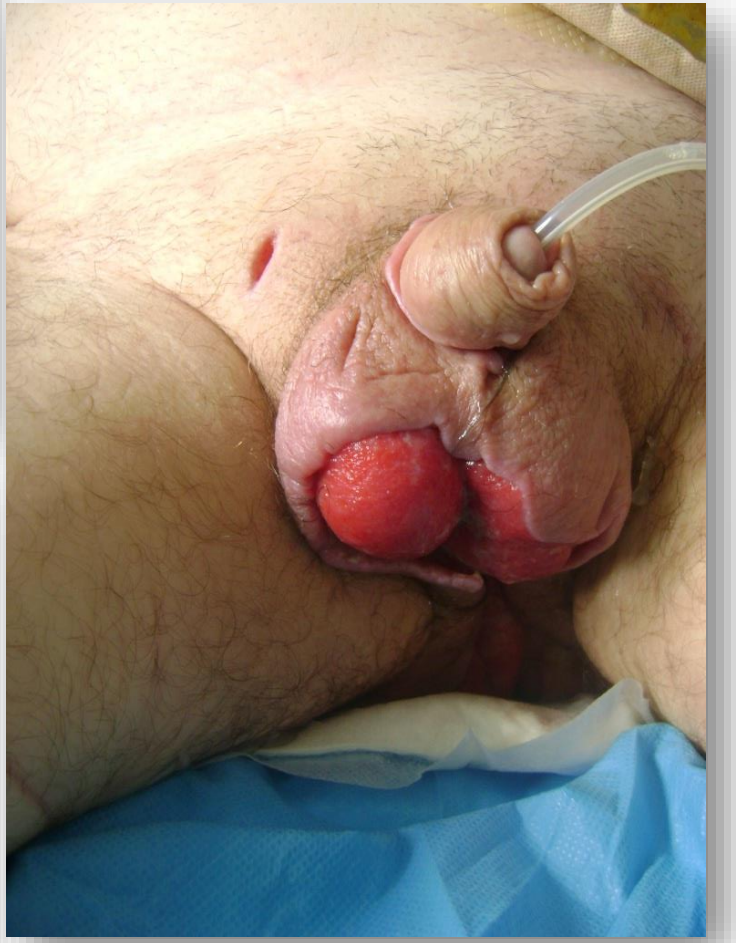
	OHB	Pas d'OHB
Mortalité	4,5%	9,4%
Durée de séjour	14,3 jours	10,7 jours
Coût	52 205 $	45 464 $

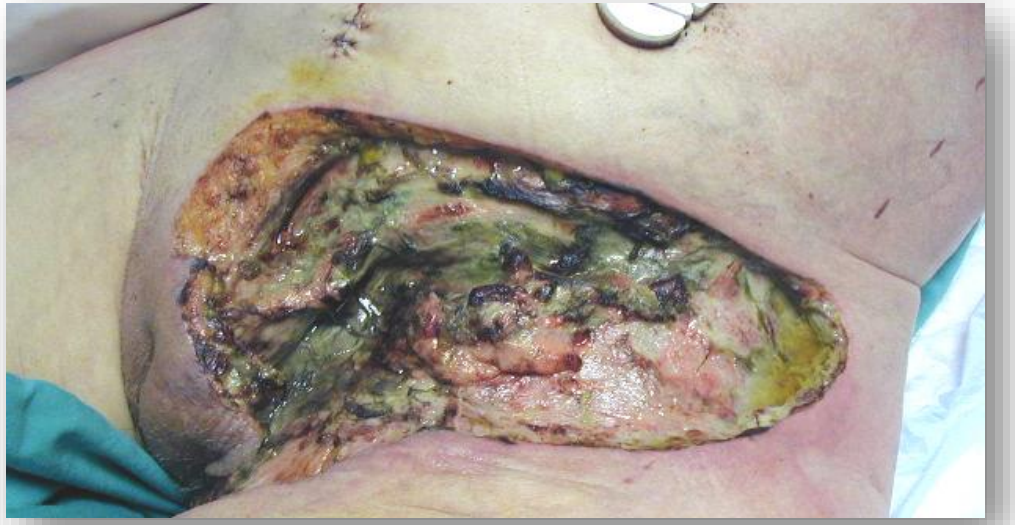
Soh SR et al. ICM 2012.

La mortalité est-elle le bon critère de jugement ?









