26es JNI 2025 TOURS
et la région Centre - Val de Loire VINCI
Journées Nationales d'infectiologie
du mercredi 11 juin 2025 au vendredi 13 juin 2025
Journée Nationale de Formation des Paramédicaux en Infectiologie
Jeudi 12 juin 2025

Ostéomyélites de la base du crâne bactériennes et fongiques : analyse rétrospective de 127 cas

Léo MIMRAM, David LEBEAUX, Benjamin VERILLAUD, Samia HAMANE, Mathilde LIBERGE, Philippe HERMAN, Jean-Michel MOLINA, Anne-Lise MUNIER

Déclaration de liens d'intérêt avec les industriels de santé en rapport avec le thème de la présentation (loi du 04/03/2002) :

L'orateur ne souhaite pas répondre ☐

- **Intervenant** : MIMRAM Léo
- **Titre** : Ostéomyélite de la base du crâne bactérienne et fongique

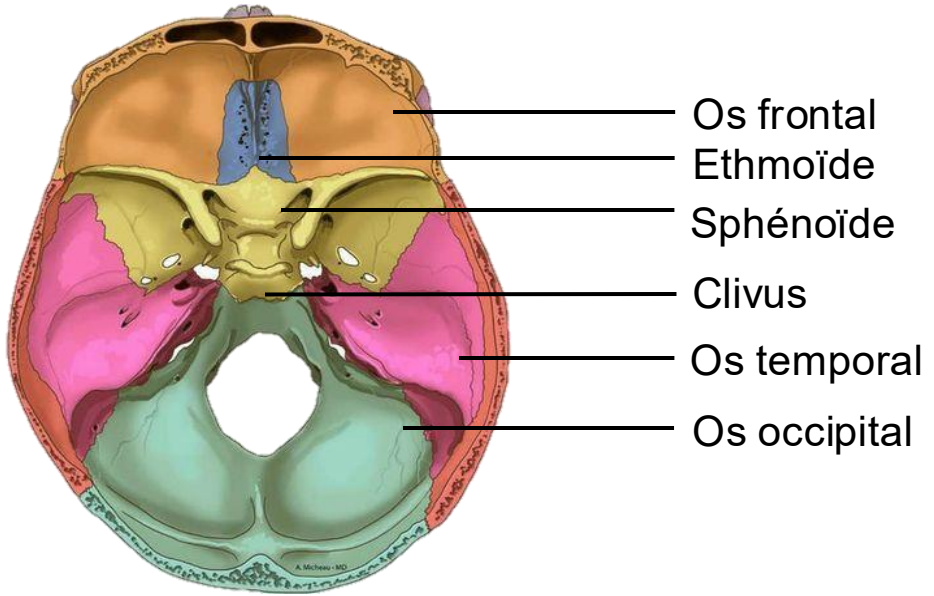
- Consultant ou membre d'un conseil scientifique ☐ OUI ☑ NON
- Conférencier ou auteur/rédacteur rémunéré d'articles ou documents ☐ OUI ☑ NON
- Prise en charge de frais de voyage, d'hébergement ou d'inscription à des congrès ou autres manifestations ☐ OUI ☑ NON
- Investigateur principal d'une recherche ou d'une étude clinique ☐ OUI ☑ NON

Déclaration d'intérêt de 2014 à 2024

- Intérêts financiers : NON
- Liens durables ou permanents : NON
- Interventions ponctuelles : NON
- Intérêts indirects : NON

Contexte : Ostéomyélite de la base du crâne

- Infection rare et complexe
- Otogène ++ / non-otogène
- Bactérienne (*Pseudomonas aeruginosa*++) / Fongique (*Aspergillus* spp.)
- Encore **peu de données dans la littérature**



Objectifs

Décrire et comparer

- l'épidémiologie
- les caractéristiques cliniques
- la sévérité
- les modalités du diagnostic microbiologique
- la prise en charge

Méthodologie

Observationnelle
Rétrospective

Monocentrique
Hôpital Lariboisière
CHU

Janvier 2012
Aout 2022

Dossiers médicaux électroniques
Registre national de décès

Méthodologie

Observationnelle
Rétrospective

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Dossiers médicaux électroniques
Registre national de décès

- ✓ Âge > 18 ans
- ✓ Symptômes compatibles avec OBC otogène ou non-otogène
- ✓ Atteinte osseuse au TDM ou à l'IRM

- ✓ Ostéoradionécrose
- ✓ Atteinte seulement des tissus mous ou fixation à l'imagerie nucléaire sans atteinte osseuse au TDM ou à l'IRM

Epidémiologie

Table 1. Baseline characteristics of patients with SBO

	Total [1]	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Demographics							
Sex, female	28 (22%)	127	17 (18%)	97	10 (37%)	27	0.03
Age (years)	72.3 [65.6-81.2]	127	72.3 [64.1-82.6]	97	71.0 [66.0-76.8]	27	0.4
Medical history							
Immunosuppression[3]	18 (14%)	126	14 (15%)	96	3 (11%)	27	0.8
Diabetes mellitus	106 (83%)	127	80 (82%)	97	23 (85%)	27	>0.9
Cardiovascular disease[4]	43 (34%)	126	32 (33%)	96	9 (33%)	27	>0.9

