

Actualités en Réanimation: Méningo-encéphalites bactériennes

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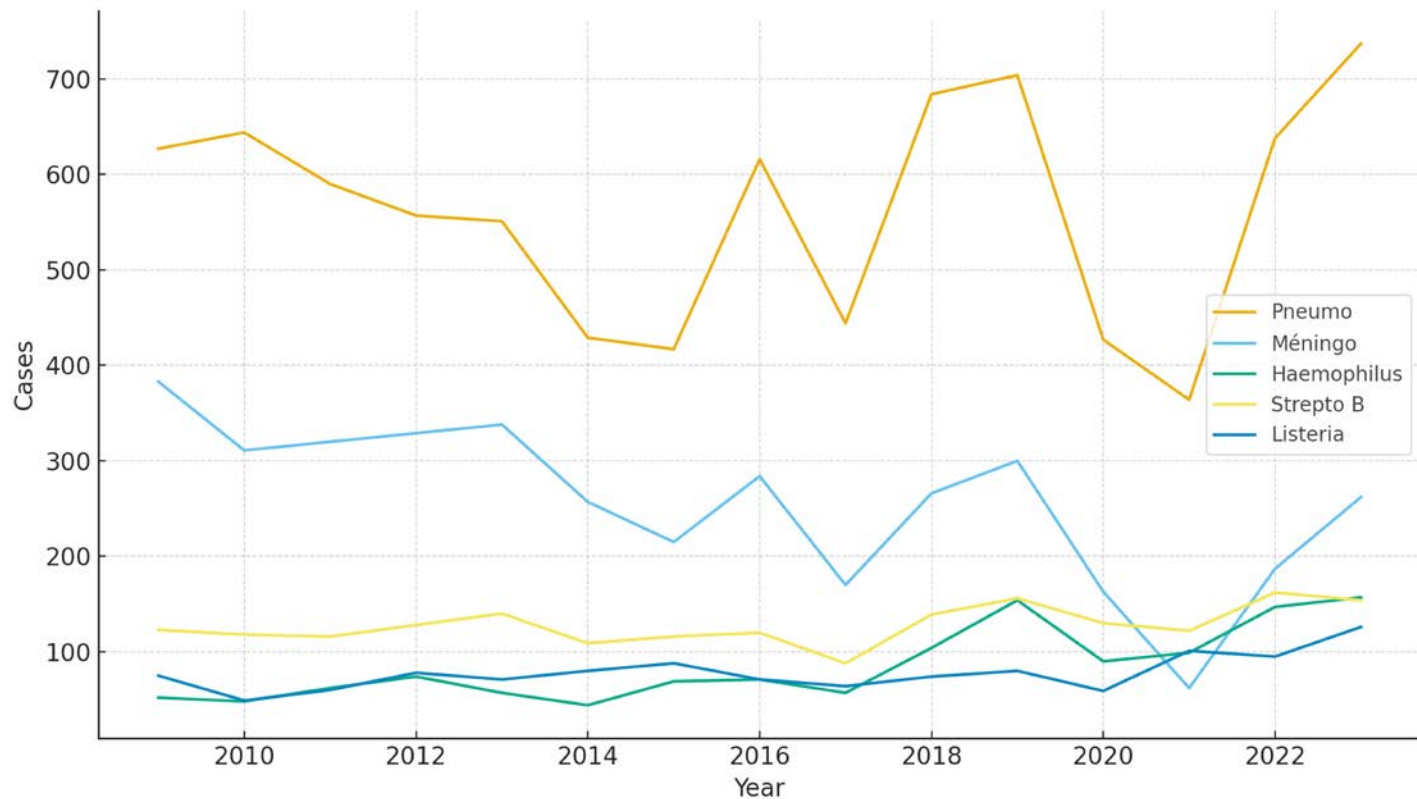
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Plan