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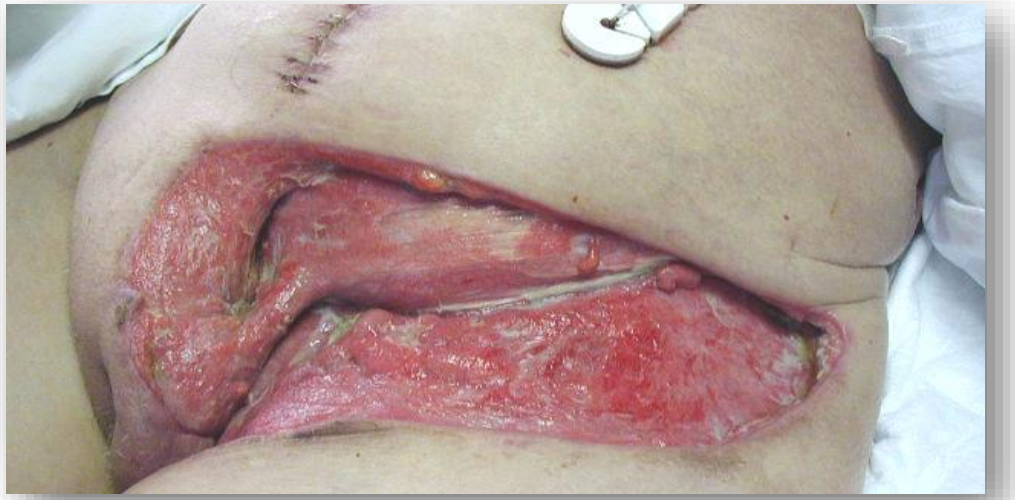

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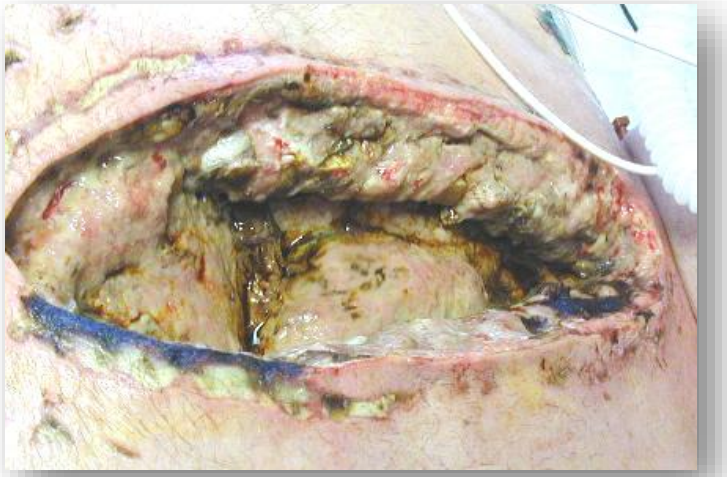

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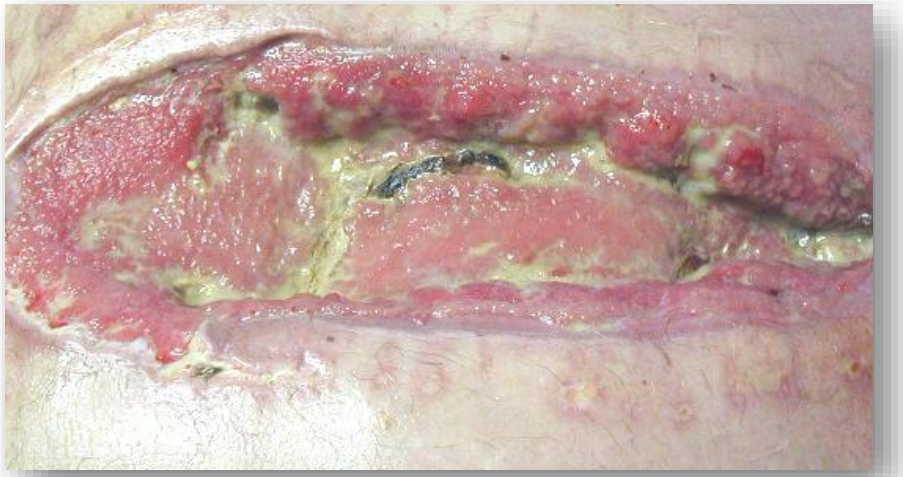

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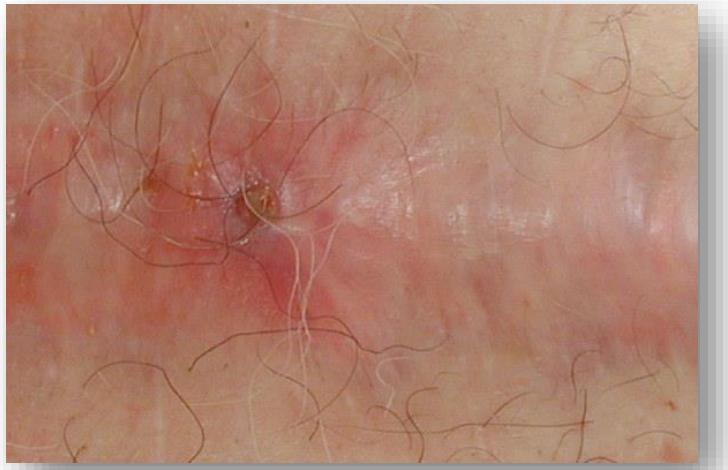

