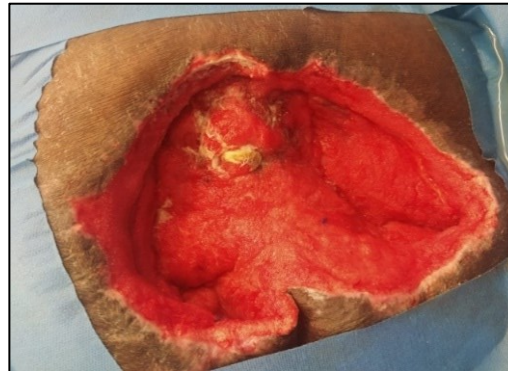


## Cas clinique : infections cutanées

Bon usage antibiotique dans les infections communautaires graves

6 juin 2025



**Sébastien TANAKA**

- Département d'anesthésie-réanimation, DMU PARABOL, CHU Bichat-Claude Bernard, Paris
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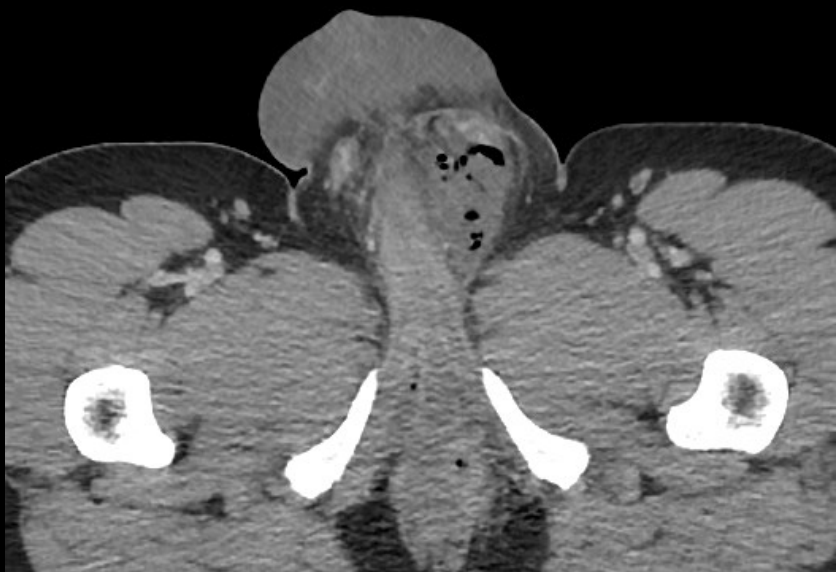
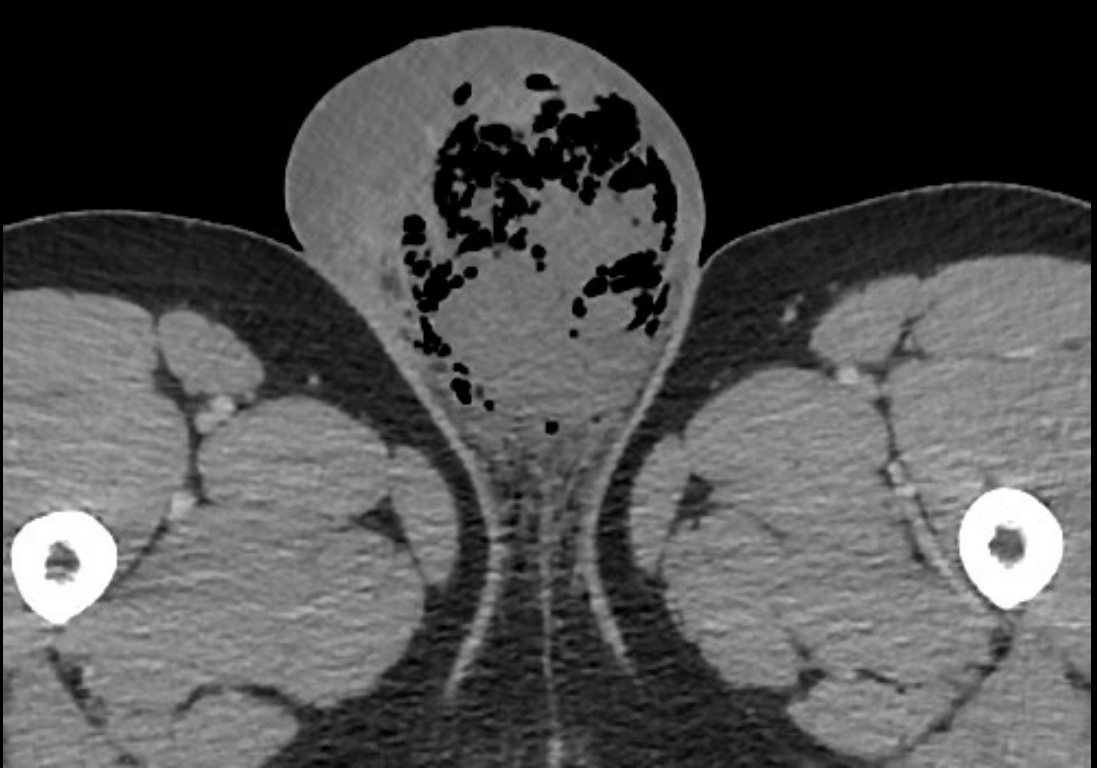
Pas de conflit d'intérêt en lien avec cette présentation

# Monsieur R, 25 ans

- Originaire du Bangladesh, en France depuis 10 ans, vit à Saint-Denis
- Profession: livreur
- Célibataire sans enfant
- Pas d'ATCD
- Tabagisme, 2-3 cigarettes par jour, pas de prise de toxique

# Monsieur R, 25 ans

- Œdème des bourses depuis 5 jours
- Consulte un médecin traitant qui lui prescrit des AINS en topique et per os
- Se présente 2 jours plus tard au SAU de Bichat pour une évolution locale défavorable et des douleurs intenses
- A l'examen clinique au SAU :
  - Volumineux oedeme des bourses avec petites plages de nécrose
  - GCS 15, FC: 165/min, PA : 118/71 mmHg. T : 37,6°C, FR 33/min, SpO2 90% en AA
  - Patient tachypnéique, en sueur
  - Pas de franche marbrure



# Prise en charge initiale au SAU

- Bilan pré-opératoire + hémocultures
- Appel du chirurgien et du MAR
- Remplissage vasculaire
- Antibiothérapie

# Quelle antibiothérapie probabiliste ?

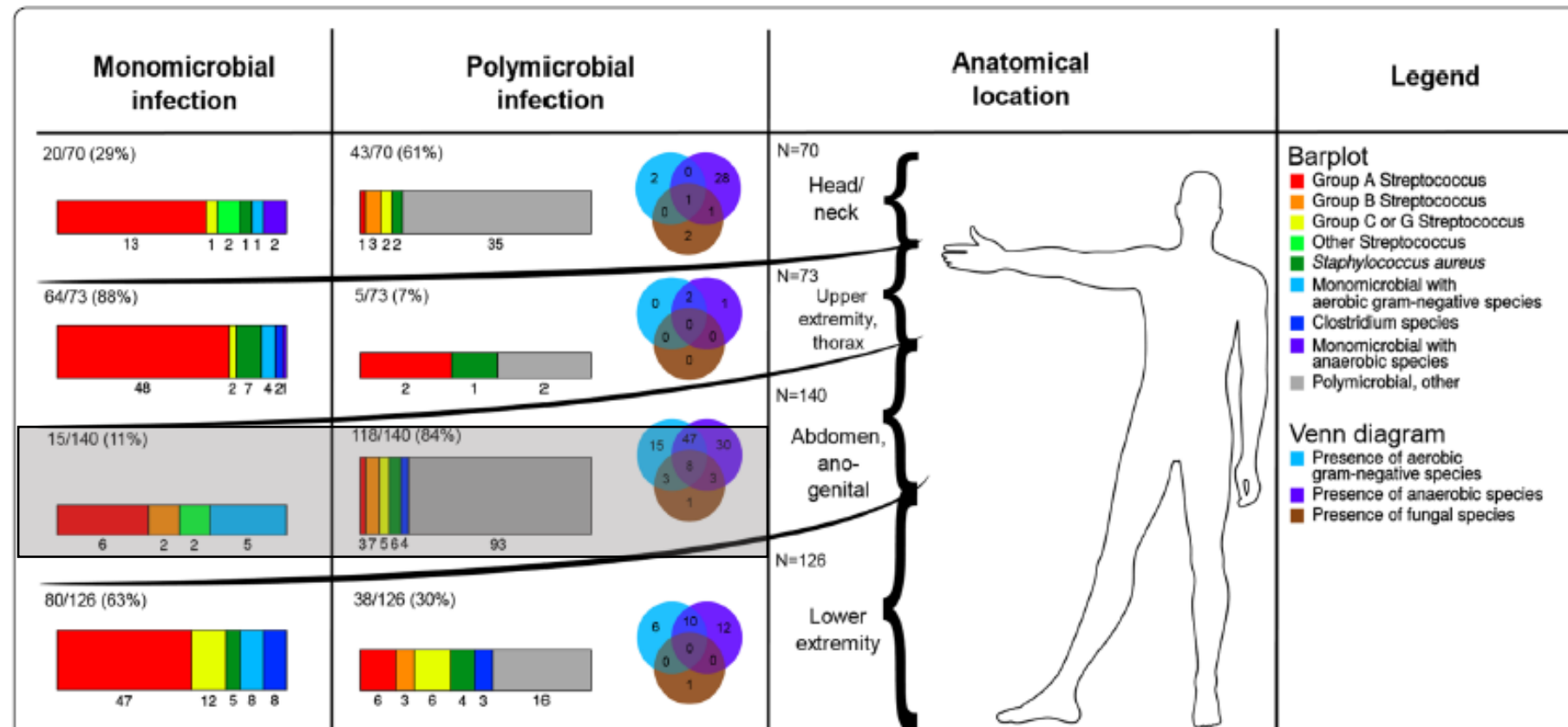
1. Pas tout de suite, j'attends les prélèvements per-opératoires
2. Céfotaxime - Métronidazole
3. Pipéracilline - Tazobactam
4. Imipénem ou Méropénem
5. Autre antibiotique
6. J'ajoute systématiquement un agent antitoxinique

# Patient's characteristics and outcomes in necrotising soft-tissue infections: results from a Scandinavian, multicentre, prospective cohort study

Martin Bruun Madsen<sup>1\*</sup>, Steinar Skrede<sup>2,3</sup>, Anders Perner<sup>1,4</sup>, Per Arnell<sup>5</sup>, Michael Nekludov<sup>6</sup>,  
Trond Bruun<sup>2</sup>, Ylva Karlsson<sup>7</sup>, Marco Bo Hansen<sup>8</sup>, Peter Polzik<sup>8</sup>, Morten Hedetoft<sup>8</sup>, Anders Rosén<sup>5</sup>,  
Edoardo Saccenti<sup>9</sup>, François Bergey<sup>10</sup>, Vitor A. P. Martins dos Santos<sup>9,10</sup>, INFECT study group,  
Anna Norrby-Teglund<sup>11</sup> and Ole Hyldegaard<sup>4,8</sup>



## Microbiologie



**Fig. 2** Microbiological findings by affected body part. In 26 (6%) patients, no microbe was detected (7 patients with infection located to head/neck area, 4 in the upper extremities, 7 in the abdomen and ano-genital area, and 8 in the lower extremities). The square diagrams show the distribution of the microbiological agents found in monomicrobial and polymicrobial infections, separated by the body part affected. The size of the square represents the number of patients. The Venn diagrams show the distribution microbiological findings of aerobic Gram-negative species, anaerobic species, and fungal species in patients with polymicrobial infection