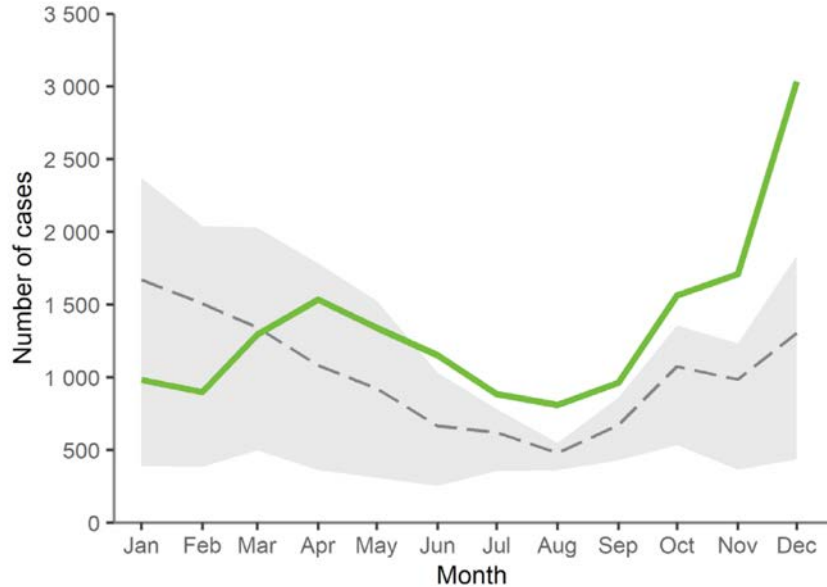
- Epidémiologie
- Diagnostic
- Optimisation prise en charge
- Neuroréanimation
- Antibiothérapie
- Pronostic

Evolution du nombre de méningites bactériennes en métropole

Données Epibac



Infections invasives à Pneumocoque en Europe



- Méningites 16.5%
- Pneumonies 41.2%
- Bactériémies 37.7%
- Autres 4.6%

Clinical features, etiologies, and outcomes in adult patients with meningoencephalitis requiring intensive care (EURECA): an international prospective multicenter cohort study (Sonneville, ICM 2022)

599 patients admis en réanimation

Categories	n (%)
Acute bacterial meningitis	247 (41.8)
<i>Streptococcus pneumoniae</i>	148 (25)
<i>Neisseria meningitidis</i>	17 (2.9)
<i>Listeria monocytogenes</i>	14 (2.4)
Other causes*	68 (11.5)
Characteristics at ICU admission	
Time from hospital to ICU admission, days	1 [1—3]
Reason for ICU admission	
Altered mental status ^a	431 (73.2)
Seizures / status epilepticus	88 (14.9)
Sepsis / respiratory failure	43 (7.3)
Other	27 (4.6)
SAPS II, points	42 [30—57]
GCS score < 8, indicating coma	202 (34.3)
Non-neurologic organ failure	
Respiratory SOFA > 2 ^b	97 (16.5)
Cardiovascular SOFA > 2 ^c	136 (23.1)
Renal SOFA > 2 ^d	48 (8.1)
Liver SOFA > 2 ^e	7 (1.2)
Coagulation SOFA > 2 ^f	23 (3.9)

Characteristics and prognostic factors of bacterial meningitis in the intensive care unit: a prospective nationwide cohort study (DVIDB, AIC 2023)

Characteristic	ICU, N = 1369
Positive blood culture	957/1197 (80%)
Causative pathogen	
<i>S. pneumoniae</i>	1,071/1369 (78%)
<i>N. meningitidis</i>	124/1369 (9%)
<i>L. monocytogenes</i>	36/1369 (3%)
<i>H. influenzae</i>	27/1,369 (2%)
Clinical course	
Pneumonia	247/1268 (19%)
Circulatory shock	220/1272 (17%)
Respiratory failure	470/1300 (36%)
Mechanical ventilation	715/1329 (54%)
Seizures	230/1313 (18%)

Post-hoc analysis of a multicentre prospective cohort study on prognostic factors in community-acquired bacterial meningitis admitted to the ICU