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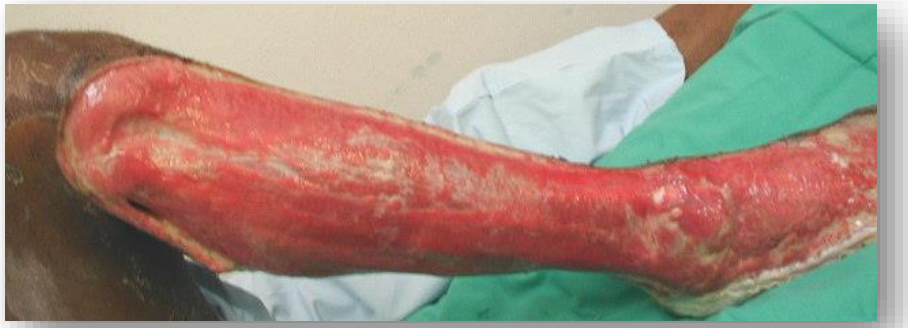
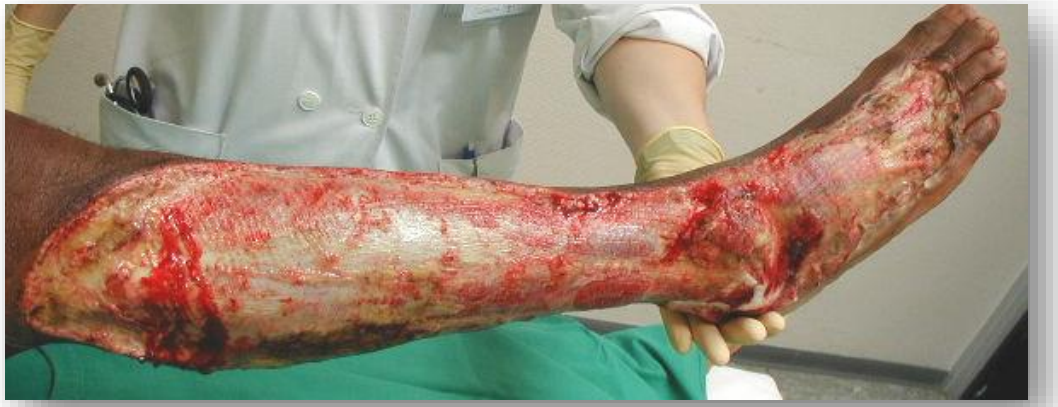
