# Bactériémies chez le sujet âgé

**Rodolphe Buzelé**

**JILB 2025**

# Au menu

- **La bactériémie?**
- **Le sujet âgé?**
- **Spécificités gériatriques des bactériémies et de leur prise en charge**

Epidémiologie/Pronostic
Complications, risque d'endocardite, d'IPOA
Diagnostic
Prise en charge
    Peut on extrapoler les avancées récentes chez le sujet âgé?
Modalités spécifiques de traitement

} **Une pathologie particulière?**

# Définitions

## Bactériémie?

**C'est l'isolement dans une hémoculture d'un germe pathogène strict**

**(ou dans deux hémocultures d'un pathogène possible – contaminant éventuel)**

*Staphylococcus aureus, S.lugdunensis*
BGN et BGN non fermentants
*Streptococcus sp*
*Enterococcus sp*
*Listeria, Pasteurella, Brucella*
*Candida…*

→ **Pathogène quelque soit le nombre de flacon prélevé et le nombre de flacon positif**

Commensaux de la peau:
-SCN
*-Bacillus sp*
*-Micrococcus sp*
*-Cutibacterium acnes…*

→ **Contexte clinique évocateur** /!\ matériel intra vasculaire /!\

**≥ 2 flacons de 2 paires différentes**
avec la même bactérie
(antibiogramme identique)

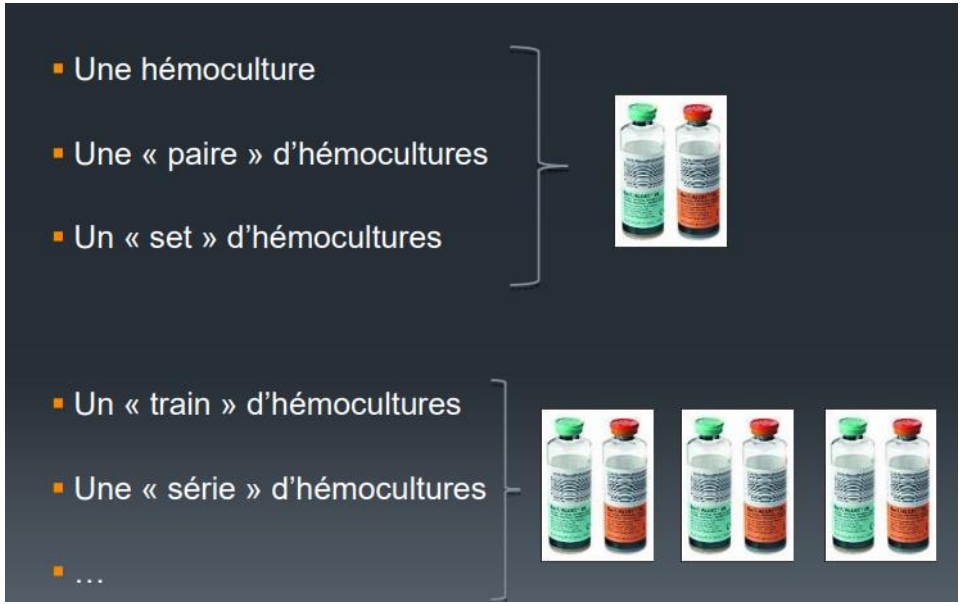
**Autres arguments pour une contamination pour CG+ en amas/SCN**

- **Délai de positivté > 15h**
- **1 seul flacon + sur 1 paire**

*P. Gazeau, JRATB 2023*

# Hémocultures – Rappels pratiques

- **Une hémoculture → Une PAIRE d'hémocultures**




*S. Dargere, GERICCO 2015*

- **Quand?**

**AVANT ATB** (sauf purpura fulminans)

Pendant pic si pic fébrile si pic
→ MAIS NE PAS ATTENDRE

**Chez le sujet âgé: en cas de suspicion d'infection avant ATB (quand hospitalisé)**

→ **C'est à dire?**

- **Combien?**

Sepsis → 2 paires et ATB urgente

Tableau non aigu (suspicion d'EI, fièvre prolongée) → 2 à 3 paires

- **Infection de PICC/PAC (KT longue durée)**

→ Paires couplées KT/périph x2

# Hémocultures – Rappels pratiques

- **Comment?**

**Flacon aérobie PUIS anaérobie**

- **Si infection KT longue durée suspectée:**

  Paire KT puis immédiatement paire périph

  SANS RINCER le KT

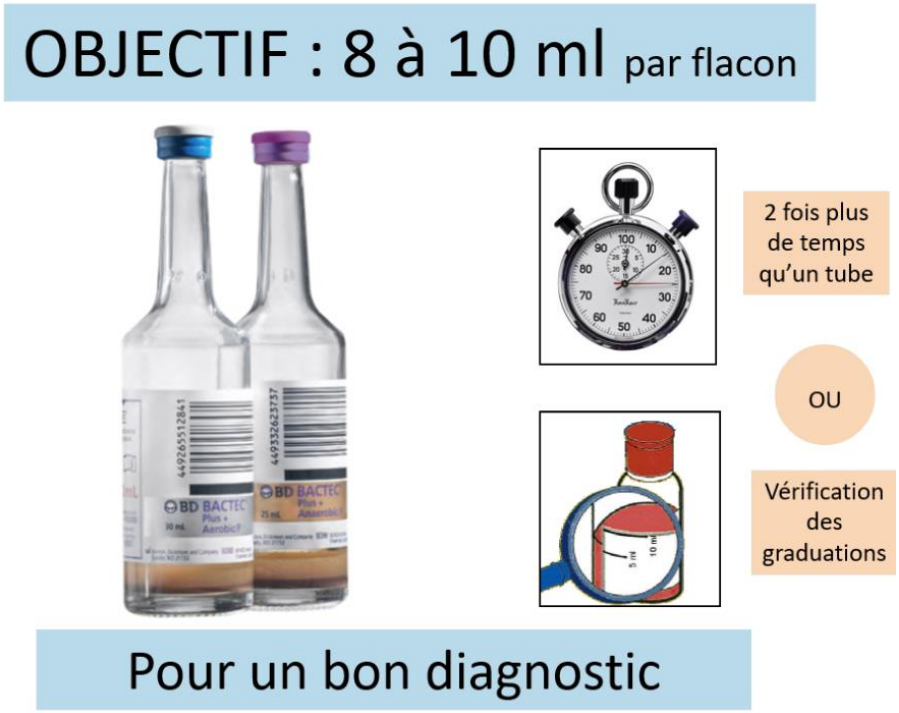
  **ETIQUETTER les flacons KT/périph**

- **Asepsie cutanée**

  ➡ Risque de contamination +++

- **Au moins 10mL de sang par flacon**

  ➡ Augmente la rentabilité de l'hémoculture



# Hémocultures – Rappels pratiques

- **Comment?**

**Flacon aérobie PUIS anaérobie**

- **Si infection**

  Paire

  SANS

  **ETIQU**

- **Asepsie cutanée**

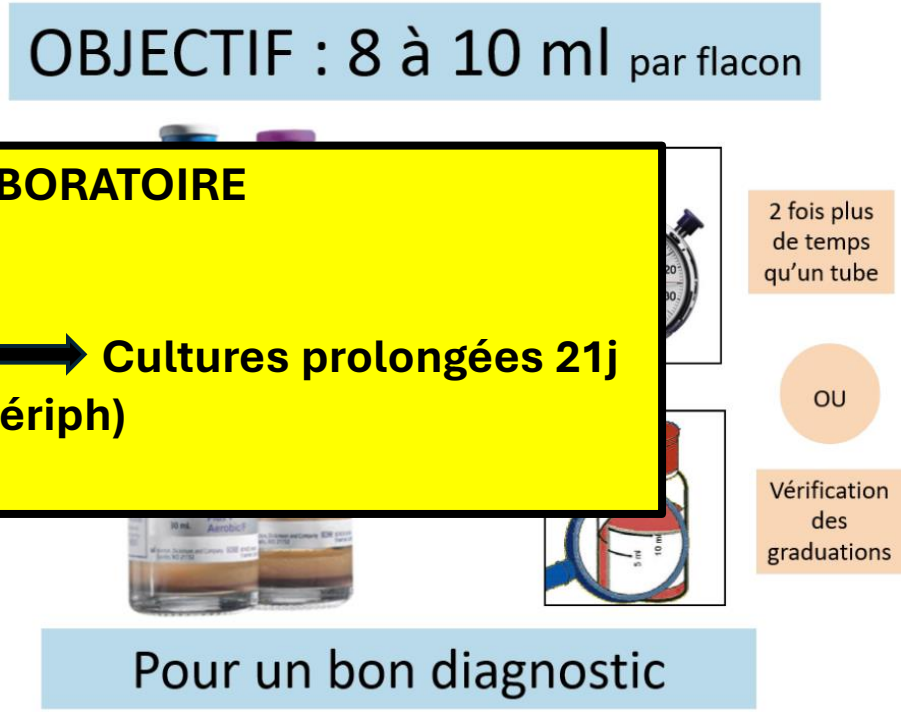
  ➡ Risque de contamination +++

**INFORMER/RENSEIGNER LE LABORATOIRE**

**Contexte clinique**

**Suspicion d'endocardite/infection sur matériel ➡ Cultures prolongées 21j**

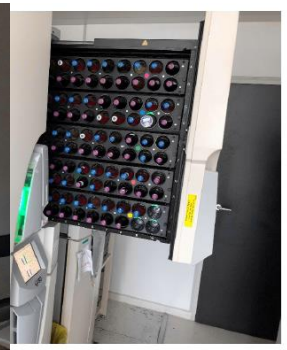
**Site de prélèvement (KT/périph)**




- **Au moins 10mL de sang par flacon**

  ➡ Augmente la rentabilité de l'hémoculture

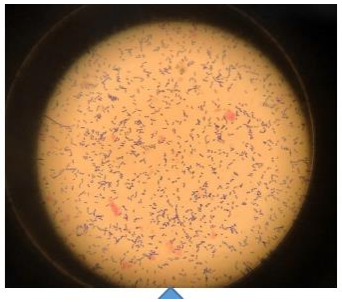
# Hémocultures – Rappels pratiques



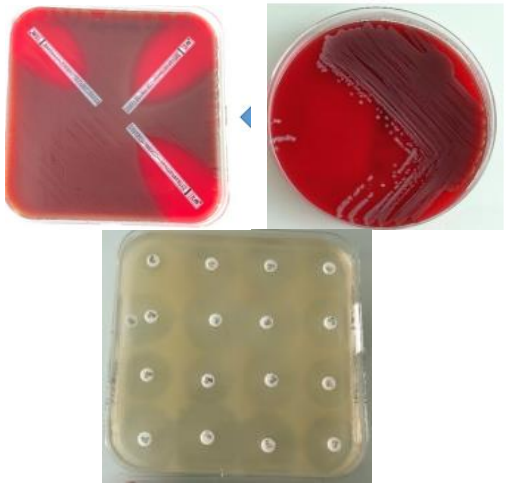
Mise en culture en Incubateur

- Détection de CO produit
- Faux positifs possibles (hémopathies malignes)
- Culture classique : 5j
- Culture prolongée (suspicion d'EI) : 21j

et OUI, les levures poussent sur les hémocs de bactério*



Examen direct
Coloration de GRAM
Cocci/Bacille GRAM +/-
**20 minutes**



**24h – 48h**

Mise en **culture sur géloses** pour identification et ATBgrammes

**APPEL DU CLINICIEN OBLIGATOIRE**

**Selon laboratoire**
Identification directe sur flacon par Maldi-Tof
**+/- PCR pour mécanismes de résistance (mecA pour SARM,** recherche de BLSE)

*P. Gazeau, JRATB 2023*

# Sujet âgé?

Insee

# PYRAMIDE DES ÂGES AU 1ER JANVIER 2025

## DONNÉES PROVISOIRES DE POPULATION

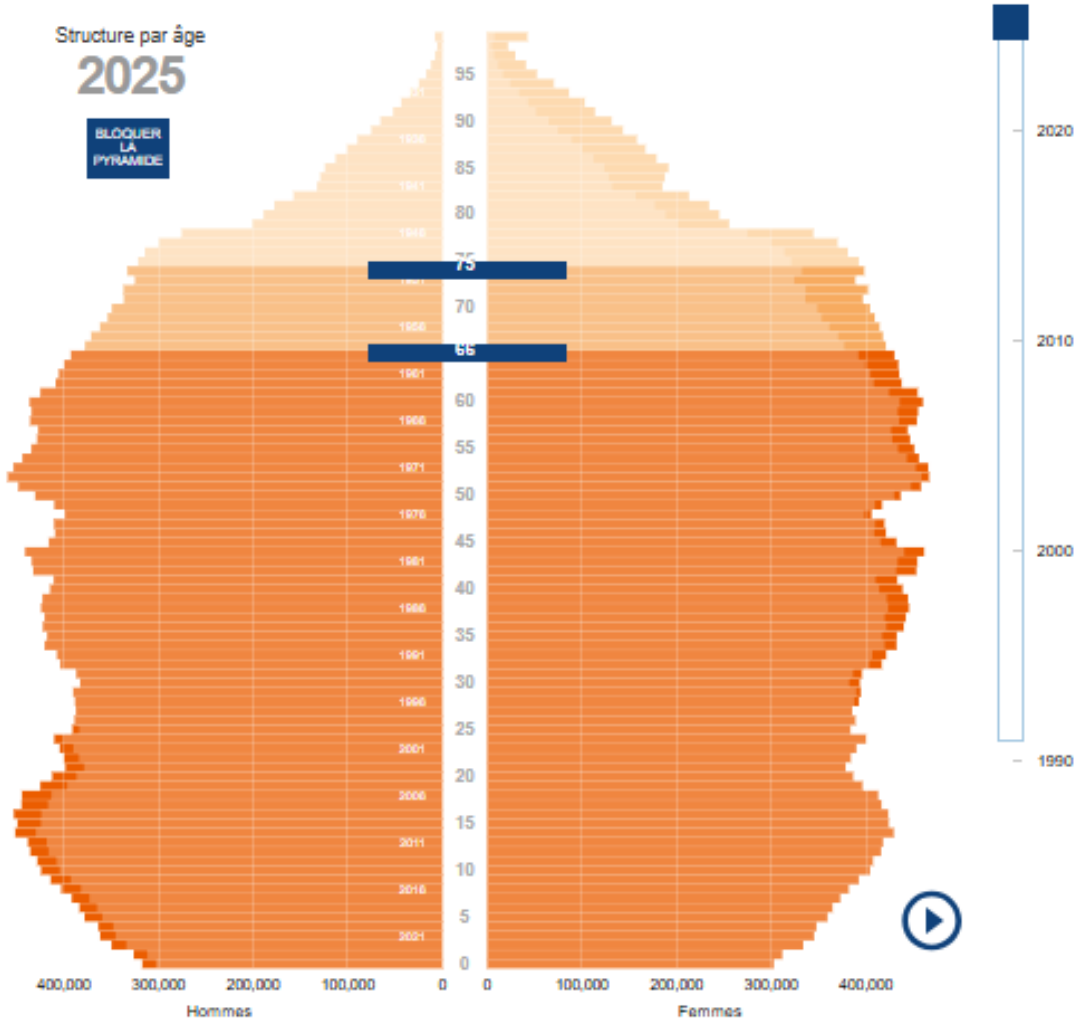
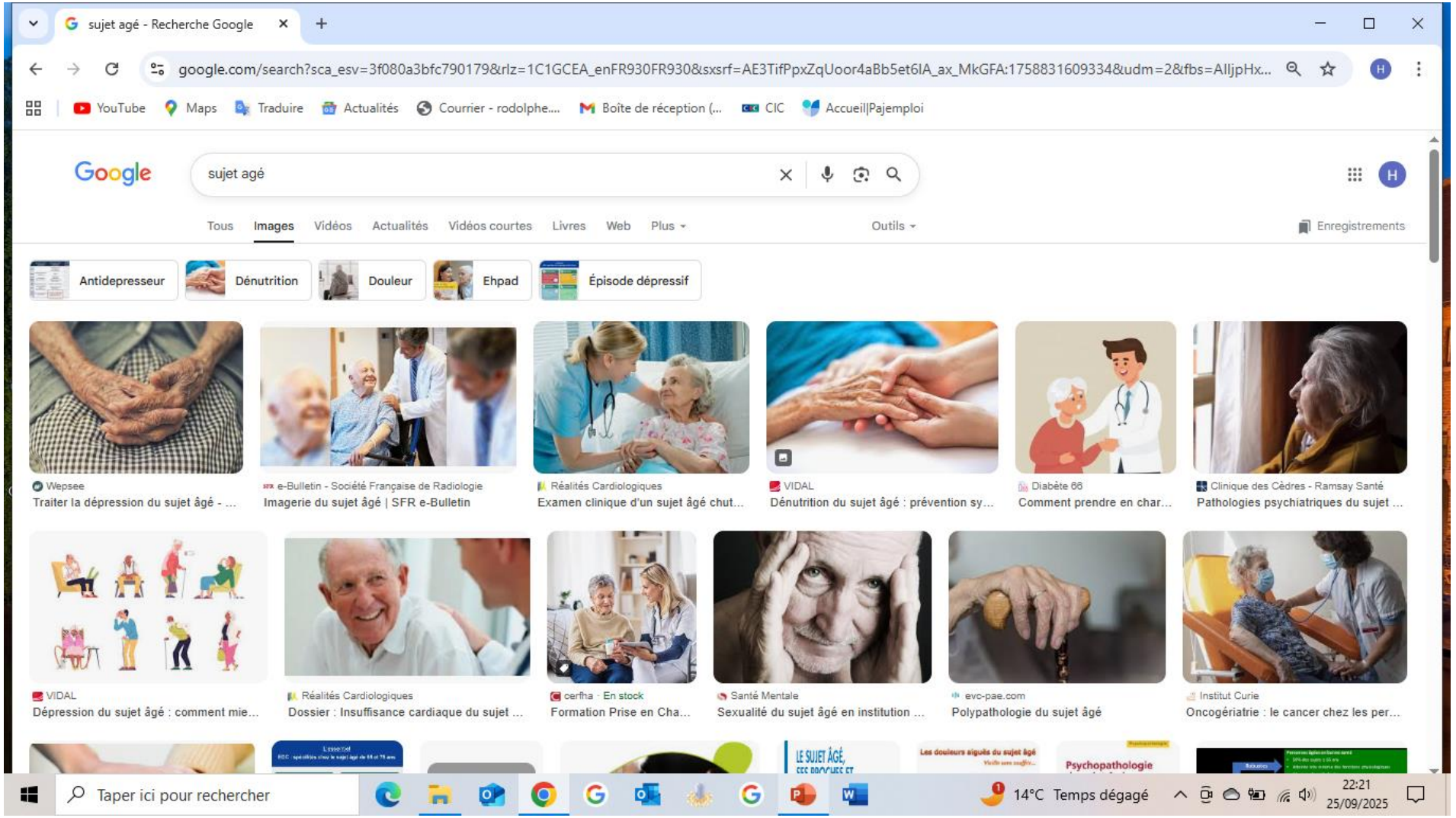



Tableau de données agrégées par tranches d'âges

| Tranches d'âge | Millions | Pourcentage |
|---|---|---|
| 75+ | 7,3 | 11% |
| 66–74 | 6,8 | 10% |
| 0-65 | 54,5 | 79% |
| Total | 68,6 | 100% |

APPLIQUER LES TRANCHES D'ÂGE

# Sujet âgé?




**D’après Google le sujet est malade, dépendant, fragile et souriant**

# Sujet âgé?

HAS
HAUTE AUTORITÉ DE SANTÉ

**Évaluation de la prise en soin des personnes âgées**
selon le référentiel de certification

Date validation Collège le 2 mai 2024

## Les personnes âgées

La définition d'une personne âgée dépend du contexte. Le vieillissement est un processus progressif. Ainsi, la fragilité – plus que l'âge de l'état civil – aide à mieux cerner les personnes qui relèvent de la gériatrie, même si la limite communément admise est 75 ans. Ainsi, l'entrée dans la vieillesse ne se réfère à aucun âge particulier mais à un état d'incapacité fonctionnelle éprouvé subjectivement ou objectivement selon les dires des personnes âgées elles-mêmes.

Les personnes âgées constituent une population :

- spécifique en raison de la fréquence de polypathologies, et, pour les plus âgées d'entre elles, de la prévalence augmentée de fragilité physique, psychique ou socio-économique et du risque de perte d'autonomie et de dépendance ;
- hétérogène, plus souvent hospitalisée, pour une durée plus longue et en passant plus fréquemment par le service des urgences.

BMJ

*BMJ* 2011;343:d7679 doi: 10.1136/bmj.d7679 (Published 15 December 2011) 

RESEARCH

CHRISTMAS 2011: DEATH'S DOMINION

# How fast does the Grim Reaper walk? Receiver operating characteristics curve analysis in healthy men aged 70 and over



Fiona F Stanaway *research fellow*[1], Danijela Gnjidic *research fellow*[2 3 4], Fiona M Blyth *deputy*


## What is already known on this topic

The Grim Reaper, the personification of death, is a well known mythological and literary figure

High quality scientific research linking the Grim Reaper to mortality is limited, despite extensive anecdotal evidence attesting his important role in death

## What this study adds

The Grim Reaper prefers to walk at 0.82 m/s (2 miles (about 3 km) per hour), with a maximum estimated speed of 1.36 m/s (3 miles (about 5 km) per hour)

Older men wishing to outrun the Grim Reaper should maintain walking speeds above these levels

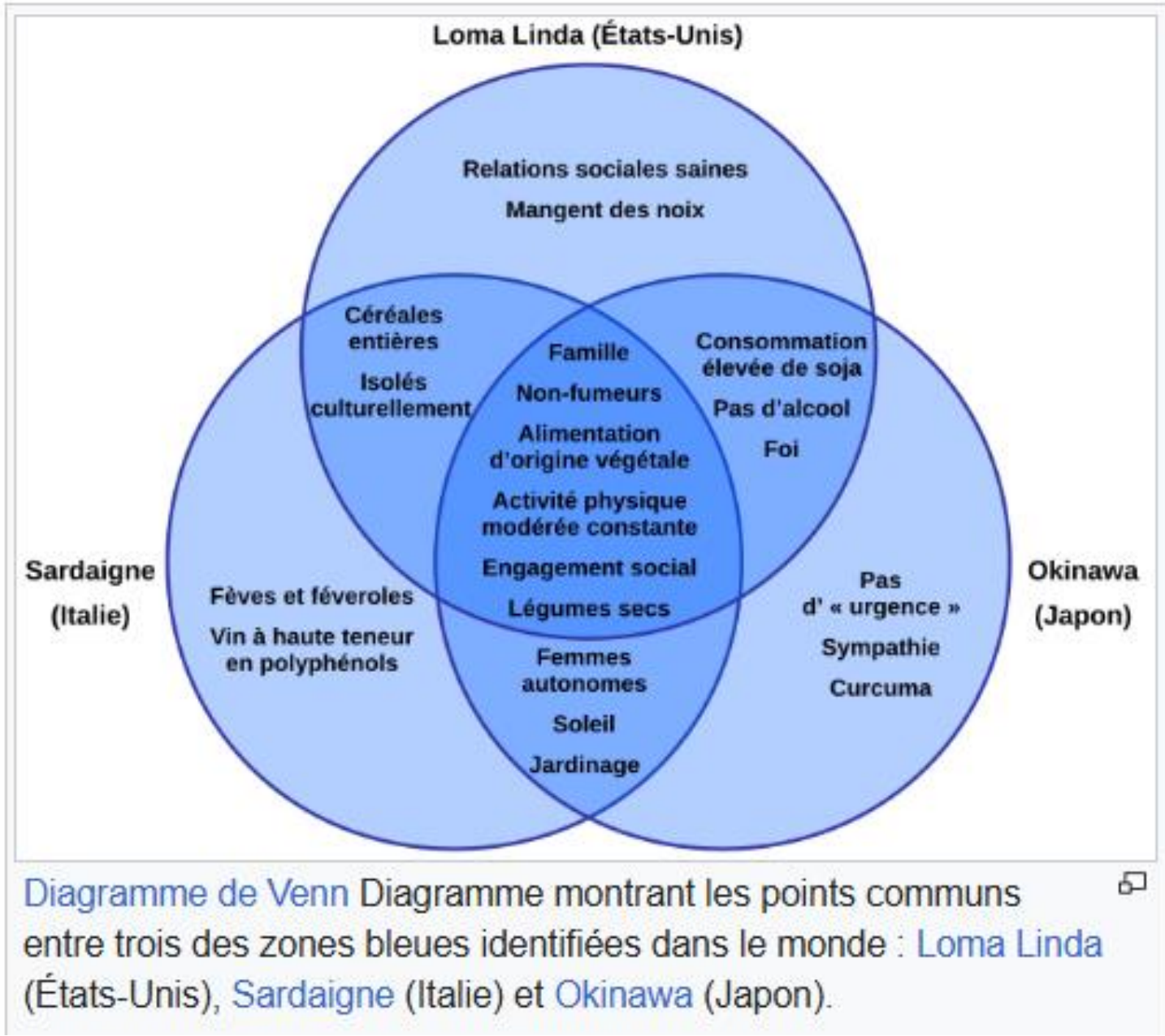



Diagramme de Venn Diagramme montrant les points communs entre trois des zones bleues identifiées dans le monde : Loma Linda (États-Unis), Sardaigne (Italie) et Okinawa (Japon).

# Définitions

**Le sujet âgé en Maladies Infectieuses?**

# Définitions

**Le sujet âgé en Maladies Infectieuses?**


**Rien**

(mais je conseille quand même)

# Sujet âgé?


- Sujet > 75 ans
- Ou > 65 ans avec au moins 3 critères de Fried

| | |
|---|---|
| **Perte de poids involontaire** | ☐ Perte involontaire de > 4,5 Kg au cours des 12 derniers mois |
| **Fatigue** | ☐ La personne sent que tout ce qu'elle fait lui demande un effort, ou qu'elle ne peut plus faire ce qu'elle faisait avant; et ceci souvent, fréquemment ou la plupart du temps<br>Fatigue subjective, originalement évaluée à partir de deux questions inclues dans le questionnaire CES-D de dépression |
| **Bas niveau d'activité physique** | ☐ Dépense énergétique très basse, estimée sur la base d'un questionnaire*. Correspond à une personne très sédentaire, qui ne fait aucune activité physique régulière<br>(*) Dans le dans le 20ème percentile inférieur, selon âge, du Minnesota Leisure Time Activity Questionnaire (MLTAQ) |
| **Faiblesse musculaire** | ☐ Définie par une force faible au *grip test* mesurée avec un dynamomètre (dans le 20ème percentil inférieur)<br>Valeurs seuil :<br>Homme : BMI < 24 = ≤ 29 Kg; BMI 24-28 = ≤ 30 Kg; BMI > 28 = ≤ 32 Kg.<br>Femme : BMI < 23 = ≤ 17 Kg; BMI 23-26 = ≤ 17.3 Kg, BMI 26-29 = ≤ 18Kg; BMI > 29 = ≤ 21 Kg |
| **Vitesse de marche ralentie** | ☐ > 7 secs pour parcourir 4,5 m, à sa vitesse de marche habituelle<br>ou > 6 secs, si taille > 159 cm chez les femmes, > 173 cm chez les hommes |

**Fragilité**

*Fried LP, J Gerontol 2001*

# Sujet âgé – Maladies Infectieuses

**Fragilité et polypathologie**

Décompensations secondaires à la bactériémie
Complications rapides de l'hospitalisation
Prise en charge – ***encore plus*** – globale

**Individualisation de la prise en charge**

Tenir compte de l'espérance de vie
Tenir compte du confort et de la qualité de vie
Même quand les ATB semblent pouvoir tout faire

*Larcenet M, Pennac D et al, Journal d'un Corps 2012*

# Sujet âgé infecté

**Immunosenescence/Altération des barrières**

Susceptibilité aux infections

**Prévalence du matériel implanté**

- POA
- Prothèses valvulaires, vasculaires
- **TAVI**
- Pace-Maker, DAI
- Greffes secondaires pus fréquentes

**Présentations cliniques atypiques**

- Confusion, AEG, chute, incontinence, déclin
- **APYREXIE**
- Rupture avec l'état antérieur
- « pneumonéphrites »

➡ Hémocultures avant antibiothérapie

**Prévalence des infections liées aux soins**

- Antibiorésistance
- ATB large spectre
- Effets indésirables
- Impact microbiote/environnement

**Modifications de PK**

- Altérations de la clairance
- Dénutrition, hypoalbuminémie
- **Interactions**
- Difficultés de voie d'abord, troubles de déglutition
- Effets indésirables majorés (confusion, complications des diarrhées)

➡ **Adaptation/individualisation de l'ATBthérapie**

**Découverte fréquente d'une porte d'entrée néoplasique**

*Larcenet M, Pennac D et al, Journal d'un Corps 2012*

# Sujet âgé – Maladies Infectieuses

**Présentations cliniques atypiques**

Confusion, AEG, chute, incontinence, déclin

**APYREXIE**

Rupture avec l'état antérieur

« pneumonéphrites »

➡ **Hémocultures avant antibiothérapie**

⬇

**Double risque**

**- Retard diagnostique**

**- Surestimation des problématiques infectieuses – ATBthérapies à l'aveugle**

*Larcenet M, Pennac D et al, Journal d'un Corps 2012*

# Sujet âgé – Maladies Infectieuses

**Présentations cliniques atypiques**

Confusion, AEG, chute, incontinence, déclin

**APYREXIE**

Rupture avec l'état antérieur

« pneumonéphrites »

→ **Hémocultures avant antibiothérapie**


**Double risque**

**- Retard diagnostique**

**- Surestimation des problématiques infectieuses – ATBthérapies à l'aveugle**

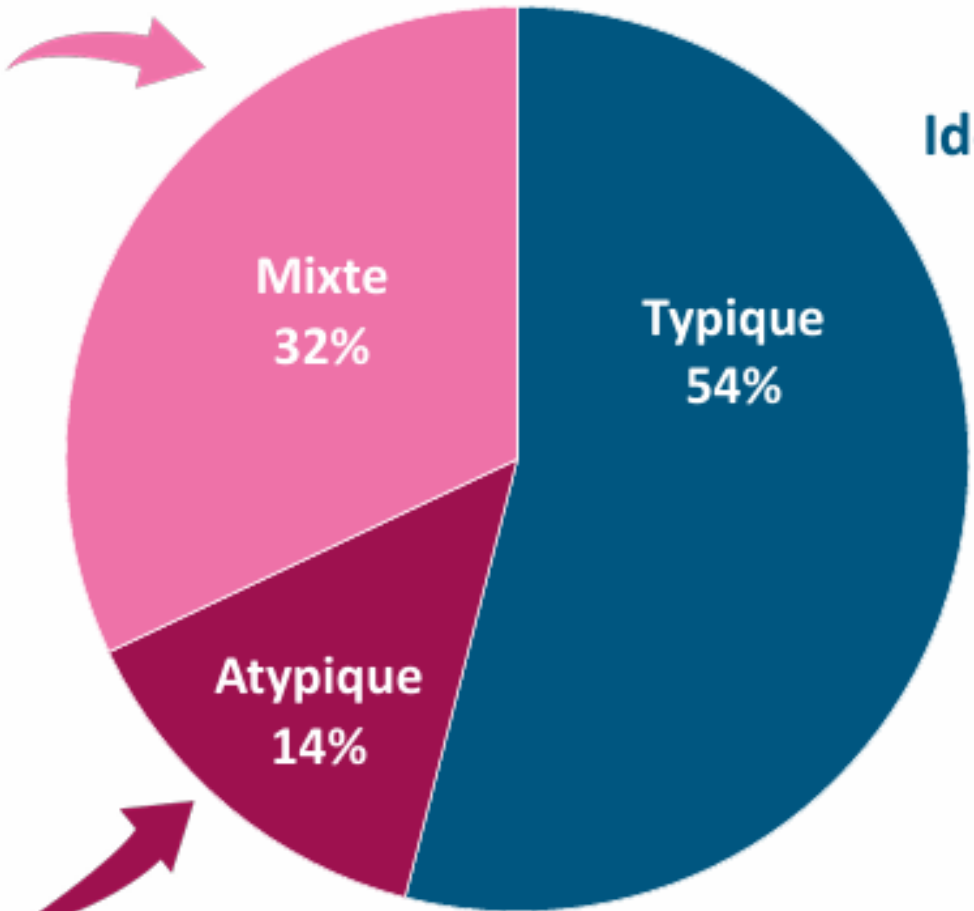
*Larcenet M, Pennac D et al, Journal d'un Corps 2012*

# Bactériémie du sujet âgé

Une présentation atypique?