210 patients - 27 services de réanimation

Reason(s) for admission in ICU	
- Altered mental status	153/210 (72.9%)
- Hemodynamic failure	22/210 (10.5%)
- Respiratory distress	16/210 (7.6%)
- Sepsis or septic shock	4/210 (1.9%)
- Purpura	12/210 (5.7%)
- Acute renal failure	2/210 (1.0%)
- Seizure	4/210 (1.9%)
- Cardiorespiratory arrest	1/210 (0.5%)
- Patient monitoring (no failure)	16/210 (7.6%)

Multivariate logistic regression model on factors associated with admission to ICU		
	OR [95% IC]	p value
Alteration of consciousness	7.51 [3.65 – 15.42]	p < 0.001
Microbiological culture on CSF		
- N. meningitidis vs other bacteria	3.45 [1.15– 10.00]	p = 0.028

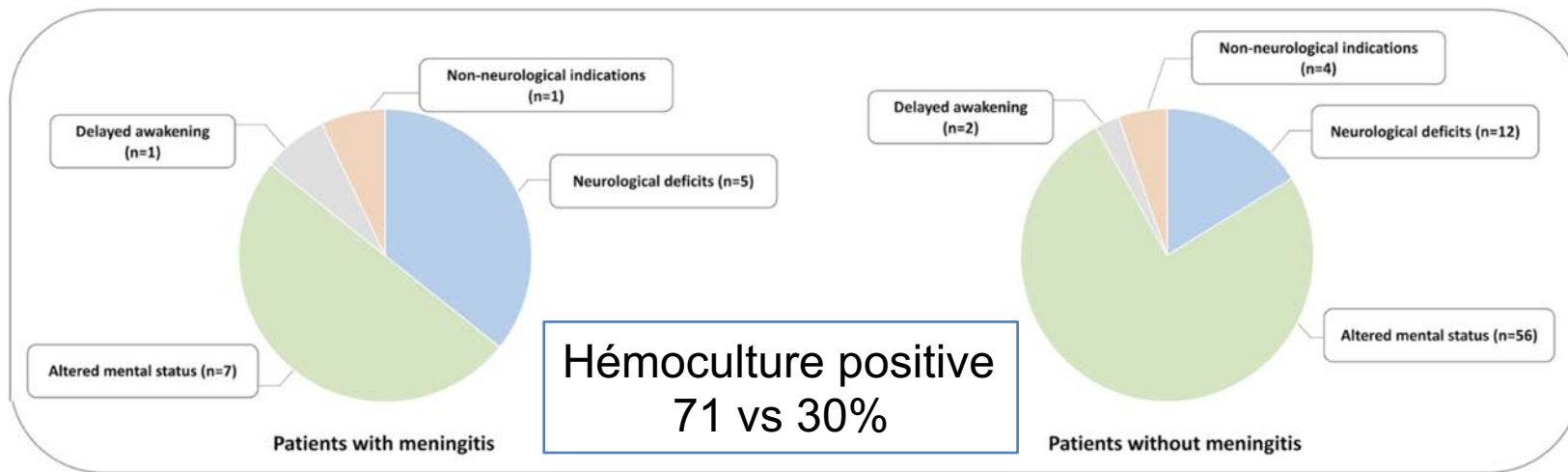


Clinique

Country	Netherlands ICU ¹	France ²	Netherlands ³	Netherlands Pneumo ³	Netherlands Méningo ³
Observation period	06-22	13-15	06-23	06-23	06-23
Number of patients	1573/2709	533	2974	2029	329
Headache	78%	71%	80%	79%	91%
Nausea/vomiting	54%	-	-	-	-
Neck stiffness	71%	63%	72%	74%	76%
Rash	10%	-	-	52%	-
Temperature	74% (>38.0°)	38.5 (37.7-39.3)	72% (>38.0°)	74% (>38.0°)	51% (>38.0°)
Altered mental status	85%	71%	71%	80%	47%
Coma	32%	26%	21%	25%	10%
Focal neurologic deficits	32%	34%	23%	26	11%
Triad of fever, neck stiffness and altered mental status (GCS<14)	47%	-	39%	45%	19%