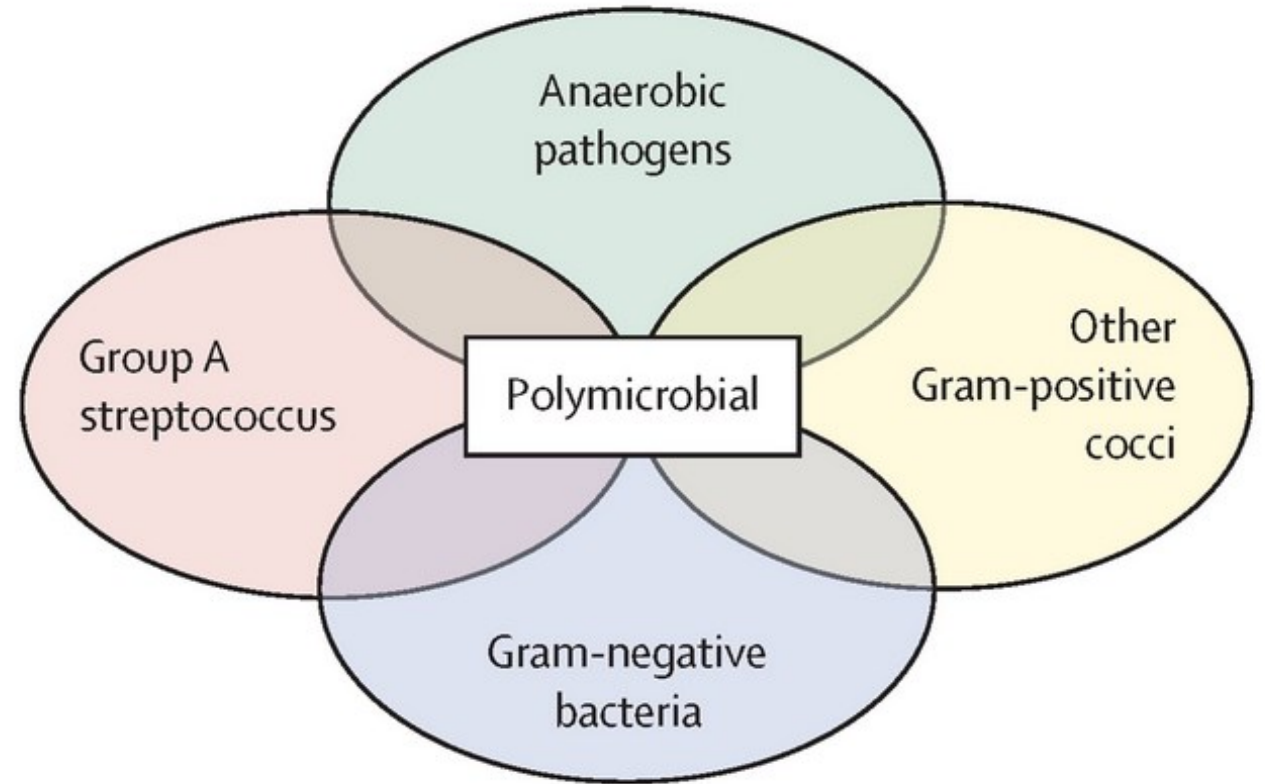
# Microbiologie : classification selon la localisation

| Localisation     | Microbiologie                                                                                                                                                                                                                                                                                                                                                         |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Membre supérieur | <ul style="list-style-type: none"><li>- <i>Streptococcus pyogenes</i></li><li>- Autres Streptocoques (groupes C, G...)</li><li>- <i>Staphylococcus aureus</i></li><li>- Anaérobies</li></ul>                                                                                                                                                                          |
| Membre inférieur | <ul style="list-style-type: none"><li>- <i>Streptococcus pyogenes</i></li><li>- Autres Streptocoques (groupes C, G...)</li><li>- <i>Staphylococcus aureus</i></li><li>- Bactéries à Gram négatif</li><li>- <i>Clostridium sp.</i></li></ul>                                                                                                                           |
| Périnée          | <ul style="list-style-type: none"><li>- Bactéries à Gram positif (<i>Streptococcus sp.</i>, <i>Enterococcus sp.</i>...)</li><li>- Bactéries à Gram négatif : Enterobacterales (<i>E. coli</i> +++, <i>Klebsiella sp.</i>...)</li><li>- Anaérobies (<i>Bacteroides sp.</i>, <i>Prevotella sp.</i>, <i>Peptostreptococcus sp.</i>, <i>Clostridium sp.</i>...)</li></ul> |
| Région cervicale | <ul style="list-style-type: none"><li>- <i>Streptococcus viridans</i></li><li>- <i>Staphylococcus sp.</i></li><li>- Anaérobies (<i>Bacteroides sp.</i>, <i>Prevotella sp.</i>, <i>Fusobacterium sp.</i>, <i>Peptostreptococcus sp.</i>...)</li><li>- <i>Streptococcus pyogenes</i></li><li>- <i>Haemophilus influenzae</i></li></ul>                                  |

# Antibiothérapie des DHBN

- Pas d'étude multicentrique randomisée
- Très peu de donnée de pharmacodynamie/cinétique
- Analogie de prise en charge avec les patients en sepsis ou choc septique
- Administration la plus précoce possible +++

Sartelli et al. World J Emerg Surg. 2022  
Evens et al. CCM. 2021



Hua et al. Lancet infectious disease. 2023

# Impact of prior antibiotic therapy on severe necrotizing soft-tissue infections in ICU patients: results from a French retrospective and observational study

Sébastien Tanaka<sup>1,2</sup> · Michael Thy<sup>1,3,4</sup> · Parvine Tashk<sup>1</sup> · Lara Ribeiro<sup>5</sup> · Brice Lortat-Jacob<sup>1</sup> · Jean-François Hermieu<sup>6</sup> · Nathalie Zappella<sup>1</sup> · Sacha Rozencwajg<sup>1,3</sup> · Aurelie Snauwaert<sup>1</sup> · Enora Atchade<sup>1</sup> · Nathalie Grall<sup>7,8</sup> · Maksud Assadi<sup>1,3</sup> · Alexy Tran-Dinh<sup>1,3,9</sup> · Philippe Montravers<sup>1,3,10</sup>

Comparaison de patients exposés à une antibiothérapie (> 24 h avant la chirurgie) à des patients non exposés

|                                           | Overall<br><i>n</i> = 100 | Unexposed group<br><i>n</i> = 77 | Exposed group<br><i>n</i> = 23 | <i>p</i> value |
|-------------------------------------------|---------------------------|----------------------------------|--------------------------------|----------------|
| Age (years), median [IQR]                 | 58 [50–68]                | 59 [50–68]                       | 57 [52–61]                     | 0.371          |
| Male sex, <i>n</i> (%)                    | 63 (63)                   | 47 (61)                          | 16 (70)                        | 0.623          |
| BMI (kg/m <sup>2</sup> ), median [IQR]    | 28 [23–34]                | 27 [22–32]                       | 30 [26–35]                     | 0.102          |
| Localization: limbs, <i>n</i> (%)         | 52 (52)                   | 38 (49)                          | 14 (61)                        | 0.353          |
| Localization: pelvis, <i>n</i> (%)        | 15 (15)                   | 11 (14)                          | 4 (17)                         | 0.743          |
| Localization: cephalic, <i>n</i> (%)      | 23 (23)                   | 21 (27)                          | 2 (9)                          | 0.09           |
| Localization: trunk, <i>n</i> (%)         | 13 (13)                   | 8 (10)                           | 5 (22)                         | 0.169          |
| Skin surface (%), median [IQR]            | 4.5 [4.5–9]               | 4.5 [4.5–9]                      | 4.5 [4.5–9]                    | 0.597          |
| SAPS-II score on admission, median [IQR]  | 28 [23–37]                | 28 [23–37]                       | 25 [21–36]                     | 0.287          |
| SOFA score on admission, median [IQR]     | 5 [3–6]                   | 5 [3–6]                          | 4 [3–7]                        | 0.977          |
| LRINEC score on admission, median [IQR]   | 2 [1–4]                   | 2 [0–4]                          | 3 [2–5]                        | 0.118          |
| Septic shock on admission, <i>n</i> (%)   | 65 (65)                   | 51 (66)                          | 14 (61)                        | 0.628          |
| Charlson score on admission, median [IQR] | 4 [3–7]                   | 3 [2–6]                          | 3 [2–6]                        | 0.758          |
| Underlying medical conditions             |                           |                                  |                                |                |
| Malignancy, <i>n</i> (%)                  | 23 (23)                   | 20 (26)                          | 3 (13)                         | 0.264          |
| Obesity, <i>n</i> (%)                     | 24 (23)                   | 16 (21)                          | 7 (30)                         | 0.399          |
| Diabetes mellitus, <i>n</i> (%)           | 24 (24)                   | 17 (22)                          | 7 (30)                         | 0.415          |
| Coronary disease, <i>n</i> (%)            | 20 (20)                   | 14 (18)                          | 6 (26)                         | 0.553          |
| Peripheral vascular disease, <i>n</i> (%) | 17 (17)                   | 13 (17)                          | 4 (17)                         | 1              |
| Alcohol use, <i>n</i> (%)                 | 20 (20)                   | 16 (21)                          | 4 (17)                         | 1              |
| Active smoking, <i>n</i> (%)              | 54 (54)                   | 42 (55)                          | 12 (52)                        | 1              |
| Immunosuppression, <i>n</i> (%)           | 10 (10)                   | 8 (10)                           | 2 (9)                          | 1              |

*BMI* body mass index, *LRINEC* Laboratory Risk Indicators for Necrotizing Fasciitis score, *SAPS-II* Simplified Acute Physiology Score-II, *SOFA* sequential organ failure assessment

|                                                | Unexposed group<br><i>n</i> = 77 | Exposed group<br><i>n</i> = 23 | <i>p</i> value |
|------------------------------------------------|----------------------------------|--------------------------------|----------------|
| Supportive therapy during the ICU stay         |                                  |                                |                |
| Renal replacement therapy, <i>n</i> (%)        | 15 (21)                          | 7 (30)                         | 0.395          |
| Need of reoperation, <i>n</i> (%)              | 38 (49)                          | 11 (48)                        | 0.741          |
| Number of bedside debridement, median [IQR]    | 4 [1, 10]                        | 6 [2, 10]                      | 0.446          |
| Length of mechanical ventilation, median [IQR] | 3 [0, 12]                        | 9 [0, 14]                      | 0.596          |
| Length of hospital stay in days, median [IQR]  | 39 [18, 59]                      | 47 [40, 60]                    | 0.208          |
| Length of ICU stay in days, median [IQR]       | 7 [2, 19]                        | 11 [4, 20]                     | 0.446          |
| Mortality at day 28, <i>n</i> (%)              | 14 (18)                          | 4 (17)                         | 1              |
| Mortality at day 90, <i>n</i> (%)              | 19 (25)                          | 4 (17)                         | 0.578          |
| Mortality at 1 year, <i>n</i> (%)              | 20 (26)                          | 4 (17)                         | 0.579          |

**Table 2** Distribution of microorganisms at the time of the first sampling in the groups exposed and unexposed to antibiotics

|                                                                   | Unexposed group | Exposed group  | <i>p</i> value |
|-------------------------------------------------------------------|-----------------|----------------|----------------|
| Aerobes, <i>n</i> (%)                                             | <b>111 (86)</b> | <b>31 (76)</b> | <b>0.326</b>   |
| Gram-positive bacteria, <i>n</i> (%)                              | <b>71 (55)</b>  | <b>16 (39)</b> | <b>0.207</b>   |
| Enterococci, <i>n</i> (%)                                         | 12 (9)          | 4 (10)         | 1              |
| Streptococci, <i>n</i> (%)                                        | 37 (29)         | 8 (20)         | 0.341          |
| GAS, <i>n</i> (%)                                                 | 10 (8)          | 2 (5)          | 0.728          |
| Staphylococci, <i>n</i> (%)                                       | 24 (19)         | 4 (10)         | 0.419          |
| <i>Staphylococcus aureus</i> , <i>n</i> (%)                       | 12 (9)          | 3 (7)          | 1              |
| Coagulase-negative staphylococci, <i>n</i> (%)                    | 10 (8)          | 1 (2)          | 0.449          |
| Gram-negative bacteria, <i>n</i> (%)                              | <b>40 (31)</b>  | <b>15 (37)</b> | <b>0.476</b>   |
| <i>Enterobacterales</i> , <i>n</i> (%)                            | 34 (26)         | 12 (29)        | 0.634          |
| <i>Escherichia coli</i> , <i>n</i> (%)                            | 15 (12)         | 6 (15)         | 0.562          |
| Nonfermenting Gram-negative bacilli, <i>n</i> (%)                 | 6 (5)           | 3 (7)          | 0.426          |
| <i>Pseudomonas aeruginosa</i> , <i>n</i> (%)                      | 6 (5)           | 3 (7)          | 0.426          |
| Anaerobes, <i>n</i> (%)                                           | <b>15 (12)</b>  | <b>7 (23)</b>  | <b>0.267</b>   |
| Fungi, <i>n</i> (%)                                               | <b>3 (2)</b>    | <b>3 (7)</b>   | <b>0.133</b>   |
| Total number of strains, <i>n</i> (%)                             | <b>129</b>      | <b>41</b>      |                |
| Total number of MDR bacteria, <i>n</i> (%)                        | <b>7 (5)</b>    | <b>1 (2)</b>   | <b>1</b>       |
| MRSA, <i>n</i> (%)                                                | 2 (3)           | 0 (0)          | 1              |
| Overproduction of intrinsic or plasmid-encoded AmpC, <i>n</i> (%) | 2 (3)           | 0 (0)          | 1              |
| ESBL producing <i>Enterobacterales</i> , <i>n</i> (%)             | 2 (3)           | 1 (2)          | 0.548          |
| Carbapenemase producing <i>Enterobacterales</i> , <i>n</i> (%)    | 1 (1)           | 0 (0)          | 1              |

- Culture microbiologique positive chez 84 patients et négative chez 16 patients
- Pas de différence entre les 2 groupes  
(3/23 = 13% dans le groupe exposé vs. 13/77 = 17% dans le groupe non-exposé ( $p = 0,70$ ))
- Même proportion d'antibiothérapie probabiliste adaptée entre les groupes ( $n = 60$  (84.5%) dans le groupe non-exposé vs.  $n = 19$  (86.4%) dans le groupe exposé,  $p = 0,482$ ).