- Anorexie
- Confusion
- Chute
- Asthénie
- Déclin fonctionnel

**+ signes typiques**




**Idem adulte jeune**

- Anorexie
- Confusion
- Chute
- Asthénie
- Déclin fonctionnel

**Jarrett** *et al.* Arch Intern Med 1995
**Metlay** *et al.* Arch Intern Med 1997
**Fernández-Sabé** *et al.* Medicine 2003



*Roubaud Baudron C., JNI 2022*

ANN MED
*Annals of Medicine*, 2015; 47: 354–358

ISSN 0785-3890 print/ISSN 1365-2060 online
DOI: 10.3109/07853890.2015.1019915

informa
healthcare

ORIGINAL ARTICLE

# Presentation of infection in older patients—a prospective study

Dafna Yahav[1,2], Agata Schlesinger[2,3], Vered Daitch[4], Yulia Akayzen[4], Laura Farbman[2,4], Yasmin Abu-Ghanem[4], Mical Paul[2,5] & Leonard Leibovici[2,4]

***Design.*** **We analyzed data from a prospectively collected database on presentation of infection in 4,308 patients, and compared the presentation of older patients (≥75 years) versus adults (<75 years).**
***Settings.*** **Single tertiary medical center.**
***Participants.*** **Patients admitted with suspected bacterial infection during 2002–2004 and 2010–2011.**
***Measurements.*** **We evaluated clinical presentation on day of admission, including vital signs and laboratory parameters.**

**4308 adultes (prospectif) avec une suspicion d'infection**

- SIRS, Sepsis ou choc septique
- Infection focale
- Prescription d'antibiotiques
- Hémocultures réalisées

**Patients âgés ≥ 75 ans n=1933** — **236 bactériémies**

**Patients jeunes < 75 ans n=2375** — **233 bactériémies**

Table I. Vital signs and ts.

| | Bacteremia | | |
|---|---|---|---|
| Parameter | Older patients Median (IQR) | Adults Median (IQR) | Difference *P* |
| Fever | 38.7 (38.0–39.1) | 38.7 (38.0–39.4) | 0.458 |
| HR | 91.0 (80.0–106.0) | 101.0 (89.5–116.0) | <0.001 |
| SBP | 120.0 (100.0–138.0) | 114.0 (98.0–137.0) | 0. 288 |
| DBP | 63.0 (52.0–75.0) | 64.0 (56.0–75.0) | 0.191 |
| Parameter | *n* (%) | *n* (%) | *P* |
| Consciousness | 117 (50.9) | 172 (77.5) | <0.001 |
| Dyspnea | 58 (27.9) | 40 (19.7) | 0.052 |
| Septic shock | 25 (11.3) | 10 (4.6) | 0.01 |
| Acute renal failure | 86 (38.7) | 41 (18.6) | <0.001 |
| Chills | 68 (34.9) | 73 (37.4) | 0.598 |
| Vomiting | 21 (9.1) | 35 (15.3) | 0.041 |

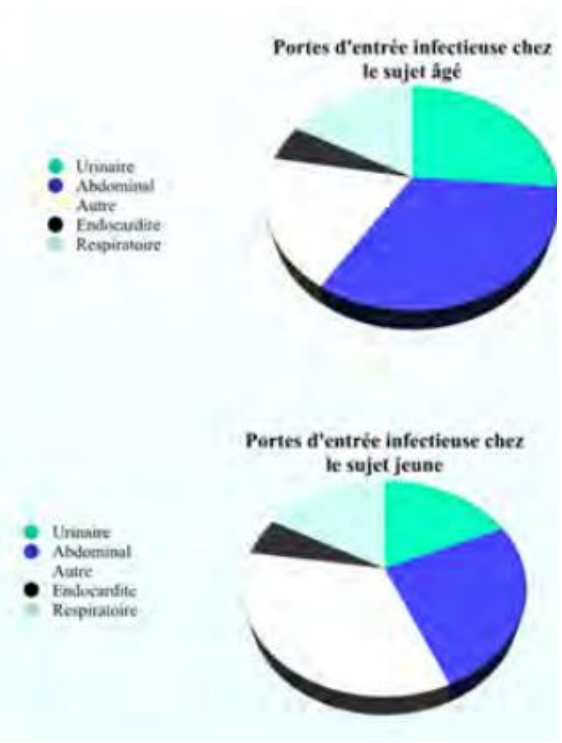
DBP = diastolic blood p blood pressure.

# Etude rétrospective de la mortalité à long terme après bactériémie chez 166 patients : comparaison sujets jeunes versus sujets âgés

*Joris Galland, Ludovic Karkowski, Mathieu Cabon, Fabien Dutasta, Gael Cinquetti, Pascale Perez, Redouan Saidi, Serge Vedy, P.Carassou*

*Service de médecine interne et de maladies infectieuses et tropicales*

*HIA Legouest - Metz*




**Sujet âgé si > 65 ans (n=95/166)**

**Apyrétiques (51% vs 12%, p< 0,001)**

**Syndrome confusionnel (56% vs 14%, p < 0,001)**

**Tableau 6 : Seuils de température pour définir la fièvre et l'hypothermie dans les études sur les bactériémies du sujet âgé**

| Etude (référence) | Design | Nombre de bactériémies | Age seuil pour définir les sujets âgés | Définition de la fièvre (°C) | % fébriles | Définition de l'hypothermie (°C) | % hypothermes |
|---|---|---|---|---|---|---|---|
| Gleckman 1982 (111) | R | 192 | 65 | NP | 87 | - | - |
| Meyers 1989 (118) | R | 100 | 65 | >38,3 | 65 | <36,1 | 2 |
| Chassagne 1992 (80) | P | 71 | 65 | >38,5 | 80 | NP | 1,5 |
| Fontanarosa 1992 (95) | R | 79 | 65 | >38,3 | 37 | <36,1 | 10 |
| Pfitzenmeyer 1995 (106) | P | 46 | 62 | ≥38,5 | 74 | - | - |
| Lee 2007 (89) | P | 406 | 65 | >38,5 | 86 | NP | 3,9 |
| Lee 2007 (89) | P | 69 | 85 | >38,5 | 77 | NP | 1,4 |
| Wester 2013 (94) | R | 334 | 65 | ≥38,5 | 64 | <36,0 | 0,3 |
| Wester 2013 (94) | R | 118 | 85 | ≥38,5 | 64 | <36,0 | 1,7 |
| Green 2014 (87) | R | 38 | 80 | >37,2 | 79 | - | - |

Adapté de la méta-analyse de Yahav *et al.* (85). NP, non précisé ; P, Prospectif ; R, Rétrospectif, °C, degrés Celsius ; %, pourcentage

**Donc hémocultures au moindre doute MAIS pas ATB au moindre doute (sauf défaillance)**

*Hyernard C.*

Wester et al. BMC Infectious Diseases 2013, 13:346
http://www.biomedcentral.com/1471-2334/13/346

BMC Infectious Diseases

RESEARCH ARTICLE Open Access

# Age-related differences in symptoms, diagnosis and prognosis of bacteremia

Astrid L Wester[1*], Oona Dunlop[2], Kjetil K Melby[3,4], Ulf R Dahle[1] and Torgeir Bruun Wyller[3,5]

## Table 1 Descriptive data and clinical presentation by 3 age groups

| | Total material (680 patients) | Age groups (% within age group) | | | |
|---|---|---|---|---|---|
| | | < 65 years (228 patients) | 65-84 years (334 patients) | ≥ 85 years (118 patients) | Overall p-value |
| Symptoms on infection | | | | | |
| Total number of reported symptoms; median (IQR) | 3 (2–4) | 3 (2–4) | 3 (2–4) | 3 (2–3) | 0.351 |
| "Classical symptoms"[3] ≥ 3 | 253 (37.4%) | 110 (48.7%) | 108 (32.5%)* | 35 (29.7%)* | < 0.001 |
| Zero "classical symptoms" | 57 (8.4%) | 7 (3.1%) | 36 (10.8%)* | 14 (11.9%)* | 0.002 |
| "Atypical symptoms"[4] ≥ 1 | 337 (49.6%) | 82 (36.0%) | 180 (53.9%)* | 75 (63.6%)* | < 0.001 |

[1] Comorbid conditions: Malignant disease, alcoholism, diabetes mellitus, chronic renal failure, heart failure. [2] Non-specific tentative diagnoses: acute deterioration of performing daily tasks, reduced general condition, confusion, dizziness, falls, fainting, question of cerebral infarction. [3] "Typical symptoms": fever/chills, localized pain, nausea/vomiting, diarrhoea, cough, dyspnoea, expectoration, signs of urinary tract infection (UTI) such as urgency, pyuria, haematuria; skin rash, coma, seizures. [4] "Atypical symptoms": Malaise, fall/dizziness/syncope/unsteadiness, immobility, acute incontinence of urine or faeces, paresis, speaking difficulties, confusion. *Significantly different from the age group < 65, which was treated as reference group.

Wester et al. BMC Infectious Diseases 2013, 13:346
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CLINICAL RESEARCH STUDY · Volume 132, Issue 11, P1344-1352.E1, November 2019 Download Full Issue

# Atypical Presentation of Bacteremia in Older Patients Is a Risk Factor for Death

Caroline Hyernard, MD [a] · Alice Breining, MD [b] · Sophie Duc, MD [a] · ... · Florent Guerville, MD [a] · Muriel Rainfray, MD, PhD [a] · Claire Roubaud-Baudron, MD, PhD [a,i] ... Show more

**Material and methods**: We conducted an observational prospective study at Bordeaux University Hospital (France) in 2016. All consecutive patients ≥75 years with bacteremia were included. Atypical presentation was defined as the absence of temperature ≥38.3°C or <36°C, chills or severe sepsis. Mortality and functional status (Activities of Daily Living (ADL)) were recorded at 1 week (D7) and 3 months (M3).

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CLINICAL RESEARCH STUDY · Volume 132, Issue 11, P1344-1352.E1, November 2019 Download Full Issue

# Atypical Presentation of Bacteremia in Older Patients Is a Risk Factor for Death

Caroline Hyernard, MD [a] · Alice Breining, MD [b] · Sophie Duc, MD [a] · ... · Florent Guerville, MD [a] · Muriel Rainfray, MD, PhD [a] · Claire Roubaud-Baudron, MD, PhD [a,j] ... Show more

**21% aucun signe de SIRS/typique d'infection**

## Table 1b. Descriptive data of 131 patients at baseline and comparison at Day 7 and Month 3 according to survival status (clinical and laboratory tests data)

| | Baseline | Day 7 (n=131) | | | Month 3 (n=128) | | |
|---|---|---|---|---|---|---|---|
| | All patients (n=131) | Dead (n=12) | Alive (n=119) | *p value* | Dead (n=53) | Alive (n=75) | *p value* |
| ***Clinical manifestations, n (%)*** | | | | | | | |
| Typical signs | 104 (79.4) | 7 (58.3) | 97 (81.5) | *0.071* | 36 (70.6) | 60 (85.7) | *0.068* |
| Fever ≥38.3°C | 86 (65.6) | 3 (25.0) | 83 (69.7) | *0.003* | 30 (56.6) | 55 (73.3) | *0.059* |
| Hypothermia <36°C | 6 (4.6) | 2 (16.7) | 4 (3.4) | *0.094* | 2 (3.8) | 3 (4.0) | *1.000* |
| Chills | 37 (28.2) | 3 (25.0) | 34 (28.6) | *1.000* | 15 (28.3) | 22 (29.3) | *1.000* |
| Hypotension | 24 (18.3) | 3 (25.0) | 21 (17.6) | *0.460* | 9 (17.0) | 14 (18.7) | *1.000* |
| Severe sepsis | 12 (9.2) | 0 (0.0) | 12 (10.1) | *0.601* | 2 (3.8) | 9 (12.0) | *0.121* |
| Septic shock | 12 (9.2) | 3 (25.0) | 9 (7.6) | *0.081* | 7 (13.2) | 5 (6.7) | *0.233* |

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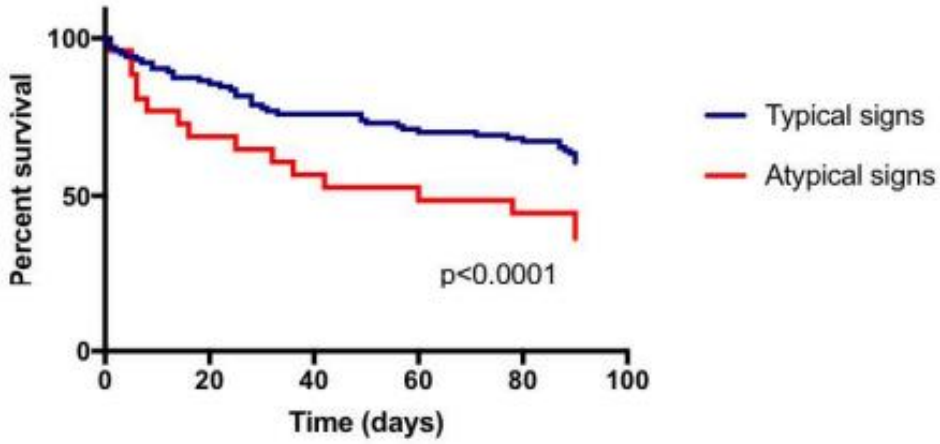


**Figure 1 : Survival according to clinical presentation of bacteremia in 131 patients**
Kaplan Meier survival curve. *p*-values determined by log rank test

**Atypique 21%**
D7-mortality 16%
D30-mortality 30%
D90-mortality 61%

**Typique 79%**
D7-mortality 6%
D30-mortality 19%
D90-mortality 44%

## Table 6. Outcomes of bacteremia according to clinical profile (typical vs atypical)

| | All patients (n=131) | Atypical group (n=27) | Typical group (n=104) | *p-value* |
|---|---|---|---|---|
| ***Mortality, n (%)*** | | | | |
| Day 7 | 12 (9.2) | 5 (18.5) | 7 (6.7) | *0.071* |
| Month 1 | 30 (22.9) | 9 (33.3) | 21 (20.2) | *0.197* |
| Month 3 | 53 (41.4) | 16 (61.5) | 37 (36.3) | *0.026* |
| Time between bacteremia and death, (days) mean (SD) | 35.3 (30.9) | 24.7 (25.6) | 37.7 (32.2) | *0.146* |
| ***Survival*** | | | | |
| Mean length of hospitalization, mean (SD)* | 18.3 (15.9) | 13.1 (10.0) | 19.2 (16.6) | *0.066* |

* n=93. n, number of patients; SD, Standard Deviation.

J7 OR 4.5, 95% CI 1.1-19
J90 OR 3.8, 95% CI 1.3-11

Après ajustement pour âge, sexe, BMI, CCI score, sévérité, délai d'initiation d'antitiotiques, infection nosocomiale, type de bactérie

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**La fièvre initiale était corrélée à la survie à J7**

## Table 1b. Descriptive data of 131 patients at baseline and comparison at Day 7 and Month 3 according to survival status (clinical and laboratory tests data)

| | Baseline | Day 7 (n=131) | | | Month 3 (n=128) | | |
|---|---|---|---|---|---|---|---|
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| ***Clinical manifestations, n (%)*** | | | | | | | |
| Typical signs | 104 (79.4) | 7 (58.3) | 97 (81.5) | *0.071* | 36 (70.6) | 60 (85.7) | *0.068* |
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**Table 4. Independent risk factors for D7, M3-mortality and atypical manifestations of bacteremia (multivariate analysis)**

| | OR (95%CI) | *p-value* |
|---|---|---|
| **D7-mortality risk factors** | | |
| Atypical manifestations | 3.44 (0.82-14.49) | *0.092* |
| Gram negative bacteria | 0.08 (0.02-0.41) | *0.003* |
| **M3-mortality risk factors** | | |
| Nosocomial infection | 5.69 (2.04-15.87) | *0.001* |
| Congestive heart failure | 4.79 (1.87-12.28) | *0.001* |
| Atypical manifestations | 3,97 (1.34-11.77) | *0.013* |
| Solid/hematologic malignancy | 3.20 (1.13-9.06) | *0.029* |
| Age | 1.10 (1.01-1.20) | *0.039* |
| Female sex | 0.19 (0.07-0.51) | *0.001* |
| **Risk factors for atypical manifestations of bacteremia** | | |
| *Staphylococcus aureus* bacteremia | 3.77 (1.14-12.41) | *0,029* |
| Diabetes | 2.46 (1.01-5.99) | *0.048* |

OR, Odd Ratio; CI, Confidence Interval. *p*- values determined by binary logistic regression.

**Absence de point d'appel?**

**Dysautonomie/Dysrégulation autonome/FC?**

diagnostics

MDPI

*Article*

# Atypical Presentation of Bacteremic Urinary Tract Infection in Older Patients: Frequency and Prognostic Impact

**Caroline Laborde [1], Julien Bador [2], Arthur Hacquin [1], Jérémy Barben [1], Sophie Putot [1], Patrick Manckoundia [1] and Alain Putot [1,*]**

[1] Médecine Interne Gériatrie, Centre Hospitalier Universitaire Dijon Bourgogne, 21000 Dijon, France;

**Abstract:** In older patients, urinary tract infection (UTI) often has an atypical clinical presentation, making its diagnosis difficult. We aimed to describe the clinical presentation in older inpatients with UTI-related bacteremia and to determine the prognostic impact of atypical presentation. This cohort study included all consecutive patients older than 75 years hospitalized in a university hospital in 2019 with a UTI-related gram-negative bacillus (GNB) bacteremia, defined by blood and urine cultures positive for the same GNB, and followed up for 90 days. Patients with typical symptoms of UTI were compared to patients with atypical forms. Among 3865 inpatients over 75 with GNB-positive urine culture over the inclusion period, 105 patients (2.7%) with bacteremic UTI were included (mean age 85.3 ± 5.9, 61.9% female). Among them, UTI symptoms were reported in only 38 patients (36.2%) and 44 patients (41.9%) had no fever on initial management. Initial diagnosis of UTI was made in only 58% of patient. Mortality at 90 days was 23.6%. After adjustment for confounders, hyperthermia (HR = 0.37; IC95 (0.14–0.97)) and early UTI diagnosis (HR = 0.35; IC95 (0.13–0.94)) were associated with lower mortality, while UTI symptoms were not associated with prognosis. In conclusion, only one third of older patients with UTI developing bacteremia had UTI symptoms. However, early UTI diagnosis was associated with better survival.

**Mortalité: OR 0.37 si T°> 38.3°C**

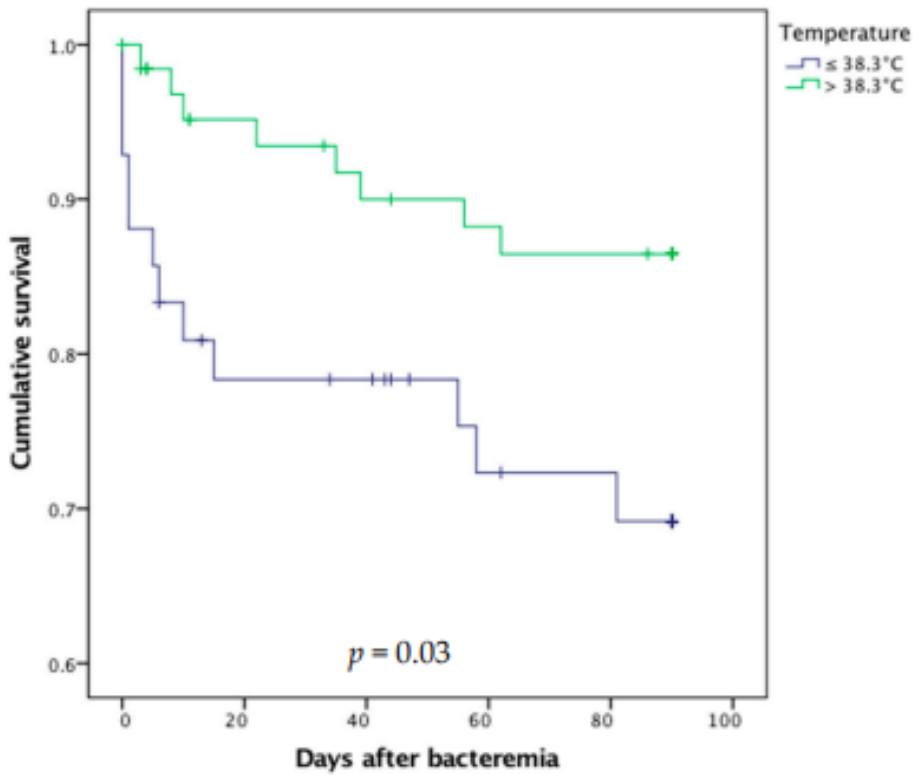


**Figure 3.** Survival curves after bacteremic urinary tract infection in febrile and afebrile older patients.

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# BACTEREMIC URINARY TRACT INFECTION IN HOSPITALIZED OLDER PATIENTS—ARE ANY CURRENTLY AVAILABLE DIAGNOSTIC CRITERIA SENSITIVE ENOUGH?

Henry J. Woodford MBBS, Clive Graham MBBS, Manjula Meda MBBS, Jolanta Miciuleviciene MD

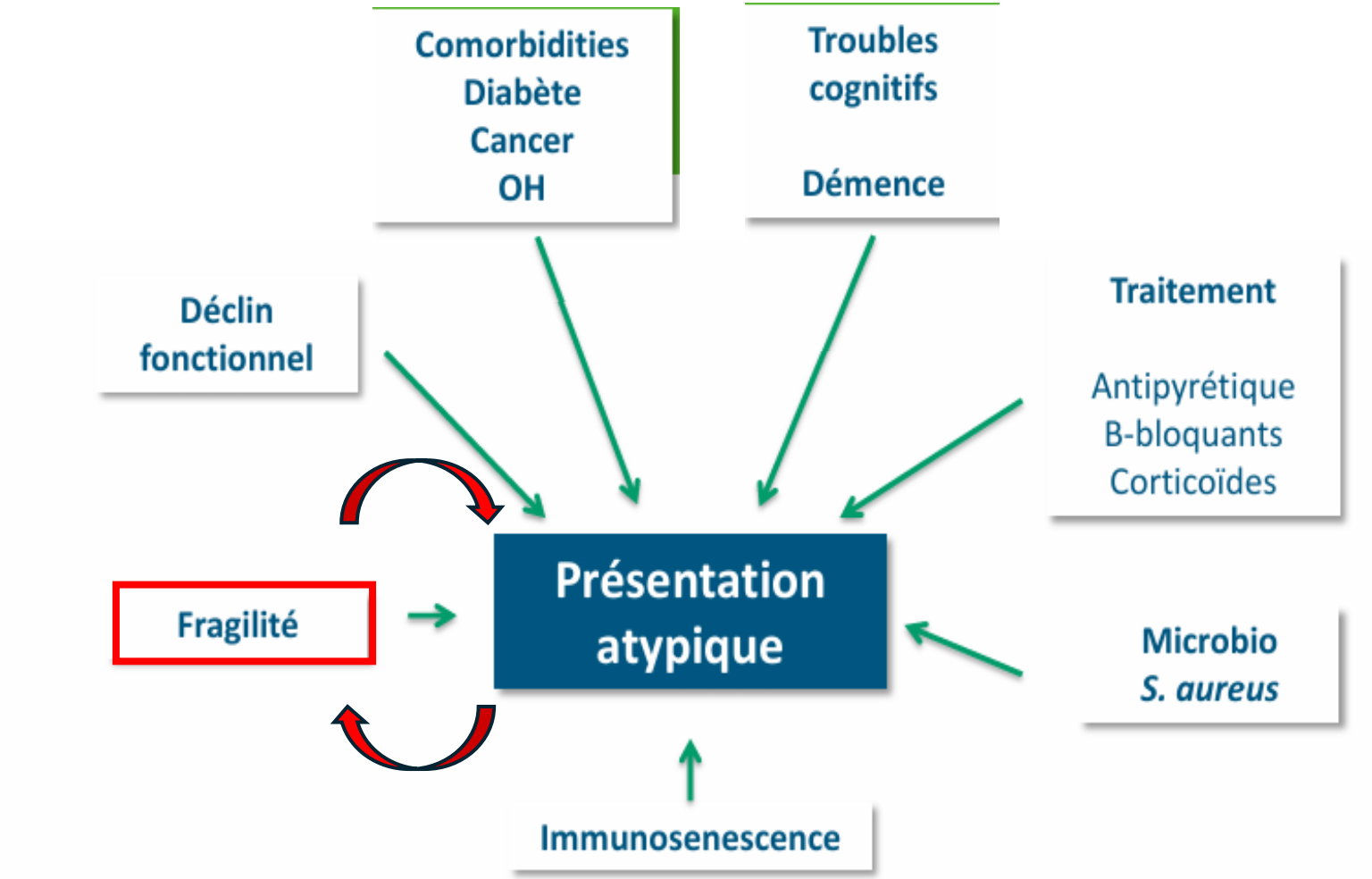
## METHODS

Patients were identified with concurrent positive blood and urine cultures for the same organism from the pathology laboratory computer system. Patients' records were then retrospectively obtained to extract relevant clinical information. Patients with a likely alternative source of the bacteremia with secondary urinary tract seeding were excluded. Patients were divided into two groups—aged 18 to 74 and 75 and older. Three sets of proposed diagnostic criteria were applied retrospectively for the older patients to try to evaluate their sensitivity to detect significant (bacteremic) UTI in hospitalized patients.[4–6]

**Table 1. Presenting Symptoms and Clinical Signs**

| Symptoms and Signs | n (%) Total N = 61 | 18–74 n = 24 | > 75 n = 37 |
|---|---|---|---|
| Dysuria | 9 (14.7) | 8 (33.3) | 1 (2.7) |
| Hematuria | 2 (3.3) | 1 (4.2) | 1 (2.7) |
| Frequency | 7 (11.5) | 4 (16.7) | 3 (8.1) |
| Urgency | 1 (1.6) | 1 (4.1) | 0 |
| Retention | 5 (8.2) | 1 (4.1) | 4 (10.8) |
| Suprapubic pain | 9 (14.8) | 3 (10.7) | 6 (16.2) |
| Flank pain | 9 (14.8) | 4 (16.7) | 5 (13.5) |
| Rigors | 19 (31.1) | 9 (37.5) | 10 (27.0) |
| Any urinary tract symptoms | 38 (62.3) | 19 (79.2) | 19 (51.4) |
| Pyrexia* | | | |
| >37.0°C | 58 (95.1) | 24 (100) | 34 (91.9) |
| >37.9°C | 50 (82.0) | 23 (95.8) | 27 (73.0) |
| 1.5°C increase above baseline | 46 (75.4) | 23 (95.8) | 23 (62.2) |
| Chronic urinary catheter | 15 (24.6) | 3 (12.5) | 12 (32.4) |
| Suprapubic tenderness | 18 (29.5) | 4 (16.7) | 14 (37.8) |
| Costovertebral angle tenderness | 7 (11.5) | 4 (16.7) | 3 (8.1) |
| Delirium | 13 (21.3) | 3 (12.5) | 10 (27.0) |
| Acute or worsened urinary incontinence | 3 (4.9) | 2 (8.3) | 1 (2.7) |
| Functional decline | 17 (27.9) | 1 (4.1) | 16 (43.2) |
| Dementia | 10 (16.4) | 2 (8.3) | 8 (21.6) |
| Change in urine character or hematuria | 10 (16.4) | 4 (16.7) | 6 (16.2) |
| Pulse >100 beats per minute | 29 (47.5) | 7 (29.2) | 22 (59.5) |
| Systolic blood pressure <100 mmHg | 5 (8.2) | 1 (4.1) | 4 (10.8) |
| C-reactive protein >9 mg/L | 60 (98.4) | 23 (95.8) | 37 (100) |
| Serum total white cell count >11.0$10^9$/L | 45 (73.8) | 18 (75.0) | 27 (73.0) |

*Peak recorded temperature during the illness.