Epidémiologie

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[3] *Hemopathic malignancies (n=5), Solid organ transplant (n=5), Solid cancer (n=4), Systemic disease (n=3), Immunosuppressants (n=11), HIV (n=3).*

78% d'hommes
72.3 ans

Epidémiologie

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83% Diabète
14%
Immunodépression

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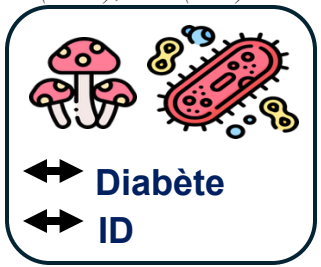

Clinique

Otalgie ++

Fièvre rare

PF++

Atteinte des autres nerfs crâniens++

	Total [1]	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Clinical presentation							
Ear pain	109 (86%)	127	86 (89%)	97	20 (74%)	27	0.07
Otorrhea	96 (76%)	127	74 (76%)	97	20 (74%)	27	0.8
Fever	6 (5%)	127	1 (1%)	97	4 (15%)	27	**0.008**
Headache	21 (17%)	127	8 (8%)	97	12 (44%)	27	**<0.001**
Facial paralysis	38 (30%)	127	23 (24%)	97	13 (48%)	27	**0.013**
Other cranial nerve palsy [5]	19 (15%)	127	9 (9%)	97	8 (30%)	27	**0.012**
Pathologic otoscopic findings	89 (93%)	96	71 (97%)	73	17 (77%)	22	**0.007**
Stenosis/oedema	70 (73%)		56 (77%)		13 (59%)		0.1
Granulation tissue	69 (72%)		60 (82%)		9 (41%)		**0.008**
Non otogenic SBO [6]	12 (9%)	127	6 (6%)	97	5 (18%)	27	0.06

[1] *n (%) ; Median [IQR]*

[2] *Fisher's exact test; Wilcoxon rank sum test*

[5] *I (n=1), III (n=3), V (n=1), VI (n=6), IX (n=5), X (n=4), XII (n=9)*

[6] *Originated from sinuses (n=5), the pharynx (n=3) or remained unknown (n=4)*

Clinique

- Fièvre
- Céphalées
- Paralysie faciale
- Atteinte des autres paires crâniennes

Clinical presentation	Total [1]	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Ear pain	109 (86%)	127	86 (89%)	97	20 (74%)	27	0.07
Otorrhea	96 (76%)	127	74 (76%)	97	20 (74%)	27	0.8
Fever	6 (5%)	127	1 (1%)	97	4 (15%)	27	**0.008**
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Imagerie

TDM + IRM : Se = 96%

IRM a permis de rattraper 7 diagnostics

Table 3. Imaging features of patients with SBO

	Total[1]	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Number of imaging per patient (diagnosis and follow-up)*	4.0 [4.0-6.0]	126	4.0 [3.0-5.0]	97	8.0 [6.0-10.8]	26	**<0.001**
Time between 1st symptoms and 1st positive imaging (days)	39.0 [17.8-65.0]	104	43.0 [17.8-64.8]	78	38.0 [17.0-111.0]	23	>0.9
Pathological initial imaging							
CT- scan	95 (83%)	115	77 (84%)	92	18 (78%)	23	0.55
MRI	57 (65%)	88	45 (66%)	68	12 (60%)	20	0.61
CT-scan and MRI within 3 weeks	76 (96%)	79	60 (97%)	62	16 (94%)	17	0.52
PET-CT (before or within 15 days of treatment)	18 (100%)	18	17 (100%)	17	1 (100%)	1	1
Labelled leucocyte scintigraphy (before or within 15 days of treatment)	54 (86%)	63	45 (83%)	54	9 (100%)	9	0.33

[1] Median [IQR]; n (%)

[2] Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-squared test

**CT-scan, MRI, PET-CT, leukocyte scintigraphy*

Imagerie

- TVC
- Infiltration des espaces vasculo-nerveux
- Collections
- Infiltration tissus mous
- Arthrite C1-C2

Table 3. Imaging features of patients with SBO

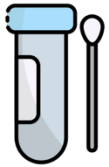
	Total[1]	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Complications							
Cerebral venous thrombosis	20 (16%)	127	11 (11%)	97	9 (33%)	27	**0.014**
Vascular infiltration	42 (33%)	127	25 (26%)	97	14 (52%)	27	**0.01**
Neurological infiltration	24 (19%)	127	11 (11%)	97	12 (44%)	27	**<0.001**
Temporo-mandibular joint involvement	49 (39%)	127	35 (36%)	97	12 (44%)	27	0.4
Collection	36 (28%)	127	22 (23%)	97	13 (48%)	27	**0.009**
Infiltration of muscle and adjacent tissue	72 (57%)	127	47 (48%)	97	23 (85%)	27	**<0.001**
C1-C2 arthritis	4 (3%)	127	1 (1%)	97	3 (11%)	27	**0.032**