Tanaka, Montravers et al.

## Antibiothérapie probabiliste

### $\beta$ -lactamine à large spectre

Si suspicion ou portage BLSE :  
Méropénème/Imipénème

Si absence de suspicion ou de portage BLSE :

- Céfotaxime + Métronidazole  
OU
- Pipéracilline - Tazobactam

+

Agent anti-SDMR  
si patient porteur  
ou facteurs de  
risque

Daptomycine

OU

Vancomycine

OU

Linézolide

+

Agent  
anti-  
toxinique

Clindamycine

OU

Haute dose  
d'antibiotique

$\beta$ -lactamines  
en perfusion  
continue

Dosage  
des  
antibiotiques

Surveillance  
de la  
toxicité rénale,  
hématologique,  
hépatique

Chirurgie : prélèvements microbiologiques profonds

Antibiothérapie définitive = Adaptation / Désescalade thérapeutique

Arrêt antibiothérapie : 48 à 72h après la dernière reprise chirurgicale + bonne évolution clinico-biologique

# En pratique

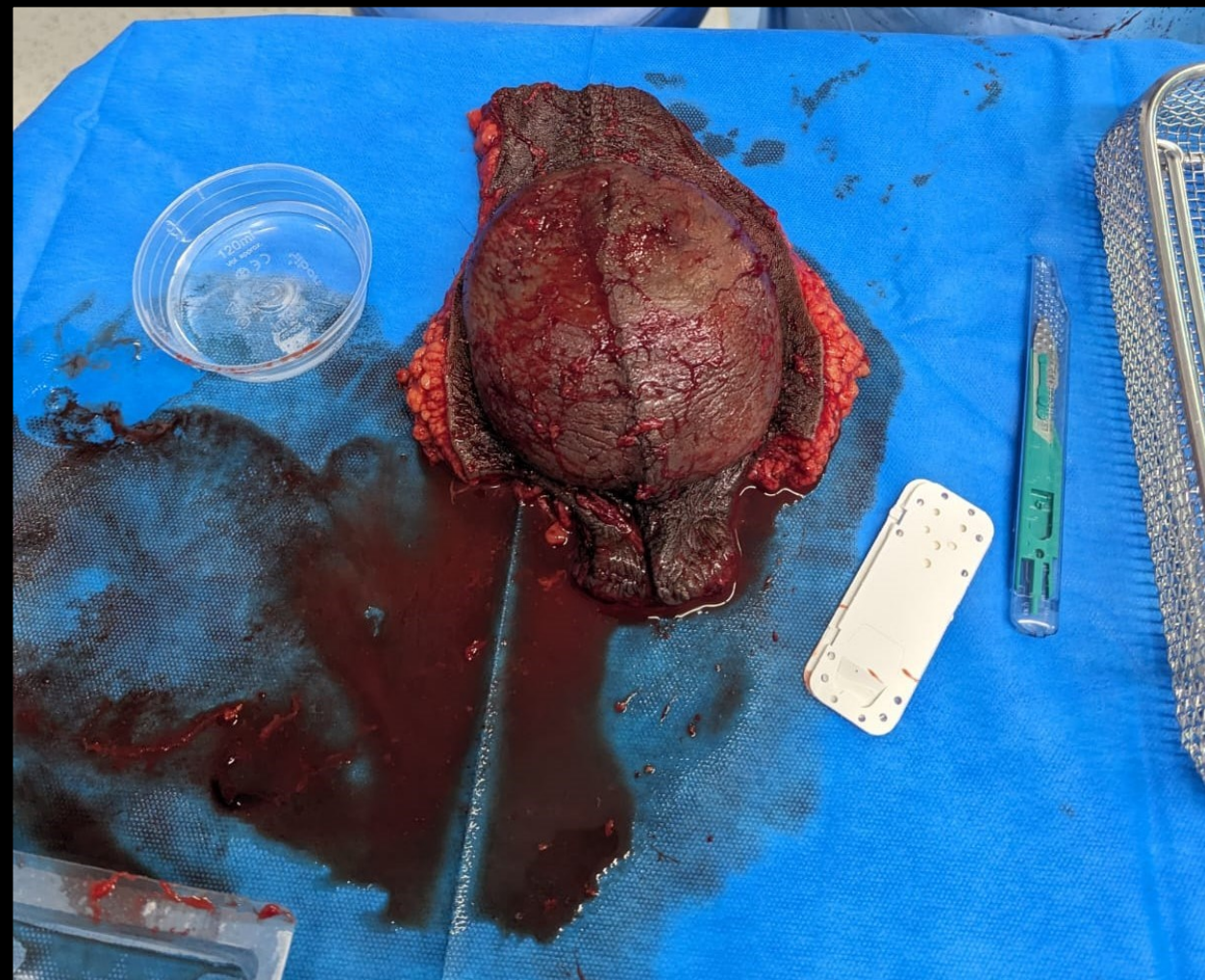
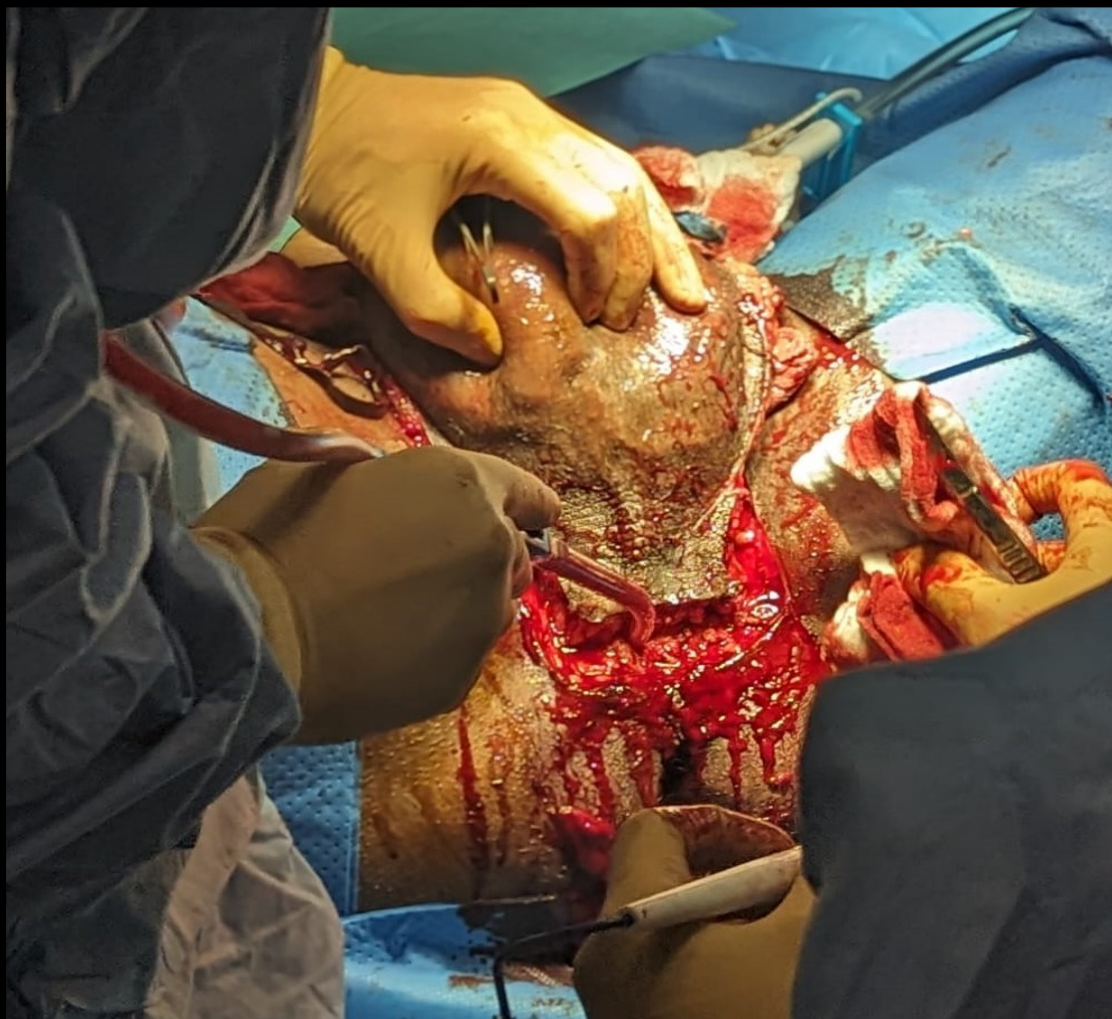
- Antibiothérapie choisie aux urgences :

Pipéracilline - Tazobactam + Amikacine

# En per-opératoire...

- Débridement large
  - Multiples prélèvements profonds
  - Exérèse en monobloc du fourreau de la verge
  - Exérèse de la paroi du scrotum en épargnant les corps caverneux, spongieux, les cordons spermatiques et les testicules
  - Colostomie de décharge
- 
- Support par Noradrénaline
  - Poursuite du remplissage vasculaire
  - Poursuite de Pipéracilline - Tazobactam







# Prélèvements per-opératoires

| Coloration de gram                                                                 |  |  |                                                                                                                                                  |    |
|------------------------------------------------------------------------------------|--|--|--------------------------------------------------------------------------------------------------------------------------------------------------|----|
| •  |  |  | Très nombreux bacilles à Gram négatif                                                                                                            |    |
| •  |  |  | Très nombreux cocci à Gram positif                                                                                                               |    |
| •                                                                                  |  |  | Quelques bacilles à Gram positif                                                                                                                 |    |
| Culture et ou identification                                                       |  |  |                                                                                                                                                  |    |
| •  |  |  | <b>1.Escherichia coli Nombreuses colonie...</b><br><b>2.Streptococcus anginosus Présence de</b><br><b>3.Flore polymorphe anaérobie Présen...</b> |    |
|                                                                                    |  |  | 1.                                                                                                                                               | 2. |
| Méthode : Diffusion                                                                |  |  | V                                                                                                                                                | V  |
| CASFM/EUCAST 2023 V1                                                               |  |  | V                                                                                                                                                | V  |
| Pénicilline G                                                                      |  |  |                                                                                                                                                  | S  |
| Amoxicilline                                                                       |  |  | S                                                                                                                                                | S  |
| Amoxicilline+ac. clavulanique                                                      |  |  | S                                                                                                                                                |    |
| Ticarcilline                                                                       |  |  | S                                                                                                                                                |    |
| Ticarcilline+ac. clavulanique                                                      |  |  | S                                                                                                                                                |    |
| Pipéracilline                                                                      |  |  | S                                                                                                                                                |    |
| Pipéracilline+tazobactam                                                           |  |  | S                                                                                                                                                |    |
| Méïcillinam                                                                        |  |  | S                                                                                                                                                |    |
| Céfoxitine                                                                         |  |  | S                                                                                                                                                |    |
| Céfotaxime                                                                         |  |  | S                                                                                                                                                | S  |
| Ceftazidime                                                                        |  |  | S                                                                                                                                                |    |
| Aztréonam                                                                          |  |  | S                                                                                                                                                |    |
| Céfépime                                                                           |  |  | S                                                                                                                                                |    |
| Imipénème                                                                          |  |  | S                                                                                                                                                |    |
| Méropénème                                                                         |  |  | S                                                                                                                                                |    |
| Ertapénème                                                                         |  |  | S                                                                                                                                                |    |
| Gentamicine                                                                        |  |  | S                                                                                                                                                |    |
| Gentamicine (500 µg)                                                               |  |  |                                                                                                                                                  | S  |
| Tobramycine                                                                        |  |  | S                                                                                                                                                |    |
| Amikacine                                                                          |  |  | S                                                                                                                                                |    |
| Tétracycline                                                                       |  |  |                                                                                                                                                  | S  |
| Doxycycline                                                                        |  |  |                                                                                                                                                  | S  |