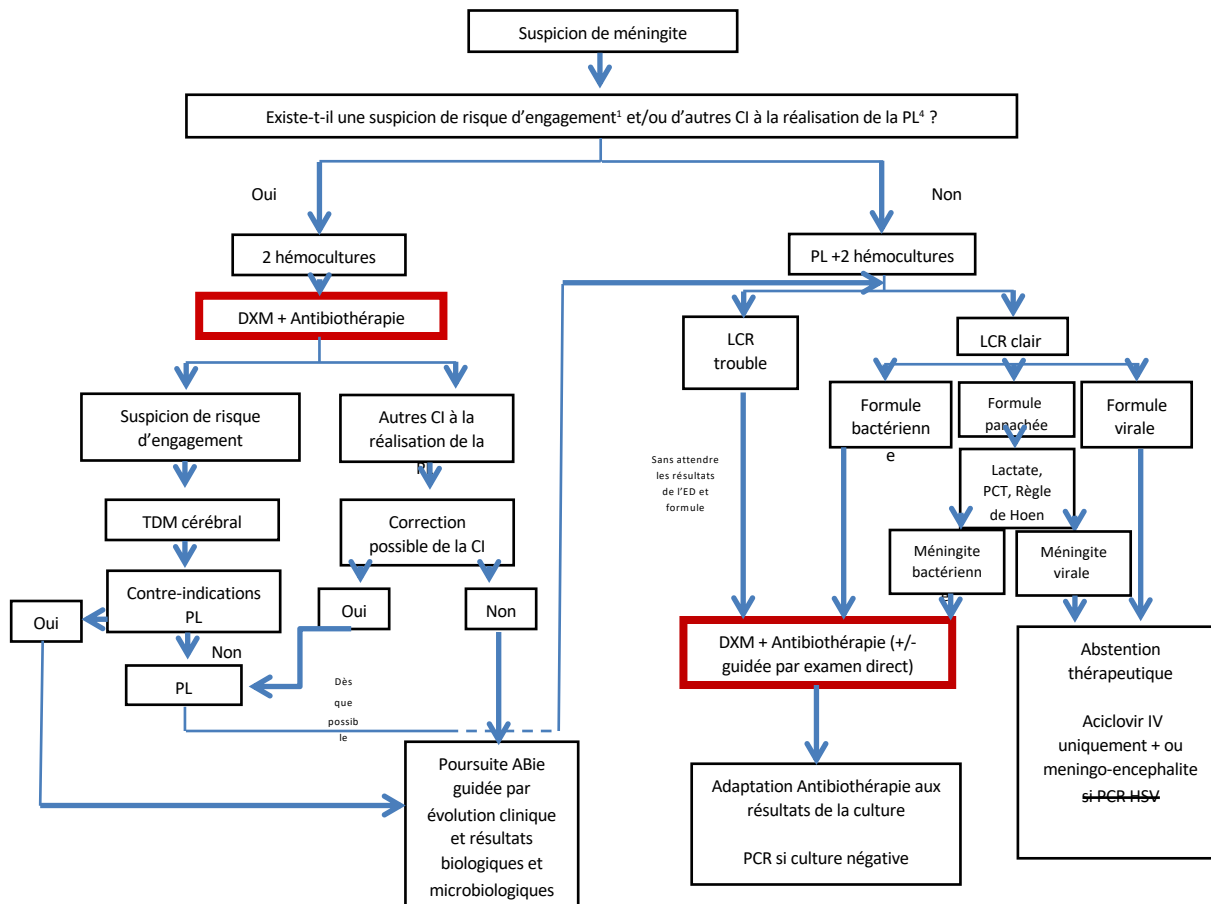
Meningitis in critically ill patients admitted to intensive care unit for severe community-acquired pneumococcal pneumonia