[1] *Median [IQR]; n (%)*

[2] *Wilcoxon rank sum test; Fisher's exact test; Pearson's Chi-squared test*

[*] *CT-scan, MRI, PET-CT, leukocyte scintigraphy*

Diagnostic microbiologique



238 prélèvements superficiels : écouvillons en majorité (n=148)

95 prélèvements profonds représentant 314 échantillons

Table 4. Microbiological features of patients with SBO

	Total	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Microbiology							
Monomicrobial[3]	71 (57%)	124	65 (67%)	97	6 (22%)	27	**<0.001**
Number of attributable species per patient	1.0 [1.0-3.0]	124	1.0 [1.0-2.0]	97	3.0 [2.0-4.0]	27	**<0.001**

\+ **Infections polymicrobiennes**

Diagnostic microbiologique

Prélèvements avant le traitement final

Diagnosis modalities	Total	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Number of samples until final treatment	2.0 [1.0-3.0]	127	2.0 [1.0-3.0]	97	3 [2-4.5]	27	**0.012**
Number of superficial samples until final treatment	1.0 [1.0-3.0]	127	2.0 [1.0-3.0]	97	2.0 [1.0-2.0]	27	0.77
Number of surgical samples until final treatment		127		97		27	**<0.001**
0	59 (46%)		58 (60%)		1 (4%)		*<0.001*
1	50 (39%)		32 (33%)		15 (55%)		*0.055*
*≥2**	18 (14%)		7 (7%)		11 (41%)		*<0.001*
Deep tissue surgical biopsy needed for final diagnosis	49 (40%)	124	28 (29%)	97	21 (78%)	27	**<0.001**
Superficial sample enough for final diagnosis[4]	75 (60%)		69 (71%)		6 (22%)		

[1] *n (%)- Median [IQR]*

[2] *Fisher's exact test; Wilcoxon rank sum test*

[4] *Ear canal swab (n=55), Aspiration of pus (n=15), ear wick culture (n=1), Ear canal biopsy (n=3), one superficial sample's type is unknown.*

** 2 (n=14), 3 (n=2), 4 (n=2)*

Diagnostic microbiologique

+ Prélèvements profonds nécessaires au diagnostic

	Total	N=127	Bacterial[1]	N=97	Fungal[1]	N=27	p-value[2]
Diagnosis modalities							
Number of samples until final treatment	2.0 [1.0-3.0]	127	2.0 [1.0-3.0]	97	3 [2-4.5]	27	**0.012**
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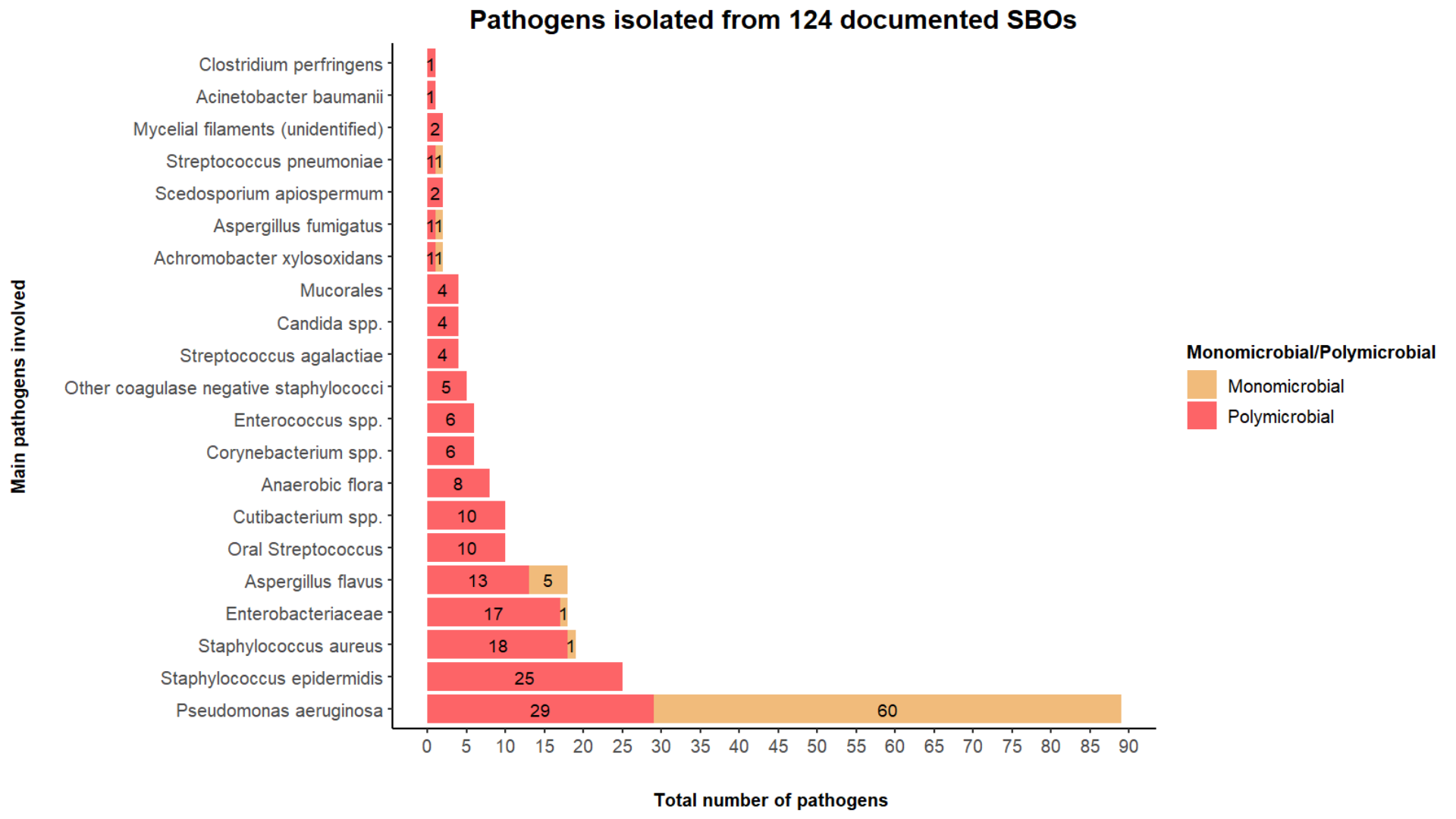
** 2 (n=14), 3 (n=2), 4 (n=2)*