# Hémocultures

| •  | 1.Escherichia coli Présence de |
|---------------------------------------------------------------------------------------|--------------------------------|
| Identification par                                                                    | Spectrom...                    |
| Méthode : Diffusion                                                                   | V                              |
| CASFM/EUCAST 2023 V1                                                                  | V                              |
| Amoxicilline                                                                          | S                              |
| Amoxicilline+ac. clavulanique                                                         | S                              |
| Ticarcilline                                                                          | S                              |
| Ticarcilline+ac. clavulanique                                                         | S                              |
| Pipéracilline                                                                         | S                              |
| Pipéracilline+tazobactam                                                              | S                              |
| Méïcillinam                                                                           | S                              |
| Céfoxitine                                                                            | S                              |
| Céfotaxime                                                                            | S                              |
| Ceftazidime                                                                           | S                              |
| Aztréonam                                                                             | S                              |
| Céfépime                                                                              | S                              |
| Imipénème                                                                             | S                              |
| Méropénème                                                                            | S                              |
| Ertapénème                                                                            | S                              |
| Gentamicine                                                                           | S                              |
| Tobramycine                                                                           | S                              |
| Amikacine                                                                             | S                              |
| Tigécycline                                                                           | S                              |
| Acide nalidixique                                                                     | S                              |
| Ofloxacine                                                                            | S                              |
| Ciprofloxacine                                                                        | S                              |
| Lévofloxacine                                                                         | S                              |
| Triméthoprime+sulfamétho...                                                           | S                              |
| Nitrofuranes                                                                          | S                              |
| Fosfomycine                                                                           | S                              |

# Désescalade thérapeutique

- Importante, mais pas d'étude spécifique dans les DHBN
- Néanmoins doit être discutée en fonction de l'état clinique du patient et le besoin d'une éventuelle reprise chirurgicale



# Patient's characteristics and outcomes in necrotising soft-tissue infections: results from a Scandinavian, multicentre, prospective cohort study

Martin Bruun Madsen<sup>1\*</sup>, Steinar Skrede<sup>2,3</sup>, Anders Perner<sup>1,4</sup>, Per Arnell<sup>5</sup>, Michael Nekludov<sup>6</sup>, Trond Bruun<sup>2</sup>, Ylva Karlsson<sup>7</sup>, Marco Bo Hansen<sup>8</sup>, Peter Polzik<sup>8</sup>, Morten Hedetoft<sup>8</sup>, Anders Rosén<sup>5</sup>, Edoardo Saccenti<sup>9</sup>, François Bergey<sup>10</sup>, Vitor A. P. Martins dos Santos<sup>9,10</sup>, INFECT study group, Anna Norrby-Teglund<sup>11</sup> and Ole Hyldegaard<sup>4,8</sup>

|                                                                                  | <b>n = 402</b> |
|----------------------------------------------------------------------------------|----------------|
| <b>Surgical management<sup>a</sup></b>                                           |                |
| Estimated maximum skin defect during surgery (percent body surface) <sup>b</sup> | 5 (2–10)       |
| Number of operations during ICU admission at specialised hospital                | 4 (3–5)        |
| Time from admission to surgery (h) <sup>c</sup>                                  | 19 (6–43)      |
| Amputation (any body part) <sup>d</sup>                                          | 54 (13%)       |
| Upper arm                                                                        | 4 (1%)         |
| Lower arm                                                                        | 3 (1%)         |
| Hand                                                                             | 0              |
| Finger                                                                           | 1 (< 1%)       |
| Upper leg                                                                        | 39 (10%)       |
| Lower leg                                                                        | 1 (< 1%)       |
| Foot                                                                             | 0              |
| Toe                                                                              | 1 (< 1%)       |
| Penis                                                                            | 7 (2%)         |

# Adaptation pour Augmentin

Combien de temps?

1. 7 jours?
2. 14 jours?
3. 72h?
4. Selon l'évolution locale?
5. Autre?

# Durée de traitement

- Il n'existe aucune étude ayant évalué l'impact de la durée de l'ATB
- Aucun consensus clair dans les recommandations
- Données hétérogènes selon les auteurs:
  - Durée globale de traitement d'environ 8 à 10 j
  - Arrêt des antibiotiques acceptable 48 à 72h après la dernière reprise chirurgicale en l'absence de signe d'inflammation systémique
  - Place de la PCT pour arrêter les antibiotiques?

# Short Versus Long Antibiotic Duration for Necrotizing Soft Tissue Infection: A Systematic Review and Meta-Analysis

4 études  
N = 532 patients  
Durée courte < 7 jours

Nicole B. Lyons, Brianna L. Cohen, Christopher F. O'Neil Jr, Walter A. Ramsey, Kenneth G. Proctor, Nicholas Namias, and Jonathan P. Meizoso

|                  | <i>Kenneally et al.</i> <sup>13</sup> | <i>Lauerman et al.</i> <sup>8</sup> | <i>Terzian et al.</i> <sup>14</sup> | <i>Valadez et al.</i> <sup>15</sup> | Total      | p                |
|------------------|---------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------|------------------|
| Patients         | 71                                    | 28                                  | 32                                  | 49                                  | 180        | —                |
| Short            | —                                     | 140                                 | 119                                 | 93                                  | 352        |                  |
| Long             |                                       |                                     |                                     |                                     |            |                  |
| Mortality        |                                       |                                     |                                     |                                     |            | <i>p</i> = 0.683 |
| Short            | 1 ( 1.4%)                             | 3 (10.7%)                           | 2 ( 6.3%)                           | 4 ( 8.2%)                           | 10 ( 5.6%) |                  |
| Long             | —                                     | 3 ( 2.1%)                           | 8 ( 6.7%)                           | 6 ( 6.5%)                           | 17 ( 4.8%) |                  |
| Recurrence       |                                       |                                     |                                     |                                     |            | <i>p</i> = 1.000 |
| Short            | 1 ( 1.4%)                             | 0 ( 0%)                             | 2 ( 6.3%)                           | —                                   | 3 ( 2.3%)  |                  |
| Long             | —                                     | 0 ( 0%)                             | 7 ( 5.9%)                           | —                                   | 7 ( 2.7%)  |                  |
| Limb amputation  | —                                     | —                                   |                                     |                                     |            | <i>p</i> = 0.389 |
| Short            |                                       |                                     | 2 ( 6.3%)                           | 15 (30.6%)                          | 17 (20.2%) |                  |
| Long             |                                       |                                     | 7 ( 5.9%)                           | 27 (29.0%)                          | 34 (16.0%) |                  |
| CDI              | —                                     |                                     |                                     |                                     |            | <i>p</i> = 0.322 |
| Short            |                                       | 1 ( 3.6%)                           | —                                   | 4 ( 8.2%)                           | 5 ( 6.5%)  |                  |
| Long             |                                       | 5 ( 3.6%)                           | —                                   | 3 ( 3.2%)                           | 8 ( 3.4%)  |                  |
| Hospital LOS (d) |                                       | —                                   | —                                   |                                     |            | —                |
| Short            | 7                                     |                                     |                                     | 15                                  | 9.6        |                  |
| Long             | —                                     |                                     |                                     | 15                                  | 15         |                  |
| ICU LOS (d)      |                                       | —                                   | —                                   |                                     |            | —                |
| Short            | 1                                     |                                     |                                     | 1.5                                 | 1.1        |                  |
| Long             | —                                     |                                     |                                     | 1                                   | 1          |                  |
| 30-d readmission | —                                     | —                                   | —                                   |                                     |            | <i>p</i> = 0.792 |
| Short            |                                       |                                     |                                     | 7 (14.3%)                           | 7 (14.3%)  |                  |
| Long             |                                       |                                     |                                     | 11 (11.8%)                          | 11 (11.8%) |                  |



# Monsieur R

- Pansements quotidiens en réanimation
- 4 reprises chirurgicales en 15 jours

# Prélèvements de la 4<sup>ème</sup> reprise (J12)

|                               |  |  | 1.Escherichia coli Rares colonies de | 2.Staphylococcus epidermidis Rares colonie... | 3.Staphylococcus haemolyticus Rares coloni... |
|-------------------------------|--|--|--------------------------------------|-----------------------------------------------|-----------------------------------------------|
|                               |  |  | 1.                                   | 2.                                            | 3.                                            |
| BLSE                          |  |  | Positif                              |                                               |                                               |
| Identification par            |  |  | Spectrom...                          | Spectrom...                                   | Spectrom...                                   |
| Méthode : Diffusion           |  |  | V                                    | V                                             | V                                             |
| CASFM/EUCAST 2023 V1          |  |  | V                                    | V                                             | V                                             |
| Oxacilline                    |  |  |                                      | R                                             | S                                             |
| Amoxicilline                  |  |  | R                                    |                                               |                                               |
| Amoxicilline+ac. clavulanique |  |  | ZIT                                  | R                                             | S                                             |
| Ticarcilline                  |  |  | R                                    |                                               |                                               |
| Ticarcilline+ac. clavulanique |  |  | R                                    |                                               |                                               |
| Pipéracilline                 |  |  | R                                    |                                               |                                               |
| Méïcillinam                   |  |  | S                                    |                                               |                                               |
| Céfoxitine                    |  |  | S                                    |                                               |                                               |
| Céfotaxime                    |  |  | R                                    |                                               |                                               |
| Ceftazidime                   |  |  | R                                    |                                               |                                               |
| Aztréonam                     |  |  | R                                    |                                               |                                               |
| Céfépime                      |  |  | R                                    |                                               |                                               |
| Imipénème                     |  |  | S                                    |                                               |                                               |
| Méropénème                    |  |  | S                                    |                                               |                                               |
| Ertapénème                    |  |  | S                                    |                                               |                                               |
| Gentamicine                   |  |  | S                                    | R                                             | S                                             |
| Kanamycine                    |  |  |                                      | R                                             | S                                             |
| Tobramycine                   |  |  | S                                    | R                                             | S                                             |
| Amikacine                     |  |  | S                                    |                                               |                                               |
| Tétracycline                  |  |  |                                      | S                                             | S                                             |
| Doxycycline                   |  |  |                                      | S                                             | S                                             |
| Minocycline                   |  |  |                                      | S                                             | S                                             |
| Tigécycline                   |  |  | S                                    |                                               |                                               |
| Acide nalidixique             |  |  | R                                    |                                               |                                               |
| Ofloxacine                    |  |  | R                                    |                                               |                                               |

|                              |  |  | 1.Escherichia coli Rares colonies de | 2.Staphylococcus epidermidis Rares colonie... | 3.Staphylococcus haemolyticus Rares coloni... |
|------------------------------|--|--|--------------------------------------|-----------------------------------------------|-----------------------------------------------|
|                              |  |  | 1.                                   | 2.                                            | 3.                                            |
| Moxifloxacin                 |  |  |                                      |                                               | S                                             |
| Erythromycine                |  |  |                                      | R                                             | S                                             |
| Clarithromycine              |  |  |                                      |                                               | S                                             |
| Azithromycine                |  |  |                                      |                                               | S                                             |
| Clindamycine                 |  |  |                                      | R                                             | S                                             |
| Linézolide                   |  |  |                                      | R                                             | S                                             |
| Daptomycine CMI (microdil... |  |  |                                      | S 1.0                                         | S 0.5                                         |
| Triméthoprim+sulfamétho...   |  |  | R                                    | R                                             | S                                             |
| Nitrofuranes                 |  |  | S                                    |                                               |                                               |
| Acide fusidique              |  |  |                                      | R                                             | S                                             |
| Fosfomycine                  |  |  | S                                    |                                               |                                               |
| Rifampicine                  |  |  |                                      | R                                             | S                                             |

# Que faire?

1. Je traite *E coli* BLSE par un pénem
2. Je ne considère pas les staphylocoques blancs
3. Je traite les staphylocoques blancs