**Limpawattana** *et al.* Asian Biomed 2017 – **Hyernard** *et al.* Am J Med 2019
**Gleckman** *et al.* JAMA 1982, **Yo** *et al.* Diagn Microbiol Infect Dis 2016

*Roubaud Baudron C., JNI 2022*

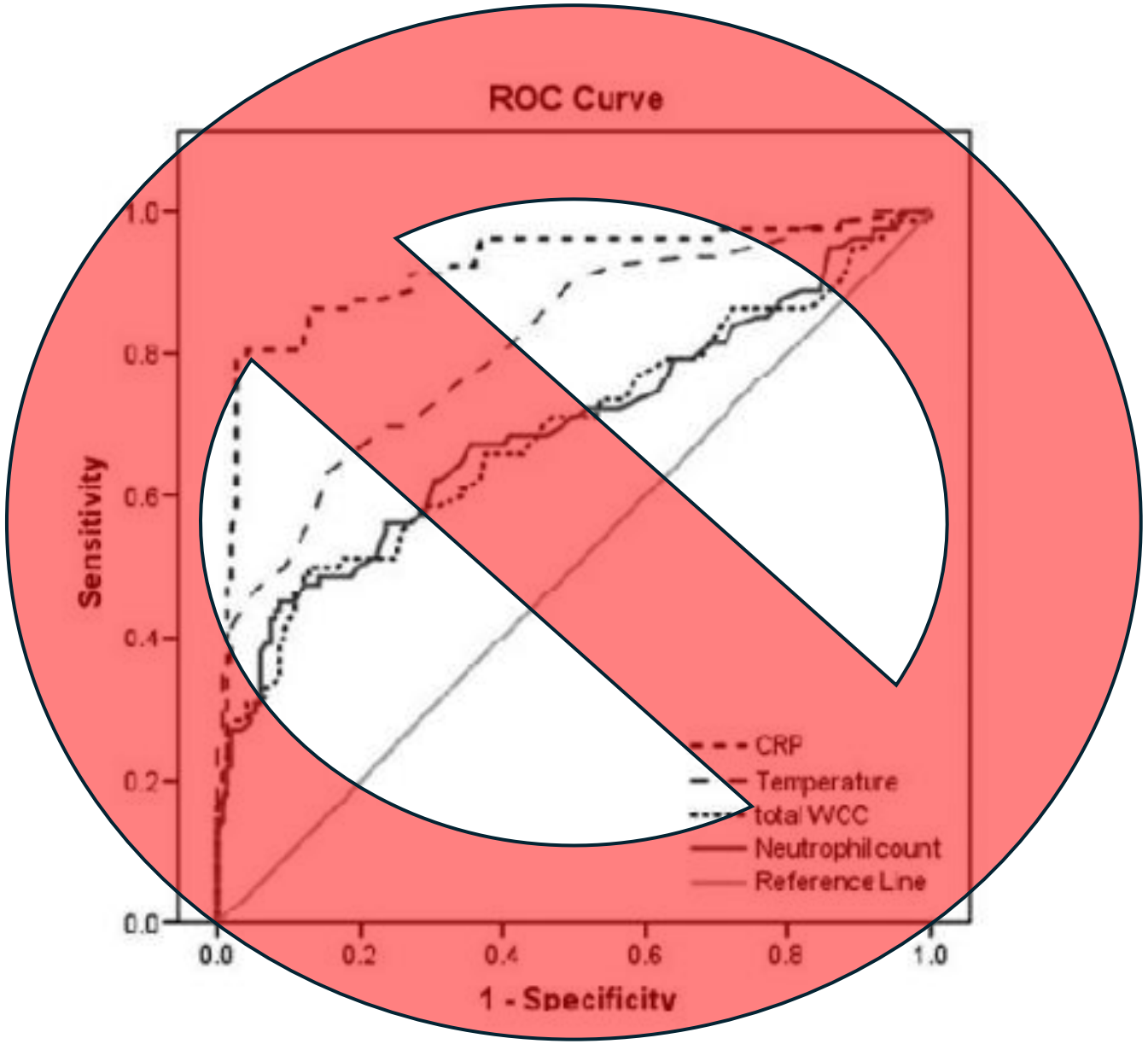



**Figure 4: Courbes ROC de la CRP, la température, les leucocytes totaux et le nombre de polynucléaires neutrophiles dans le diagnostic d'infection chez la personne âgée**

# Bactériémie du sujet âgé

Une épidémiologie spécifique?

*Epidemiol. Infect.* (2007), **135**, 1037–1042. 
doi:10.1017/S0950268806007631 Printed in the United Kingdom

# Burden of community-onset bloodstream infection: a population-based assessment

Although community-onset bloodstream infection (BSI) is recognized to be a major cause of morbidity and mortality, there is a paucity of population-based studies defining its overall burden. We conducted population-based laboratory surveillance for all community-onset BSI in the Calgary Health Region during 2000–2004. A total of 4467 episodes of community-onset BSI were identified for an overall annual incidence of 81·6/100 000. The three species, *Escherichia coli*,

K. B. LAUPLAND[1,2,3,5*], D. B. GREGSON[1,2,4], W. W. FLEMONS[1,6], D. HAWKINS[1,6], T. ROSS[5] AND D. L. CHURCH[1,2,4]

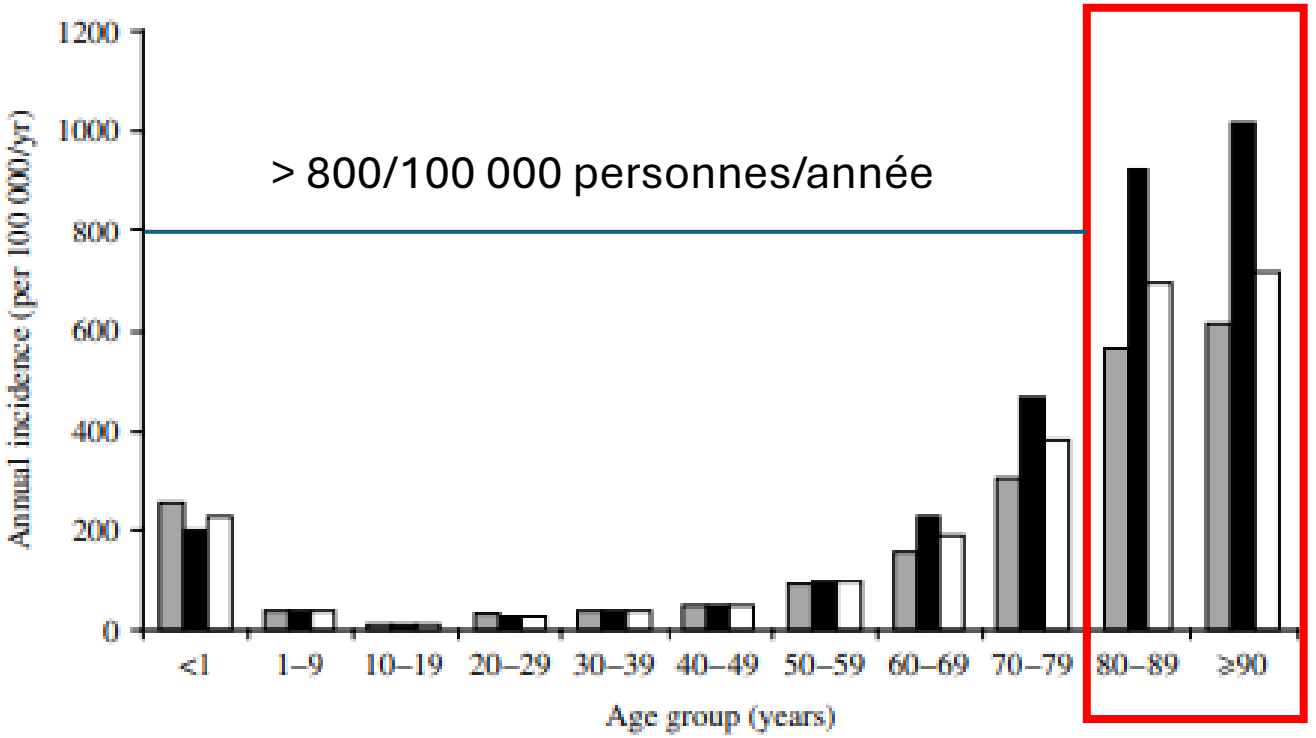



**Fig.** Age- and gender-specific incidence of community-onset bloodstream infections, Calgary Health Region, 2000–2004. ▒, Female; ■, male; □, total.

**Tableau 4 : Porte d'entrée des bactériémies du sujet âgé.**

| Etude (référence) | Design | Nombre de bactériémies | Age seuil pour définir les sujets âgés | Porte d'entrée (pourcentages) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Urinaire | Respiratoire | Abdominale | Cathéter | Peau et tissus mous | Autre | Inconnue | Primaire |
| Meyers 1989 (118) | R | 100 | 65 | **27** | 12 | 16 | 9 | 6 | - | 21 | - |
| Chassagne 1992 (80) | P | 71 | 65 | **32** | 17 | 10 | - | 11 | 14 | - | - |
| Fontanarosa 1992 (95) | R | 79 | 65 | **44** | 27 | 9 | - | 3 | 5 | 11 | - |
| Pfitzenmeyer 1995 (106) | P | 46 | 62 | **59** | 11 | 20 | - | - | 7 | - | - |
| Gavazzi 2002 (93) | R | 758 | 65 | 24 | 10 | 12 | 9 | 8 | 4 | **30** | - |
| Gavazzi 2002 (93) | R | 649 | 76 | **29** | 12 | 11 | 7 | 6 | 3 | 28 | - |
| Gavazzi 2002 (93) | R | 333 | 85 | **39** | 14 | 11 | 2 | 8 | 2 | 24 | - |
| Lee 2007 (89) | P | 406 | 65 | **31** | 8 | 4 | 4 | 10 | - | - | 14 |
| Lee 2007 (89) | P | 69 | 85 | **28** | 19 | 1 | 1 | 9 | - | - | 17 |
| Crane 2007 (90) | R | 347 | 65 | **34** | 10 | 12 | - | - | - | - | 21 |
| Soogard 2008 (100) | R | 1092 | 65 | **36** | 19 | 10 | - | - | 15 | 19 | - |
| Soogard 2008 (100) | R | 909 | 80 | **43** | 15 | 11 | - | - | 8 | 24 | - |
| Reunes 2011 (86) | R | 142 | 70 | **31** | 14 | 7 | 20 | 11 | - | - | 14 |
| Rebelo 2011 (88) | R | 31 | 65 | 39 | **45** | - | - | 13 | 10 | 10 | - |
| Rebelo 2011 (88) | R | 63 | 75 | **48** | 37 | - | - | 13 | 3 | 3 | - |
| Rebelo 2011 (88) | R | 41 | 85 | **51** | 32 | - | - | 15 | 10 | 5 | - |
| Wester 2013 (94) | R | 334 | 65 | **40** | 28 | - | - | - | 18 | 14 | - |
| Wester 2013 (94) | R | 118 | 85 | **33** | **33** | - | - | - | 12 | 22 | - |
| Retamar 2014 (65) | P | 120 | 80 | **26** | 11 | 18 | 12 | 7 | 2 | 24 | - |
| Hernandez 2015 (92) | P | 2605 | 65 | **35** | 10 | 19 | 7 | 4 | 6 | 15 | - |

Adapté de la méta-analyse de Yahav *et al.* (85). P, Prospectif ; R, Rétrospectif

*Hyernard C.*

# Etude rétrospective de la mortalité à long terme après bactériémie chez 166 patients : comparaison sujets jeunes versus sujets âgés

*Joris Galland, Ludovic Karkowski, Mathieu Cabon, Fabien Dutasta, Gael Cinquetti, Pascale Perez, Redouan Saidi, Serge Vedy, P.Carassou*

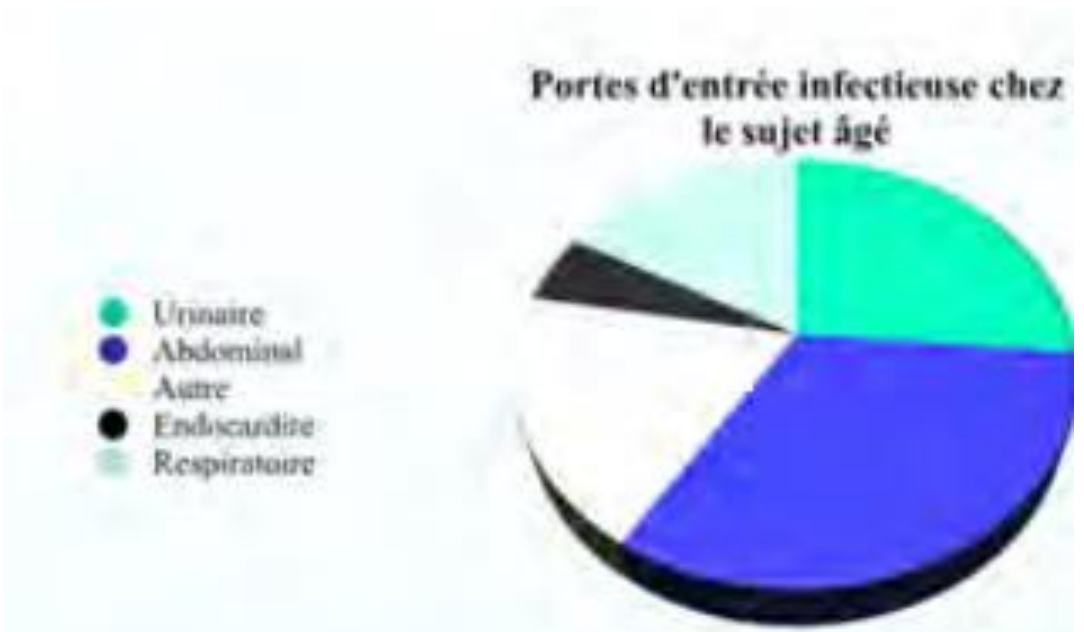
*Service de médecine interne et de maladies infectieuses et tropicales*

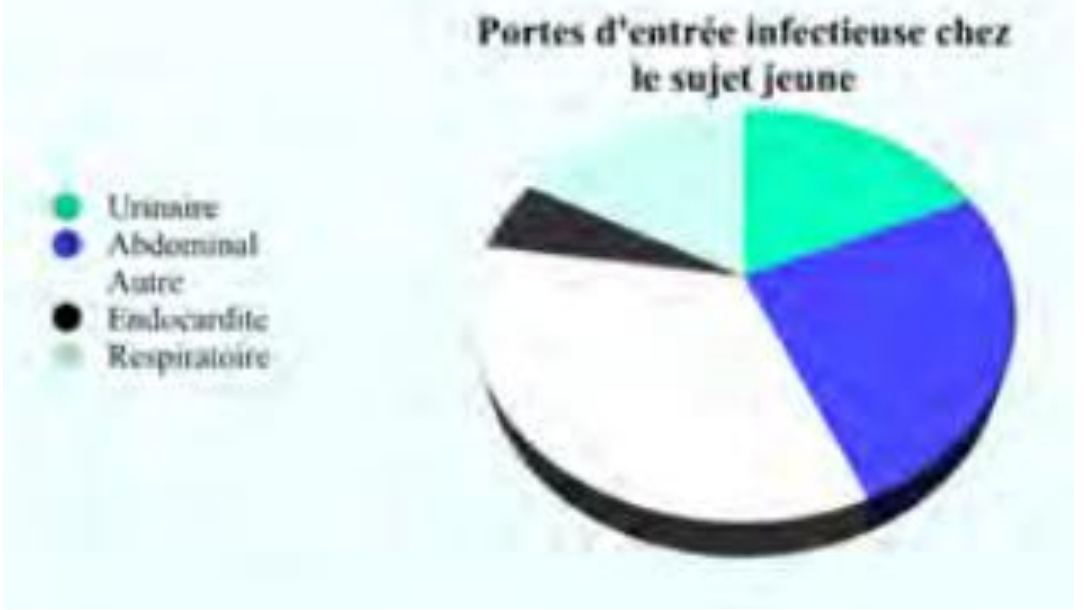
*HIA Legouest - Metz*

**Sujet âgé si > 65 ans (n=95/166)**

**Apyrétiques (51% vs 12%, p< 0,001)**

**Syndrome confusionnel (56% vs 14%, p < 0,001)**



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## Short-Term Mortality in Relation to Age and Comorbidity in Older Adults with Community-Acquired Bacteremia: A Population-Based Cohort Study

Mette Søgaard DVM, Henrik C. Schønheyder MD, DMSc, Anders Riis MSc, Henrik T. Sørensen MD, DMSc, , Mette Nørgaard MD, PhD

**2851 patients adultes avec bactériémie communautaire**
**851 <65 ans, 1092 entre 65 et 80 ans, 909 > 80 ans**

**Mortalité** **x 1.5 si > 65 ans**
**x 1.8 si > 80 ans**
**Indépendamment des comorbidités (effet propre de l'âge)**

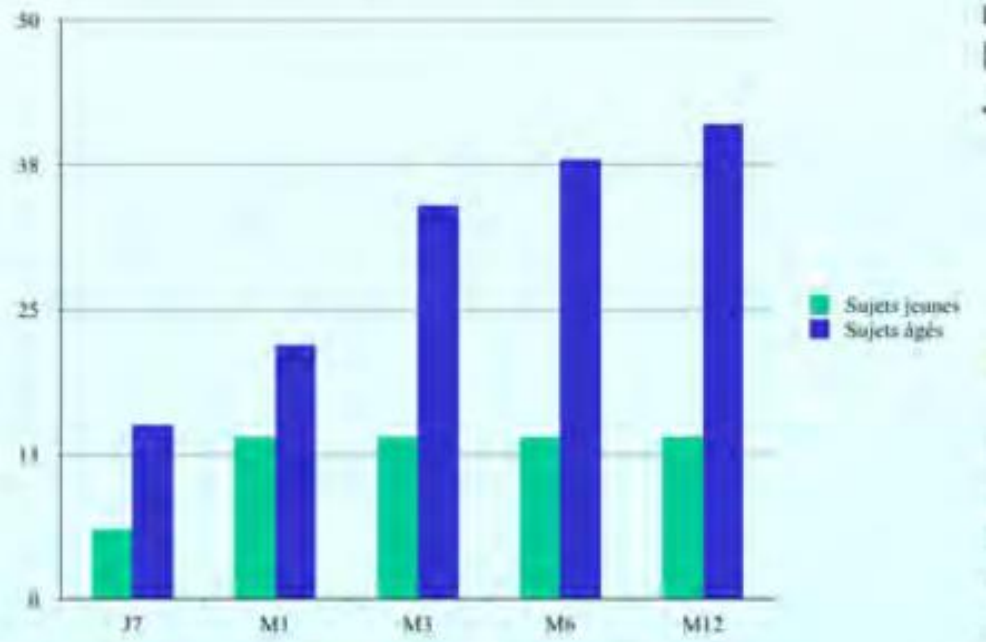


**Figure 2 – Evolution du taux de mortalité (%) des 2 groupes**

## Etude rétrospective de la mortalité à long terme après bactériémie chez 166 patients : comparaison sujets jeunes versus sujets âgés

*Joris Galland, Ludovic Karkowski, Mathieu Cabon, Fabien Dutasta, Gael Cinquetti, Pascale Perez, Redouan Saidi, Serge Vedy, P.Carassou*
*Service de médecine interne et de maladies infectieuses et tropicales*
*HIA Legouest - Metz*

**Surmortalité persistante dans l'année**

**Tableau 3 : Mortalité des bactériémies chez les sujets de plus de 75 ans**

| Comparaison des taux de mortalité des bactériémies chez les sujets de plus de 75 ans | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Caractéristiques de la bactériémie | | | Taux de mortalité | | | |
| Etudes (référence) | Nb de sujets | Age (ans) | Type de bactériémie | Porte d'entrée | Sévérité | 1 semaine | 1 mois | Intra-hospitalière | 3 mois |
| Leibovici (1993) (99) | 338 | >80 | N=24% | U=50%, P=10% | 13% choc septique | 22% | 50% | 35% | 85% |
| Gavazzi (2002) (93) | 182 | >85 | N=0% | U=31%, P=18,1% | - | 15% | - | - | - |
| Soogard (2008) (100) | 909 | >80 | N=0% | U=43%, P=15% | - | 14% | 21% | - | - |
| Retamar (2014) (65) | 120 | >80 | N=53% | U=26%, Inc=24% | 27% choc septique + sepsis sévère | - | 28% | - | - |
| Lee (2007) (89) | 69 | ≥85 | N=0% | U=27%, P=18,8% | 39% choc septique | - | - | - | 26% |
| Wester (2013) (94) | 118 | ≥85 | N=0% | U=33%, P=33% | 46% de défaillance d'organe | - | - | 12,7% à 14 jours | - |

Adapté de la revue de la littérature de Yahav *et al.* (85). Les études centrées sur les bactériémies nosocomiales ont été exclues. Inc, Inconnue ; N, Nosocomial ; Nb, nombre ; P, pulmonaire ; U, Urinaire

*Hyernard C.*

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# Atypical Presentation of Bacteremia in Older Patients Is a Risk Factor for Death

Caroline Hyernard, MD [a] · Alice Breining, MD [b] · Sophie Duc, MD [a] · ... · Florent Guerville, MD [a] · Muriel Rainfray, MD, PhD [a] · Claire Roubaud-Baudron, MD, PhD [a,i] ... Show more

**Material and methods**: We conducted an observational prospective study at Bordeaux University Hospital (France) in 2016. All consecutive patients ≥75 years with bacteremia were included. Atypical presentation was defined as the absence of temperature ≥38.3°C or <36°C, chills or severe sepsis. Mortality and functional status (Activities of Daily Living (ADL)) were recorded at 1 week (D7) and 3 months (M3).

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Caroline Hyernard, MD [a] · Alice Breining, MD [b] · Sophie Duc, MD [a] · ... · Florent Guerville, MD [a] · Muriel Rainfray, MD, PhD [a] · Claire Rc

## Table 3. Outcomes of bacteremia at Day 7, Month 1 and 3 (mortality and morbidity)

| ***Mortality*** | **All patients, at baseline (n=131)** | **Day 7** | **Month 1** | **Month 3** |
|---|---|---|---|---|
| Cumulative number of deaths, n (%) | 53 (41.4) | 12 (9.2) | 30 (22.9) | 53 (41.4) |
| Etiology of death , n (%) | 53 (41.4) | 12 (9.2) | 18 (13.7) | 23 (18.0) |
| initial bacteremia | 11 (20.8) | 9 (75.0) | 2 (11.1) | 0 (0.0) |
| new sepsis | 17 (32.1) | 1 (8.3) | 8 (44.4) | 8 (34.8) |
| acute non-infectious events | 11 (20.8) | 2 (16.7) | 4 (22.2) | 5 (21.7) |
| chronic disease | 14 (26.4) | 0 (0.0) | 4 (22.2) | 10 (43.4) |
| Time between bacteremia and death, (days) mean (SD) | 35.3 (30.9) | | | |
| ***Morbidity*** | All patients | | 1 month | 3 months |
| ADL score, mean (SD) * | 3.6 (2.0) | | 2.8 (2.1) | 2.9 (2.2) |
| Admission to rehabilitation care facility, n (%) ** | | | | 16 (24.2) |
| Admission to nursing-home, n (%) ** | | | | 7 (10.6) |
| Mean length of hospitalization, mean (SD)*** | 18.3 (15.9) | | | |

n, number of patients; SD, Standard deviation. *n= 75, only M3 survivors were considered; **percentages calculated among patients living at home at baseline and alive at the end of hospitalization,***n=93 (only survivors)

THE AMERICAN JOURNAL of MEDICINE
Official Journal of the Alliance for Academic Internal Medicine



CLINICAL RESEARCH STUDY · Volume 132, Issue 11, P1344-1352.E1, November 2019 Download Full Issue

# Atypical Presentation of Bacteremia in Older Patients Is a Risk Factor for Death

Caroline Hyernard, MD [a] · Alice Breining, MD [b] · Sophie Duc, MD [a] · ... · Florent Guerville, MD [a] · Muriel Rainfray, MD, PhD [a] · Claire Roubaud-Baudron, MD, PhD [a,*] ... Show more

## Table 3. Outcomes of bacteremia at Day 7, Month 1 and 3 (mortality and morbidity)

| ***Mortality*** | **All patients, at baseline (n=131)** | **Day 7** | **Month 1** | **Month 3** |
|---|---|---|---|---|
| Cumulative number of deat | | | | 53 (41.4) |
| Etiology of death , n (%) | | | | 23 (18.0) |
| initial bacteremia | | | | 0 (0.0) |
| new sepsis | | | | 8 (34.8) |
| acute non-infectious | | | | 5 (21.7) |
| chronic disease | | | | 10 (43.4) |
| Time between bacteremia (SD) | | | | |
| ***Morbidity*** | | | | 3 months |
| ADL score, mean (SD) * | 3.6 (2.0) | | 2.8 (2.1) | 2.9 (2.2) |
| Admission to rehabilitation care facility, n (%) ** | | | | 16 (24.2) |
| Admission to nursing-home, n (%) ** | | | | 7 (10.6) |
| Mean length of hospitalization, mean (SD)*** | 18.3 (15.9) | | | |

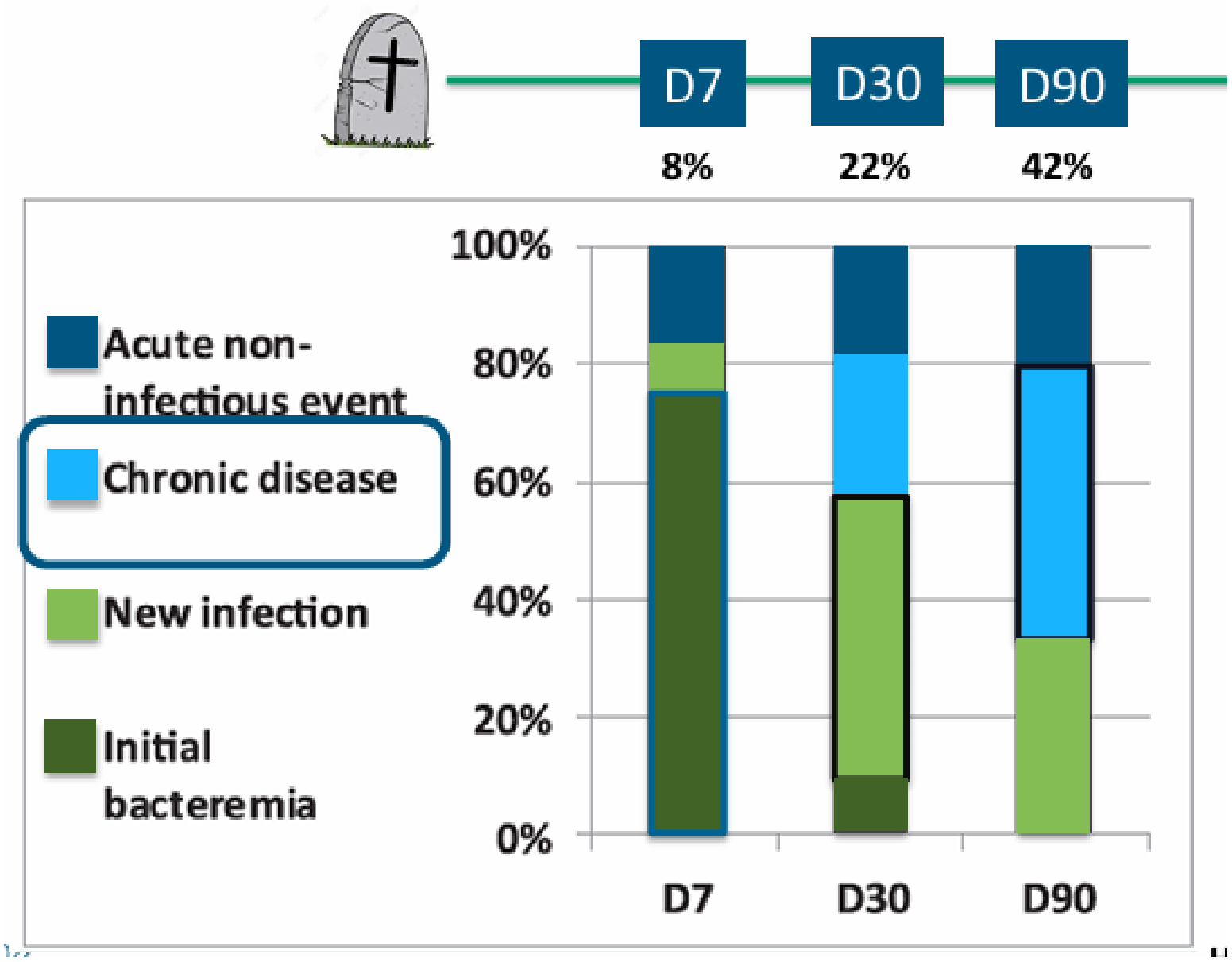
n, number of patients; SD, Standard deviation. *n= 75, only M3 survivors were considered; **percentages calculated among patients living at home at baseline and alive at the end of hospitalization,***n=93 (only survivors)

**41% de décès à M3**
**Pronostic très sombre**

**Au-delà de la gravité/des complications**

**Souvent le mode d'entrée dans la fin de vie**

**Marqueur de fragilité**




*Roubaud Baudron C., JNI 2022*

# Bactériémie du sujet âgé

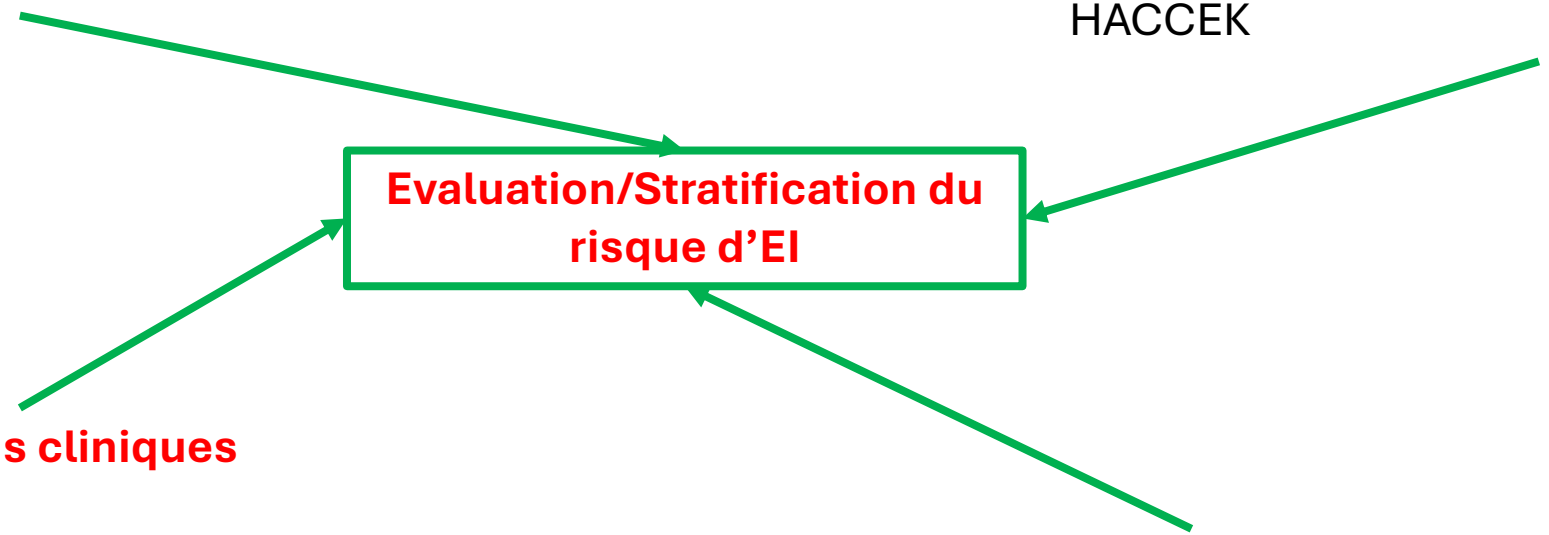
Des complications spécifiques?