262 patients admitted to ICU
for severe pneumococcal community-acquired pneumonia



Dexamethasone

- DXM recommandée chez adulte et enfant dans les pays de haut niveau socio-économique (grade A)
- Adulte: 10mgx4, Enfant: 0,6mg/kg/j en 4 doses
- 4 jours pour tout le monde
- En même temps que 1ere dose Antibiotique (grade A)
- Jusqu'à 4h après la première dose (grade C)
- Traitement à poursuivre si Pneumocoque ou Haemophilus (grade B)



1/ **Présence de signes cliniques focaux** (déficit neurologique focal (sauf les atteintes de nerfs crâniens en dehors du III), crises épileptiques focales récentes, symptômes neurologiques centraux présents depuis plus de 4 jours ; 2/ **présence de symptômes et signes d'engagement cérébral** : troubles de la vigilance et un ou plus des éléments suivants (anomalies pupillaires (mydriase fixée uni ou bilatérale), dysautonomie (hypertension artérielle et bradycardie, anomalies du rythme ventilatoire), crises toniques postérieures, aréactivité aux stimulations, réactions de décortication ou de décérébration ; 3/ **crises épileptiques non contrôlées**.

4/ **Autres CI à la PL** : anomalie connue de l'hémostase, traitement anticoagulant à dose efficace, Suspicion de trouble majeur de l'hémostase (saignement majeur), instabilité hémodynamique

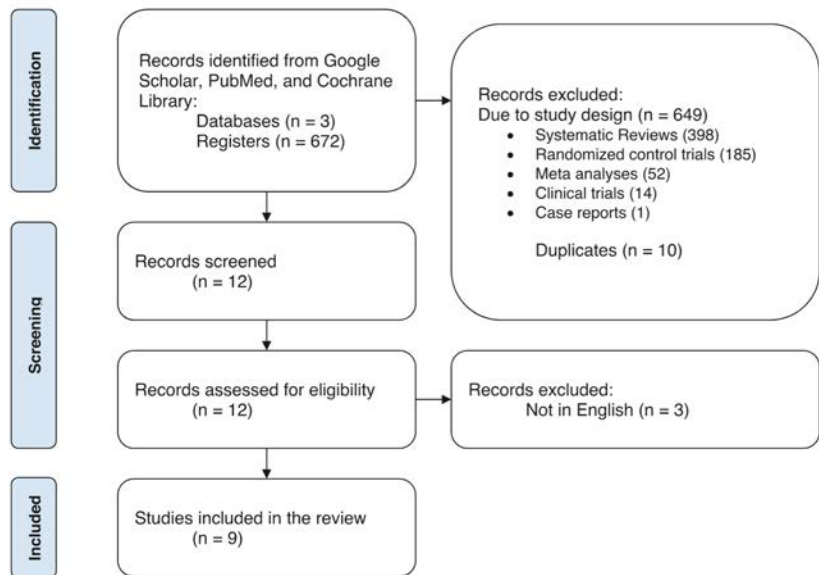
252 French patients with neurolisteriosis

	Odds ratio (95% CI)	p value
Female sex	2.68 (1.24–5.83)	0.013
Age (years)	1.35 (0.99–1.85)	0.058
Ongoing organ neoplasia	4.58 (1.53–13.73)	0.007
Recent major weight loss	2.65 (1.08–6.55)	0.034
Multi-organ failure	3.08 (1.25–7.58)	0.014
Aggravation of any pre-existing organ dysfunction	2.75 (1.23–6.16)	0.014
Influenza-like symptoms	0.47 (0.20–1.12)	0.087
Mechanical ventilation	2.89 (1.31–6.37)	0.009
Neutropenia <200 cells per μ L	3.57 (1.24–10.23)	0.018
Positive blood cultures	3.67 (1.60–8.40)	0.002
Protein concentration in the CSF	1.18 (0.99–1.41)	0.062
Adjunctive dexamethasone for meningitis	4.58 (1.50–13.98)	0.008