# Dynamic Changes in Microbial Composition During Necrotizing Soft-Tissue Infections in ICU Patients

Michael Thy<sup>1,2†</sup>, Sébastien Tanaka<sup>1,3††</sup>, Alexy Tran-Dinh<sup>1,4,5</sup>, Lara Ribeiro<sup>4,6</sup>, Brice Lortat-Jacob<sup>1</sup>, Julia Donadio<sup>7</sup>, Nathalie Zappella<sup>1</sup>, Mouna Ben-Rehouma<sup>1,8</sup>, Parvine Tashk<sup>1</sup>, Aurelie Snauwaert<sup>1</sup>, Enora Atchade<sup>1</sup>, Nathalie Grall<sup>4,9,10</sup> and Philippe Montravers<sup>1,4,11</sup>

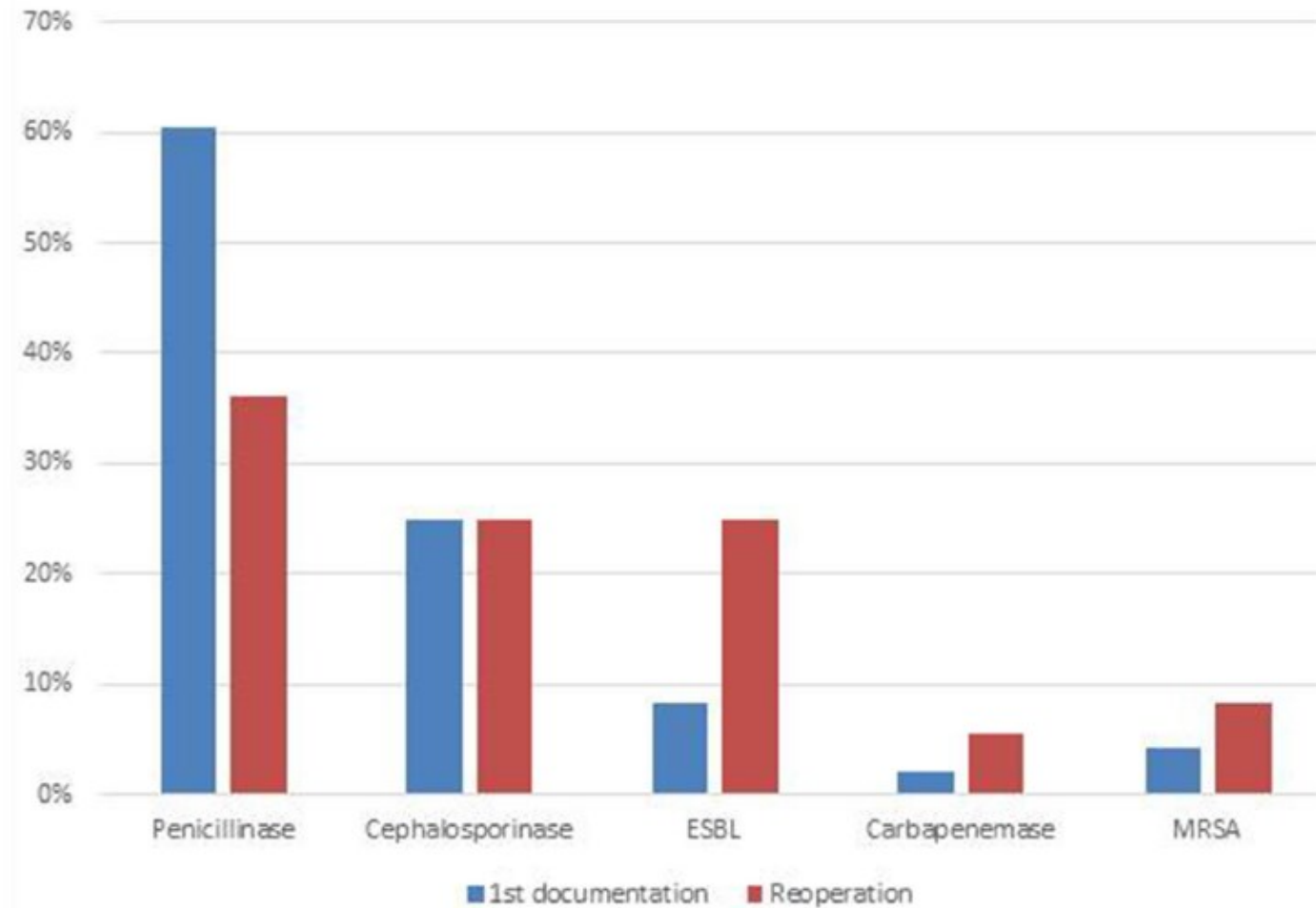
**TABLE 2 |** Microorganisms isolated from the first and second surgery.

|                                                     | First surgery | Reoperation | Emerging organisms | Persisting organisms |
|-----------------------------------------------------|---------------|-------------|--------------------|----------------------|
| Aerobes, <i>n</i> (%)                               | 146 (84)      | 84 (88)     | 56                 | 28                   |
| Gram-positive bacteria, <i>n</i> (%)                | 87 (50)       | 37 (39)*    | 20                 | 17                   |
| Enterococci, <i>n</i> (%)                           | 16 (9)        | 7 (7)       | 4                  | 3                    |
| <i>E. faecalis</i> , <i>n</i> (%)                   | 12 (7)        | 3 (4)       | 2                  | 1                    |
| <i>E. faecium</i> , <i>n</i> (%)                    | 1 (1)         | 3 (4)       | 2                  | 1                    |
| Streptococci, <i>n</i> (%)                          | 45 (27)       | 10 (12)*    | 2                  | 8                    |
| GAS, <i>n</i> (%)                                   | 12 (7)        | 1 (1)       | 0                  | 1                    |
| Staphylococci, <i>n</i> (%)                         | 26 (15)       | 20 (21)     | 14                 | 6                    |
| <i>Staphylococcus aureus</i> , <i>n</i> (%)         | 15 (9)        | 8 (10)      | 6                  | 2                    |
| Coagulase-negative staphylococci, <i>n</i> (%)      | 11 (7)        | 10 (12)     | 8                  | 2                    |
| Gram-negative bacteria, <i>n</i> (%)                | 59 (35)       | 47 (52)*    | 36                 | 11                   |
| <i>Enterobacterales</i> , <i>n</i> (%)              | 48 (28)       | 33 (35)     | 26                 | 17                   |
| <i>Escherichia coli</i> , <i>n</i> (%)              | 21 (12)       | 15 (18)     | 10                 | 5                    |
| <i>Enterobacter</i> spp., <i>n</i> (%)              | 2 (1)         | 6 (7)*      | 6                  | 0                    |
| <i>Klebsiella</i> spp., <i>n</i> (%)                | 9 (5)         | 12 (15)*    | 10                 | 2                    |
| Non-fermenting Gram-negative bacilli, <i>n</i> (%)  | 11 (7)        | 14 (17)*    | 10                 | 4                    |
| <i>Pseudomonas aeruginosa</i> , <i>n</i> (%)        | 9 (5)         | 14 (17)*    | 10                 | 4                    |
| Anaerobes, <i>n</i> (%)                             | 22 (13)       | 5 (6)       | 3                  | 2                    |
| <i>Bacteroides</i> spp., <i>n</i> (%)               | 9 (5)         | 4 (5)       | 3                  | 1                    |
| Fungi, <i>n</i> (%)                                 | 6 (4)         | 6 (7)       | 6                  | 0                    |
| <i>Candida albicans</i> , <i>n</i> (%)              | 1 (1)         | 2 (2)       | 2                  | 0                    |
| Total number of strains, <i>n</i> (%)               | 174 (100)     | 95 (100)    | 65                 | 30                   |
| Total number of MDR bacteria, <i>n</i> (%)          | 9 (5)         | 22 (27)*    | 19                 | 3                    |
| MRSA                                                | 2             | 3           | 3                  | 0                    |
| Overproduction of intrinsic or plasmid-encoded AmpC | 2             | 5*          | 3                  | 2                    |
| ESBL producing <i>Enterobacterales</i>              | 4             | 9*          | 8                  | 1                    |
| Carbapenemase producing <i>Enterobacterales</i>     | 1             | 2           | 2                  | 0                    |
| XDR <i>Pseudomonas aeruginosa</i>                   | 0             | 3*          | 3                  | 0                    |

GAS, group A streptococci; MRSA, methicillin-resistant *Staphylococcus aureus*; AmpC, cephalosporinase; ESBL, extended spectrum betalactamase; XDR, extensively drug resistant. The variables followed by an asterisk \* indicate those with a significant difference between 1st surgery and re-intervention among patients.

# Dynamic Changes in Microbial Composition During Necrotizing Soft-Tissue Infections in ICU Patients

Michael Thy<sup>1,2†</sup>, Sébastien Tanaka<sup>1,3†</sup>, Alexy Tran-Dinh<sup>1,4,5</sup>, Lara Ribeiro<sup>4,6</sup>, Brice Lortat-Jacob<sup>1</sup>, Julia Donadio<sup>7</sup>, Nathalie Zappella<sup>1</sup>, Mouna Ben-Rehouma<sup>1,8</sup>, Parvine Tashk<sup>1</sup>, Aurelie Snauwaert<sup>1</sup>, Enora Atchade<sup>1</sup>, Nathalie Grall<sup>4,9,10</sup> and Philippe Montravers<sup>1,4,11</sup>

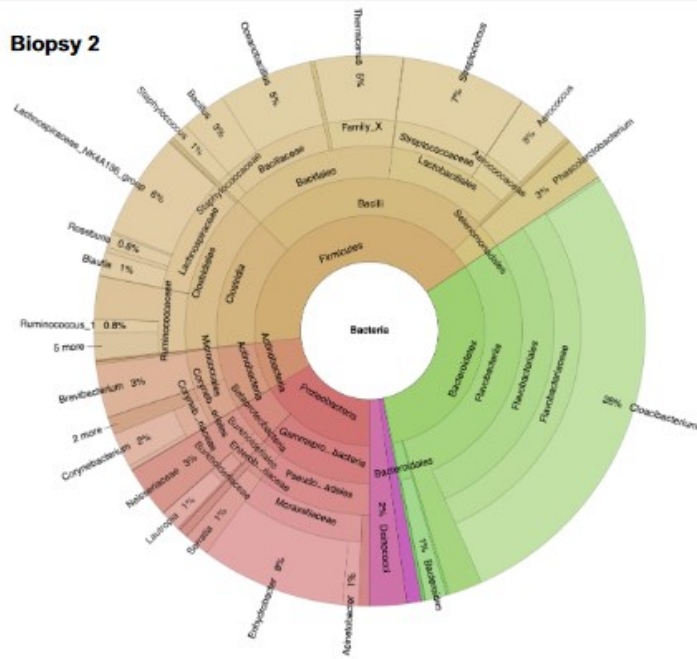


**FIGURE 1 |** Proportions of identified antibiotic resistances among MDR bacteria during initial surgery and at the time of reoperation. ESBL, extended-spectrum betalactamase; MRSA, methicillin-resistant *Staphylococcus aureus*.

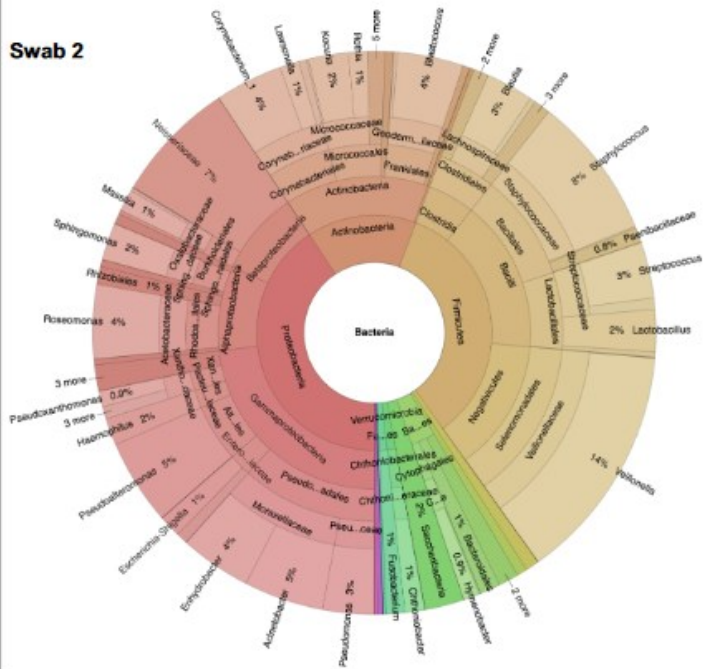
# Faut-il traiter les staph blancs?