# Faut-il rechercher une endocardite?

# Faut-il rechercher une endocardite?

**Terrain / Patient**
Valvulopathie
Matériel intracardiaque
Porte d'entrée

**Microbiologiques**
GRAM +
S. aureus, E. faecalis, Streptococcus mutans, gallolyticus
HACCEK




**Manifestations cliniques**
Arthrites, SDI
Emboles cutanés
Signes neurologiques

**Paramètres de la bactériémie**
Nombre d'hémocultures positives
Origine communautaire versus nosocomiale
Durée d'évolution
Délai de positivité (inoculum)

# Faut-il rechercher une endocardite?

**Terrain / Patient**
Valvulopathie
Matériel intracardiaque
Porte d'entrée

**Microbiologiques**
GRAM +
S. aureus, E. faecalis, Streptococcus mutans, gallolyticus
HACCEK

**Evaluation/Stratification du risque d'EI**

**Manifestations cliniques**
Arthrites, SDI
Emboles cutanés
Signes neurologiques

**Examen clinique**

**Paramètres de la bactériémie**
Nombre d'hémocultures positives
Origine communautaire versus nosocomiale
Durée d'évolution
Délai de positivité (inoculum)

# Faut-il rechercher une endocardite?

**Terrain / Patient**
Valvulopathie
Matériel intracardiaque
Porte d'entrée

**Microbiologiques**
GRAM +
S. aureus, E. faecalis, Streptococcus mutans, gallolyticus
HACCEK

**Evaluation/Stratification du risque d'EI**

**Manifestations cliniques**
Arthrites, SDI
Emboles cutanés
Signes neurologiques

**Paramètres de la bactériémie**
Nombre d'hémocultures positives
Origine communautaire versus nosocomiale
Durée d'évolution
Délai de positivité (inoculum)

ORIGINAL ARTICLE BACTERIOLOGY

Clin Microbiol Infect 2014; ■: 1.e1–1.e9

# Utilization of blood cultures in Danish hospitals: a population-based descriptive analysis

S. Gubbels[1], J. Nielsen[1], M. Voldstedlund[1], B. Kristensen[2], H. C. Schønheyder[4,5], C. M. J. E. Vandenbroucke-Grauls[6], M. Arpi[7], M. K. Björnsdóttir[3], J. Dahl Knudsen[8], R. B. Dessau[9], T. Gorm Jensen[10], P. Kjældgaard[11], L. Lemming[12], J. K. Møller[13], D. Schrøder Hansen[14] and K. Mølbak[1]

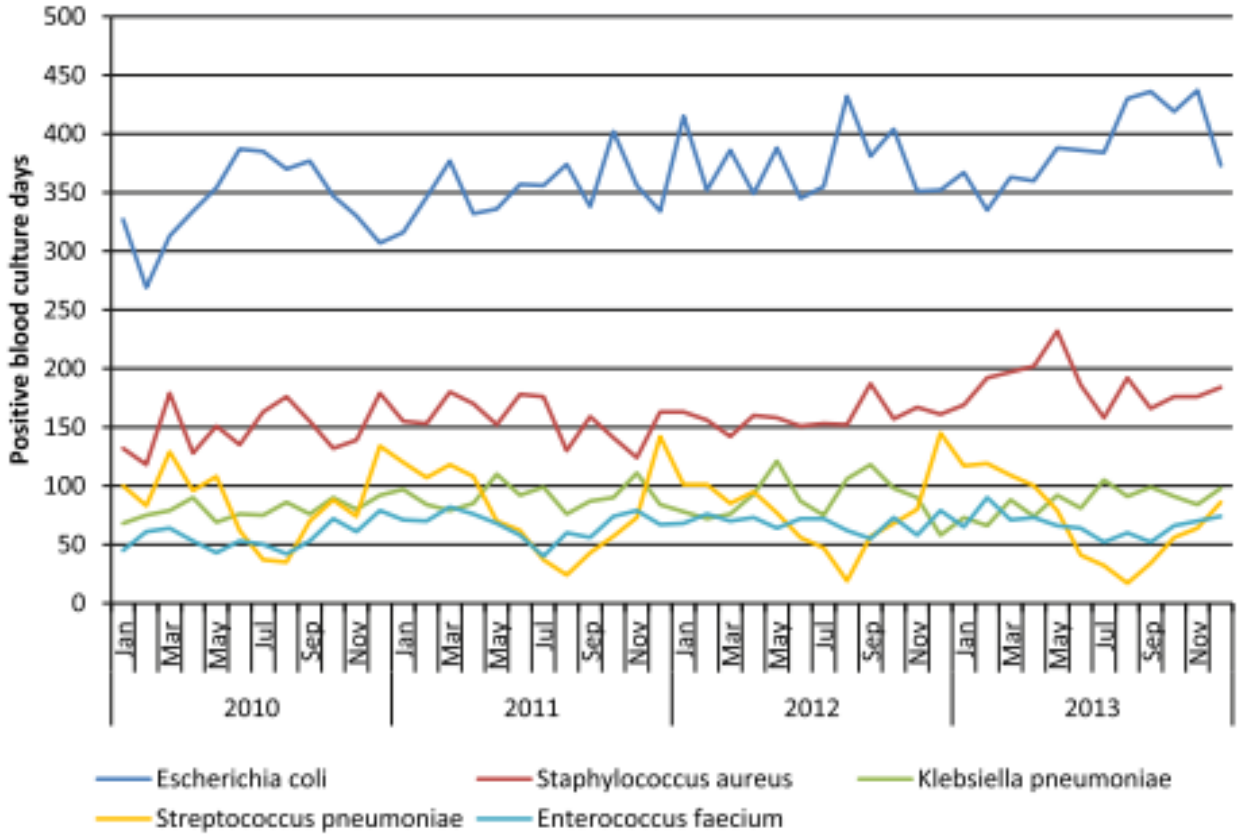



FIG. 2. Frequency of five most common pathogens per blood culture day between 2010 and 2013.

***E. Coli*** **de loin la 1ère cause de bactériémie**

**Quasiment aucune endocardite**


JOURNAL ARTICLE EDITOR'S CHOICE

# Prevalence of infective endocarditis in patients with positive blood cultures: a Danish nationwide study

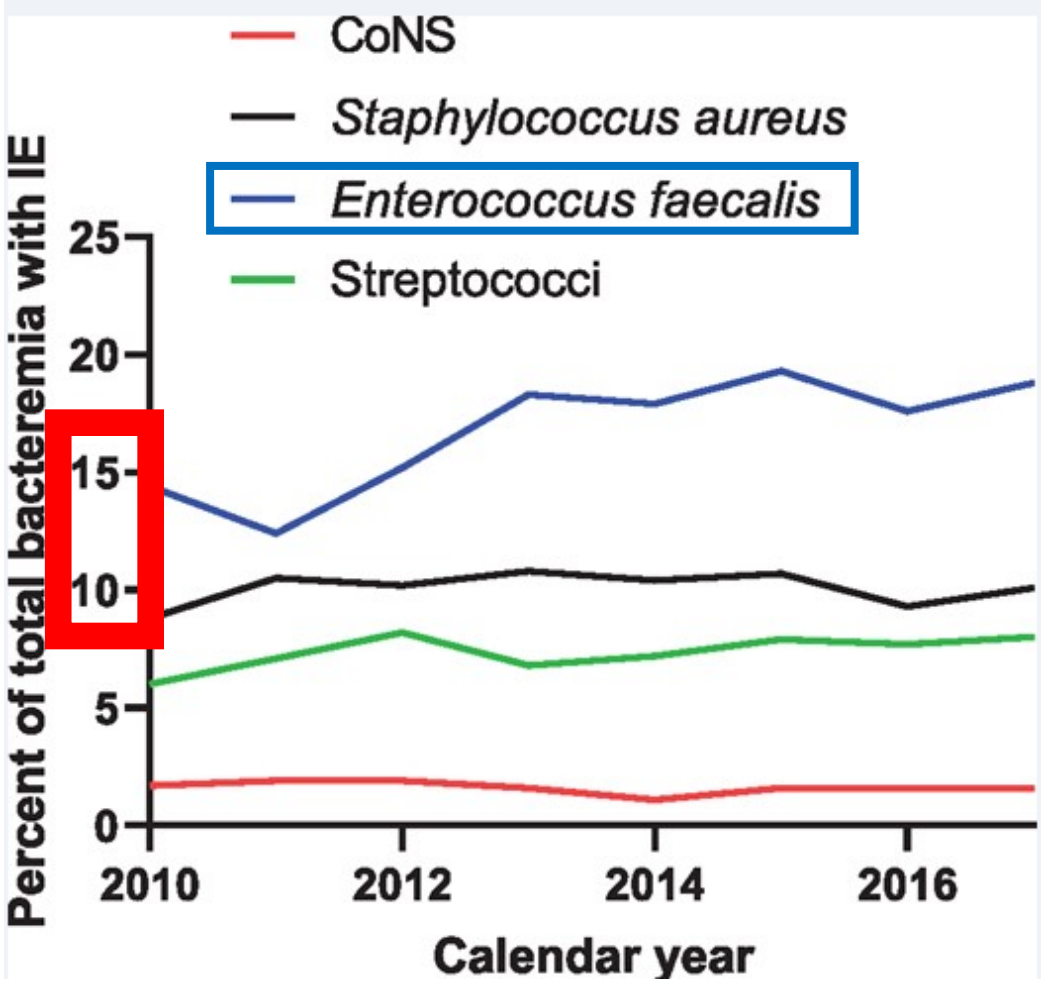
Get access >

Lauge Østergaard ✉, Niels Eske Bruun, Marianne Voldstedlund, Magnus Arpi, Christian Østergaard Andersen, Henrik C Schønheyder, Lars Lemming, Flemming Rosenvinge, Nana Valeur, Peter Søgaard ... Show more

Volume 40, Issue 39

14 October 2019

**69021 bactériémies sur 7 ans**



Clinical Microbiology and Infection 30 (2024) 306–311

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Clinical Microbiology and Infection

journal homepage: www.clinicalmicrobiologyandinfection.com

Review

# Bacteraemia with gram-positive bacteria—when and how do I need to look for endocarditis?

Magnus Rasmussen [1,2,*], Patrik Gilje [3], Erika Fagman [4,5], Andreas Berge [6,7]

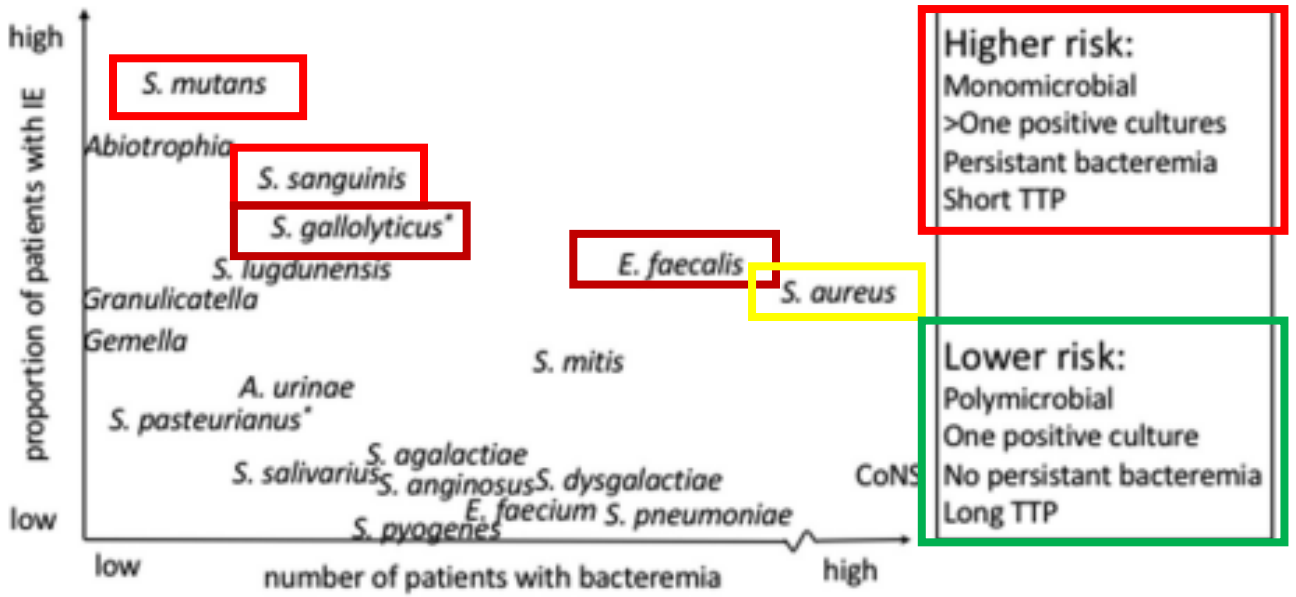


**Fig. 1.** Schematic representation of risk for IE in bacteraemia with different gram-positive bacterial species and groups. Each species or group of species are placed along the X-axis in the figure according to the proportion of positive blood cultures. This is based on figures from the microbiology laboratory in Lund, Sweden from 2019 (pre-pandemic). The breaks in the X-axis indicate that bacteraemia with *S. aureus* and CoNS are much more common (around 15% and 20% of positive blood cultures, respectively) than bacteraemia with *E. faecalis* and *S. pneumoniae* (around 2.5% of positive blood cultures). The catchment area and laboratory routines have been described elsewhere [20]. The proportion of patients with bacteraemia with a particular bacterium that has IE is given on the Y-axis. This is based partly on the following references [3,5,8,13,14,16,17,19,20,62]. Note that the placing of each species is not an absolute one since studies with different methodologies and settings will not produce identical results. The asterisk indicates that *S. gallolyticus* and *S. pasteurianus* are both part of the bovis group. To the right within the box are factors related to microbiology that modify the risk for IE. In the upper right part factors increasing the risk for IE are given and in the lower right part factors that decrease the risk for IE are given. A short or long time to positivity (TTP) will vary between species and settings. For *S. aureus* and *E. faecalis* the median TTP is 13 and 12 h in our setting, respectively [20,23]. Persistent bacteraemia refers to positive blood cultures after the initiation of antibiotic therapy. Different studies used different definitions but most commonly 48–72 h. CoNS, coagulase-negative staphylococci; *E. faecalis*, *Enterococcus faecalis*; IE, infective endocarditis; *S. aureus*, *Staphylococcus aureus*.

# Streptococcal endocarditis: a meta-analysis of species dependant risk

www.thelancet.com Vol 87 September, 2025

Gavin Deas,[a,*] Todd C. Lee,[b] Julia Colston,[c] Mahableshwar Albur,[c] Julia Vasant,[d] Angela H. Nobbs,[e] Philip Williams,[a] and Fergus Hamilton[a,f]

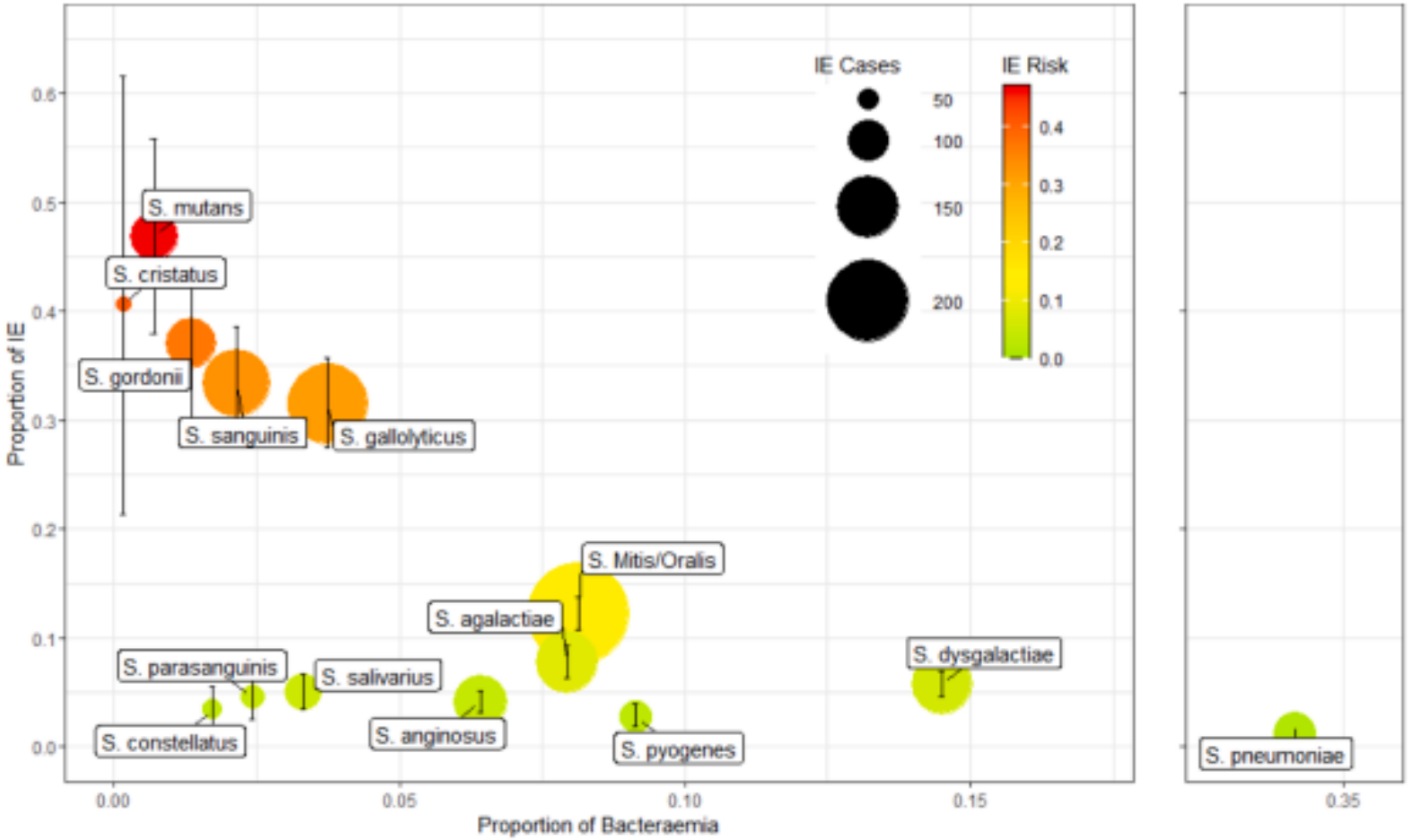


***Fig. 2:*** Infective endocarditis prevalence of streptococcal species vs. proportion of streptococcal species bacteraemia. Coloured by increasing endocarditis risk, green (low < 10%) to red (high > 35%). Circles are proportionate to the total number of endocarditis cases. The vertical lines represent the 95% confidence intervals around the proportion of bacteraemias with endocarditis.

Clinical Microbiology and Infection 30 (2024) 306–311

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**Scores prédictifs d'endocardite**

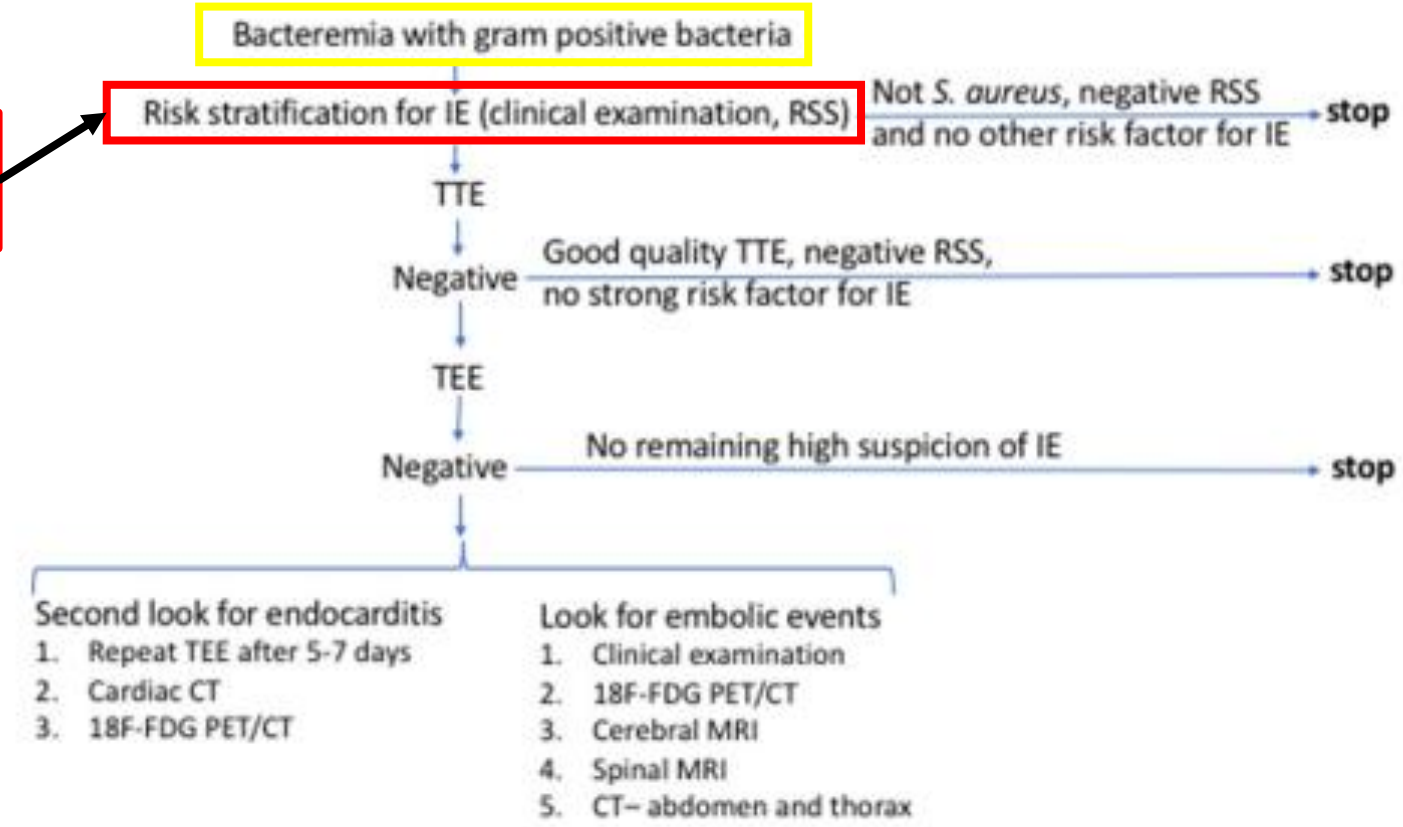


**Fig. 2.** Suggested algorithm on how to investigate patients with gram-positive bacteraemia. With 'no other risk factor' we refer to a broad range of risk factors mentioned under microbiology-related factors and patient-related factors. With 'strong risk factors' we mainly refer to the presence of valve prosthesis. The suggested algorithm should never replace good clinical judgement and thorough evaluation.

Clinical Microbiology and Infection 30 (2024) 306–311

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Magnus Rasmussen [1,2,*], Patrik Gilje [3], Erika Fagman [4,5], Andreas Berge [6,7]

**Table 1**
Components of risk stratification systems for infective endocarditis in gram-positive bacteraemia

| | *S. aureus* | | | Streptococci and 'strep-like' | | *E. faecalis* | |
|---|---|---|---|---|---|---|---|
| | PREDICT [25] | VIRSTA [24] | POSITIVE [20] | HANDOC [5] | Chamat-Hedemand [35] | NOVA [18] | DENOVA [19] |
| Validation | [36,38–40] | [20,39,40] | [39,40] | [37,40] | No | [19,31,40] | [40] |
| Bacterial factors | | | | | | | |
| Species | Only Sa | Only Sa | Only Sa | -1p-1p[f] | 4 groups[h] | Efm + Efs | Only Efs |
| Two positive cultures | – | – | – | 1p | ± | 5p[j] | 1p |
| Monomicrobial | – | – | – | 1p | – | – | Only mm |
| Persistent bacteraemia | 2p | 3p | – | – | – | – | – |
| TTP | – | – | 2p/3p/5p[e] | – | – | – | – |
| Patient factors | | | | | | | |
| Symptom duration (>7 d) | – | – | – | 1p | – | – | 1p |
| Community acquisition | 2p[b] | 2p | – | 1p | – | – | – |
| Valve disease[a] | + | 3p | 5p | 1p[g] | ±[i] | 2p | 1p |
| CIED | 2p[c] | 4p | – | – | ±[i] | – | – |
| IVDU | – | 4p | 3p | – | – | – | – |
| Murmur | – | – | – | 1p[g] | – | 1p | 1p |
| Unknown origin of infection | – | – | – | – | – | 4p | 1p |
| Severe infection, dissemination | – | Several[d] | – | – | – | – | – |
| Embolism | – | 5p | 6p | – | – | – | 1p |
| Recommendation | Day 0: ≤3p, day 3: ≤1p, no TEE | ≤2p no TEE | ≤4p no TEE | ≤2p no echo | Flowchart, no echo/TTE/TEE | ≤3p no TEE | ≤2p no TEE |

# Faut-il rechercher une endocardite?

- Question pour toute bactériémie à germe à risque

- **Chez le sujet âgé?**

Plus d'endocardite?

➡ **Difficile de dire mais le terrain le laisse penser (l'âge ne ressort pas dans les scores)**

Jusqu'ou aller dans la recherche d'EI en cas de bactériémie?

➡ **Bénéfice/Risque de chaque examen (ETO notamment)**

**Caractère invasif, coût, prolongation de l'hospitalisaiton**

Les recommandations sont elles adaptées?

➡ **Recommandations générales mais à prise en charge à individualiser**

Traitements empiriques d'endocardites classées possibles parce que non excluables?

➡ **Très souvent, pas de preuve formelle mais un risque vital en cas de rechute donc traitement 4 à semaines de principe**

# Faut-il rechercher une endocardite?

- Question pour toute bactériémie à germe à risque

- **Chez le sujet âgé?**

**Prises en charge à discuter**
**Expertise Gériatrique et Infectiologique**

**Tendre vers la prise en charge optimale recommandée tout en tenant compte de la prise en charge optimale individuelle**

Plus d'endocardit

➡ **Difficile d**

Jusqu'ou aller dan

➡ **Bénéfice**

Les recommandations sont elles adaptées?

➡ **Recommandations générales mais à prise en charge à individualiser**

Traitements empiriques d'endocardites classées possibles parce que non excluables?