Diagnostic microbiologique

Table 7. Outcomes and follow-up of patients with SBO

	Total[1]	N=127	Bacterial[1]	N = 97	Fungal[1]	N = 27	p-value[2]
Hospital care							
Time between 1st symptoms and 1st consultation (days)	36.0 [12.0-82.0]	109	42.0 [12.3-80.5]	83	34.0 [12.8-162.8]	24	0.7
Time between 1st consultation and treatment (days)	13.0 [6.0-34.5]	123	10.5 [5.0-26.3]	94	25.5 [13.8-52.0]	26	**0.003**

Diagnostic microbiologique + difficile = retard à l'initiation du traitement


Pathogens isolated from 124 documented SBOs
Main pathogens involved
Clostridium perfringens
Acinetobacter baumanii
Mycelial filaments (unidentified)
Streptococcus pneumoniae
Scedosporium apiospermum
Aspergillus fumigatus
Achromobacter xylosoxidans
Mucorales
Candida spp.
Streptococcus agalactiae
Other coagulase negative staphylococci
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Corynebacterium spp.
Anaerobic flora
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Oral Streptococcus
Aspergillus flavus
Enterobacteriaceae
Staphylococcus aureus
Staphylococcus epidermidis
Pseudomonas aeruginosa
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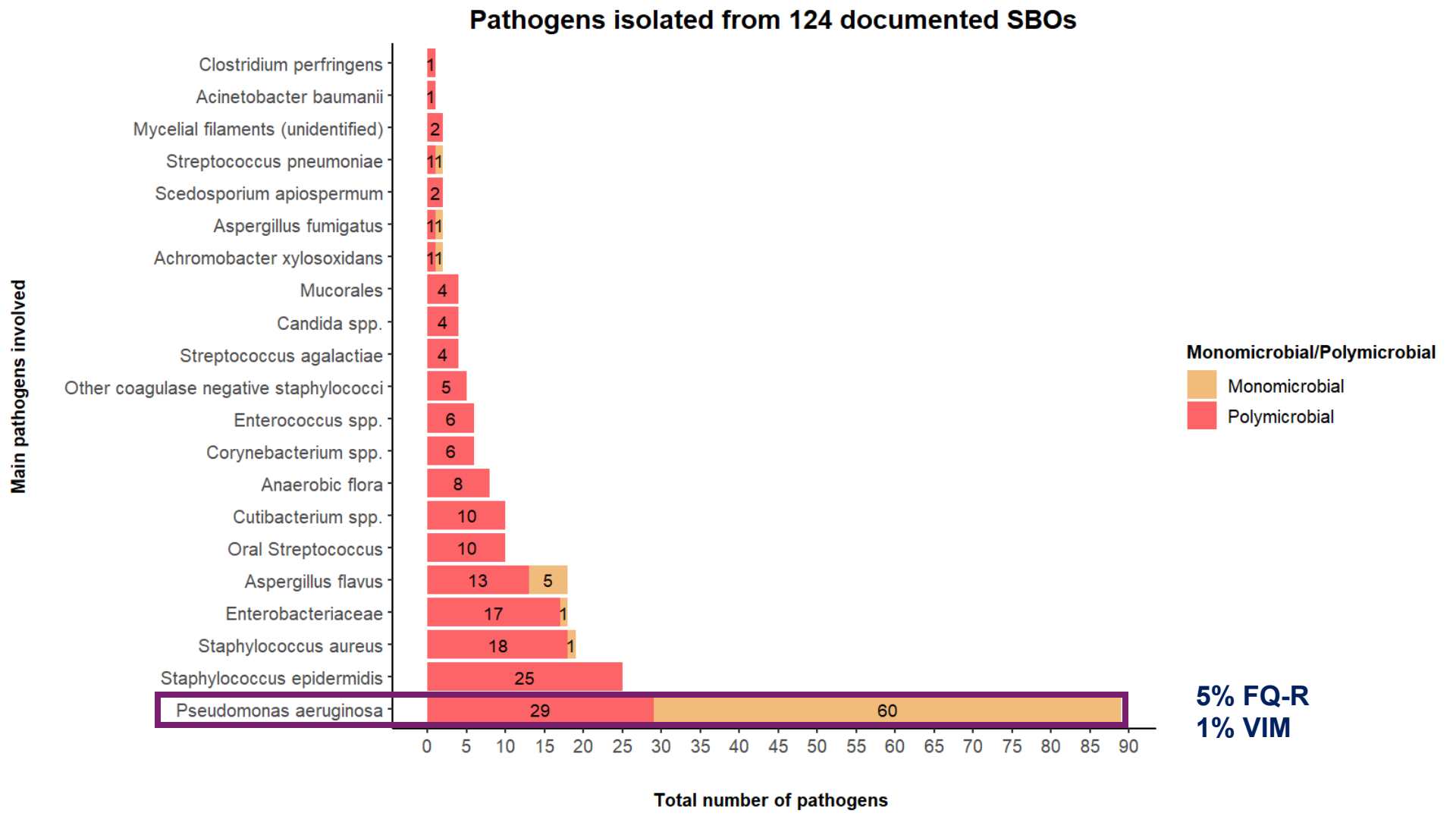
Total number of pathogens
Monomicrobial/Polymicrobial
Monomicrobial
Polymicrobial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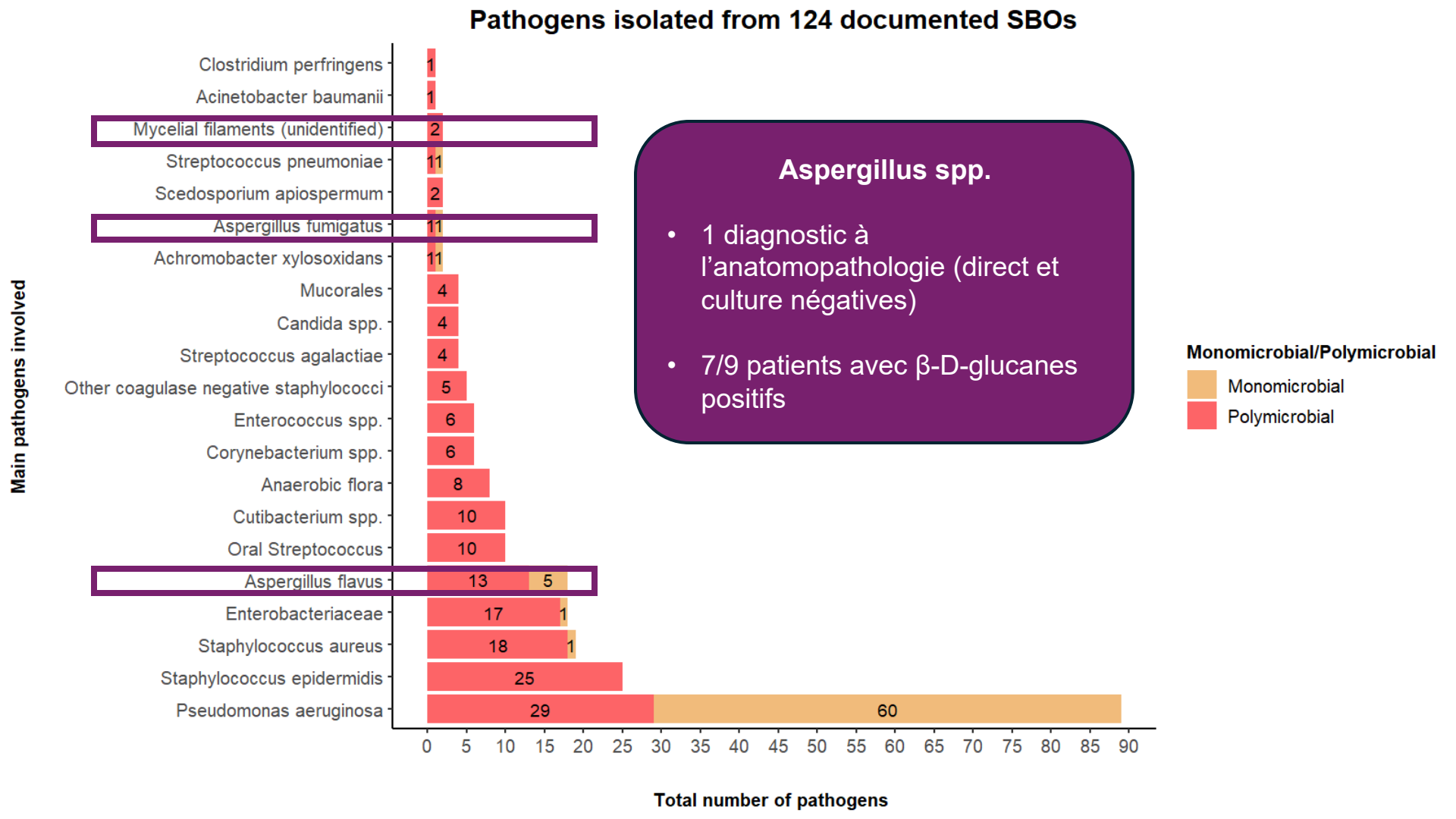
Total number of pathogens
Monomicrobial/Polymicrobial
Monomicrobial
Polymicrobial
5% FQ-R
1% VIM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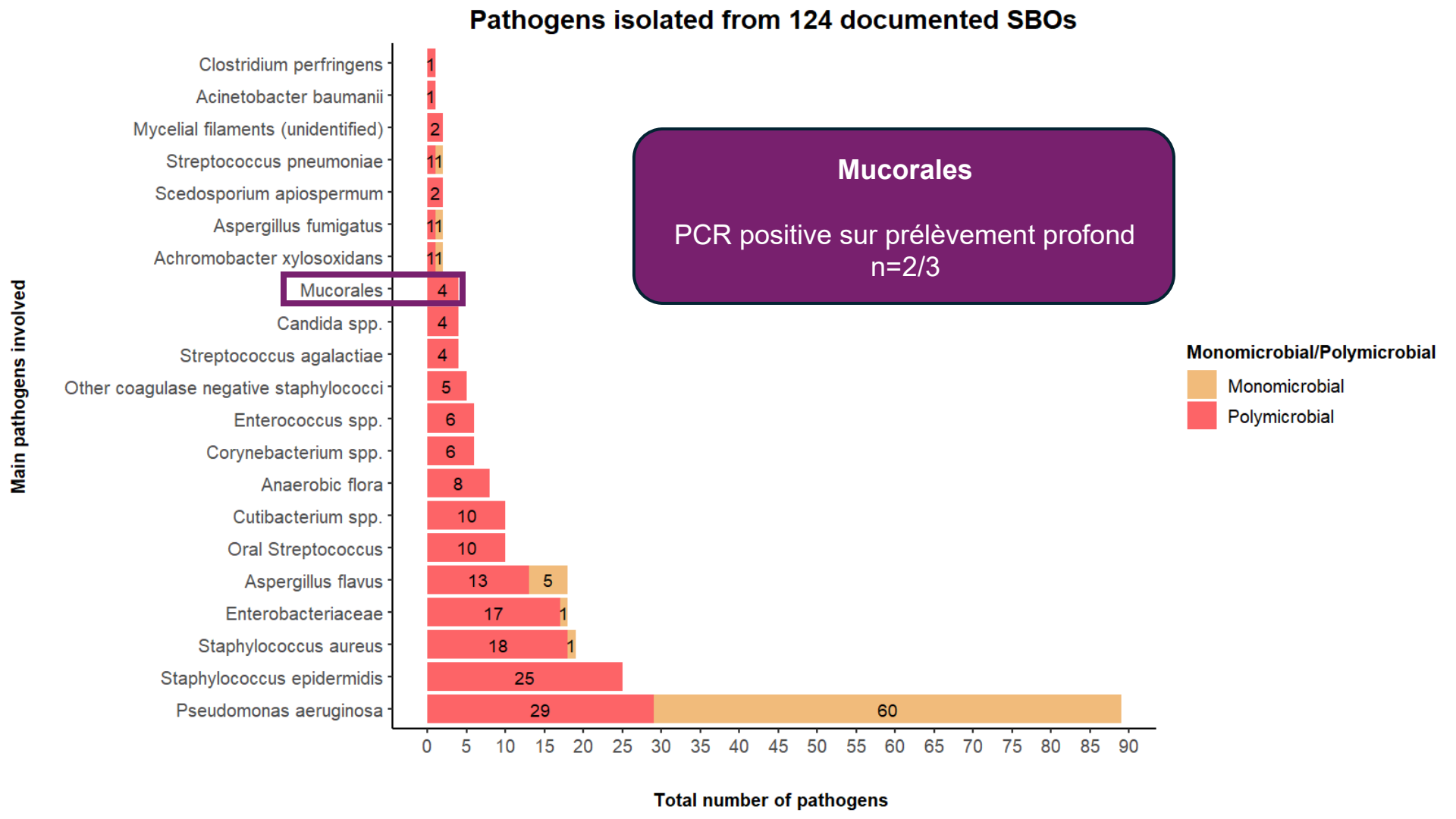
Total number of pathogens
Aspergillus spp.
• 1 diagnostic à l'anatomopathologie (direct et culture négatives)
• 7/9 patients avec β-D-glucanes positifs