- Pas de réponse à ce jour
- Evaluation en fonction de l'état clinique du patient
- Prélèvement profond de bonne qualité
- On ne traite pas un écouvillonnage de la peau

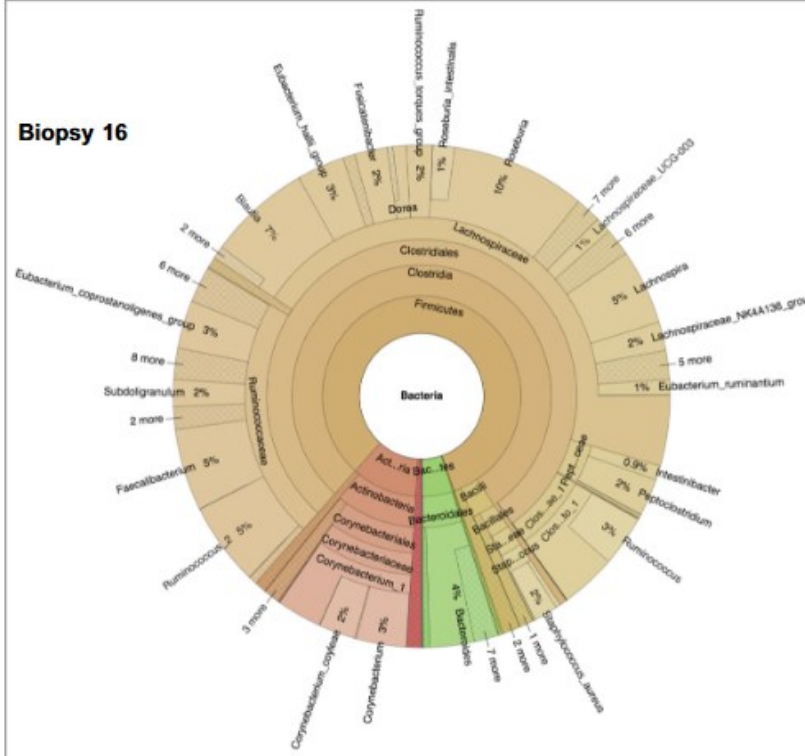
Biopsy 2



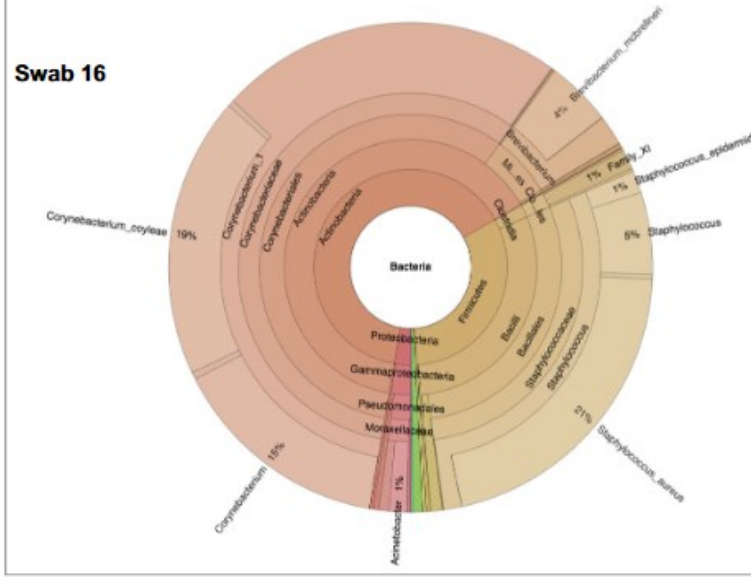
Swab 2



Biopsy 16



Swab 16



## Investigation of the skin microbiome: swabs vs. biopsies\*

S. Prast-Nielsen <sup>1,2</sup>, A.-M. Tobin <sup>2,3</sup>, K. Adamzik, <sup>3</sup> A. Powles, <sup>4</sup> L.W. Hugerth, <sup>1,2</sup> C. Sweeney, <sup>3</sup> B. Kirby, <sup>3</sup> L. Engstrand <sup>1,2</sup> and L. Fry <sup>4</sup>

<sup>1</sup>Department of Microbiology, Tumor and Cell Biology; <sup>2</sup>Centre for Translational Microbiome Research (CTMR), Karolinska Institute, Stockholm, Sweden

<sup>3</sup>Department of Dermatology, St Vincent's University Hospital, Dublin, Ireland

<sup>4</sup>Imperial College, London, U.K.

Comparaison du microbiome  
d'écouvillon cutané vs. biopsie  
de peau chez 16 patients

Prast-Nielsen et al.  
British Journal of Dermatology. 2019



# Monsieur R

- Traitement par **Méropenem – Daptomycine** pendant 10 jours
- Finalement l'évolution locale et systémique est favorable
- Pansement type VAC
- Greffe de peau 1 mois plus tard
- Monsieur R se porte bien

# Dosage des ATB

| PHARMACO - TOXICO - SERU... |  |       |  |  |                                                                                                |
|-----------------------------|--|-------|--|--|------------------------------------------------------------------------------------------------|
| ATB : Céfotaxime            |  |       |  |  |                                                                                                |
| Date début de traitement    |  |       |  |  | Non Co...                                                                                      |
| Voie d'administration       |  |       |  |  | Perfusi...                                                                                     |
| Posologie                   |  |       |  |  | /24h                                                                                           |
| Dose                        |  | mg    |  |  | 12000                                                                                          |
| Dose/poids patient          |  | mg/kg |  |  | -                                                                                              |
| Heure de dernière prise     |  |       |  |  | 14/05/...                                                                                      |
| Délai (Prise/Prélèvement)   |  |       |  |  | 3h 40min                                                                                       |
| Céfotaxime                  |  | mg/L  |  |  | 29.5                                                                                           |
| Zones thérapeutiques        |  |       |  |  | Absorpt...  |

|                           |  |       |  |                                                                                                   |                                                                                                 |
|---------------------------|--|-------|--|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| ATB : Daptomycine         |  |       |  |                                                                                                   |                                                                                                 |
| Date début de traitement  |  |       |  |                                                                                                   | Non Co...                                                                                       |
| Voie d'administration     |  |       |  |                                                                                                   | Perfusion                                                                                       |
| Posologie                 |  |       |  |                                                                                                   | 1/J                                                                                             |
| Dose                      |  | mg    |  |                                                                                                   | 800                                                                                             |
| Dose/poids patient        |  | mg/kg |  |                                                                                                   | -                                                                                               |
| Heure de dernière prise   |  |       |  |                                                                                                   | 26/05/...                                                                                       |
| Délai (Prise/Prélèvement) |  |       |  |                                                                                                   | 16h 30...                                                                                       |
| Daptomycine               |  | mg/L  |  |                                                                                                   | 7.7                                                                                             |
| Zones thérapeutiques      |  |       |  |                                                                                                   | Distribu...  |
| ATB : Méropénème          |  |       |  |                                                                                                   |                                                                                                 |
| Date début de traitement  |  |       |  | Non Co...                                                                                         |                                                                                                 |
| Voie d'administration     |  |       |  | Perfusi...                                                                                        |                                                                                                 |
| Posologie                 |  |       |  | 1/J                                                                                               |                                                                                                 |
| Dose                      |  | mg    |  | 6000                                                                                              |                                                                                                 |
| Dose/poids patient        |  | mg/kg |  | -                                                                                                 |                                                                                                 |
| Heure de dernière prise   |  |       |  | 27/05/...                                                                                         |                                                                                                 |
| Délai (Prise/Prélèvement) |  |       |  | 3h 30min                                                                                          |                                                                                                 |
| Méropénème                |  | mg/L  |  | 9.5                                                                                               |                                                                                                 |
| Zones thérapeutiques      |  |       |  | Distribu...  |                                                                                                 |
| Commentaire               |  |       |  | La conc...   |                                                                                                 |

# Quid des traitements anti-toxiniques

- Vancomycine, Clindamycine et Linézolide réduisent la production du superantigène impliqué dans la genèse de ce choc
- Etudes essentiellement *in vitro* +++++  
Stevens et al. CID. 1995  
Stevens et al. CID. 2006
- De nombreuses sociétés savantes recommandent leur utilisation systématique en probabiliste
- Attention à la Vancomycine car faible pénétration tissulaire

Etude rétrospective, 1956 patients

Streptocoques du groupe A

Mortalité à l'hôpital

Effectiveness of adjunctive clindamycin in  $\beta$ -lactam antibiotic-treated patients with invasive  $\beta$ -haemolytic streptococcal infections in US hospitals: a retrospective multicentre cohort study

Ahmed Babiker, Xiaobai Li, Yi Ling Lai, Jeffrey R Strich, Sarah Warner, Sadia Sarzynski, John P Dekker, Robert L Danner, Sameer SKadi

Autres streptocoques

Babiker et al. Lancet infectious disease. 2021

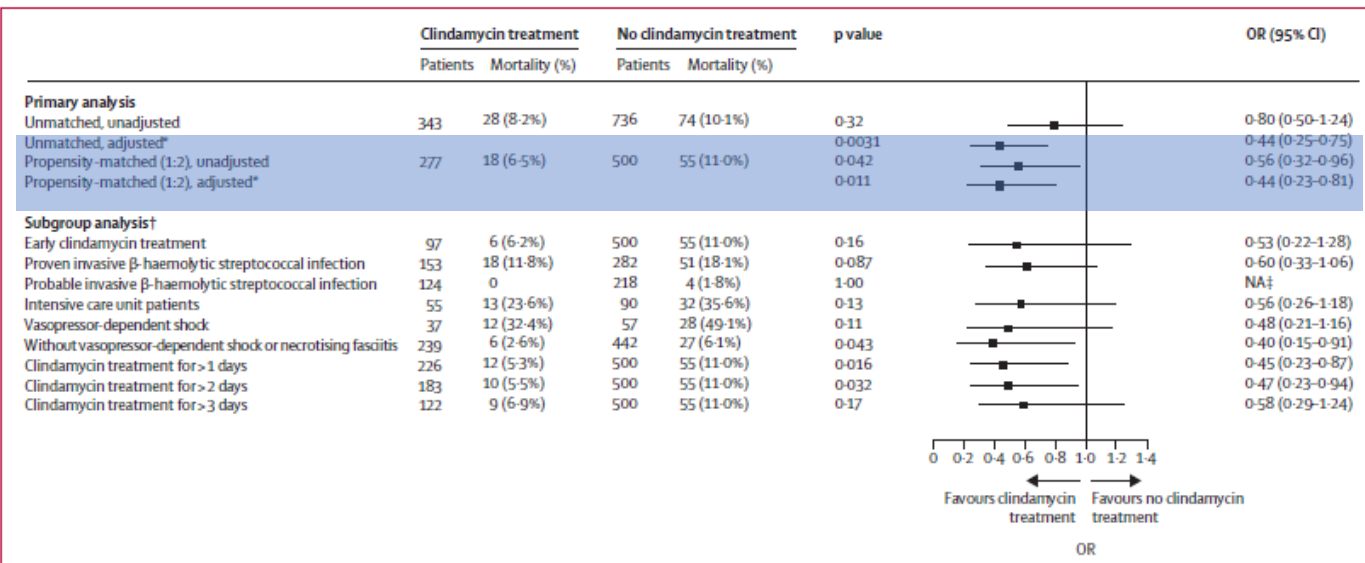


Figure 4: OR of in-hospital mortality in patients with invasive group A  $\beta$ -haemolytic streptococcal infection treated with versus without adjunctive clindamycin. The ORs (95% CIs) of in-hospital mortality in the primary analysis, by propensity matching and adjustment status, and in subgroup analyses of propensity-matched patients in the invasive group A  $\beta$ -haemolytic streptococcal infection cohort. OR=odds ratio. NA=not applicable. \* Adjusted for proven invasive  $\beta$ -haemolytic streptococcal infection, vasopressor-dependent shock, and intensive care unit status. † All subgroup analyses were propensity-matched. ‡ Too few deaths in patients with probable invasive  $\beta$ -haemolytic streptococcal infection alone precluded reliable assessment of the effect of clindamycin on mortality.