➡ **Très souvent, pas de preuve formelle mais un risque vital en cas de rechute donc traitement 4 à semaines de principe**

AMERICAN SOCIETY FOR MICROBIOLOGY | Clinical Microbiology Reviews

Antimicrobial Chemotherapy | Review

# The emerging challenge of *Enterococcus faecalis* endocarditis after transcatheter aortic valve implantation: time for innovative treatment approaches

Jaclyn A. Cusumano,[1] Andreas P. Kalogeropoulos,[2] Mathieu Le Provost,[3] Nicolas R. Gallo,[1,3] Steven M. Levine,[4] Thomas Inzana,[5] Aikaterini Papamanoli[6]

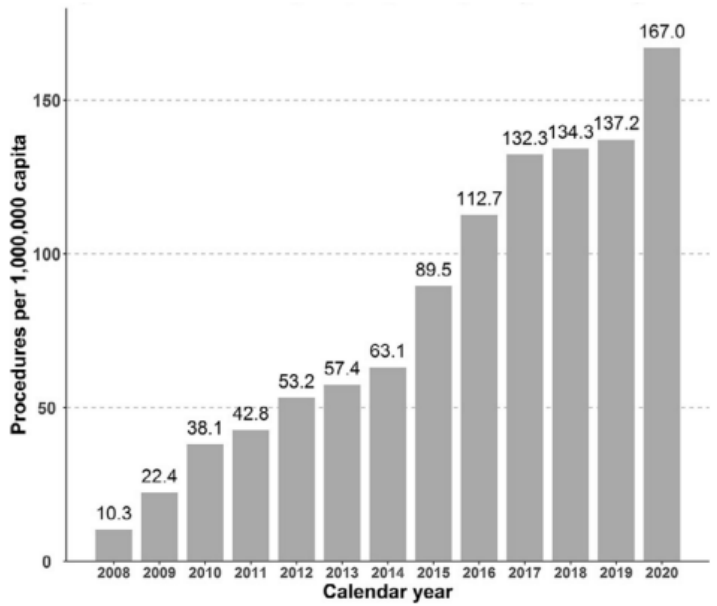


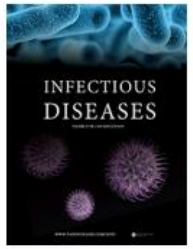

FIG 2 Nationwide utilization of TAVI in Denmark per 1,000,000 residents, 2008–2020. Reproduced from reference (10) under a Creative Commons license.

| | TAVI IE | Native valve IE | Non-TAVI prosthetic valve IE |
|---|---|---|---|
| *Enterococcus* spp. | 24.6%–38.5% (13, 15, 19, 23, 24) | 10%–12% (19, 25, 26) | 16%–21.2% (19, 25) |
| *Staphylococcus aureus* | 16.1%–30.8% (13, 15, 19, 23, 24) | 28.7%–31% (19, 26) | 17.4%–23% (19, 23, 27) |
| *Streptococcus* spp. | 6.9%–30.8% (17, 19, 24) | 23%–26% (19, 25, 26) | 8.3%–25% (17, 19, 25) |

A summary of organism rates among different valve types can be found in Table 1

**Méfions-nous des entérocoques chez le sujet agé**

# Faut-il rechercher une localisation sur les POA?



Infectious Diseases

Taylor & Francis

Published online: 09 Aug 2024.

ISSN: 2374-4235 (Print) 2374-4243 (Online) Journal homepage: www.tandfonline.com/journals/infd20



# Prevalence and risk factors for haematogenous periprosthetic joint infection during *Staphylococcus aureus* bacteraemia

Hanna Blank, Hebba Abdul Rahim, Olof Thompson & Lisa I. Påhlman

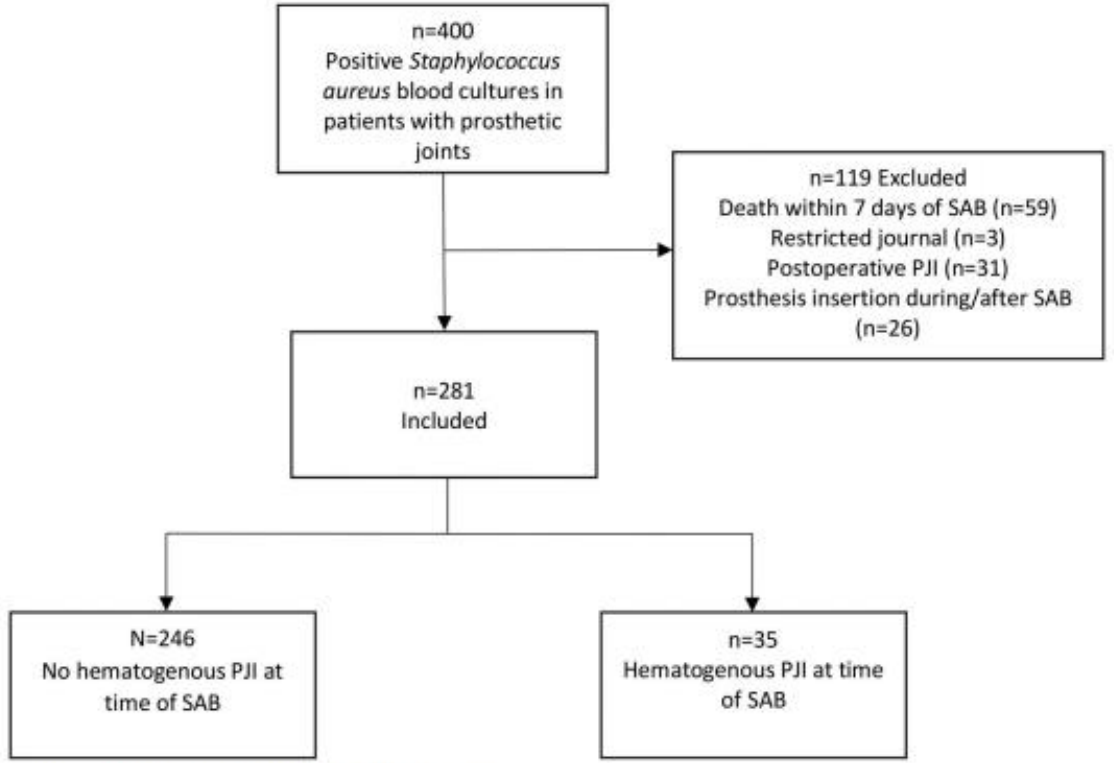



**Figure 1.** Flowchart of included and excluded study participants.
Abbreviations: SAB: *S. aureus* bacteraemia, PJI: Periprosthetic joint infection

**Table 2.** Logistic regression of variables associated with PJI.

| | Univariate analysis | | Multivariate analysis | |
|---|---|---|---|---|
| | OR (95% CI) | p-value | OR (95% CI) | p-value |
| Number of prostheses | 1.66 (1.03-2.70) | 0.039 | 1.97 (1.17-3.31) | 0.011 |
| Age | 0.94 (0.91-0.97) | <0.001 | 0.93 (0.90-0.97) | <0.001 |

The multivariate analysis included the variables patient age and number of prostheses. OR = Odds ratio; PJI = Periprosthetic joint infection.

**12% d'infection de POA lors de la bactériémie à SA (séries précédentes 15 à 40%)**

**Table 3.** Characteristics and outcome of patients without PJI at initial SAB.

| Characteristic | Complicated SAB *n* = 128 | Uncomplicated SAB *n* = 118 | p-value |
|---|---|---|---|
| PJI during follow up | 1 | 1 | 0.6 |
| Mortality during follow up, n (%) | 45 (35%) | 41 (35%) | 0.95 |

Abbreviations; IQR = Interquartile range, CRP = C-reactive protein, SAB=*S. aureus* bacteraemia, PJI = Periprosthetic joint infection.

# Faut-il rechercher une localisation sur les POA?

- **OUI**

- Mais l'examen clinique suffit le plus souvent: douleur ou non, impotence ou non

  **Importance de l'examen clinique**

- Ponction pour confirmer

- **L'IPOA est le plus souvent inaugurale/d'emblée**

# Faut-il rechercher d’autres foyers septiques avec une TEP?

# Faut-il rechercher d’autres foyers septiques avec une TEP?

**Médecine version 2.0**

DPP/PC portable ergonomique/Multi taches : moins de temps pour l’examen

On compense

(ou un bénéfice secondaire pour les TEPistes?)

**Examen clinique avant tout**

Buis et al. BMC Infectious Diseases (2022) 22:282
https://doi.org/10.1186/s12879-022-07273-x

BMC Infectious Diseases

RESEARCH Open Access

# [18F]FDG-PET/CT in *Staphylococcus aureus* bacteremia: a systematic review

D. T. P. Buis[1*], E. Sieswerda[2,3], I. J. E. Kouijzer[4], W. Y. Huynh[1], G. L. Burchell[5], M. A. H. Berrevoets[6], J. M. Prins[1] and K. C. E. Sigaloff[1]

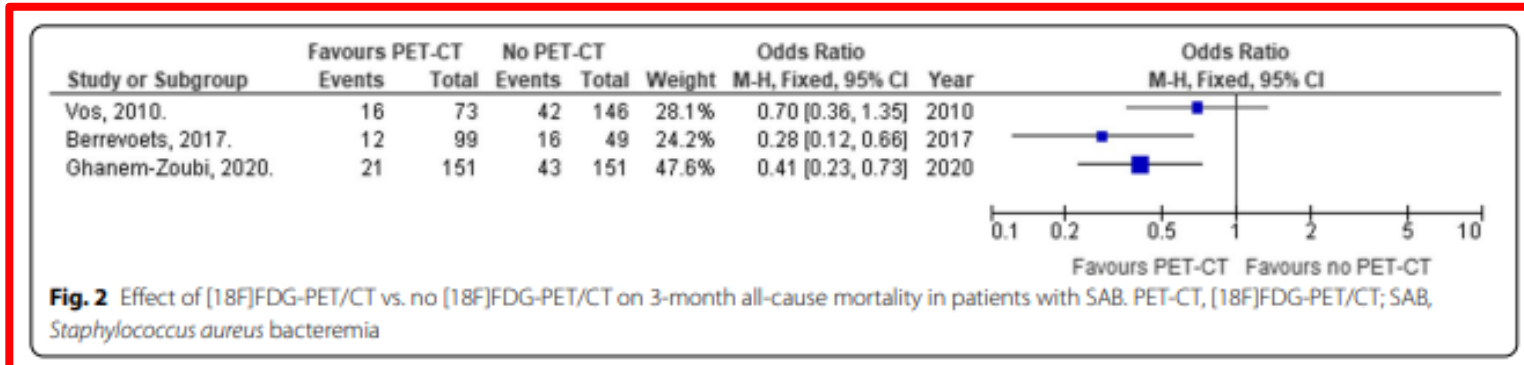



**Fig. 2** Effect of [18F]FDG-PET/CT vs. no [18F]FDG-PET/CT on 3-month all-cause mortality in patients with SAB. PET-CT, [18F]FDG-PET/CT; SAB, *Staphylococcus aureus* bacteremia

**Table 3** GRADE assessment quality of evidence

**[18F]FDG-PET/CT vs. no [18F]FDG-PET/CT in hospitalized adult patients with *Staphylococcus aureus* bacteremia**
**Population: Hospitalized adult patients with *Staphylococcus aureus* bacteremia**
**Intervention: $^{18}$F-FDG PET/CT**
**Comparison: No $^{18}$F-FDG PET/CT**

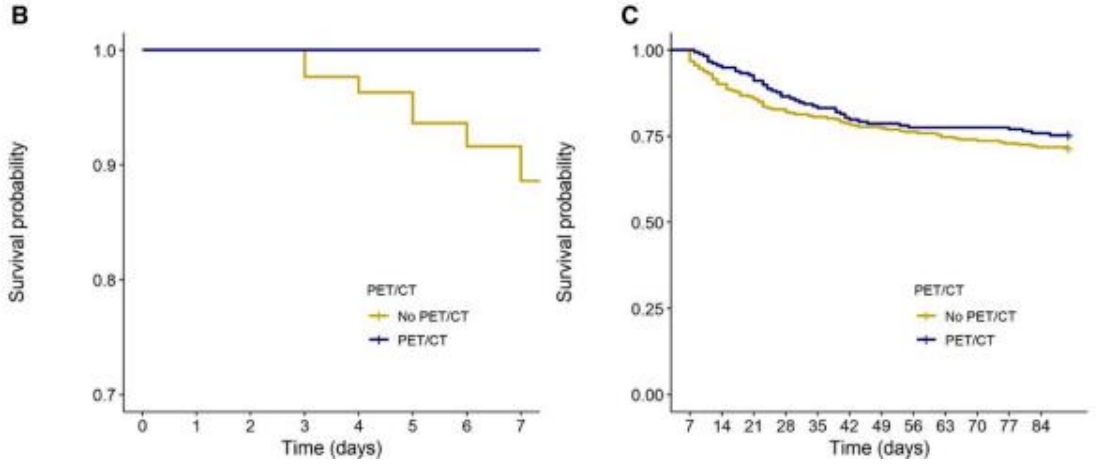
| Outcome | N participants, n studies | Quality of the evidence (GRADE) |
|---|---|---|
| Mortality | 880 participants, 5 studies | Low |
| New diagnostic findings detected by PET-CT | 102 participants, 1 study | Very low |
| Infection relapse rate | 778 participants, 4 studies | Very low |
| SAB-specific mortality | 76 participants, 1 study | Very low |
| Change of antibiotic treatment duration and regimen | 299 participants, 1 study | Very low |
| Performance of source control interventions | 299 participants, 1 study | Very low |

GRADE Working Group grades of evidence
High quality: The authors have a lot of confidence that the true effect is similar to the estimated effect
Moderate quality: The authors believe that the true effect is probably close to the estimated effect
Low quality: The true effect might be markedly different from the estimated effect
Very low quality: The true effect is probably markedly different from the estimated effect

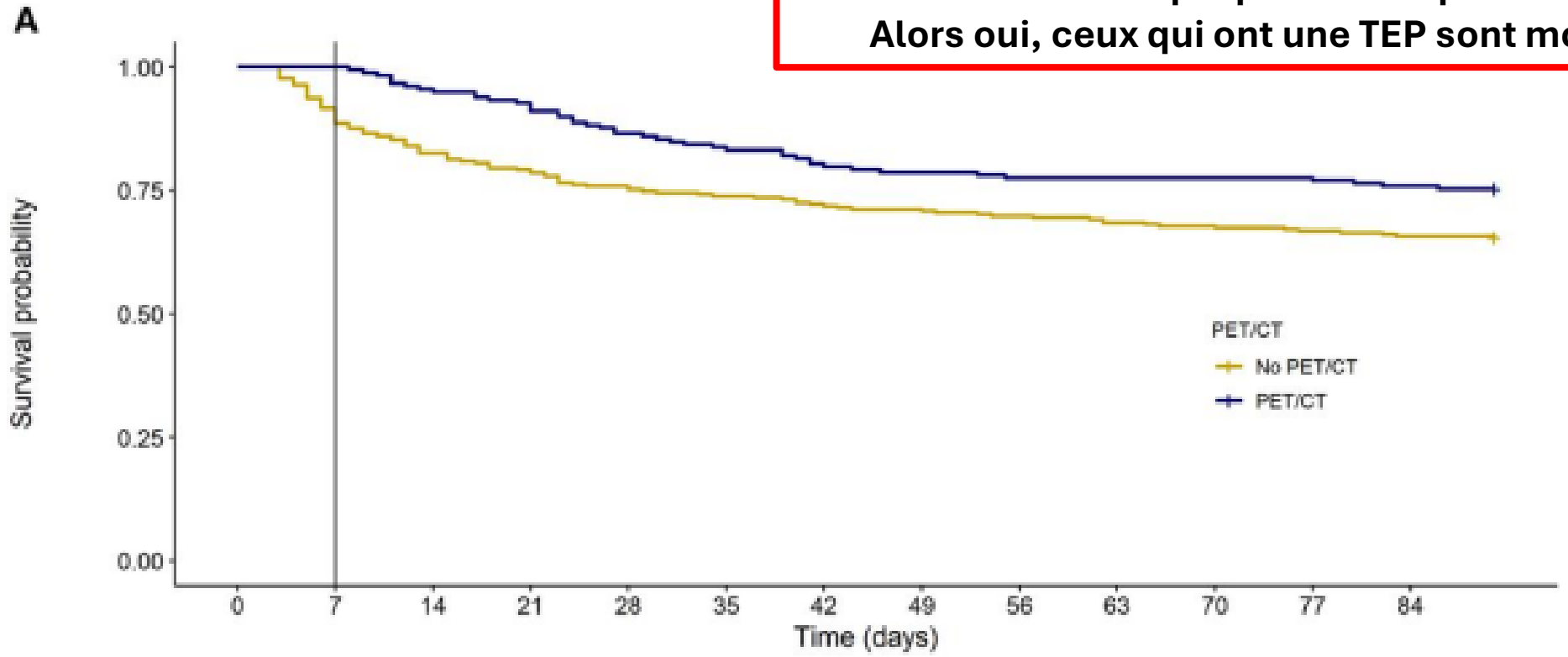
Clinical Infectious Diseases
MAJOR ARTICLE

# Positive Impact of [18F]FDG-PET/CT on Mortality in Patients With *Staphylococcus aureus* Bacteremia Explained by Immortal Time Bias

Thomas W. van der Vaart,[1,2,©] Jan M. Prins,[2] Cornelis H. van Werkhoven,[1] Thijs ten Doesschate,[1] Robin Soetekouw,[3] Gitte van Twillert,[4] Jan Veenstra,[5] Bjorn L. Herpers,[6] Wouter Rozemeijer,[7] Rogier R. Jansen,[8] Marc J. M. Bonten,[1] and Jan T. M. van der Meer[2]




**On n'a la TEP à J7 que pour ceux qui sont vivants à J7**
**Alors oui, ceux qui ont une TEP sont moins morts**



# Faut-il rechercher d'autres foyers septiques avec une TEP?

- Question non spécifique au patient âgé

**Mais**

- Nombreuses études qui tendent vers un bénéfice, aucune randomisée
- Nécessité parfois de détecter **rapidement et simultanément** des atteintes profondes et/ousur matériel
- Impact sur la prise en charge si découverte d'une tumeur colorectal en cas de bactériémie à germe digestif

**L'idée étant de cartographier rapidement l'infection pour**

- définir la durée de traitement ATB
- prendre en charge de tous les foyers
- accélérer la prise en charge (retour à domicile, DMS)

- **Place à définir**

  Actuellement en pratique courante

  En cas d'échec/bactériémie persistante

  En cas de suspicion d'infection sur matériel non identifiable autrement(stimulateurs cardiaques)

  ➞ **Si modification de la prise en charge**

# Nouvelles avancées thérapeutiques dans les bactériémies?

# Efficacy and safety of an early oral switch in low-risk *Staphylococcus aureus* bloodstream infection (SABATO): an international, open-label, parallel-group, randomised, controlled, non-inferiority trial

*Achim J Kaasch, Luis Eduardo López-Cortés, Jesús Rodríguez-Baño, José Miguel Cisneros, M Dolores Navarro, Gerd Fätkenheuer, Norma Jung, Siegbert Rieg, Raphaël Lepeule, Laetitia Goutte, Louis Bernard, Adrien Lemaignen, Katrin Kösters, Colin R MacKenzie, Alex Soriano, Stefan Hagel, Bruno Fantin, Matthieu Lafaurie, Jean-Philippe Talarmin, Aurélien Dinh, Thomas Guimard, David Boutoille, Tobias Welte, Stefan Reuter, Jan Kluytmans, Maria Luisa Martin, Emmanuel Forestier, Hartmut Stocker, Virginie Vitrat, Pierre Tattevin, Anna Rommerskirchen, Marion Noret, Anne Adams, Winfried V Kern, Martin Hellmich, Harald Seifert, for the SABATO study group**

THE LANCET
Infectious Diseases

**Adult patients with low-risk *S aureus* bloodstream infection were randomly assigned after 5–7 days of intravenous antimicrobial therapy to oral antimicrobial therapy or to continue intravenous standard therapy.**

**The composite primary endpoint was the occurrence of any complication related to *S aureus* bloodstream infection (relapsing *S aureus* bloodstream infection, deep-seated infection, and mortality attributable to infection) within 90 days.**

- **Etude SABATO** : ouverte, randomisée, contrôlée, stratifiée sur 31 centres européens, de non-infériorité, de Déc. 2013 à Déc. 2019
- **Critères d'inclusion** : >18 ans, une hémoculture + à *S. aureus*, traitée par ATB IV dans les 72h
- **Randomisation** entre 5 à 7 jours d'ATB IV puis reste PO (cotrimoxazole, clindamycine ou linézolide à l'appréciation du clinicien) vs. 14 jours d'IV (flu/cloxacilline, céfazoline pour un SAMS / vancomycine, daptomycine pour un SARM)
- **Critères d'exclusion** :
  - Bactériémie compliquée (foyer profond, choc septique, bactériémie >72h),
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  - ATCD d'infection à S. aureus dans les 3 mois, toxicomanie IV, immunosuppression, prothèse cardiaque ou vasculaire ; PM ou prothèse articulaire <6 mois
- **Critère de jugement composite** : complication en lien avec la bactériémie à *S. aureus* dans les 90 jours (rechute, infection profonde, mortalité attribuable à l'infection)
- Analyse en ITT et per protocole, marge de non-infériorité à 10%

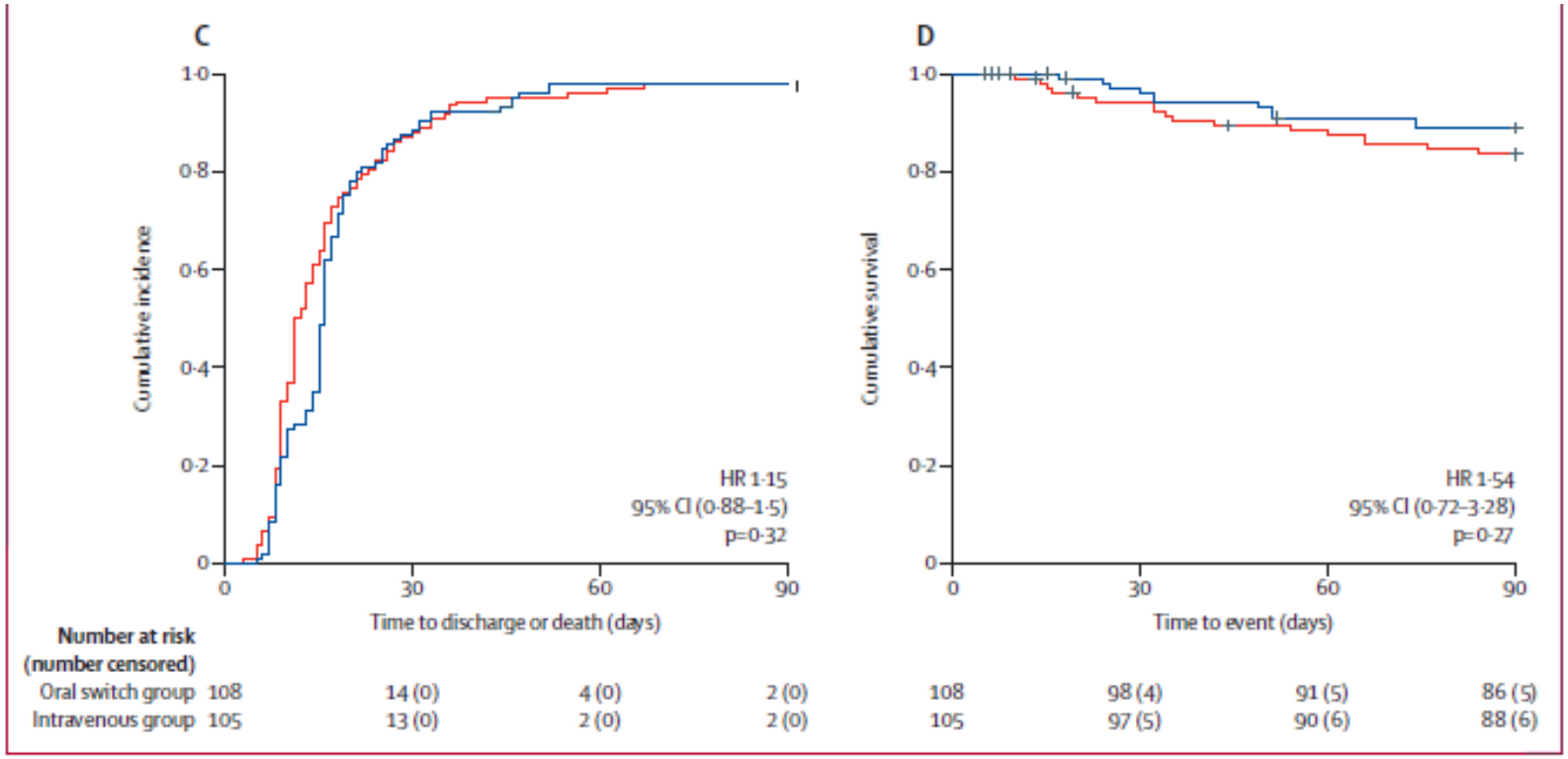


*Figure 2:* Estimates of cumulative incidence from the date of the first positive blood culture for the intention-to-treat population

# Efficacy and safety of an early oral switch in low-risk *Staphylococcus aureus* bloodstream infection (SABATO): an international, open-label, parallel-group, randomised, controlled, non-inferiority trial

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| | Intention-to-treat population | | Clinically evaluable population | |
|---|---|---|---|---|
| | Oral switch group (n=108) | Intravenous group (n=105) | Oral switch group (n=86) | Intravenous group (n=79) |
| Age, years | 64·4 (16·8) | 62·6 (17·6) | 62·4 (17·1) | 62·1 (17·8) |
| Focus of infection | | | | |
| Peripheral venous catheter | 47 (44%) | 46 (44%) | 41 (48%) | 35 (44%) |
| Central venous catheter | 24 (22%) | 25 (24%) | 18 (21%) | 16 (20%) |
| Skin and soft-tissue infection | 26 (24%) | 22 (21%) | 19 (22%) | 19 (24%) |
| Other† | 5 (5%) | 4 (4%) | 4 (5%) | 3 (4%) |
| Not identified | 6 (6%) | 8 (8%) | 4 (5%) | 6 (8%) |
| Comorbidities | | | | |
| Moderate or severe liver disease | 11 (10%) | 4 (4%) | 8 (10%) | 2 (3%) |
| Chronic renal failure | 17 (16%); 1 | 18 (17%) | 10 (12%); 1 | 12 (15%) |
| End-stage renal disease | 9 (8%); 1 | 5 (5%) | 5 (6%); 1 | 4 (5%) |
| Chronic lung disease | 14 (13%); 1 | 17 (16%) | 10 (12%) | 11 (14%) |
| Diabetes without end-organ damage | 25 (23%) | 18 (17%) | 21 (24%) | 11 (14%) |
| Diabetes with end-organ damage | 19 (18%) | 10 (10%) | 13 (15%) | 9 (11%) |
| Any immunosuppression‡ | 16 (15%) | 16 (15%); 1 | 12 (14%) | 14 (18%); 1 |
| Charlson Comorbidity Index | 3 (1–5) | 3 (1–4) | 2 (1–4) | 3 (1–4) |

- **Etude SABATO** : ouverte, randomisée, contrôlée, stratifiée sur 31 centres européens, de non-infériorité, de Déc. 2013 à Déc. 2019
- **Critères d'inclusion** : >18 ans, une hémoculture + à *S. aureus*, traitée par ATB IV dans les 72h
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- **Critère de jugement composite** : complication en lien avec la bactériémie à *S. aureus* dans les 90 jours (rechute, infection profonde, mortalité attribuable à l'infection)
- Analyse en ITT et per protocole, marge de non-infériorité à 10%

| Comorbidity | Score |
|---|---|
| Prior myocardial infarction | 1 |
| Congestive heart failure | 1 |
| Peripheral vascular disease | 1 |
| Cerebrovascular disease | 1 |
| Dementia | 1 |
| Chronic pulmonary disease | 1 |
| Rheumatologic disease | 1 |
| Peptic ulcer disease | 1 |
| Mild liver disease | 1 |
| Diabetes | 1 |
| Cerebrovascular (hemiplegia) event | 2 |
| Moderate-to-severe renal disease | 2 |
| Diabetes with chronic complications | 2 |
| Cancer without metastases | 2 |
| Leukemia | 2 |
| Lymphoma | 2 |
| Moderate or severe liver disease | 3 |
| Metastatic solid tumor | 6 |
| Acquired immuno-deficiency syndrome (AIDS) | 6 |

# Efficacy and safety of an early oral switch in low-risk *Staphylococcus aureus* bloodstream infection (SABATO): an international, open-label, parallel-group, randomised, controlled, non-inferiority trial

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- **Critères d'inclusion** : >18 ans, une hémoculture + à *S. aureus*, traitée par ATB IV dans les 72h
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- **Critère de jugement composite** : complication en lien avec la bactériémie à *S. aureus* dans les 90 jours (rechute, infection profonde, [illegible]buable à l'infection)
- [illegible]T et per protocole, marge de non-infériorité à 10%

| | Intention-to-treat population | | Clinically evaluable population | |
|---|---|---|---|---|
| | Oral switch | Intravenous | Oral switch | Intravenous |
| Age, years | | | | |
| Focus of infection | | | | |
| Peripheral venous catheter | | | | |
| Central venous catheter | | | | |
| Skin and soft-tissue infection | | | | |
| Other† | | | | |
| Not identified | | | | |
| Comorbidities | | | | |
| Moderate or severe liver disease | | | | |
| Chronic renal failure | | | | |
| End-stage renal disease | 9 (8%); 1 | 5 (5%) | 5 (6%); 1 | 4 (5%) |
| Chronic lung disease | 14 (13%); 1 | 17 (16%) | 10 (12%) | 11 (14%) |
| Diabetes without end-organ damage | 25 (23%) | 18 (17%) | 21 (24%) | 11 (14%) |
| Diabetes with end-organ damage | 19 (18%) | 10 (10%) | 13 (15%) | 9 (11%) |
| Any immunosuppression‡ | 16 (15%) | 16 (15%); 1 | 12 (14%) | 14 (18%); 1 |
| Charlson Comorbidity Index | 3 (1–5) | 3 (1–4) | 2 (1–4) | 3 (1–4) |

**Extrapolation prudente au patient de Gériatrie**

**-**

**Versus**

**-**

**Bénéfice du relais per os**

**Discussion/Individualisation**

| [illegible]y | Score |
|---|---|
| | 1 |
| | 1 |
| | 1 |
| | 1 |
| | 1 |
| | 1 |
| | 1 |
| | 1 |
| Mild liver disease | 1 |
| Diabetes | 1 |
| Cerebrovascular (hemiplegia) event | 2 |
| Moderate-to-severe renal disease | 2 |
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The NEW ENGLAND JOURNAL of MEDICINE

N ENGL J MED 392;11 NEJM.ORG MARCH 13/20, 2025

ORIGINAL ARTICLE

# Antibiotic Treatment for 7 versus 14 Days in Patients with Bloodstream Infections

The BALANCE Investigators, for the Canadian Critical Care Trials Group, the Association of Medical Microbiology and Infectious Disease Canada Clinical Research Network, the Australian and New Zealand Intensive Care Society Clinical Trials Group, and the Australasian Society for Infectious Diseases Clinical Research Network

## HOW WAS THE TRIAL CONDUCTED?

Hospitalized patients (including patients in the intensive care unit) who had bloodstream infection were assigned to receive antibiotic treatment for 7 days or 14 days. Antibiotic selection, dosing, and route were at the discretion of the treating team. The primary outcome was death from any cause by 90 days after diagnosis of the bloodstream infection (noninferiority margin, 4 percentage points).