Monomicrobial/Polymicrobial
Monomicrobial
Polymicrobial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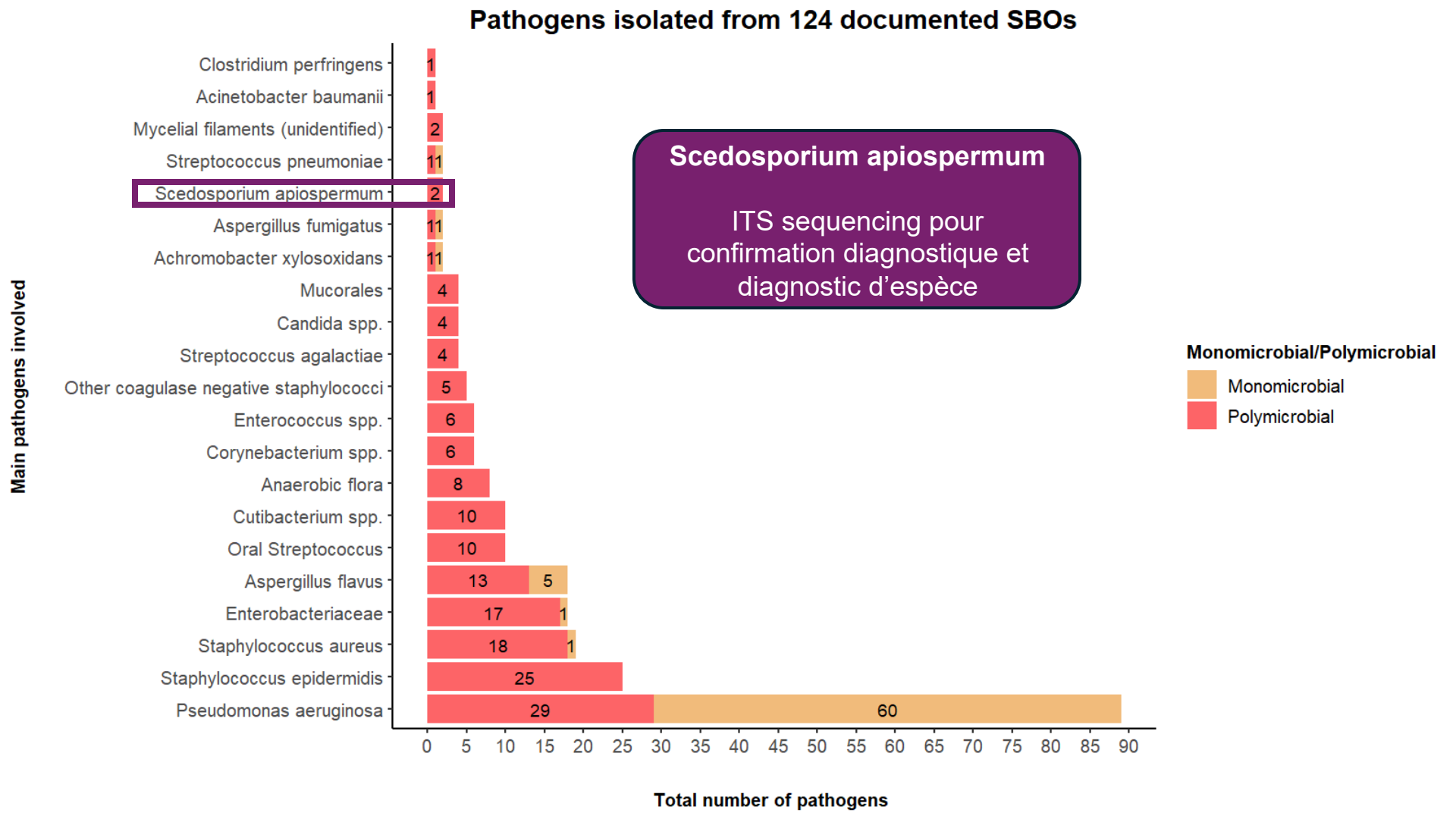
Total number of pathogens
Main pathogens involved
Mucorales
PCR positive sur prélèvement profond
n=2/3
Monomicrobial/Polymicrobial
Monomicrobial
Polymicrobial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Total number of pathogens
Main pathogens involved
Scedosporium apiospermum
ITS sequencing pour confirmation diagnostique et diagnostic d'espèce
Monomicrobial/Polymicrobial
Monomicrobial
Polymicrobial