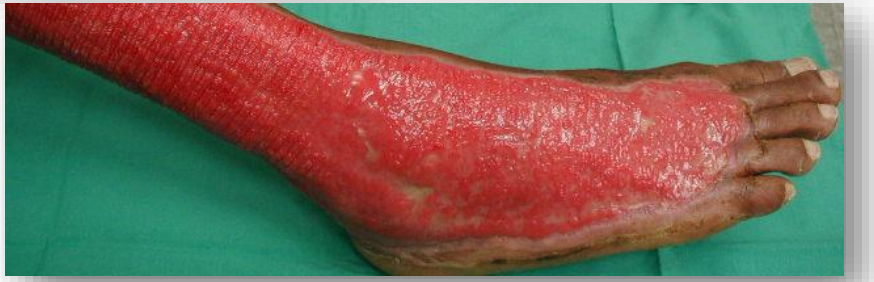
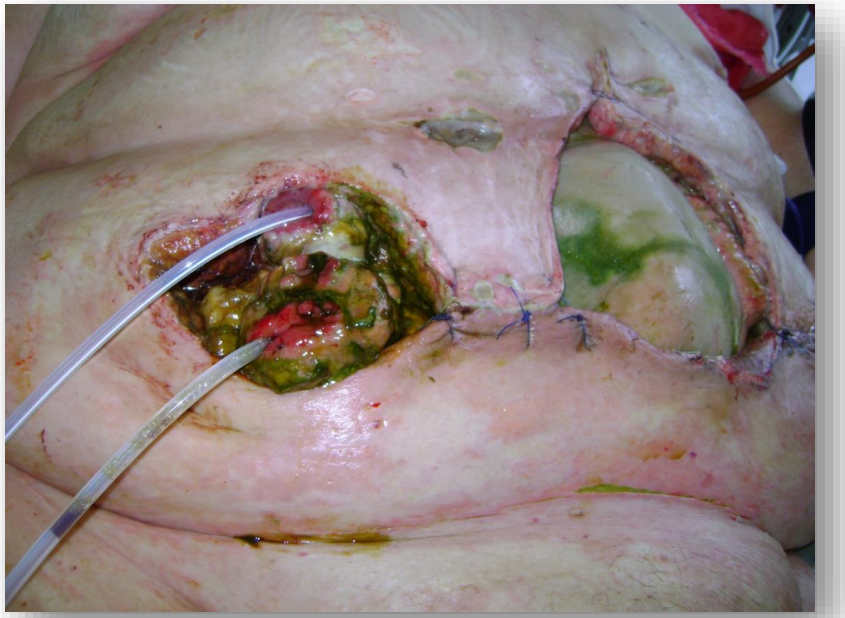
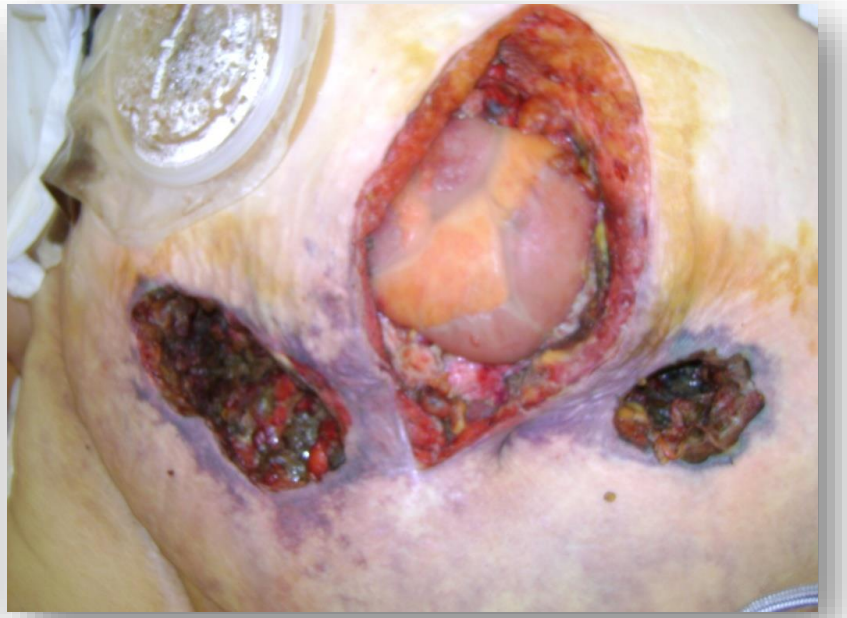
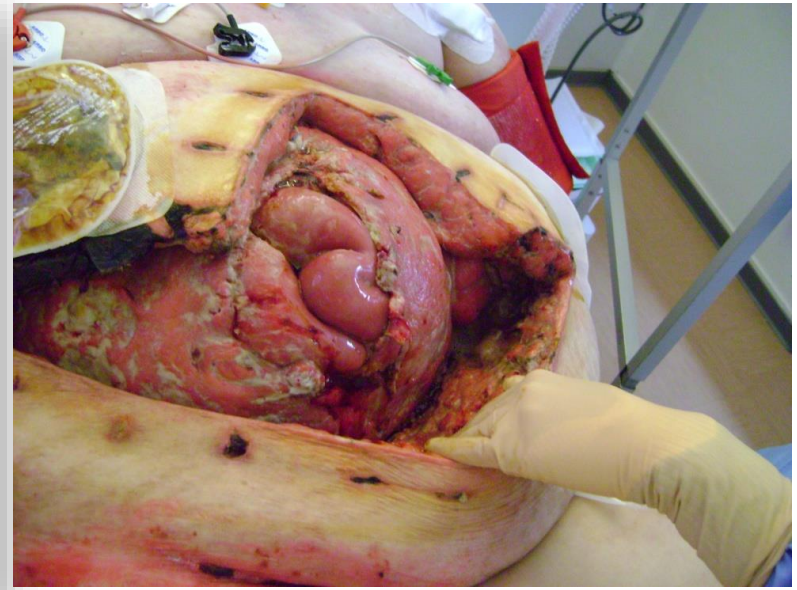