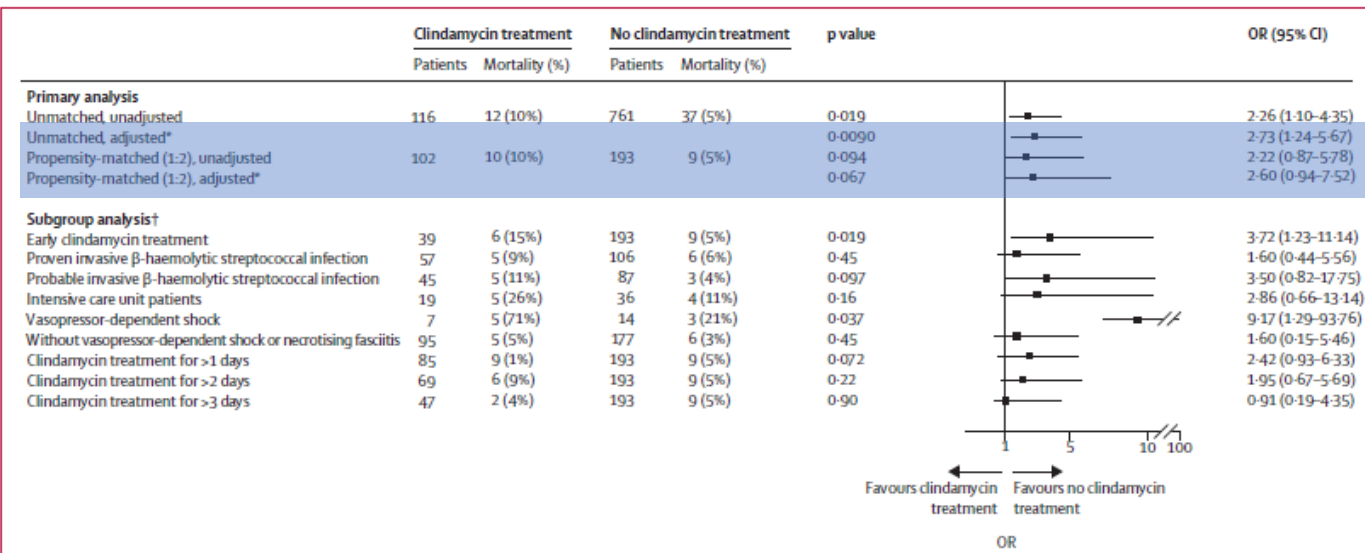


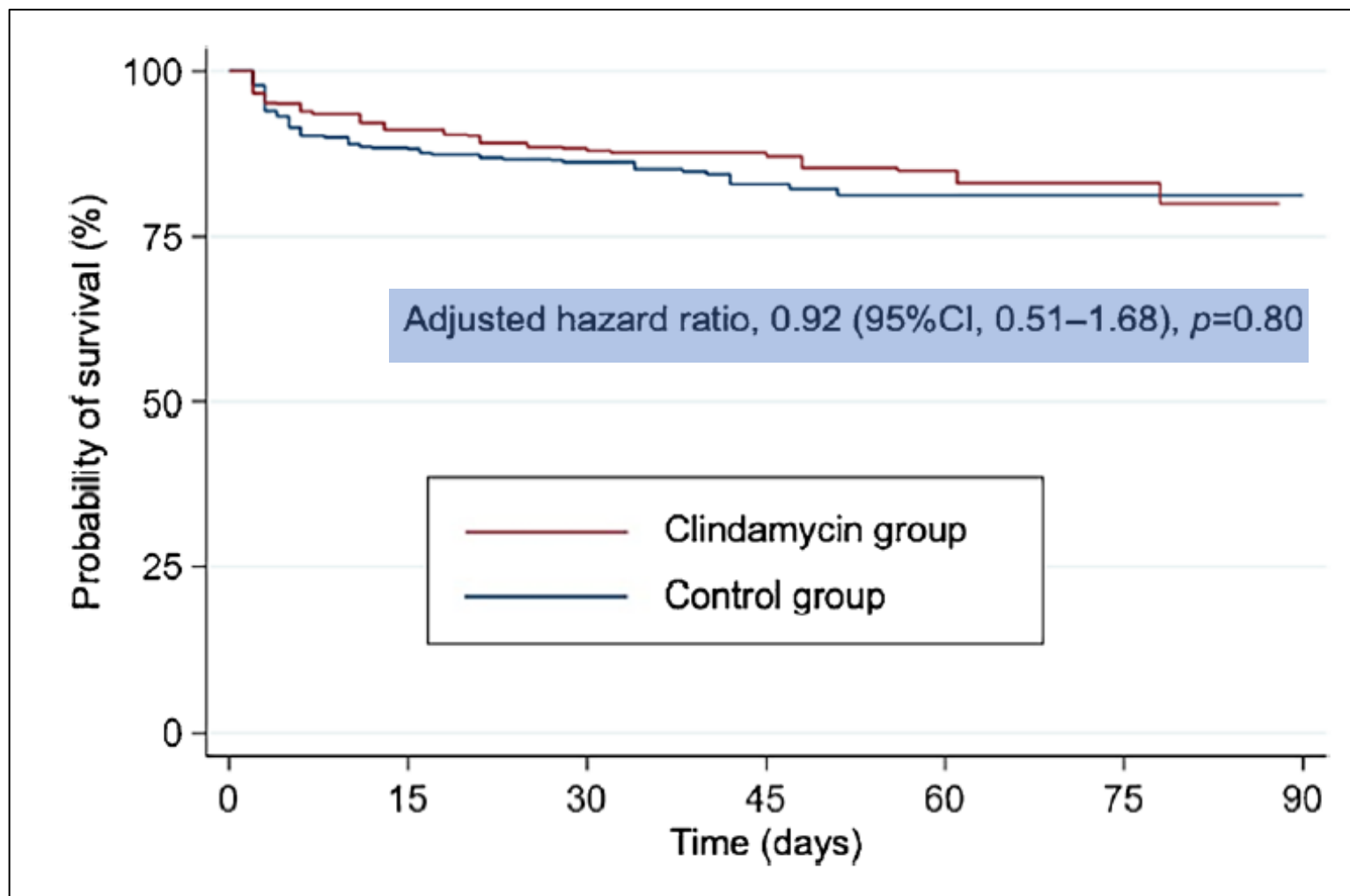
Figure 5: OR of in-hospital mortality in patients with invasive non-group A/B  $\beta$ -haemolytic streptococcal infection treated with versus without adjunctive clindamycin. The ORs (95% CIs) of in-hospital mortality in the primary analysis, by propensity matching and adjustment status, and in subgroup analyses of propensity-matched patients in the invasive group A  $\beta$ -haemolytic streptococcal infection cohort. OR=odds ratio. \* Adjusted for proven invasive  $\beta$ -haemolytic streptococcal infection, vasopressor-dependent shock, and intensive care unit status. † All subgroup analyses were propensity-matched.



Association between adjunct clindamycin and in-hospital mortality  
in patients with necrotizing soft tissue infection due to group  
*A Streptococcus*: a nationwide cohort study

Shoichiro Hamada<sup>1,2</sup> · Mikio Nakajima<sup>1,2,3</sup> · Richard H. Kaszynski<sup>1</sup> · Shunichi Otaka<sup>3</sup> · Hideaki Goto<sup>1</sup> ·  
Hiroki Matsui<sup>3</sup> · Kiyohide Fushimi<sup>4</sup> · Yoshihiro Yamaguchi<sup>2</sup> · Hideo Yasunaga<sup>3</sup>

- Etude rétrospective japonaise
- n = 404 patients
- DHBN à Strepto A



# Linézolide

- Même effets protecteurs globalement que la Clindamycine
- Effet inhibiteur sur les souches de staphylocoques productrices de leucocidine de Panton-Valentine (PVL)
- Effet inhibiteur sur les toxines TSST-1 et alpha
- Molécule active sur les souches résistantes à la méthicilline.

# Comparison of Adjuvant Clindamycin vs Linezolid for Severe Invasive Group A *Streptococcus* Skin and Soft Tissue Infections

Emily L. Heil,<sup>1,2</sup> Harpreet Kaur,<sup>2</sup> Anthony Atalla,<sup>3</sup> Sapna Basappa,<sup>4</sup> Minu Mathew,<sup>5</sup> Hyunuk Seung,<sup>1</sup> J. Kristie Johnson,<sup>6</sup> and Gregory M. Schrank<sup>2</sup>  
<sup>1</sup>Department of Practice, Sciences, and Health Outcomes Research, University of Maryland School of Pharmacy, Baltimore, Maryland, USA, <sup>2</sup>Department of Medicine, Division of Infectious Diseases, University of Maryland School of Medicine, Baltimore, Maryland, USA, <sup>3</sup>University of Maryland School of Medicine, Baltimore, Maryland, USA, <sup>4</sup>Department of Pharmacy, University of Massachusetts Memorial Medical Center, Worcester, Massachusetts, USA, <sup>5</sup>Department of Medicine, Milton S. Eshel Medical Center, Hershey, Pennsylvania, USA, and <sup>6</sup>Department of Pathology, University of Maryland School of Medicine, Baltimore, Maryland, USA

- Etude rétrospective monocentrique
- 55 DHBN à *Strepto A*
- Clindamycine vs. Linézolide
- Critère principal : delta SOFA admission/72h

**Table 1. Patient Characteristics**

| Characteristic                                           | No. (%) or Median (IQR) |                     |                   | P Value |
|----------------------------------------------------------|-------------------------|---------------------|-------------------|---------|
|                                                          | Total (n= 55)           | Clindamycin (n= 26) | Linezolid (n= 29) |         |
| Age, y <sup>a</sup>                                      | 50 (18.0)               | 49.3 (19.0)         | 50.6 (17.4)       | .8      |
| Male sex                                                 | 38 (69.1)               | 16 (61.5)           | 22 (75.9)         | .3      |
| Transferred from an outside facility                     | 31 (56.4)               | 17 (35.4)           | 14 (48.3)         | .2      |
| Body mass index                                          |                         |                     |                   | .2      |
| <35                                                      | 49 (89.1)               | 25 (96.2)           | 24 (82.8)         |         |
| ≥35                                                      | 6 (10.9)                | 1 (3.9)             | 5 (17.2)          |         |
| Baseline serum creatinine, mg/dL                         |                         |                     |                   | .2      |
| ≤1.6                                                     | 35 (63.6)               | 19 (73.1)           | 16 (55.2)         |         |
| >1.6                                                     | 20 (36.4)               | 7 (26.9)            | 13 (44.8)         |         |
| Baseline score                                           |                         |                     |                   |         |
| LRINEC                                                   | 7 (4–9)                 | 7 (4–9)             | 8 (5–9)           | .7      |
| SOFA                                                     | 3 (1–8)                 | 5 (2–8)             | 2 (1–5)           | .08     |
| Comorbidities                                            |                         |                     |                   |         |
| Diabetes                                                 | 13 (23.6)               | 4 (15.4)            | 9 (31.0)          | .2      |
| Chronic kidney disease                                   | 9 (16.4)                | 4 (15.4)            | 5 (17.2)          | >.99    |
| Peripheral vascular disease                              | 5 (9.1)                 | 1 (3.9)             | 4 (13.8)          | .4      |
| Substance use disorder                                   | 32 (58.2)               | 17 (65.4)           | 15 (51.7)         | .3      |
| History of tobacco use                                   | 26 (47.3)               | 10 (38.5)           | 16 (55.2)         | .2      |
| Immunocompromised                                        | 4 (7.3)                 | 2 (7.7)             | 2 (6.9)           | >.99    |
| Trauma as inciting factor of infection                   | 6 (10.9)                | 1 (3.9)             | 5 (17.2)          | .2      |
| Site of infection                                        |                         |                     |                   |         |
| Head and neck                                            | 3 (5.5)                 | 3 (11.5)            | 0                 | .1      |
| Perineum or genitals                                     | 3 (5.5)                 | 0                   | 3 (10.3)          | .2      |
| Abdominal                                                | 0                       | 0                   | 0                 | >.99    |
| Thorax/trunk                                             | 4 (7.3)                 | 3 (11.5)            | 1 (3.5)           | .3      |
| Extremity                                                | 46 (83.6)               | 20 (76.9)           | 26 (89.7)         | .3      |
| Inguinal                                                 | 5 (9.1)                 | 2 (7.7)             | 3 (10.3)          | >.99    |
| Organisms isolated from clinical cultures other than GAS |                         |                     |                   |         |
| Polymicrobial infection                                  | 27 (49.1)               | 12 (46.2)           | 15 (51.7)         | .7      |
| <i>Clostridium</i> spp                                   | 0                       | 0                   | 0                 | >.99    |
| MSSA                                                     | 12 (21.8)               | 5 (19.2)            | 7 (24.1)          | .7      |
| MRSA                                                     | 11 (20)                 | 4 (15.4)            | 7 (24.1)          | .5      |
| Gram negative bacilli                                    | 7 (12.7)                | 3 (11.5)            | 4 (13.8)          | >.99    |
| Anaerobes                                                | 1 (1.8)                 | 0                   | 1 (3.5)           | >.99    |
| Coagulase-negative <i>Staphylococcus</i>                 | 8 (14.5)                | 2 (7.7)             | 6 (20.6)          | .3      |
| Adjunct therapies and management                         |                         |                     |                   |         |
| Time from admission to first surgery, h                  | 4.6 (2.0–16.0)          | 6.0 (1.7–18.0)      | 4.0 (2.0–14.5)    | .7      |
| Hyperbaric oxygen                                        | 30 (54.6)               | 15 (57.7)           | 15 (51.7)         | .7      |
| IVIg given                                               | 12 (21.8)               | 8 (30.8)            | 4 (13.8)          | .1      |
| Duration of antitoxin therapy, d                         | 3.3 (2.3–4.6)           | 2.7 (2.3–4.3)       | 3.5 (2.5–5.5)     | .4      |
| Vasopressors                                             |                         |                     |                   |         |
| Norepinephrine                                           | 22 (40)                 | 14 (53.9)           | 8 (27.6)          | .06     |
| Epinephrine                                              | 7 (12.7)                | 2 (7.7)             | 5 (17.2)          | .4      |
| Phenylephrine                                            | 2 (3.6)                 | 1 (3.9)             | 1 (3.5)           | >.99    |
| Vasopressin                                              | 7 (12.7)                | 5 (19.2)            | 2 (6.9)           | .2      |
| None                                                     | 32 (58.2)               | 12 (46.2)           | 20 (69.0)         | .09     |