Traitements

Traitement antibiotique = 55 j

Traitement antifongique = 188.5 j

Table 5. Characteristics of anti-infective therapies

	Total	N = 127[1]
History of oral antibiotic therapy before treatment	76 (76%)	100
Number of oral antibiotic lines		54
1	33 (61%)	
≥2	21 (39%)	
History of topical antibiotic therapy before treatment	64 (69%)	93
Treatment		
At least one antibiotic dual therapy line	112 (95%)	118
Total antibiotic treatment duration (days)	55.0 [44.0 -90.0]	100
Duration of intravenous therapy		67
≤14 days	16 (24%)	
15-28 days	24 (36%)	
>28 days	27 (40%)	
Total antifungal treatment duration (days)	188.5 [124.0 -278.8]	22

[1] *n (%) ; Median [IQR]*

Outcomes

+ **Durée hospitalisation**
+ **Admission en réanimation**

Table 7. Outcomes and follow-up of patients with SBO

	Total[1]	N=127	Bacterial[1]	N = 97	Fungal[1]	N = 27	p-value[2]
Length of stays (days)	12.0 [7.8-24.0]	124	10.0 [6.0-15.5]	95	38 [21.5-75.8]	26	**<0.001**
Admission to ICU	13 (10%)	127	4 (4%)	97	8 (30%)	27	**<0.001**
Outcome							
Lethality	14 (11%)	127	8 (8%)	97	4 (15%)	27	0.29
Overall six months mortality	12 (9%)	127	7 (7%)	97	3 (11%)	27	0.45
Failure of first lines treatment	17 (13%)	127	8 (8%)	97	9 (33%)	27	**0.002**
2-year recurrence of the infection	2 (2%)	113	1 (1%)	90	1 (5%)	22	0.4
Sequelae[3]	47 (45%)	105	31 (38%)	82	16 (73%)	22	**0.003**

[3] Hearing loss (n=22), Facial palsy(n=17), Other cranial nerve palsy (n=7), Vertigo (n=4), Paroxystic otalgia (n=2), Temporo-mandibular pain (n=2)

Outcomes

+ Echec d'une ou plusieurs lignes de traitement

+ Séquelles

↔ Létalité/ mortalité à 6 mois

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Facteurs de risque de sévérité

Table 6. Univariate and multivariate results for factors associated with severity (lethality or admission in ICU) of SBOs

Variable	OR*	IC95%*	p-value	OR*	IC95%*	p-value
	Univariate analysis			Multivariate analysis		
Fungal etiology	4.35	[1.53-12.38]	**0.005**	4.41	[1.40-14.36]	**0.011**
Age	1.03	[0.99-1.08]	0.140	1.05	[1.00-1.11]	0.05
CRP (mg/L)	1.01	[1.00-1.02]	**0.010**	1.01	[1.00-1.02]	**0.021**
Origin (Non-otogenic SBO)	4.41	[1.18-15.62]	**0.021**	4.48	[0.82-22.49]	0.067
Polymicrobial	2.67	[0.99-7.71]	0.056	-	-	-
Facial palsy	1.21	[0.42-3.20]	0.709	-	-	-
Immunosuppression	2.21	[0.64-6.79]	0.180	-	-	-
HbA1c (%)	1.00	[0.77-1.24]	0.986	-	-	-
Delay before treatment	1.00	[0.99-1.00]	0.498	-	-	-
Failure of first lines of treatment	1.10	[0.23-3.79]	0.895	-	-	-

**OR : Odd-ratio; IC 95% : 95% confidence interval*

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En multivarié, l'étiologie fongique reste associée à la sévérité, notamment en ajustant sur le caractère polymicrobien et le caractère otogène ou non de l'infection.

Limites

- Etude rétrospective monocentrique
  - ✓ Données manquantes
  - ✓ Absence de standardisation dans la réalisation des prélèvements
- Absence de recommandations quant à l'interprétation des résultats microbiologiques (à la discrétion du clinicien)
- Biais du centre expert

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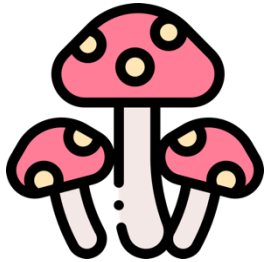
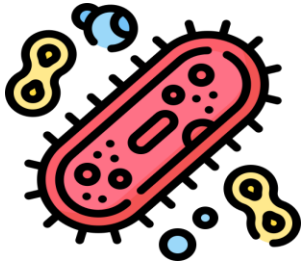
→ **Intêret d'une étude prospective multicentrique**

Take home message





1. Tableau plus sévère

✓ Clinique : + d'atteinte des paires crâniennes

✓ Imagerie : + de complications

2. Diagnostic notamment microbiologique plus complexe :

✓ + de prélèvements profonds nécessaires au diagnostic

✓ + de retard diagnostic

✓ + d'infections polymicrobiennes

3. Evolution plus grave

✓ Associée à la sévérité (létalité ou admission en réanimation) en analyse multivariée

✓ + de séquelles

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