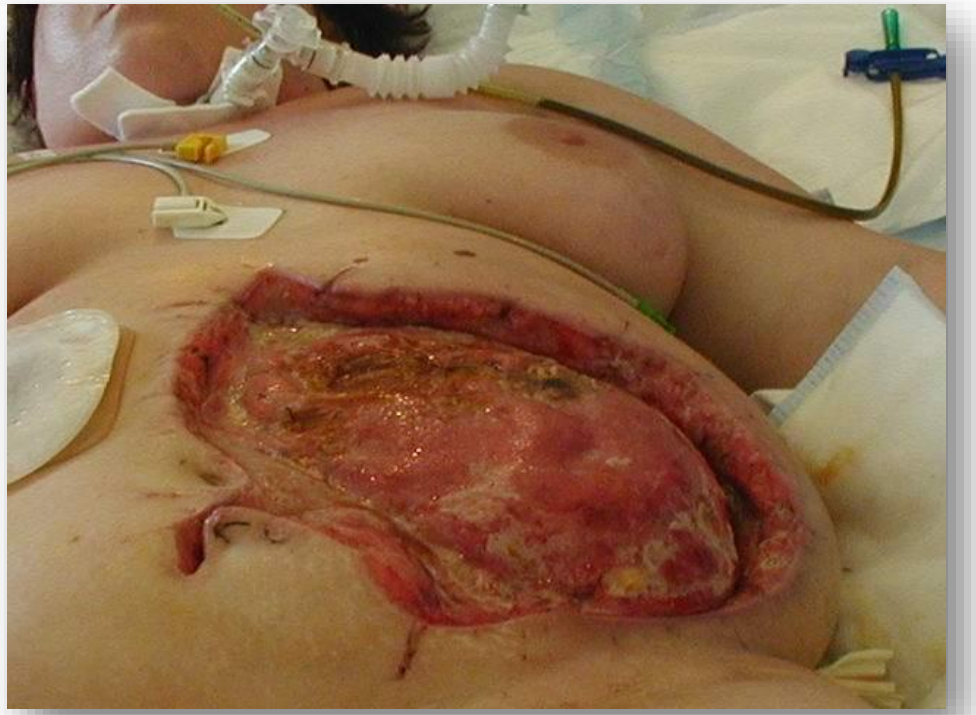


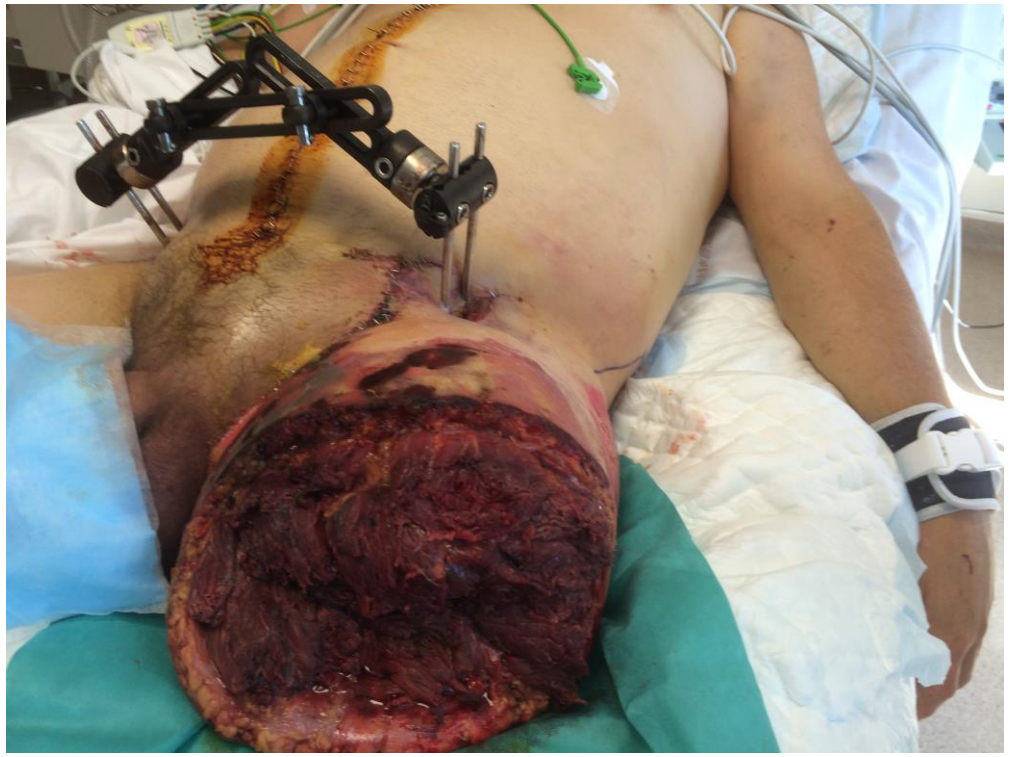


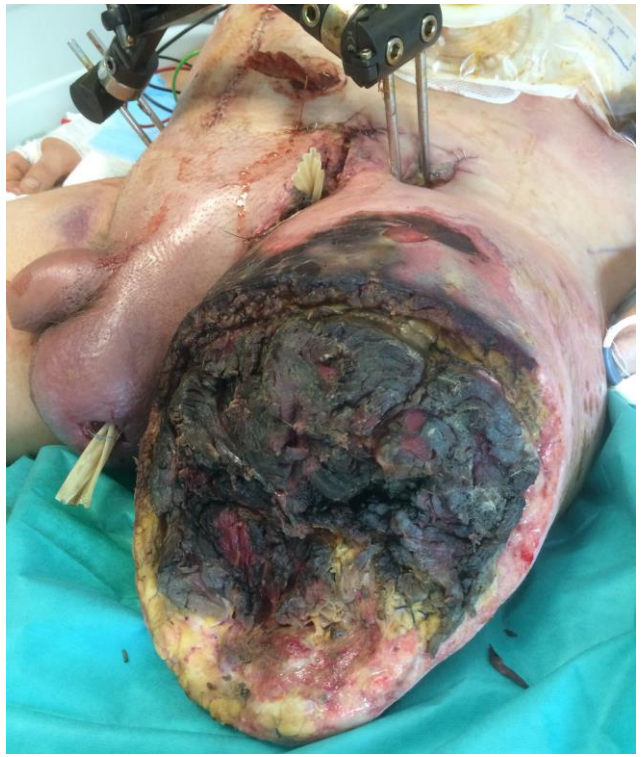


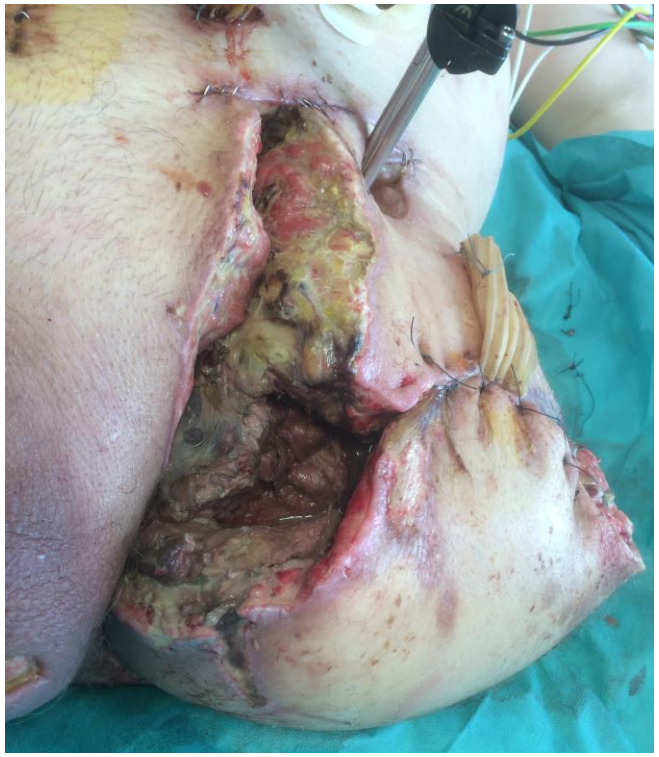


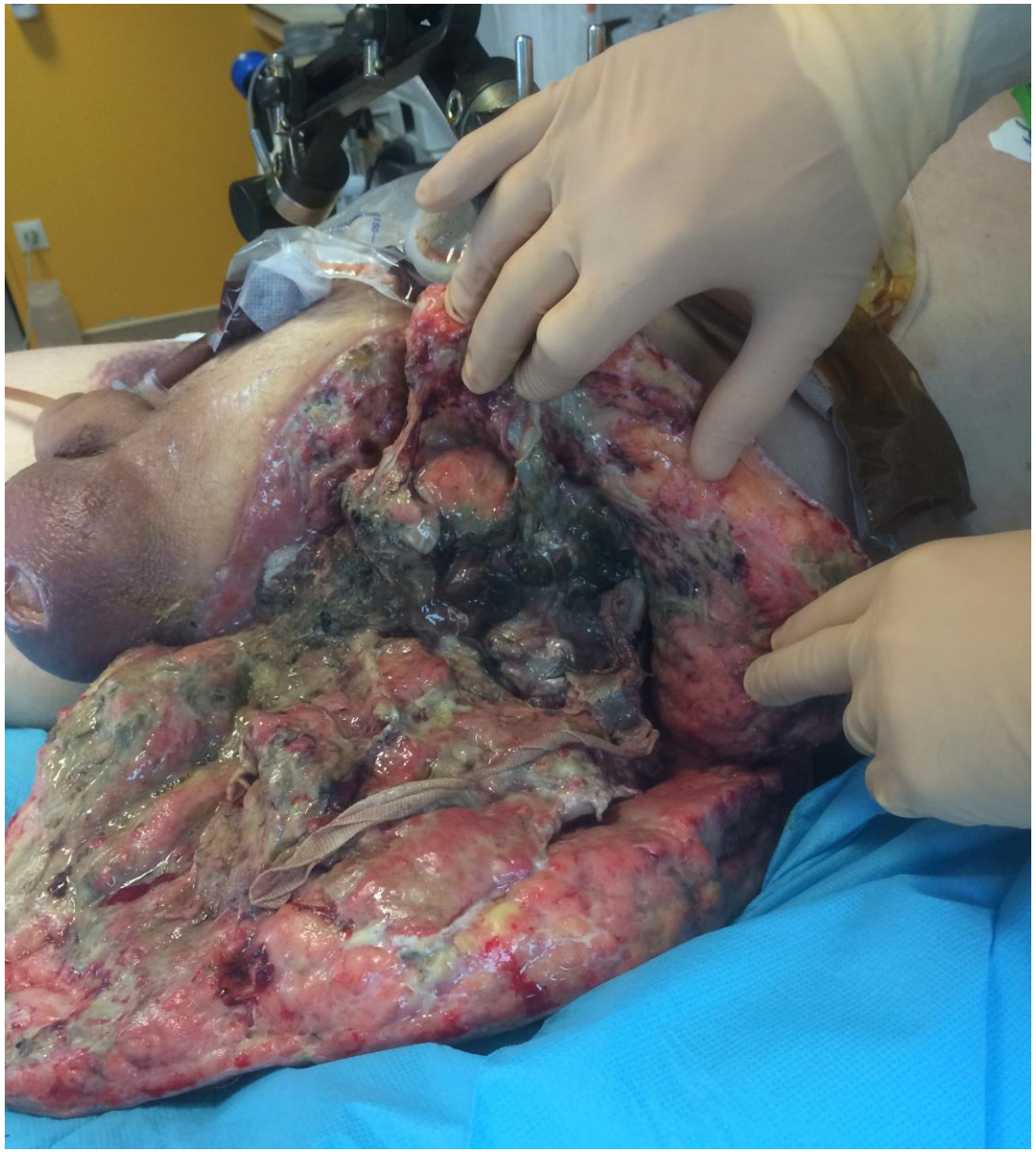


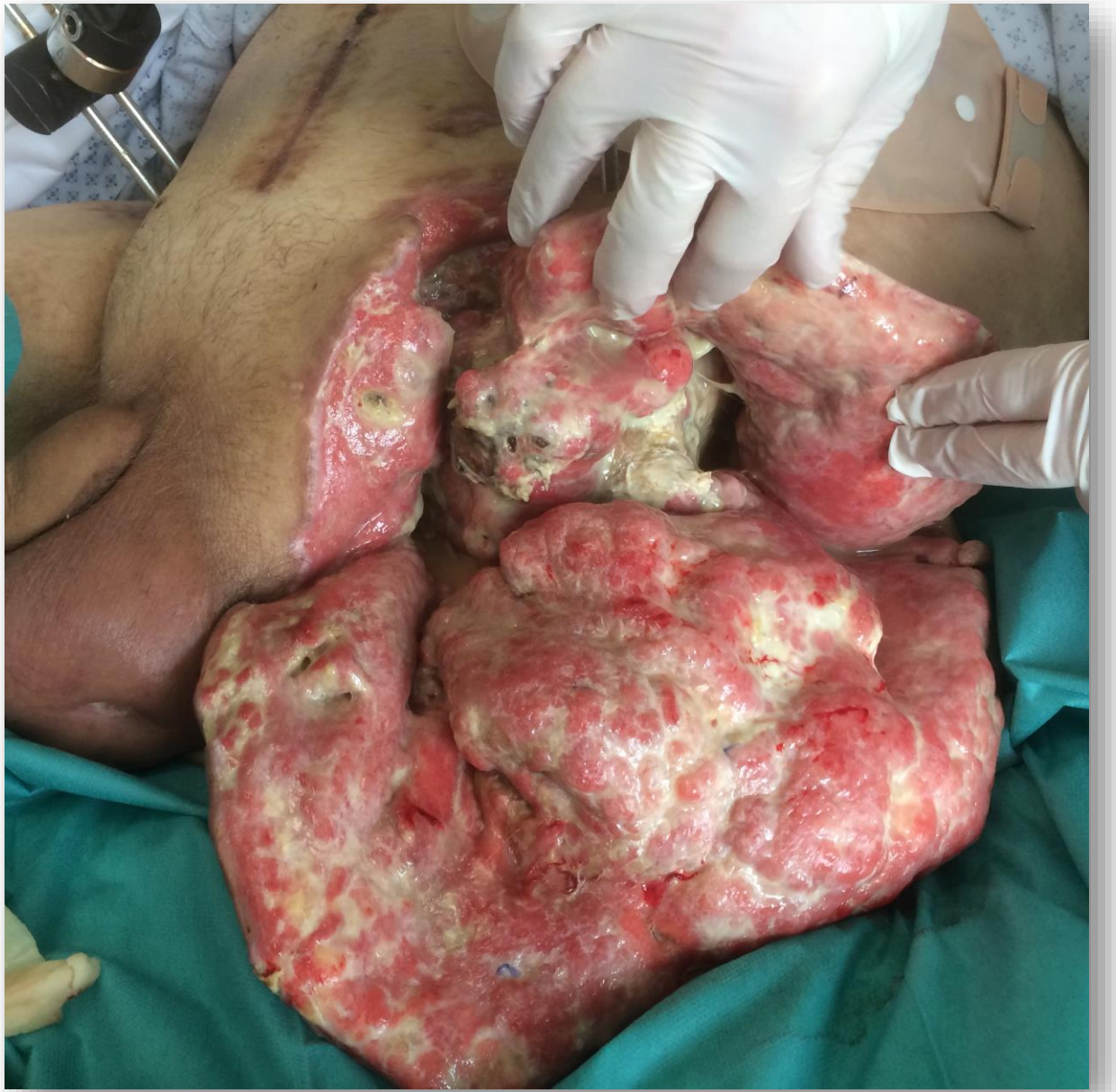




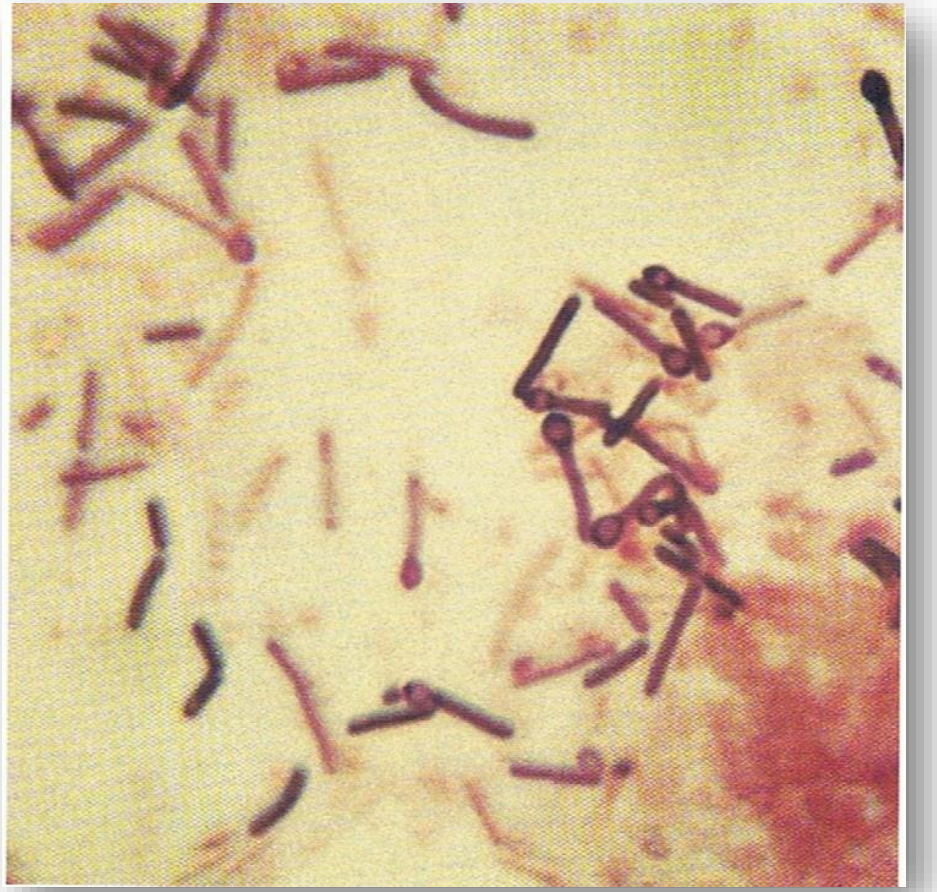








Ne pas oublier



Gestin GL. Atlas de bactériologie. Bayer infectiologie

- Plaies à haut risque donc SAT-VAT si non à jour
- Interrogatoire/quick-test
- Rappel tous les 20 ans à partir de 20 ans

- Réanimation du sepsis
- Petite spécificité : remplissage massif

Conclusion

- Poser l’indication chirurgicale à temps +++++++
  - Critères cliniques
  - Chirurgie conservatrice initialement
  - Répéter les nécrosectomies

- Antibiothérapie selon le site et le terrain
  - Considérer la vision staphylococcique méti-R américaine avec recul
  - Strepto B A/B : dalacine (antixotinique) (linezolide ?)

- Traitements adjuvants
  - Ig et Strepto
  - OHB ? :
    - Changer les paradigmes d’évaluation ?
    - Echelles composites de qualité de vie ? Chirurgie « conservatrice » ?

Conclusion

- Poser l’indication chirurgicale à temps +++++++
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Appelez nous !!!

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