## TRIAL DESIGN

- Open-label
- Randomized
- Controlled
- Noninferiority
- Location: 74 hospital sites in 7 countries

## Patients

- 3608 patients
- Median age, 70 years
- Male: 53%; Female: 47%


The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

# Antibiotic Treatment for 7 versus 14 Days in Patients with Bloodstream Infections

Exclusion des patients à très haut risque d'endocardite
(SA, prothèse valvulaire ou vasculaire)

**Table S2. Full BALANCE Inclusion and Exclusion Criteria**

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| 1) Patient is in an intensive care unit or non-intensive care unit ward at the time the blood culture is drawn or reported as positive AND<br>2) Patient has a positive blood culture with pathogenic bacteria | 1) Patient already enrolled in the trial<br>2) Patient has severe immune system compromise, as defined by: absolute neutrophil count <$0.5x10^9$/L; or is receiving immunosuppressive treatment for solid organ or bone marrow or stem cell transplant<br>3) Patient has a prosthetic heart valve or synthetic endovascular graft (post major vessel repair with synthetic material) (note: coronary artery stents are not an exclusion)<br>4) Patient has documented or suspicion of syndrome with well-defined requirement for prolonged treatment:<br>i) infective endocarditis;<br>ii) osteomyelitis/septic arthritis;<br>iii) undrainable/undrained abscess;<br>iv) unremovable/unremoved prosthetic-associated infection (e.g. infected pacemaker, prosthetic joint infection, ventriculoperitoneal shunt infection etc.) (note: central venous catheters, including tunneled central intravenous catheter, and urinary catheters are not excluded unless the treating clinical team does not have equipoise for enrollment and randomization to either group)<br>5) Patient has a single positive blood culture with a common contaminant organism according to Clinical Laboratory & Standards Institute (CLSI) Guidelines: coagulase negative staphylococci; or *Bacillus spp.;* or *Corynebacterium spp.;* or *Propionibacterium spp.;* or *Aerococcus spp.;* or *Micrococcus spp.*<br>6) Patient has a positive blood culture with *Staphylococcus aureus* or *Staphylococcus lugdunensis*<br>7) Patient has a positive blood culture with Candida spp. or other fungal species. |

**Table 1. Characteristics of the Patients, Infections, and Pathogens at Baseline (Primary Intention-to-Treat Analysis).***

| Characteristic | Overall (N=3608) | 7-Day Group (N=1814) | 14-Day Group (N=1794) |
|---|---|---|---|
| Source of bacteremia — no. (%) | | | |
| Urinary tract | 1523 (42.2) | 757 (41.7) | 766 (42.7) |
| Intraabdominal or hepatobiliary | 679 (18.8) | 337 (18.6) | 342 (19.1) |
| Lung | 469 (13.0) | 229 (12.6) | 240 (13.4) |
| Vascular catheter | 229 (6.3) | 116 (6.4) | 113 (6.3) |
| Skin, soft tissue, or both | 187 (5.2) | 104 (5.7) | 83 (4.6) |
| Other | 67 (1.9) | 37 (2.0) | 30 (1.7) |
| Undefined or unknown | 454 (12.6) | 234 (12.9) | 220 (12.3) |
| Most commonly isolated pathogens in blood cultures — no. (%)‖ | | | |
| *Escherichia coli* | 1582 (43.8) | 805 (44.4) | 777 (43.3) |
| Klebsiella species | 552 (15.3) | 273 (15.0) | 279 (15.6) |
| Enterococcus species | 250 (6.9) | 119 (6.6) | 131 (7.3) |
| Coagulase-negative staphylococci | 174 (4.8) | 81 (4.5) | 93 (5.2) |
| Pseudomonas species | 170 (4.7) | 80 (4.4) | 90 (5.0) |
| *Streptococcus pneumoniae* | 164 (4.5) | 86 (4.7) | 78 (4.3) |
| Enterobacter species | 157 (4.4) | 80 (4.4) | 77 (4.3) |
| Proteus species | 133 (3.7) | 58 (3.2) | 75 (4.2) |
| Serratia species | 86 (2.4) | 38 (2.1) | 48 (2.7) |
| *S. pyogenes* | 74 (2.1) | 39 (2.1) | 35 (2.0) |
| *S. agalactiae* | 75 (2.1) | 40 (2.2) | 35 (2.0) |
| Number and type of organisms — no. (%) | | | |
| Monomicrobial, gram-negative | 2562 (71.0) | 1299 (71.6) | 1263 (70.4) |
| Monomicrobial, gram-positive | 625 (17.3) | 323 (17.8) | 302 (16.8) |
| Polymicrobial | 421 (11.7) | 192 (10.6) | 229 (12.8) |

**Bactériémies à faible risque microbiologique de complication/EI**

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

# Antibiotic Treatment for 7 versus 14 Days in Patients with Bloodstream Infections

**Table 1. Characteristics of the Patients, Infections, and Pathogens at Baseline (Primary Intention-to-Treat Analysis).***

| Characteristic | Overall (N=3608) | 7-Day Group (N=1814) | 14-Day Group (N=1794) |
|---|---|---|---|
| Male sex — no. (%) | 1922 (53.3) | 974 (53.7) | 948 (52.8) |
| Median age (IQR) — yr | 70 (59–80) | 70 (58–80) | 70 (59–80) |
| Diabetes mellitus | 1148 (31.8) | 596 (32.9) | 552 (30.8) |
| Solid-organ cancer | 782 (21.7) | 400 (22.1) | 382 (21.3) |
| Obesity | 655 (18.2) | 331 (18.2) | 324 (18.1) |
| Arrhythmia | 540 (15.0) | 264 (14.6) | 276 (15.4) |
| Glucocorticoid use or immunosuppression‡ | 440 (12.2) | 230 (12.7) | 210 (11.7) |
| Chronic obstructive pulmonary disease | 393 (10.9) | 198 (10.9) | 195 (10.9) |
| Renal insufficiency | 425 (11.8) | 217 (12.0) | 208 (11.6) |
| Coronary artery disease | 393 (10.9) | 193 (10.6) | 200 (11.1) |
| Congestive heart failure | 386 (10.7) | 205 (11.3) | 181 (10.1) |
| Liver disease | 227 (6.3) | 117 (6.4) | 110 (6.1) |
| Peripheral vascular disease | 223 (6.2) | 107 (5.9) | 116 (6.5) |
| Dialysis dependency | 127 (3.5) | 60 (3.3) | 67 (3.7) |
| Leukemia or lymphoma | 101 (2.8) | 49 (2.7) | 52 (2.9) |
| Median Clinical Frailty Scale score (IQR)§ | 4 (3–5) | 4 (3–5) | 4 (3–5) |

# Score de Fragilité Clinique

**1 Très en forme -** Personnes qui sont robustes, actives, énergiques et motivées. Ces personnes font de l'exercice régulièrement. Ils sont parmi les plus en forme de leur âge.

**2 Bien** - Personnes qui ne présentent **aucun symptôme de maladie active** mais sont moins en forme que la catégorie 1. Font souvent, des exercices ou sont très **actives par période**. (par exemple des variations saisonnières).

**3 Assez bien** - Personnes dont les **problèmes médicaux sont bien contrôlés**, mais ne sont **pas régulièrement actives** au-delà de la marche quotidienne.

**4 Vulnérable - Sans être dépendantes** des autres pour l'aide quotidienne, souvent leurs **symptômes limitent leurs activités**. Une plainte fréquente est d'être ralentie et/ou d'être fatiguée pendant la journée.

**5 Légèrement fragile -** Personnes qui ont souvent **un ralentissement plus évident**, et ont besoin d'aide dans les **activités d'ordre élevé de la vie quotidienne** (finances, transport, grosses tâches ménagères, médicaments). Généralement, la fragilité légère empêche progressivement de faire les courses, de marcher seul dehors, de préparer les repas et de faire le ménage.

**6 Modérément fragile -** Personnes qui ont besoin d'aide pour **toutes les activités à l'extérieur** et pour l'**entretien de la maison**. A l'intérieur, elles ont souvent des problèmes pour monter/descendre les escaliers, ont besoin d'aide **pour prendre un bain** et pourraient avoir besoin d'une aide minimale (être à coté) pour s'habiller.

**7 Sévèrement fragile - Totalement dépendantes pour les soins personnels,** quelle que soit la cause (physique ou cognitive). Malgré tout, elles semblent stables et n'ont pas un risque élevé de décéder (dans les prochains 6 mois).

**8 Très sévèrement fragile -** Totalement dépendantes, la fin de vie approche. Typiquement, elles ne pourraient pas récupérer même d'une maladie mineure/ maladie légère.

**9 En phase terminale -** Approchant la fin de vie. Cette catégorie concerne les personnes ayant une **espérance de vie < 6 mois**, qui **sinon ne sont pas fragiles de façon évidente.**

**Classification de la fragilité des personnes atteintes de démence.**

Le degré de fragilité correspond au degré de démence.

Les **symptômes courants de démence légère** inclus : l'oubli des détails d'un événement récent mais le souvenir que l'événement a eu lieu, la répétition de la même question / histoire et le retrait social.

Dans la **démence modérée**, la mémoire récente est très altérée, même si les personnes peuvent bien se rappeler des événements de leur vie passée. Ils peuvent faire des soins personnels avec incitation.

Dans la **démence grave**, elles ne peuvent pas faire les soins personnels sans aide.

**Des jeunes vieux**

ORIGINAL ARTICLE

# Antibiotic Treatment for 7 versus 14 Days in Patients with Bloodstream Infections

| Analysis | 7 Days | 14 Days | Risk Difference (95% CI) |
|---|---|---|---|
| | *no. of events/total no.* | | *percentage points* |
| Intention-to-treat | 261/1802 | 286/1779 | −1.6 (−4.0 to 0.8) |
| Per-protocol | 178/1370 | 222/1483 | −2.0 (−4.5 to 0.6) |
| Modified intention-to-treat | 247/1788 | 272/1765 | −1.6 (−3.9 to 0.7) |

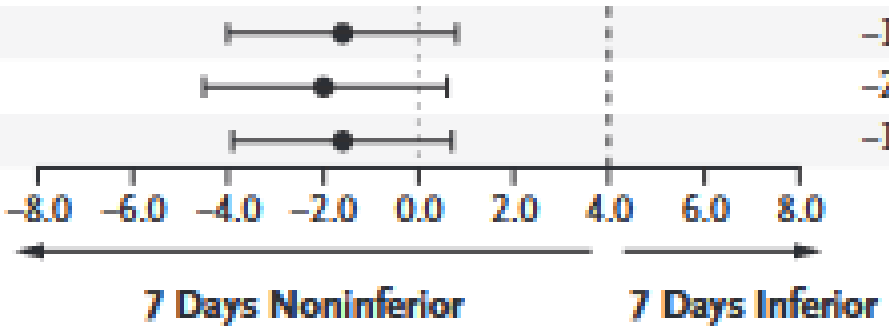


**Figure 2. Primary Outcome According to Analysis.**

Shown are the differences between the groups in the primary outcome — death from any cause by 90 days after the date of diagnosis of a bloodstream infection — in the intention-to-treat, per-protocol, and modified intention-to-treat analyses. The modified intention-to-treat analysis excluded patients who died before day 7 of treatment (i.e., before divergence in the treatment-duration assignment). A 95.7% confidence interval is shown for the intention-to-treat analysis (accounting for alpha spending in interim analyses), and 95% confidence intervals are shown for the other two analyses. The widths of the confidence intervals have not been adjusted for multiplicity. The dashed line indicates the noninferiority margin of 4 percentage points.

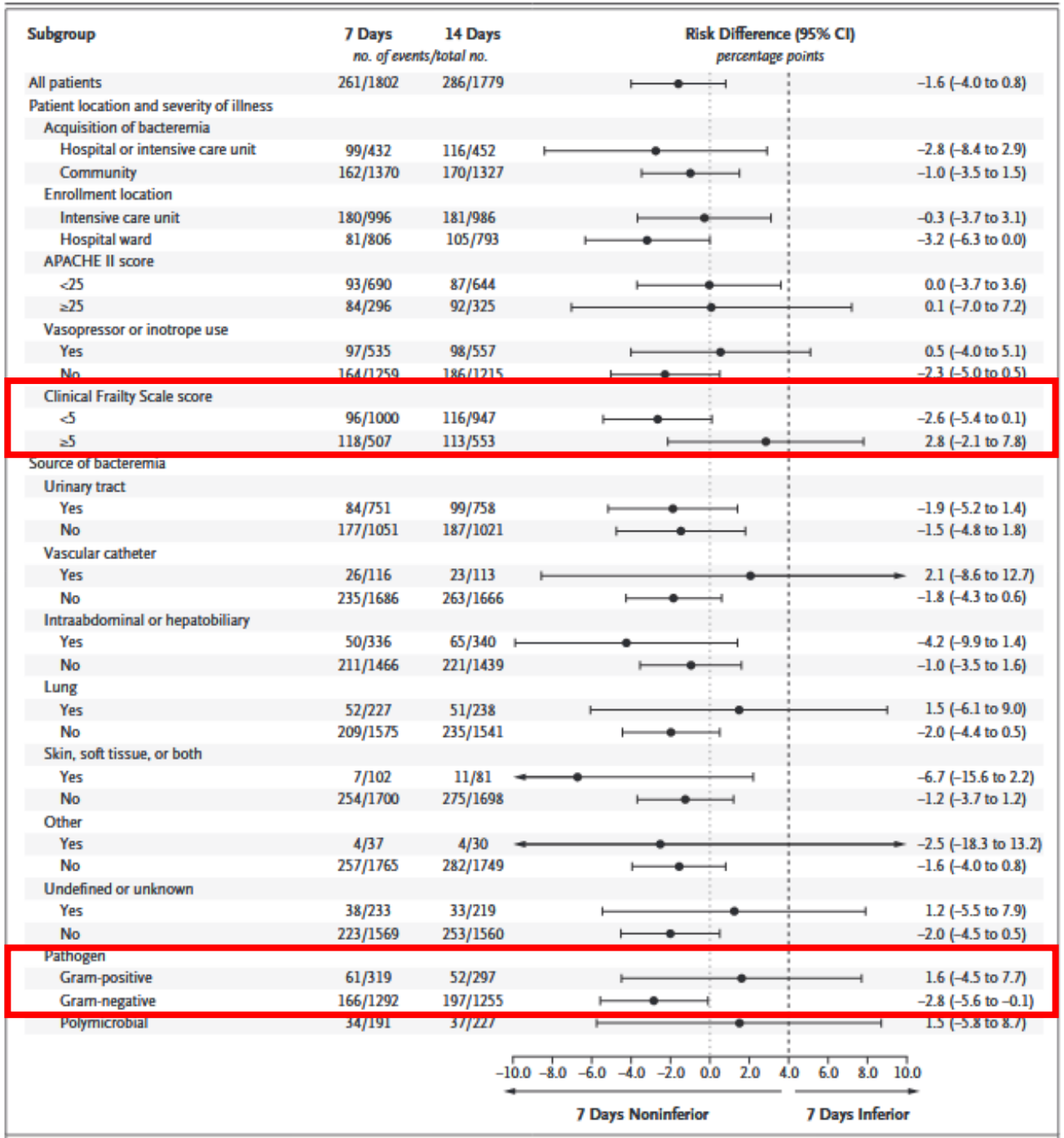


**Figure 3.** Primary Outcome According to Subgroup.

**Surtout vrai pour les bactériémies à BGN du patient peu fragile**

**Non démontré dans le sous groupe FSS ≥ 5**

Clinical Infectious Diseases

MAJOR ARTICLE

# Seven Versus 14 Days of Antibiotic Therapy for Uncomplicated Gram-negative Bacteremia: A Noninferiority Randomized Controlled Trial

Dafna Yahav,[1,2] Erica Franceschini,[3] Fidi Koppel,[4] Adi Turjeman,[2,5] Tanya Babich,[2,5] Roni Bitterman,[4] Ami Neuberger,[4,6] Nesrin Ghanem-Zoubi,[4] Antonella Santoro,[3] Noa Eliakim-Raz,[1,2] Barak Pertzov,[5] Tali Steinmetz,[5] Anat Stern,[4] Yaakov Dickstein,[4] Elias Maroun,[4] Hiba Zayyad,[4] Jihad Bishara,[1,2] Danny Alon,[7] Yonatan Edel,[2,8] Elad Goldberg,[9] Claudia Venturelli,[3] Cristina Mussini,[3] Leonard Leibovici,[2,5] Mical Paul[4,6]; for the Bacteremia Duration Study Group[a]

***Methods.*** This was a randomized, multicenter, open-label, noninferiority trial. Inpatients with gram-negative bacteremia, who were afebrile and hemodynamically stable for at least 48 hours, were randomized to receive 7 days (intervention) or 14 days (control) of covering antibiotic therapy. Patients with uncontrolled focus of infection were excluded. The primary outcome at 90 days was a composite of all-cause mortality; relapse, suppurative, or distant complications; and readmission or extended hospitalization (>14 days). The noninferiority margin was set at 10%.

**Pas de critère d'exclusion lié au terrain en dehors de l'immunodépression**

*Clinical Infectious Diseases*

MAJOR ARTICLE

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**Table 2. Outcomes of 7 Versus 14 Days of Antibiotic Therapy for Uncomplicated Gram-Negative Bacteremia**

| Outcome | Short Arm (7 d) (n = 306) | Long Arm (14 d) (n = 298) | Risk Difference (95% CI) | *P* Value |
|---|---|---|---|---|
| Primary outcome | 140 (45.8) | 144 (48.3) | –2.6 (–10.5 to 5.3) | .527 |
| 90-d all-cause mortality | 36 (11.8) | 32 (10.7) | 1.0 (–4.0 to 6.1) | .702 |
| Readmissions | 119 (38.9) | 127 (42.6) | –3.7 (–11.5 to 4.1) | .363 |
| Extended hospitalization beyond 14 d | 15 (4.9) | 19 (6.4) | –1.5 (–5.1 to 2.2) | .483 |
| Distant complications | 2 (0.7) | 1 (0.3) | … | 1.0 |
| Relapse of bacteremia | 8 (2.6) | 8 (2.7) | –0.07 (–2.6 to 2.5) | .957 |
| Suppurative complications | 16 (5.2) | 10 (3.4) | 1.8 (–1.4 to 5.1) | .257 |
| 14-d mortality | 7 (2.3) | 4 (1.3) | 0.95 (–1.42 to 3.44) | .288 |
| 28-d mortality | 15 (4.9) | 13 (4.4) | 0.54 (–2.98 to 4.06) | .753 |

**OK ça marche mais**

*Clinical Infectious Diseases*

MAJOR ARTICLE

# Seven Versus 14 Days of Antibiotic Therapy for Uncomplicated Gram-negative Bacteremia: A Noninferiority Randomized Controlled Trial

Dafna Yahav,[1,2] Erica Franceschini,[3] Fidi Koppel,[4] Adi Turjeman,[2,5] Tanya Babich,[2,5] Roni Bitterman,[4] Ami Neuberger,[4,6] Nesrin Ghanem-Zoubi,[4] Antonella Santoro,[3] Noa Eliakim-Raz,[1,2] Barak Pertzov,[5] Tali Steinmetz,[5] Anat Stern,[4] Yaakov Dickstein,[4] Elias Maroun,[4] Hiba Zayyad,[4] Jihad Bishara,[1,2] Danny Alon,[7] Yonatan Edel,[2,8] Elad Goldberg,[9] Claudia Venturelli,[3] Cristina Mussini,[3] Leonard Leibovici,[2,5] Mical Paul[4,6], for the Bacteremia Duration Study Group[a]

| Comorbidity | Score |
|---|---|
| Prior myocardial infarction | 1 |
| Congestive heart failure | 1 |
| Peripheral vascular disease | 1 |
| Cerebrovascular disease | 1 |
| Dementia | 1 |
| Chronic pulmonary disease | 1 |
| Rheumatologic disease | 1 |
| Peptic ulcer disease | 1 |
| Mild liver disease | 1 |
| Diabetes | 1 |
| Cerebrovascular (hemiplegia) event | 2 |
| Moderate-to-severe renal disease | 2 |
| Diabetes with chronic complications | 2 |
| Cancer without metastases | 2 |
| Leukemia | 2 |
| Lymphoma | 2 |
| Moderate or severe liver disease | 3 |
| Metastatic solid tumor | 6 |
| Acquired immuno-deficiency syndrome (AIDS) | 6 |

**Table 1. Baseline Characteristics of Included Patients**

| Variable | Short-duration Arm (7 d) (n = 306) | Long-duration Arm (14 d) (n = 298) |
|---|---|---|
| Patient characteristics | | |
| Age, y, median (IQR) | 71 (61.8–81) | 71 (61–80) |
| Charlson comorbidity score, median (IQR) | 2 (1–3) | 2 (1–4) |
| Functional capacity | | |
| Independent | 186 (61.1) | 189 (63.4) |
| Needs assistance in ADL | 53 (17.3) | 44 (14.8) |
| Dependent in ADL | 40 (13.1) | 51 (17.1) |
| Bedridden | 26 (8.5) | 14 (4.7) |

**Pas beaucoup de vieux vieux**

Saad et al. BMC Infectious Diseases (2020) 20:785
https://doi.org/10.1186/s12879-020-05498-2

BMC Infectious Diseases

RESEARCH ARTICLE Open Access

# Oral beta-lactam step down in bacteremic *E. coli* urinary tract infections

Stephan Saad[1*], Neil Mina[2], Colin Lee[3] and Kevin Afra[4*]

| | Oral fluoroquinolone step down ($n = 130$) | Oral beta-lactam step down ($n = 77$) | *p*-value |
|---|---|---|---|
| Primary Outcome | | | |
| Clinical cure | 127 (98) | 72 (94) | 0.13 |
| Secondary Outcomes | | | |
| 30-day mortality | 1 (1) | 0 (0) | 0.43 |

**Table 1** Baseline characteristics of patients

| | Oral fluoroquinolone step down ($n = 130$) | Oral beta-lactam step down ($n = 77$) | *p*-value |
|---|---|---|---|
| Age, median, years (IQR) | 70.5 (56.25–80.75) | 71 (54–80) | 0.72 |
| Charlson comorbidity index, median (IQR) | 1 (0–2) | 1 (0–3) | 0.96 |

**Table 1. Demographic, Clinical, and Treatment Characteristics**

| Characteristic | Patients, No. (%) | |
|---|---|---|
| | Fluoroquinolone or trimethoprim-sulfamethoxazole (n = 3134) | β-Lactam antibiotics (n = 955) |
| Age, median (IQR), y | 69 (62-80) | 73 (64-83) |
| Male | 2847 (90.8) | 884 (92.6) |
| Race/ethnicity | | |
| White | 1983 (63.3) | 617 (64.6) |
| Black | 714 (22.8) | 202 (21.2) |
| Hispanic or Latino | 185 (5.9) | 53 (5.5) |
| Native American, Alaskan, Hawaiian, or Pacific Islander | 41 (1.3) | 13 (1.4) |
| Asian | 20 (0.6) | 3 (0.3) |
| Missing, unknown, or declined to answer | 191 (6.1) | 67 (7.0) |
| Preexisting conditions[a] | | |
| Combined comorbidity score, median (IQR) | 1 (0-2) | 1 (0-3) |
| Chronic kidney disease | 564 (18.0) | 227 (23.8) |
| Chronic pulmonary disease | 681 (21.7) | 220 (23.0) |
| Heart failure | 480 (15.3) | 170 (17.8) |
| Diabetes with complication | 402 (12.8) | 130 (13.6) |
| Dementia | 180 (5.7) | 69 (7.2) |
| Immunosuppression | 182 (5.8) | 61 (6.4) |

**Table 2. Outcomes**

| Outcome | Patients, No. (%) | | aRD, % (95% CI)[a] | aRR (95% CI)[a] |
|---|---|---|---|---|
| | Fluoroquinolones or trimethoprim-sulfamethoxazole (n = 3134) | β-Lactam antibiotics (n = 955) | | |
| 30-d Mortality and recurrent bacteremia | 94 (3.0) | 42 (4.4) | 0.99 (−0.42 to 2.40) | 1.31 (0.87 to 1.95) |
| Mortality | 82 (2.6) | 29 (3.0) | 0.06 (−1.13 to 1.26) | 1.02 (0.67 to 1.56) |
| Recurrent bacteremia | 12 (0.4) | 14 (1.5) | 1.03 (0.24 to 1.82) | 3.43 (0.42 to 27.90) |
| 90-d Mortality and recurrent bacteremia | 238 (7.6) | 96 (10.1) | 1.81 (−0.24 to 3.87) | 1.23 (0.96 to 1.56) |
| Mortality | 208 (6.6) | 75 (7.9) | 0.68 (−1.16 to 2.52) | 1.10 (0.85 to 1.42) |
| Recurrent bacteremia | 34 (1.1) | 25 (2.6) | 1.38 (0.30 to 2.47) | 2.15 (0.92 to 5.01) |
| Repeated hospitalization with UTI | | | | |
| At 30 d | 22 (0.7) | 14 (1.5) | 0.81 (−0.06 to 1.67) | 2.08 (0.72 to 5.99) |
| At 90 d | 46 (1.5) | 29 (3.0) | 1.46 (0.28 to 2.64) | 1.94 (0.97 to 3.85) |

Abbreviation: aRD, adjusted risk difference; aRR, adjusted relative risk; UTI, urinary tract infection.