# Comparison of Adjuvant Clindamycin vs Linezolid for Severe Invasive Group A *Streptococcus* Skin and Soft Tissue Infections

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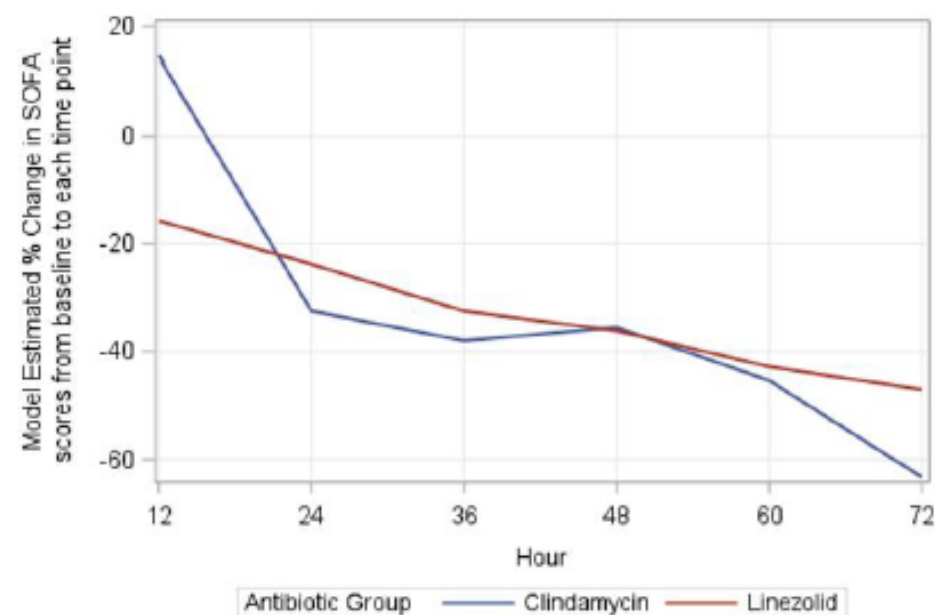
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**Table 2. Change in SOFA Scores From Baseline Across Various Time Points**

| SOFA Score           | LS Mean (SE)         |                    | Clindamycin vs Linezolid |               | P Value |
|----------------------|----------------------|--------------------|--------------------------|---------------|---------|
|                      | Clindamycin (n = 23) | Linezolid (n = 23) | LS Mean Difference (SE)  | 95% CI        |         |
| Baseline             | 6.37 (0.85)          | 4.41 (0.85)        | 1.97 (1.09)              | −0.47 to 4.41 | .1      |
| Percentage change to |                      |                    |                          |               |         |
| 12 h                 | 16.5 (22.8)          | −17.1 (7.4)        | 33.6 (24.1)              | −14.9 to 82.2 | .2      |
| 24 h                 | −30.6 (9.6)          | −25.1 (11.6)       | −5.5 (15.2)              | −36.3 to 25.3 | .7      |
| 36 h                 | −36.1 (11.3)         | −33.8 (12.4)       | −2.3 (16.9)              | −36.4 to 31.9 | .9      |
| 48 h                 | −33.6 (14.5)         | −37.5 (11.7)       | 3.9 (18.7)               | −33.9 to 14.6 | .8      |
| 60 h                 | −43.4 (13.6)         | −44.1 (10.2)       | 0.7 (17.1)               | −33.8 to 35.2 | >.99    |
| 72 h                 | −61.4 (7.8)          | −48.4 (11.6)       | −13.0 (14.1)             | −41.6 to 15.5 | .4      |

Patients with a baseline SOFA score of 0 were excluded from this analysis.

Abbreviations: LS, least squares; SOFA, Sequential Organ Failure Assessment.



**Figure 1.** The model-estimated percentage change in Sequential Organ Failure Assessment (SOFA) score for clindamycin and linezolid across the first 72 hours of hospitalization (Table 3).

Mortalité : Clindamycine n = 2 (7.7%) vs. Linézolide n = 1 (3.4%), p= 0,6



# Should Linezolid Replace Clindamycin as the Adjunctive Antimicrobial of Choice in Group A Streptococcal Necrotizing Soft Tissue Infection and Toxic Shock Syndrome? A Focused Debate

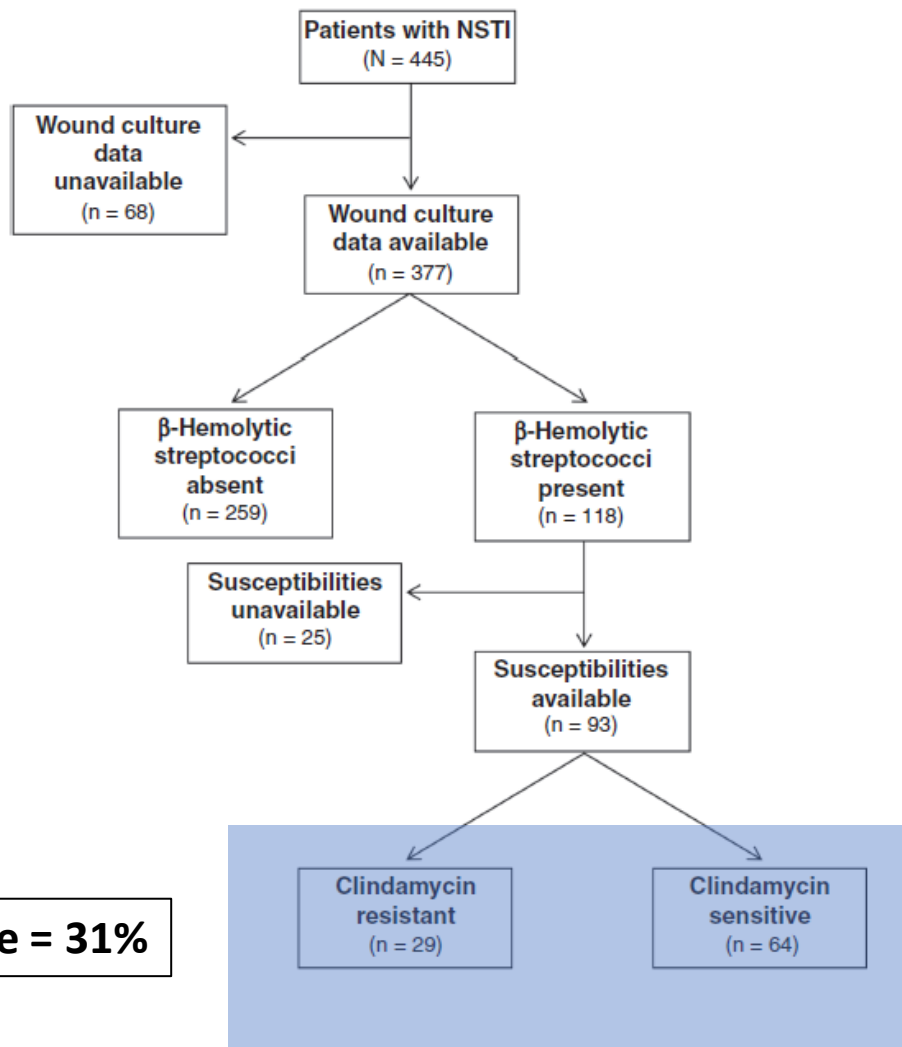
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Group A *Streptococcus* (GAS) necrotizing soft tissue infections and toxic shock syndrome remain high-mortality conditions. In vitro and animal model data, as well as multiple observational studies, suggest adjunctive clindamycin (ie, given with a beta-lactam) reduces invasive GAS infection mortality by inhibiting exotoxin production. Unfortunately, clindamycin resistance in GAS has been rapidly increasing in the United States since the mid-2010s, although the clinical significance of this remains unclear. Linezolid is a promising alternative adjunctive agent to which US GAS isolates remain near-universally susceptible, with a similar mechanism of action and similar in vitro evidence of GAS virulence factor attenuation. However, the clinical data supporting linezolid's value in severe GAS infections are far more limited. Here the authors review the data and reasoning behind a general preference for clindamycin or linezolid in a focused, pro-con debate format.

**Keywords.** group A *Streptococcus*; necrotizing soft tissue infection; toxic shock syndrome; clindamycin; linezolid.

- Registre prospectif à Seattle
- Entre 2015 et 2018
- n = 445 DHBN



# Outcomes of $\beta$ -Hemolytic Streptococcal Necrotizing Skin and Soft-tissue Infections and the Impact of Clindamycin Resistance

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**Table 5. Unadjusted and Adjusted Risk Ratio Estimates Comparing Patients With or Without Clindamycin-resistant Strains Among Those With  $\beta$ -Hemolytic Streptococci**

|                               | RR (95% CI)     |                       |
|-------------------------------|-----------------|-----------------------|
|                               | Unadjusted      | Adjusted <sup>a</sup> |
| <b>Amputation<sup>b</sup></b> |                 |                       |
| Clindamycin sensitive         | Reference       | Reference             |
| Clindamycin resistant         | 1.07 (.49–2.32) | 1.86 (1.10–3.16)      |
| <b>STSS</b>                   |                 |                       |
| Clindamycin sensitive         | Reference       | Reference             |
| Clindamycin resistant         | 1.10 (.21–5.69) | 1.23 (.25–6.08)       |
| <b>Death</b>                  |                 |                       |
| Clindamycin sensitive         | Reference       | Reference             |
| Clindamycin resistant         | 0.83 (.21–2.90) | 1.38 (.41–4.63)       |

Abbreviations: CI, confidence interval; RR, risk ratio; STSS, streptococcal toxic shock syndrome.

<sup>a</sup>Adjusted for injection drug use, transfer status, and age by quintile.

<sup>b</sup>Among patients with extremity involvement (n = 73).



Tanaka, Montravers et al.

## Antibiothérapie probabiliste

Haute dose  
d'antibiotique

---

$\beta$ -lactamines  
en perfusion  
continue

---

Dosage  
des  
antibiotiques

---

Surveillance  
de la  
toxicité rénale,  
hématologique,  
hépatique

### $\beta$ -lactamine à large spectre

Si suspicion ou portage BLSE :  
Méropénème/Imipénème

Si absence de suspicion ou de portage  
BLSE :

- Céfotaxime + Métronidazole  
OU
- Pipéracilline - Tazobactam

+

Agent anti-SDMR  
si patient porteur  
ou facteurs de  
risque

Daptomycine

OU

Vancomycine

OU

+

Agent  
anti-  
toxinique

Clindamycine

OU

Linézolide

Chirurgie : prélèvements microbiologiques profonds

Antibiothérapie définitive = Adaptation / Désescalade thérapeutique

Arrêt antibiothérapie : 48 à 72h après la dernière reprise chirurgicale + bonne évolution clinico-biologique

# Conclusion

- Microbiologie variée, dynamique dans le temps et l'espace
- Antibiothérapie probabiliste précoce, intraveineuse, à large spectre
- Doses élevées d'antibiotique, monitoring +++
- L'adjonction d'un traitement anti-toxinique semble raisonnable surtout si atteinte des membres



## D  partement d'anesth  sie-r  animation Bichat

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