JAMA Network Open

Original Investigation | Infectious Diseases

## Oral β-Lactam Antibiotics vs Fluoroquinolones or Trimethoprim-Sulfamethoxazole for Definitive Treatment of Enterobacterales Bacteremia From a Urine Source

Jesse D. Sutton, PharmD, MS; Vanessa W. Stevens, PhD; Nai-Chung N. Chang, PhD; Karim Khader, PhD; Tristan T. Timbrook, PharmD, MBA; Emily S. Spivak, MD, MHS

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RESEARCH ARTICLE Open Access

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**Table 1** Baseline characteristics of patients

| | Oral fluoroquinolone step down ($n = 130$) | Oral beta-lactam step down ($n = 77$) | *p*-value |
|---|---|---|---|
| Age, median, years (IQR) | 70.5 (56.25–80.75) | 71 (54–80) | 0.72 |
| Charlson comorbidity index, median (IQR) | 1 (0–2) | 1 (0–3) | 0.96 |
| Primary Outcome | | | |
| Clinical cure | 127 (98) | 72 (94) | 0.13 |
| Secondary Outcomes | | | |
| 30-day mortality | 1 (1) | 0 (0) | 0.43 |

**Pas beaucoup de vieux vieux**

**Où sont nos patients?**

**Extrapolation de ces données chez le sujet âgé fragile?**

**Table 1. Demographic, Clinical, and Treatment Characteristics**

| Characteristic | Patients, No. (%) | |
|---|---|---|
| | Fluoroquinolone or trimethoprim-sulfamethoxazole (n = 3134) | |
| Age, median (IQR), y | 69 (62-80) | |
| Male | 2847 (90.8) | |
| Race/ethnicity | | |
| White | 1983 (63.3) | |
| Black | 714 (22.8) | |
| Hispanic or Latino | 185 (5.9) | |
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| Preexisting conditions[a] | | |
| Combined comorbidity score, median (IQR) | 1 (0-2) | 1 (0-3) |
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| Chronic pulmonary disease | 681 (21.7) | 220 (23.0) |
| Heart failure | 480 (15.3) | 170 (17.8) |
| Diabetes with complication | 402 (12.8) | 130 (13.6) |
| Dementia | 180 (5.7) | 69 (7.2) |

| | | r trimethoprim-n = 3134) | β-Lactam antibiotics (n = 955) | aRD, % (95% CI)[a] | aRR (95% CI)[a] |
|---|---|---|---|---|---|
| | | | 42 (4.4) | 0.99 (−0.42 to 2.40) | 1.31 (0.87 to 1.95) |
| | | | 29 (3.0) | 0.06 (−1.13 to 1.26) | 1.02 (0.67 to 1.56) |
| | | | 14 (1.5) | 1.03 (0.24 to 1.82) | 3.43 (0.42 to 27.90) |
| | | | 96 (10.1) | 1.81 (−0.24 to 3.87) | 1.23 (0.96 to 1.56) |
| | | | 75 (7.9) | 0.68 (−1.16 to 2.52) | 1.10 (0.85 to 1.42) |
| | | | 25 (2.6) | 1.38 (0.30 to 2.47) | 2.15 (0.92 to 5.01) |
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| At 90 d | 46 (1.5) | | 29 (3.0) | 1.46 (0.28 to 2.64) | 1.94 (0.97 to 3.85) |

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*JAC Antimicrob Resist*
https://doi.org/10.1093/jacamr/dlaf004

JAC-Antimicrobial Resistance 2025

# Oral switch antibiotic therapy in uncomplicated *Enterococcus faecalis* bloodstream infection

Sarah Al Mansi [1,2]*, Margaret Pokalsky[1], Katherine Turnley[1], Andrew Freeman[1], P. Brandon Bookstaver [3,4], Joseph Kohn[4], Hana R. Winders [4], Sarah Withers[5] and Majdi N. Al-Hasan [1,2]

This multi-hospital retrospective cohort study evaluated adult patients (age ≥18 years) hospitalized with uncomplicated *E. faecalis* BSI. Exclusion criteria were polymicrobial, complicated and recurrent episodes of BSI. Patients who received <7 days of antibiotic therapy were excluded. Patients who died within 7 days of the index BSI were also excluded to reduce the impact of immortal time bias.

n=131

**Table 1.** Demographics and clinical characteristics of patients with *E. faecalis* BSI per treatment group

| Variable | Oral switch therapy (*n*=44) | Standard IV therapy (*n*=87) | *P* value |
|---|---|---|---|
| Age, median (IQR) | 71 (62–77) | 70 (60–77) | 0.52 |
| Male sex, *n* (%) | 28 (63%) | 56 (64%) | 0.93 |
| Race, *n* (%) | | | 0.06 |
| White | 33 (75%) | 49 (56%) | |
| African American | 9 (20%) | 36 (41%) | |
| Other | 2 (5%) | 2 (2%) | |
| Diabetes mellitus, *n* (%) | 15 (34%) | 52 (59%) | 0.006 |
| End-stage renal disease, *n* (%) | 2 (4%) | 19 (21%) | 0.01 |
| Liver cirrhosis, *n* (%) | 4 (9%) | 7 (8%) | 0.84 |
| Cancer, *n* (%) | 13 (29%) | 10 (11%) | 0.01 |
| Nursing home residence, *n* (%) | 5 (11%) | 19 (21%) | 0.14 |
| Recent hospitalization within 90 days of index BSI, *n* (%) | 28 (63%) | 52 (59%) | 0.67 |
| Surgery within 30 days of index BSI, *n* (%) | 13 (29%) | 17 (19%) | 0.21 |
| Indwelling central venous catheter, *n* (%) | 2 (4%) | 22 (25%) | 0.004 |
| Indwelling urinary catheter, *n* (%) | 9 (2%) | 17 (19%) | 0.90 |
| Immune compromised host, *n* (%) | 7 (15%) | 9 (10%) | 0.36 |
| Urinary source of infection, *n* (%) | 22 (50%) | 24 (27%) | 0.01 |
| Echocardiogram performed | 28 (63%) | 67 (77%) | 0.11 |
| Infectious diseases consultation | 23 (52%) | 66 (76%) | 0.006 |
| ECFC, median (IQR) | 1 (0–2) | 1 (0–2) | 0.14 |

JAC Antimicrob Resist
https://doi.org/10.1093/jacamr/dlaf004

JAC-Antimicrobial Resistance 2025

# Oral switch antibiotic therapy in uncomplicated *Enterococcus faecalis* bloodstream infection

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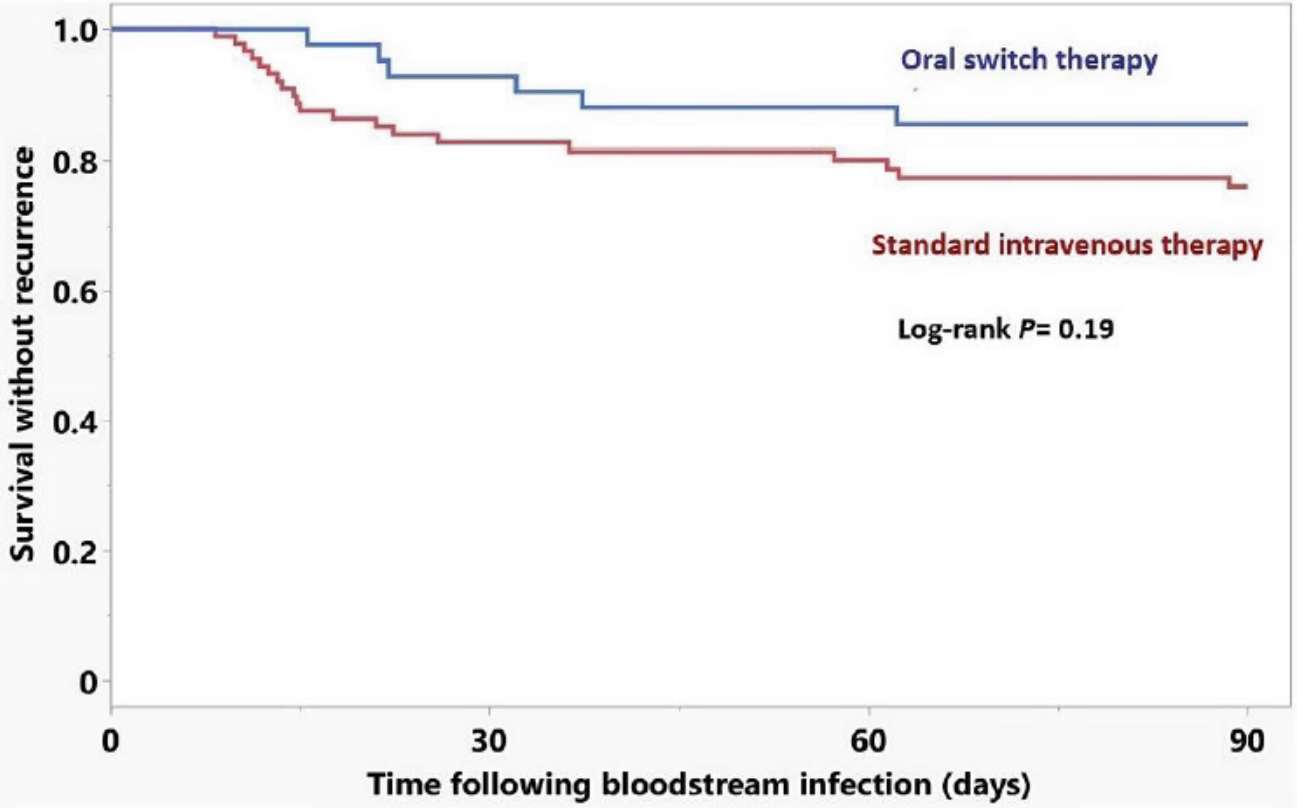


**Biais de l'étude rétrospective / Sélection des patients versus randomisation**

**50% d'IU groupe PO versus 27% groupe IV**
**Et IU indépendamment associée au succès thérapeutique**

➡ **Se méfier des données brutes d'équivalence / de l'extrapolation à une population non étudiée**

# Des modalités d’antibiothérapie adaptées au sujet âgé?

Un mot sur les ATB sous cutanés

PLOS ONE

RESEARCH ARTICLE

# Not "just" an intravenous line: Consumer perspectives on peripheral intravenous cannulation (PIVC). An international cross-sectional survey of 25 countries

Marie Cooke[1,2©]*, Amanda J. Ullman[1,2©], Gillian Ray-Barruel[1©], Marianne Wallis[1,3©], Amanda Corley[1©], Claire M. Rickard[1,2©]

**Sans compter**

- les arrachages de KT/pose/repose
- l'immobilisation induite par la VVP
- les complications propres de la VVP
- des durées d'hospitalisation longue

## Discussion

For many consumers, the experience of PIVC insertion and maintenance is often not a trivial event and can be associated with significant pain, stress and concern. The survey revealed that children experienced more difficult PIVC insertions and insertion-related pain and distress; higher first PIVC insertion attempt failure and, consequently, more insertion attempts; and a higher complication rate than adults. Similarly, older adults (> 65 years) were found to experience greater pain, stress and difficulty with PIV insertion compared with younger adults. Consumers frequently feel their opinions are disregarded when it comes to PIVC insertion and management and, as shown in these survey results, they want to be active participants in their care but are sometimes denied that opportunity.

RESEARCH NOTE

# Subcutaneously administered antibiotics: a national survey of current practice from the French Infectious Diseases (SPILF) and Geriatric Medicine (SFGG) society networks

E. Forestier[1], M. Paccalin[2], C. Roubaud-Baudron[3], T. Fraisse[4], G. Gavazzi[5] and J. Gaillat[6]

Clinical Microbiology and Infection
Volume 21, Issue 4, April 2015, Pages 370.e1-370.e3

## Enquête en France
## Infectiologues versus Gériatres

| Pattern | ID practitioners (n = 86) | Geriatricians (n = 281) | Total (n = 367) |
|---|---|---|---|
| No. of patients treated by sc antibiotics (per month) | | | |
| <1 | 32 (37.2%) | 30 (11%) | 62 (16.9%) |
| 1 to 5 | 41 (47.7%) | 141 (50%) | 182 (49.6%) |
| 6 to 10 | 10 (11.6%) | 65 (23%) | 75 (20.4%) |
| >10 | 2 (2.3%) | 40 (14%) | 42 (11.4%) |
| DNP | 1 (1.2%) | 5 (2%) | 6 (1.6%) |
| Duration of sc antibiotic treatment (days) | | | |
| <4 | 3 (3.5%) | 8 (3%) | 1 (3%) |
| 4 to 14 | 43 (50%) | 242 (86%) | 285 (77.5%) |
| >14 | 39 (45.3%) | 30 (11%) | 69 18.8%) |
| DNP | 1 (1.2%) | 1 (0%) | 2 (0.5%) |
| Antibiotics used by sc route | | | |
| Amoxicillin | 8 (9.3%) | 48 (17.1%) | 56 (15.3%) |
| Aminoglycosides | 14 (16.3%) | 115 (40.9%) | 129 (35.1%) |
| Ceftriaxone | 85 (98.9%) | 281 (100%) | 366 (100%) |
| Ertapenem | 61 (70.9%) | 61 (21.7%) | 122 (33.2%) |
| Teicoplanin | 69 (80.2%) | 75 (26.7%) | 144 (39.2%) |
| Reason for resorting to sc route | | | |
| Iv/im route contraindicated | 85 (98.8%) | 272 (96.8%) | 357 (97.3%) |
| Oral route contraindicated | 79 (91.9%) | 273 (97.2%) | 352 (95.9%) |
| Avoiding multiple oral treatment | 19 (22.1%) | 141 (50.2%) | 160 (43.6%) |
| Palliative care | 68 (79.1%) | 267 (95%) | 335 (91.3%) |
| Facilitating hospital discharge | 85 (94.2%) | 170 (60.5%) | 255 (69.5%) |
| Reason for not resorting to sc route | | | |
| No pharmacokinetic data published | 48 (55.8%) | 171 (60.9%) | 219 (59.7%) |
| No marketing authorization | 10 (11.6%) | 97 (34.5%) | 107 (29.2%) |
| Serum monitoring not available | 2 (2.3%) | 9 (3.2%) | 11 (3%) |
| No previous iv treatment | 28 (32.6%) | 25 (8.9%) | 53 (14.4%) |
| Other | 6 (7%) | 6 (2.1%) | 12 (3.3%) |
| DNP | 17 (19.8%) | 53 (18.9%) | 70 (19.1%) |

ID, infectious disease; DNP, did not pronounce; sc, subcutaneous; iv, intravenous; im, intramuscular.

RESEARCH NOTE

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| No previous iv treatment | 28 (32.6%) | 25 (8.9%) | 53 (14.4%) |
| Other | 6 (7%) | 6 (2.1%) | 12 (3.3%) |
| DNP | 17 (19.8%) | 53 (18.9%) | 70 (19.1%) |

ID, infectious disease; DNP, did not pronounce; sc, subcutaneous; iv, intravenous; im, intramuscular.

RESEARCH NOTE

# Subcutaneously administered antibiotics: a national survey of current practice from the French Infectious Diseases (SPILF) and Geriatric Medicine (SFGG) society networks

E. Forestier[1], M. Paccalin[2], C. Roubaud-Baudron[3], T. Fraisse[4], G. Gavazzi[5] and J. Gaillat[6]

Clinical Microbiology and Infection
Volume 21, Issue 4, April 2015, Pages 370.e1-370.e3

## Enquête en France
## Infectiologues versus Gériatres

| Pattern | ID practitioners (n = 86) | Geriatricians (n = 281) | Total (n = 367) |
|---|---|---|---|
| No. of patients treated by sc antibiotics (per month) | | | |
| <1 | 32 (37.2%) | 30 (11%) | 62 (16.9%) |
| 1 to 5 | 41 (47.7%) | 141 (50%) | 182 (49.6%) |
| 6 to 10 | 10 (11.6%) | 65 (23%) | 75 (20.4%) |
| >10 | 2 (2.3%) | 40 (14%) | 42 (11.4%) |
| DNP | 1 (1.2%) | 5 (2%) | 6 (1.6%) |
| Duration of sc antibiotic treatment (days) | | | |
| <4 | 3 (3.5%) | 8 (3%) | 1 (3%) |
| 4 to 14 | 43 (50%) | 242 (86%) | 285 (77.5%) |
| >14 | 39 (45.3%) | 30 (11%) | 69 18.8%) |
| DNP | 1 (1.2%) | 1 (0%) | 2 (0.5%) |
| Antibiotics used by sc route | | | |
| Amoxicillin | 8 (9.3%) | 48 (17.1%) | 56 (15.3%) |
| Aminoglycosides | 14 (16.3%) | 115 (40.9%) | 129 (35.1%) |
| Ceftriaxone | 85 (98.9%) | 281 (100%) | 366 (100%) |
| Ertapenem | 61 (70.9%) | 61 (21.7%) | 122 (33.2%) |
| Teicoplanin | 69 (80.2%) | 75 (26.7%) | 144 (39.2%) |
| Reason for resorting to sc route | | | |
| Iv/im route contraindicated | 85 (98.8%) | 272 (96.8%) | 357 (97.3%) |
| Oral route contraindicated | 79 (91.9%) | 273 (97.2%) | 352 (95.9%) |
| Avoiding multiple oral treatment | 19 (22.1%) | 141 (50.2%) | 160 (43.6%) |
| Palliative care | 68 (79.1%) | 267 (95%) | 335 (91.3%) |
| Facilitating hospital discharge | 85 (94.2%) | 170 (60.5%) | 255 (69.5%) |
| Reason for not resorting to sc route | | | |
| No pharmacokinetic data published | 48 (55.8%) | 171 (60.9%) | 219 (59.7%) |
| No marketing authorization | 10 (11.6%) | 97 (34.5%) | 107 (29.2%) |
| Serum monitoring not available | 2 (2.3%) | 9 (3.2%) | 11 (3%) |
| No previous iv treatment | 28 (32.6%) | 25 (8.9%) | 53 (14.4%) |
| Other | 6 (7%) | 6 (2.1%) | 12 (3.3%) |
| DNP | 17 (19.8%) | 53 (18.9%) | 70 (19.1%) |

ID, infectious disease; DNP, did not pronounce; sc, subcutaneous; iv, intravenous; im, intramuscular.

*Age and Ageing* 2016; **46:** 151–155
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**219 antibiothérapies SC**

# Tolerance of subcutaneously administered antibiotics: a French national prospective study

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**Methods:** sixty-six physicians accepted to participate from 50 French Infectious Diseases and Geriatrics Departments. From May to September 2014, patients treated at least one day with SC antibiotics could be included. Modalities of subcutaneous administration, occurrence of local and systemic adverse effects (AE) and clinical course were collected until the end of the treatment.

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**Table 2.** Adverse effect according to the class of antibiotic administrated subcutaneously and to the modalities of treatment

| | All antibiotics | Adverse effect | No adverse effect | *p* |
|---|---|---|---|---|
| **Class of antibiotic** | | | | 0.004 |
| Ceftriaxone | 163/219 | 35 (21.5) | 128 (78.5) | |
| Ertapenem | 30/219 | 7 (23.3) | 23 (76.7) | |
| Teicoplanin | 10/219 | 7 (70.0) | 3 (30.0) | |
| Other | 16/219 | 1 (6.2) | 15 (93.8) | |
| **Characteristics of SC injection** | | | | |
| Duration of infusion *N* (%) | 217 (99.1) | 50 (23.04) | 167 (76.9) | 0.028 |
| *Rapid (< 5 min)* | 84 (38.7) | 26 (31) | 58 (69.1) | |
| *Slow* | 133 (61.3) | 24 (18.1) | 109 (82.0) | |
| Diluent *N* (%) | 195 (89.0) | 37 (18.9) | 158 (81.02) | 0.74 |
| *NaCl 0,9% N (%)* | 141 (72.3) | 28 (19.8) | 113 (80.1) | |
| *G5% N (%)* | 29 (14.9) | 4 (13.7) | 25 (86.2) | |
| *Water N (%)* | 25 (12.8) | 5 (20.0) | 20 (80.0) | |
| Use of lidocaine (*N* = 216) *N* (%) | 62 (28.7) | 19 (30.7) | 43 (69.3) | 0.097 |
| Site of infusion *N* (%) | 211 (96.3) | 50 (23.5) | 161 (76.3) | 0.76 |
| *Thigh* | 109 (51.4) | 28 (25.6) | 81 (74.3) | |
| *Flank* | 53 (25.0) | 11 (20.7) | 42 (79.2) | |
| *Other* | 49 (23.1) | 11 (22.4) | 38 (77.5) | |
| Type of needle | 215 (93.6) | 50 (23.2) | 165 (76.7) | 0.002 |
| *Non-rigid catheter* | 146 (67.9) | 24 (16.4) | 122 (83.5) | |
| *Butterfly needle* | 36 (16.7) | 12 (33.3) | 24 (66.7) | |
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**Perfusion lente avec aiguille souple**

Infectious Diseases Now
Volume 53, Issue 7, October 2023, 104768

Letter to the editor

# Subcutaneous antibiotic therapy use by French general practitioners: Its interest and limitations

**Enquête en ligne**
**369 Médecins Généralistes en France**

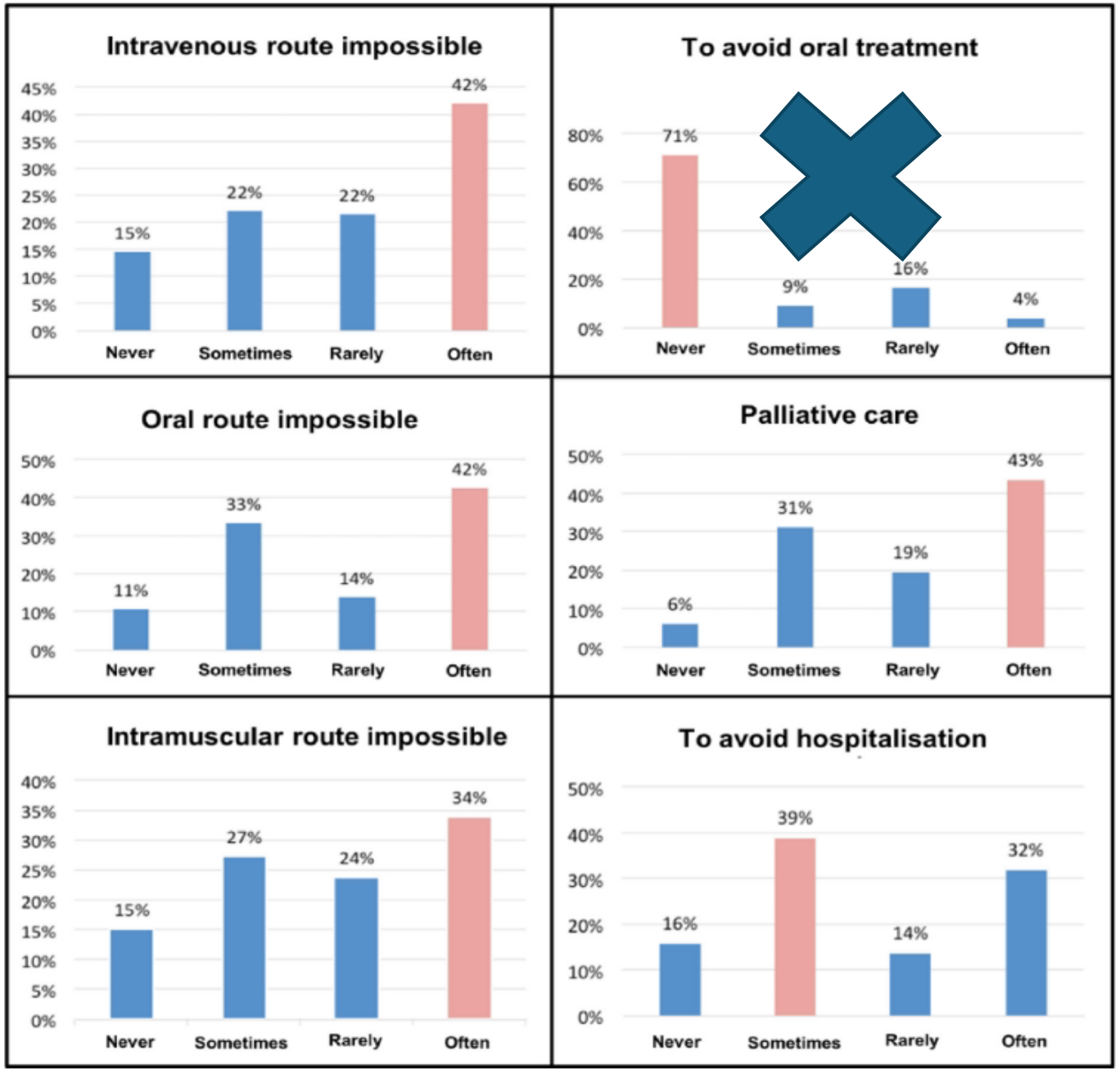


**Fig. 1.** Clinical circumstances leading GP to use subcutaneous antibiotic therapy.

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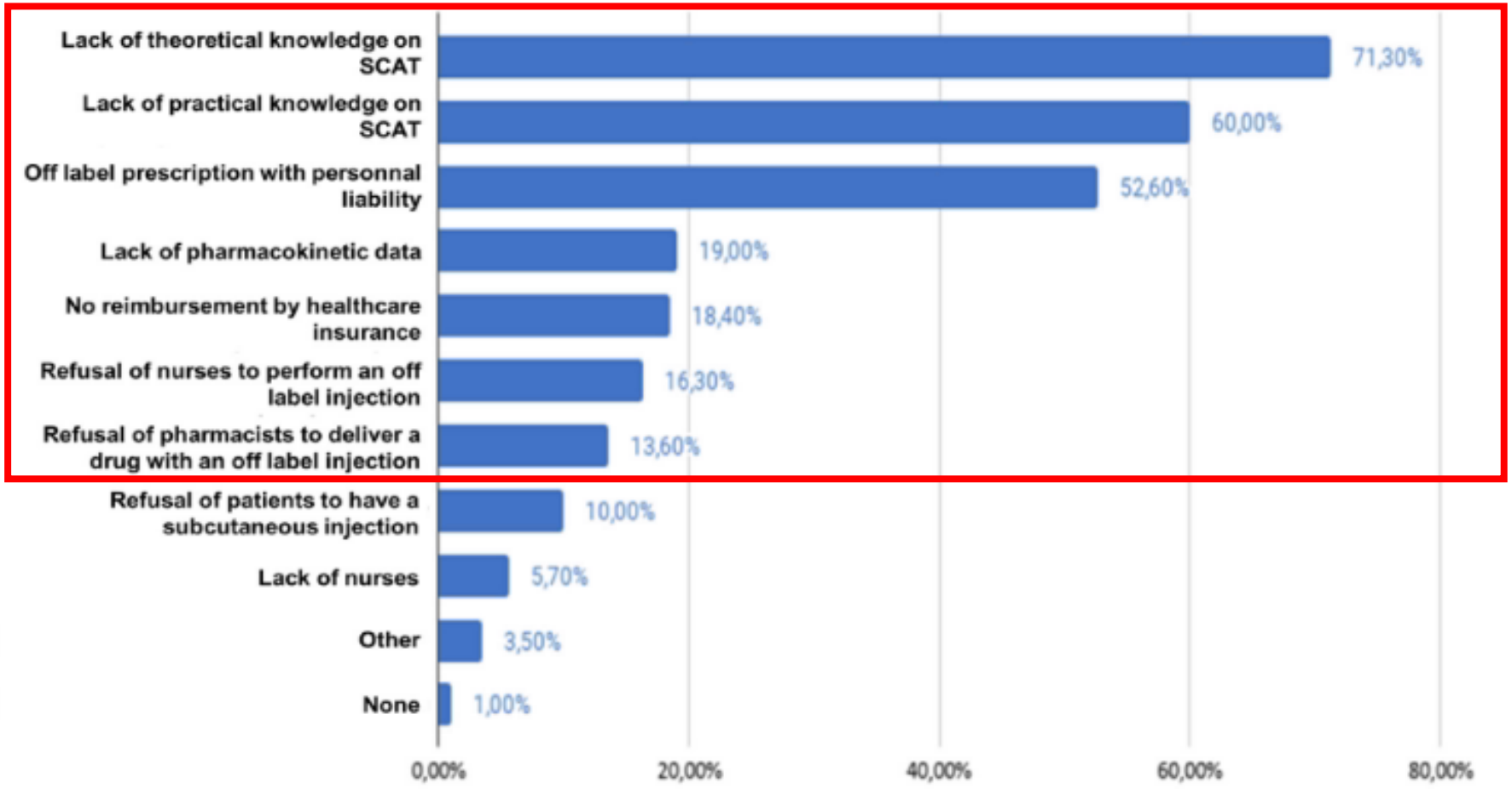
**Principaux freins**




**Nécessité d**

- **Données PK/PD et cliniques**
- **Courage des autorités**

→ **Bénéfice probable en termes de cout/complications/durée d'hospitalisation**

**Le courage des autorités de santé**

INFORMATIONS SÉCURITÉ PATIENTS

**INFORMATION TRANSMISE SOUS L'AUTORITE DE L'ANSM**

# Lettre aux professionnels de santé

Novembre 2019 - **Mise à jour de la lettre envoyée le 22 octobre 2019**

## Ceftriaxone (Rocéphine® et génériques) – Rappel sur les voies d'administration

*Information destinée aux médecins généralistes, cardiologues, ORL, médecins internistes, pédiatres, gériatres, pneumologues, urologues, néphrologues, gynécologues, gastro-entérologues, chirurgiens, dermatologues, neurologues, orthopédistes, infectiologues, urgentistes, rhumatologues, pharmaciens d'officine, pharmaciens hospitaliers.*

Madame, Monsieur, Chère Consœur, Cher Confrère,

En accord avec l'Agence nationale de sécurité du médicament et des produits de santé (ANSM), les laboratoires commercialisant des spécialités injectables à base de ceftriaxone (Rocéphine® et génériques) **souhaitent vous rappeler que la voie sous-cutanée n'est plus indiquée depuis fin 2014 dans les autorisations de mises sur le marché de ces produits**.


**Résumé**

**En l'absence de données d'efficacité suffisantes pour justifier une administration par voie sous-cutanée (SC),** l'Agence Européenne des Médicaments (EMA) a décidé fin 2014 de restreindre l'administration des spécialités à base de ceftriaxone aux **voies intraveineuse (IV) et intramusculaire (IM).**

Néanmoins dans certaines situations, le clinicien peut juger indispensable l'administration de la ceftriaxone par voie sous-cutanée au regard du rapport bénéfice/risque pour son patient et sous réserve d'en informer ce dernier ou sa famille.

Pour rappel, lors de l'utilisation des antibiotiques par voie sous-cutanée, des effets indésirables peuvent survenir. Ce sont essentiellement des réactions au site d'injection, de type érythème, rash, douleurs, œdèmes ou dans de rares cas, des nécroses.

*J Antimicrob Chemother* 2023; **78**: 1–7
https://doi.org/10.1093/jac/dkac383 Advance Access publication 14 November 2022

Journal of Antimicrobial Chemotherapy

# Subcutaneously administered antibiotics: a review

Marie Jumpertz[1,2], Romain Guilhaumou[3], Matthieu Million[1,2], Philippe Parola[1,4], Jean-Christophe Lagier[1,2], Philippe Brouqui[1,2] and Nadim Cassir[1,2]*

DROIT AU BUT

**Revue CEFRTIAXONE**

**A total of 51 cases of local AEs was reported for more than 8500 infusions, including one case of skin necrosis**

**(pas d'étude sur les complication de la CEFTRIAXONE IV chez des sujets pour qui on aurait préféré la voie SC)**

| | Antibiotic | Patient characteristics | Preparation | PK parameters | Outcome | Tolerance |
|---|---|---|---|---|---|---|
| Cortes *et al.* 2008[23] Navarra/ Portugal/ Spain | Ceftriaxone 1 or 2 g/ 24h<br>mean treatment duration: 10 days (hospitalized) 3 days (ambulatory) | 44 palliative care patients treated for respiratory infection (Including 32 outpatient patients)<br>poor veinous access (9) agitation (23) no other possibility (5) | Dilution: 50-100mL NaCl 0.9% + Lidocain 35mg<br>Duration of infusion: 10-20 min<br>Needle: 21G<br>Infusion site: abdomen<br>Daily clinical evaluation | NA | NA | 224 injections:<br>7 erythema<br>1 induration<br>4 haemorrhages |
| Roubaud-Baudron *et al.* 2017[25] France | Ceftriaxone 1g in 91.9%<br>median treatment duration: 9 days | 163 patients treated for:<br>43.8% urinary infection<br>32.8% respiratory infection<br>6.8% BJI ,<br>9% digestive infection<br>Severe: 6% | Dilution: 67.7% NaCl 0.9%, 18.7% G5%, 13.6% water<br>Duration of infusion: 42,3% < 5 minutes<br>Needle: non-rigid catheter 63% (and butterfly needle and SC needle)<br>Infusion site: abdomen, thigh | NA | Success 85%<br>Failure 16%<br>Deaths 5.5%<br>Persisting infection 5.5 % | 35 patients presenting with AEs:<br>21 pain<br>11 indurations<br>5 erythema<br>13 hematomas |
| Pouderoux *et al.* 2018[24] France | Ceftriaxone 1g median treatment duration 6 months | 3 patients treated for chronic prosthetic joint infection and chronic osteomyelitis | Dilution: 50mL NaCl 0.9%<br>Duration of infusion: 30–45 mins gravity infusion<br>Needle: butterfly needle<br>Infusion site: thigh or abdomen | NA | 1 success<br>1 lost to follow up<br>1 failure | 1 skin necrosis (direct injection)<br>1 cholestatic hepatitis |
| Noriega *et al.* 2018[5] Spain | Ceftriaxone | 233 geriatric patients treated for respiratory tract, urinary and biliary systems infections | Dilution: 50-100 mL NaCl 0.9% or G5%<br>Duration of infusion: 15 to 30 minutes<br>Needle: SC catheter (21-25 G)<br>Infusion site: abdominal wall, scapular zone, or lateral thigh border | NA | Success 82%<br>Deaths 14.9%<br>Central IV-line placement 2.7% | Oedema or erythema: 1.7% |

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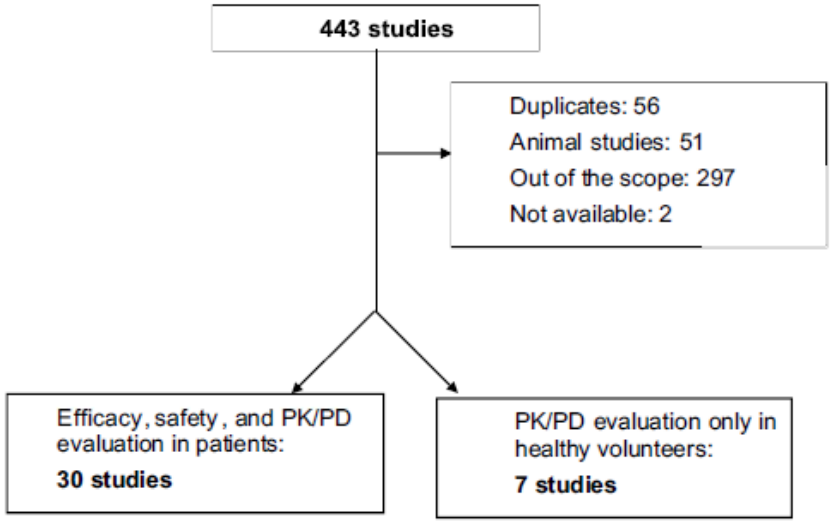


**Figure 1.** Flowchart.

**Table 1.** Recommendations for SC administration of antibiotics

**General recommendations**

SC administration of some antibiotics is reasonable in patients with non-severe infections or patients in whom other routes are not feasible/desirable

Preferred sites: abdomen wall or thigh

Prolonged infusion >30 min

Rotate infusion site every 72–96 h (immediately if local inflammation), daily clinical surveillance of infusion site

Use non-rigid catheter from 20G to 27G

Dilution in 0.9% saline solution

**Safe to use subcutaneously**

| | Dosage | Reported indications | Surveillance |
|---|---|---|---|
| Ceftriaxone | 1 g/24 h | Respiratory infections, UTI, BJI, digestive infections | Neurological surveillance (focus on confused state and abnormal movements) |
| Teicoplanin | 6–12 mg/kg/24 h<br>After IV loading phase of 48 h: 9–12 mg/kg/12 h | BJI, infective endocarditis, other infections caused by *Staphylococcus* spp. | Renal adaptation<br>TDM weekly/every 2–4 days if malnutrition or renal insufficiency |
| Ertapenem | 1 g/24 h | Respiratory infections, UTI, BJI (including salvage therapy), digestive infections | Renal adaptation<br>Neurological surveillance (focus on confused state and abnormal movements) |

**Probably safe to use subcutaneously**

| | Dosage | Reported indications | Surveillance |
|---|---|---|---|
| Ceftazidime | 1–2 g/8 h | Respiratory infections, UTI, BJI UTI | Renal adaptation<br>Neurological surveillance (focus on confused state and abnormal movements) |

**Further studies needed**

Cefepime
Fosfomycin
Piperacillin/tazobactam
Ampicillin
Metronidazole

**Le courage des autorités de santé**

INFORMATIONS
SÉCURITÉ PATIENTS

**INFORMATION TRANSMISE SOUS L'AUTORITE DE L'ANSM**

# Lettre aux professionnels de santé

Novembre 2019 - **Mise à jour de la lettre envoyée le 22 octobre 2019**

En conclusion, au regard des données disponibles, l'utilisation de la ceftriaxone en sous-cutané ne doit pas être totalement proscrite. Son rapport bénéfice/risque peut être jugé favorable dans certaines situations où le recours à une antibiothérapie intraveineuse, intramusculaire ou orale est difficile, voire impossible, car potentiellement associé à de l'inconfort, ou médicalement contre-indiqué. Le prescripteur peut alors faire le choix d'utiliser la voie sous-cutanée. Il doit au préalable informer le patient et/ou sa famille de cette pratique hors AMM, recueillir leur accord, motiver cette prescription dans le dossier, et réaliser ensuite une surveillance rigoureuse de la tolérance de l'antibiotique, notamment au site d'injection.

Références
1 - Forestier E, Paccalin M, Roubaud-Baudron C, Fraisse T, Gavazzi G, Gaillat J. Subcutaneously administered antibiotics: a national survey of current practice from the French Infectious Diseases (SPILF) and Geriatric Medicine (SFGG) society networks. Clin Microbiol Infect 2015;21(4):370.e1-3.
2 - Roubaud-Baudron C, Forestier E, Fraisse T, Gaillat J, de Wazières B, Pagani L, et al. Tolerance of subcutaneously administered antibiotics: a French national prospective study. Age Ageing 2017;46(1):151-5
3 - Noriega OD, Yarlequé León SN. Antibiotics by Subcutaneous Route: A Safe and Efficient Alternative. J Am Med Dir Assoc 2018;19(6):553-4
4 - Colin E, Baldolli A, Verdon R, Saint-Lorant G. Subcutaneously administred antibiotics. Med Mal Infect 2019, in press

Pr P Tattevin

l'Agence Européenne des Médicaments (EMA) a décidé fin 2014 de restreindre l'administration des spécialités à base de ceftriaxone aux **voies intraveineuse (IV) et intramusculaire (IM).**

Néanmoins dans certaines situations, le clinicien peut juger indispensable l'administration de la ceftriaxone par voie sous-cutanée au regard du rapport bénéfice/risque pour son patient et sous réserve d'en informer ce dernier ou sa fam

PRESCRIPTION : la voie sous cutanée n'est pas autorisée et réservée aux soins palliatifs ou CI voies AMM (IM et IV)

Pou e
sont essentiellement des réactions au site d'injection, de type érythème, rash, douleurs, œdèmes ou dans de rares cas, des nécroses.

Disponible en ligne sur ScienceDirect www.sciencedirect.com
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Médecine et maladies infectieuses 44 (2014) 275–280

Original article

# Subcutaneous and intravenous ceftriaxone administration in patients more than 75 years of age

*Ceftriaxone par voie sous-cutanée et intraveineuse en première intention chez les patients de plus de 75 ans*

***Method.*** – We performed a retrospective monocentric study on all patients more than 75 years of age admitted to the Ales hospital between January 1 and December 31, 2011, having received at least two doses of ceftriaxone intravenously (IV) or subcutaneously (SC).

**Et l'efficacité?**

Table 1
Clinical and biological data of patients more than 75 years of age receiving intravenous *vs.* subcutaneous ceftriaxone (univariate analysis).
*Description clinique et biologique des patients de plus de 75 ans traités par ceftriaxone et données de l'analyse univariée.*

| | Total $n=148$ (%) | IV group $n=110$ (%) | SC group $n=38$ (%) | *P* |
|---|---|---|---|---|
| *Men/women* | 78/70 | 59/51 | 19/19 | 0.699 |
| *Mean age (years)* | 84.7 ± 5.8 | 83.9 ± 5.7 | 86.9 ± 5.6 | 0.005 |
| *Housing (n, %)* | | | | |
| Home | 113 (76.3%) | 84 (76.4%) | 29 (76.3%) | 0.995 |
| Geriatric institution | 34 (23%) | 25 (22.8%) | 9 (23.7%) | 0.904 |
| *Global status (n, %)* | | | | |
| Dementia | 46 (32.6%) | 26 (24.5%) | 20 (57.1%) | 0.001 |
| Bedridden | 16 (11%) | 8 (7.4%) | 8 (21.6%) | 0.023 |
| | (*n* = 145) | (*n* = 108) | (*n* = 37) | |
| Palliative care | 7 (4.8%) | 5 (4.6%) | 2 (5.4%) | 0.568 |
| | (*n* = 146) | (*n* = 109) | (*n* = 37) | |
| Confusion | 24 (16.2%) | 19 (17.3%) | 5 (13.2%) | 0.717 |
| Behavioral disorders | 11 (7.4%) | 6 (5.4%) | 5 (13.2%) | 0.22 |
| Agitation | 13 (8.8%) | 7 (6.4%) | 6 (15.8%) | 0.126 |
| Wandering | 1 (0.7%) | 0 (0%) | 1 (2.9%) | 0.248 |
| | (*n* = 141) | (*n* = 106) | (*n* = 35) | |
| Swallowing disorders | 9 (6.5%) | 6 (5.8%) | 3 (8.8%) | 0.389 |
| | (*n* = 138) | (*n* = 104) | (*n* = 34) | |
| Hemostatic disorders | 22 (14.8%) | 14 (12.7%) | 8 (21%) | 0.163 |
| Mean WHO score | 2.9 ± 0.8 | 2.8 ± 0.8 | 3.1 ± 0.8 | 0.018 |
| Mean ADL score | 6.3 ± 4 | 5.8 ± 4.1 | 7.8 ± 3.6 | 0.006 |
| | (*n* = 147) | (*n* = 109) | | |
| Mean Charlson score | 7.6 ± 1.6 | 7.6± 1.7 | 7.6 ± 1.5 | 0.765 |
| | (*n* = 141) | (*n* = 106) | (*n* = 35) | |
| *Other treatments (n, %)* | | | | |
| Oral | 144 (97.3%) | 107 (97.3%) | 37 (97.4%) | 0.975 |
| SC except for insulin and heparin | 22 (14.9%) | 16 (14.5%) | 6 (15.8%) | 0.853 |
| *Mean glomerular filtration rate (mL/min)* | 56.6 ± 30.0 | 55.3 ± 29.2 | 60.4 ± 32.1 | 0.398 |
| < 30 mL/min (*n*,%) | 21 (14.2%) | 16 (14.5%) | 5 (13.2%) | 0.833 |
| *Average albuminemia (g/L)* | 28.8 ± 17.9 | 29.2 ± 20.8 | 27.5 ± 4.7 | 0.501 |
| rate < 30 g/L (*n*, %) | 74 (68.5%) | 57 (72.2%) | 17 (58.6%) | 0.18 |
| *Average CRP (mg/L)* | 116 ±105 | 128 ± 113 | 82 ± 69 | 0.004 |

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Table 3
Univariate analysis comparing the pharmacological data of patients > 75 years of age treated by intravenous or subcutaneous ceftriaxone injections.
*Description des données thérapeutiques avec analyse univariée comparant la voie intraveineuse et sous-cutanée pour la ceftriaxone chez les patients de plus de 75 ans.*

| | Total $n = 148$ (%) | IV group $n = 110$ (%) | SC group $n = 38$ (%) | *P* |
|---|---|---|---|---|
| *Decision to stop treatment* | | | | |
| *Death* | 23 (15.5%) | 16 (14.5%) | 7 (18.4%) | 0.57 |
| *Adaptation* | 2 (1.3%) | 2 (1.8%) | 0 (0%) | 0.551 |
| *Failure* | 5 (3.4%) | 4 (3.6%) | 1 (2.6%) | 0.618 |
| *Switch to oral* | 8 (5.4%) | 7 (6.4%) | 1 (2.6%) | 0.344 |
| *Mean duration of stay (days)* | 15.1 + 7.8 | 14.6 + 7.6 | 16.5 + 8.3 | 0.223 |
| *Outcome* | | | | |
| Cure | 112(76.2%) ($n = 147$) | 86 (78.2%) | 26 (70.3%) ($n = 37$) | 0.328 |
| Death | 27 (18.2%) | 17 (15.4%) | 10 (26.3%) | 0.135 |

**Peu de switch**
**3/38 de SC vers IV (7.9%)**
**26/110 de IV vers SC (23.6%)**

*J Antimicrob Chemother* 2025; **80**: 347–353
https://doi.org/10.1093/jac/dkae397 Advance Access publication 13 December 2024

Journal of Antimicrobial Chemotherapy 50 years

# Safety, tolerability and pharmacokinetics of subcutaneous cefazolin as an alternative to intravenous administration

Fionnuala Murray [1], Okhee Yoo[2,3,4], Samuel Brophy-Williams[1], Matthew Rawlins [5,6], Steven C. Wallis [7], Jason A. Roberts[7,8,9,10], Edward Raby [1,11], Sam Salman [2] and Laurens Manning [1,2,12]*

## CEFAZOLINE

## n=15 patients stables

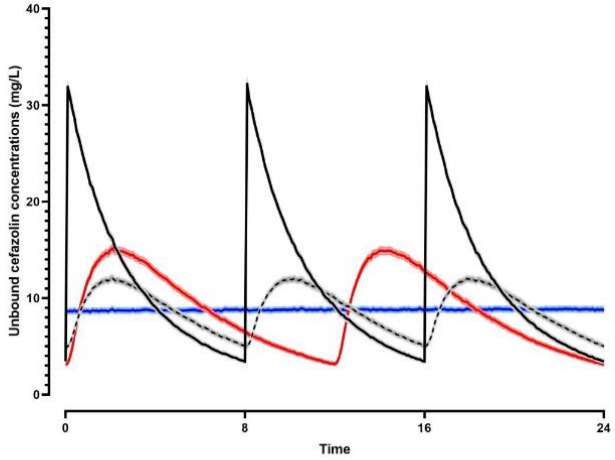


**Figure 4.** Simulated mean (with shaded simulated 95% CIs) steady-state unbound concentrations of cefazolin over 24 h. Standard IV dosing (2 g three times daily, black line) is compared with the same dose given SC (dashed). Simulated regimens of 3 g twice daily (red), and 6 g given SC as a continuous infusion (blue) are also shown.

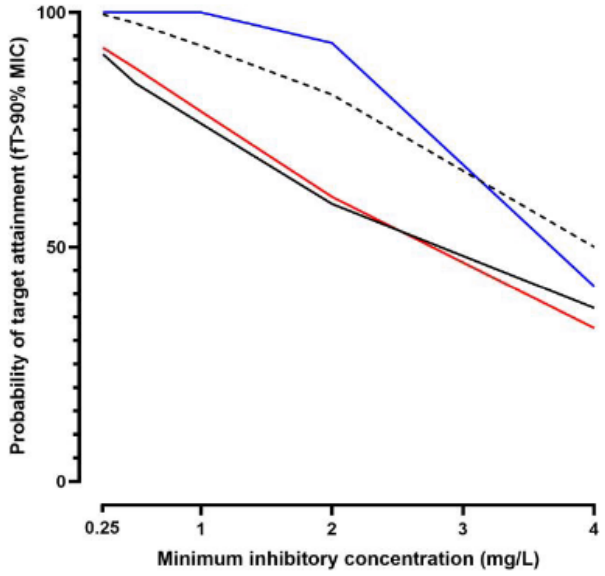


**Figure 5.** PTA, defined by unbound (free) cefazolin concentrations exceeding the MIC for 90% of the time between injections at steady state, according to possible MICs. Standard IV dosing (2 g three times daily, black line) is compared with the same dose given SC (dashed). Simulated regimens of 3 g twice daily (red), and 6 g given SC as a continuous infusion (blue) are also shown.

### *Tolerability and safety*

Reported NRS pain scores related to SC infusion ranged from 0 to 5. Five participants reported a pain score of 0 throughout the SC infusion and the subsequent 24 h. Nine participants reported mild pain (NRS 1–3) directly associated with the SC infusion of the antibiotic. Moderate pain (NRS 5) was reported by one participant. No pain or discomfort was reported by participants after completion of the SC infusion.

Seven participants had mild SC infusion site swelling corresponding to a score of 1. No participants had moderate or severe SC infusion site oedema. All participants who experienced mild infusion site oedema had complete resolution of this by 2 h post infusion. There was no association between infusion site oedema and reported NRS pain scores.

No infusion site erythema was observed in any participant during or after the SC infusion. There were no serious adverse events (grade 2 or higher) reported during the study.

# L’infectiologue sert-il quand même à quelque-chose?

J Antimicrob Chemother 2019; **74**: 1101–1107
doi:10.1093/jac/dky556 Advance Access publication 27 January 2019

Journal of Antimicrobial Chemotherapy

# Moving beyond unsolicited consultation: additional impact of a structured intervention on mortality in *Staphylococcus aureus* bacteraemia

**María Teresa Pérez-Rodríguez[1]*, Adrián Sousa[1], Luis Eduardo López-Cortés[2], Lucía Martínez-Lamas[3],**

Patients treated before and after the implementation of a bacteraemia programme **(no-BP and BP, respectively)** and a **prospective cohort (i-BP), in which an additional specific intervention for bundle application was implemented**

**Table 1.** Characteristics of the three groups analysed

| Group | Period | Analysis | Main characteristics |
|---|---|---|---|
| No-BP | January 2013–December 2014 | retrospective | telephone information by microbiologist |
| BP | January 2013–December 2014 | retrospective | multidisciplinary team; therapeutic and diagnosis recommendations based on IDS criteria |
| Excluded | January 2015–May 2016 | excluded | transition period; request for hospital ethical review board approval |
| i-BP | June 2016–July 2017 | prospective | multidisciplinary team; structured written recommendations based on the six quality-of-care bundles |

## *Variables and definitions*

The main outcome variable was compliance with the six individual activities included in the recommended bundle as specified above. Secondary outcomes were 14 and 30 day all-cause mortality, clinical cure and recurrence.

| |
|---|
| Follow-up blood culture, *n* (%) |
| Source control, *n* (%)[a] |
| Transoesophageal echocardiography, *n* (%)[b] |
| Treatment, *n* (%) |
| early cloxacillin/cefazolin use in MSSA |
| monitoring of vancomycin levels |
| appropriate treatment duration[c] |

**Table 2.** Characteristics of patients with SAB in no-BP, BP and i-BP groups

| Characteristic | No-BP (*n* = 107) | BP (*n* = 81) | i-BP (*n* = 83) | *P* |
|---|---|---|---|---|

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**Table 3.** Comparison of compliance of quality-of-care indicators and outcomes among the three groups of patients (no-BP, BP and i-BP)

| | No-BP ($n = 107$) | BP ($n = 81$) | i-BP ($n = 83$) | RR no-BP versus BP (95% CI) | *P* | RR BP versus i-BP (95% CI) | *P* |
|---|---|---|---|---|---|---|---|
| Follow-up blood culture, *n* (%) | 13 (12) | 63 (78) | 75 (90) | 5.15 (3.33–8) | <0.001 | 1.77 (0.97–3.21) | 0.033 |
| Source control, *n* (%)[a] | 33/53 (62) | 33/41 (81) | 41/49 (84) | 1.75 (0.93–3.30) | 0.070 | 1.11 (0.65–1.88) | 0.785 |
| Transoesophageal echocardiography, *n* (%)[b] | 19/34 (56) | 24/29 (83) | 34/40 (85) | 2.23 (0.99–5.00) | 0.031 | 1.08 (0.60–1.92) | 1 |
| Treatment, *n* (%) | | | | | | | |
| early cloxacillin/cefazolin use in MSSA | 29/74 (39) | 47/64 (73) | 65/71 (92) | 2.26 (1.45–3.51) | <0.001 | 2.23 (1.10–4.50) | 0.006 |
| monitoring of vancomycin levels | 14/29 (48) | 1/7 (14) | 10/12 (83) | 0.23 (0.03–1.74) | 0.200 | 3.64 (1.08–12.20) | 0.006 |
| appropriate treatment duration[c] | 58/91 (64) | 66/74 (89) | 76/80 (95) | 2.72 (1.43–5.18) | <0.001 | 1.61 (0.71–3.62) | 0.233 |
| >75% bundle compliance, *n* (%) | 21 (20) | 55 (68) | 75 (90) | 3.12 (2.16–4.48) | <0.001 | 2.45 (1.31–4.57) | <0.001 |
| Clinical cure, *n* (%) | 84 (79) | 70 (86) | 77 (93) | 1.40 (0.84–2.35) | 0.184 | 1.48 (0.77–2.87) | 0.208 |
| Recurrence, *n* (%) | 3 (3) | 3 (4) | 6 (7) | 1.21 (0.53–3.01) | 0.693 | 1.29 (0.79–2.11) | 0.498 |
| Mortality, *n* (%) | | | | | | | |
| 14 day | 19 (18) | 6 (7) | 2 (2) | 0.52 (0.25–1.07) | 0.050 | 0.48 (0.11–1.62) | 0.167 |
| 30 day | 21 (20) | 10 (12) | 4 (5) | 0.71 (0.42–1.22) | 0.234 | 0.55 (0.26–1.27) | 0.102 |

The mortality rate decreased significantly among the three groups at 14 days (no-BP 18% versus BP 7% versus i-BP 2%, $P = 0.002$) and at 30 days (no-BP 20% versus BP 12% versus i-BP 5%, $P = 0.011$).

**Table 4.** Univariate analysis of variables associated with 14 and 30 day mortality

| Variable | 14 day mortality, *n/N* (%)[a] | RR (95% CI) | *P* | 30 day mortality, *n/N* (%)[a] | RR (95% CI) | *P* |
|---|---|---|---|---|---|---|
| >75% bundle compliance | | 0.28 (0.12–0.64) | 0.002 | | 0.32 (0.16–0.64) | 0.001 |
| no | 20/120 (17) | | | 25/120 (21) | | |
| yes | 7/150 (5) | | | 10/150 (7) | | |

**Multivariée: OR=0.15 [0.05 – 0.50]**

**Multivariée: OR=0.199 [0.07 – 0.54]**

**Bénéfice d'une EMA avec Check-List/Prise en charge Temps médian estimé par patient dans le groupe i-BP = 50 min**

JAMA Network Open

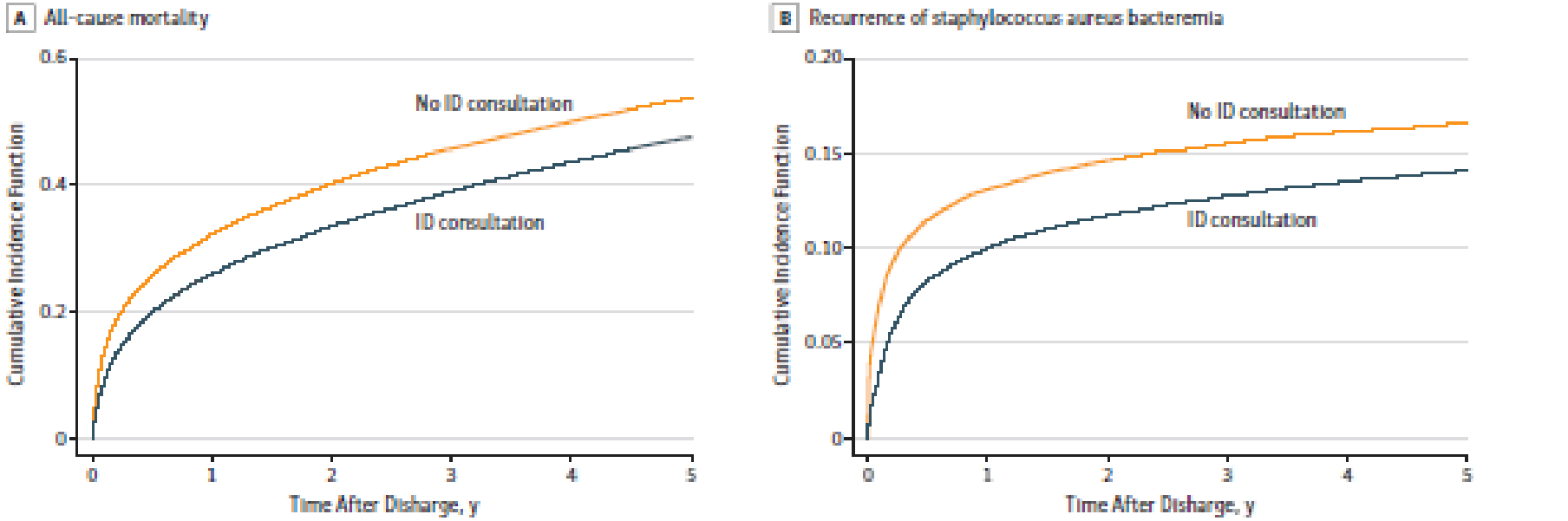
Original Investigation | Infectious Diseases

# Association of Infectious Diseases Consultation With Long-term Postdischarge Outcomes Among Patients With *Staphylococcus aureus* Bacteremia

Michihiko Goto, MD, MSCI; Michael P. Jones, PhD; Marin L. Schweizer, PhD; Daniel J. Livorsi, MD, MS; Eli N. Perencevich, MD, MS; Kelly Richardson, PhD; Brice F. Beck, MA; Bruce Alexander, PharmD; Michael E. Ohl, MD, MSPH

**DESIGN, SETTING, AND PARTICIPANTS** This cohort study included all patients (N = 31 002) with a first episode of SAB who were discharged alive from 116 acute care units of the nationwide Veterans Health Administration where ID consultation was offered. Data were collected from January 2003 to December 2014, with follow-up through September 30, 2018. Data analysis was conducted from February to December 2019.

Figure 2. Cumulative Incidence Function Plots for All-Cause Mortality and Recurrence of *Staphylococcus aureus* Bacteremia

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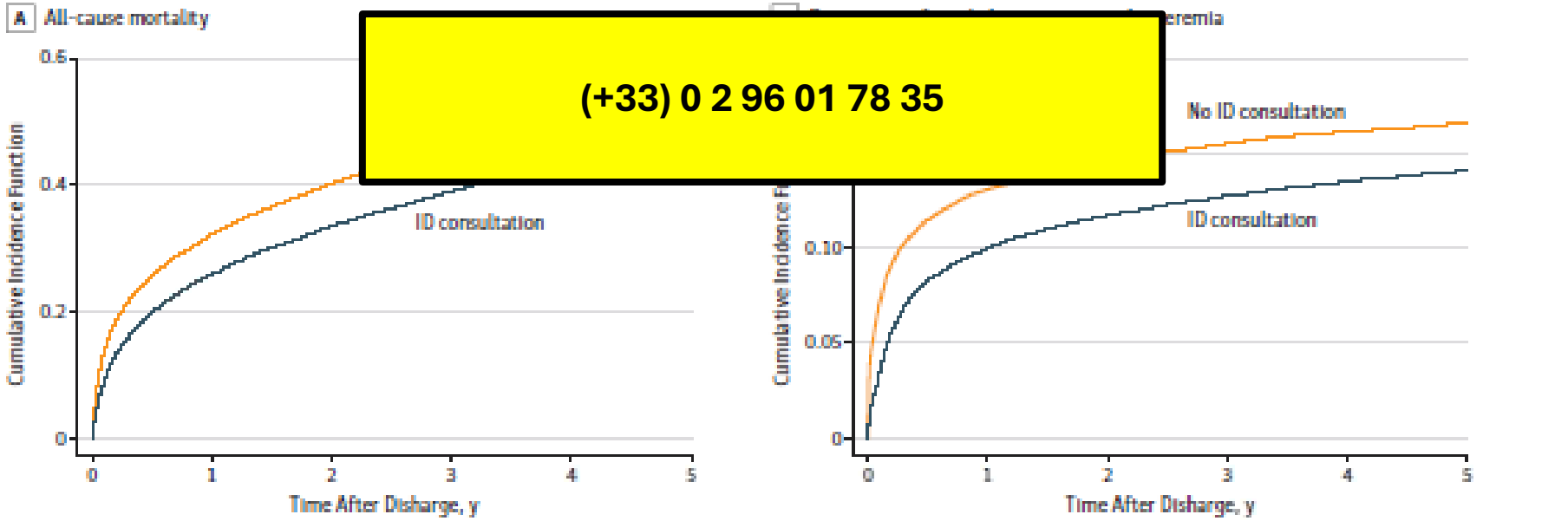




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# Bloodstream infections in the elderly: what is the real goal?

Review | Published: 05 September 2019

## CONCLUSION

with BSI are not well addressed in the literature. Utilization of comprehensive geriatric assessment and comprehensive geriatric discharge planning need to be investigated further in this setting and might serve as key for improved results in this population. In

**Pathologie grave**

Initiale
Par ses complications (directes, iatrogènes, décompensation de comorbidités/fragilités
Marqueur de fragilité (41% de décès à 3 mois)
Méfiance *Enterococcus faecalis* (et *Staphylococcus aureus*)

**Nécessité d'une étroite collaboration entre**

**Gériatres/MG**
Connaissance du patient
Evaluation de ses capacités fonctionnelles/mode de vie
Evaluation
- De la fragilité
- Des risques inhérents aux pratiques
- Des objectifs/Du cap en aigu et pour l'après

⟷

**Infectiologues**
Evaluation du risque de complications
Expertise ATB
Evaluation du bénéfice
- Des procédures diagnostiques
- Des traitements

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Evaluation du risque de complications
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aitements

**Prise en charge individualisée, mesurée et adaptée**

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