162 Deutch patients with neurolisteriosis

Risk factors for unfavorable outcome		
Variables	OR (95%CI)	P-value
Age (per year increase)	1.04 (1.01-1.06)	0.007
Male sex		
Immunocompromised state		
Glasgow Coma Scale (per point increase)	0.91 (0.80–1.06)	0.14
C-reactive protein (per 10 mg/L)		
CSF leukocyte count (per 100 cells/mm ³)		
Adequate initial ATB regimen	0.44 (0.17–1.09)	0.08
Dexamethasone 10 mg QID 4 days	0.40 (0.19–0.81)	0.017

Transcranial Doppler ultrasonography in bacterial meningitis: A systematic review



- Uniquement descriptives
- Augmentation constante de la vitesse en particulier J3-J5
- Hyperémie et IP augmentés
- Sténoses artérielles
- Association anomalies DTC et pronostic

Pression LCR

N=216	Pression LCR < 40 cmH ₂ O	Pression LCR ≥ 40 cmH ₂ O	
N	131 (61%) dont 38 (18%) P nle	85 (39%)	
Coma	14 (11%)	20 (24%)	P=0,01
Evolution défavorable	30%	35%	

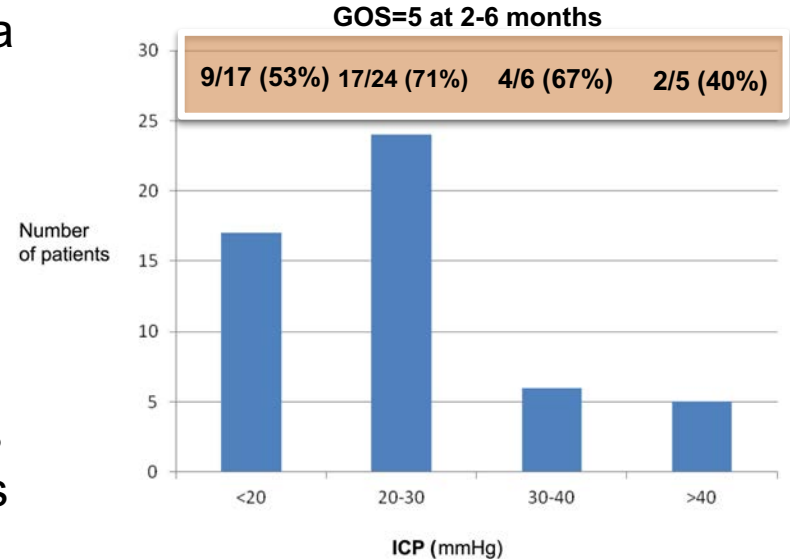
Neuro-Intensive Treatment Targeting Intracranial Hypertension Improves Outcome in Severe Bacterial Meningitis: An Intervention-Control Study

Martin Glimåker^{1*}, Bibi Johansson², Halla Halldorsdottir³, Michael Wanecek³, Adrian Elmi-Terander⁴, Per Hamid Ghatan⁵, Lars Lindquist², Bo Michael Bellander^{4*}

57 patients atteints de méningite dans le coma
comparés en ITT à 53 contrôles
52 patients avec monitoring PIC

mais

- Échelles de coma différentes selon centres
- Patients et contrôles dans centres différents
- 20 patients avec PIC dans centres contrôles



Neuro-Intensive Treatment Targeting Intracranial Hypertension Improves Outcome in Severe Bacterial Meningitis: An Intervention-Control Study

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	ITT group (n=57)	PP group (n=52)	Control group (n=53)
GOS 5 and N hearing	30 (53)*	28 (54)	17 (32)
GOS 1	7 (12)*	5 (10)*	16 (30)
GOS 5	34 (60)\$	32 (62)£	23 (43)

* p<0.05
\$ P=0.12
£ P=0.08



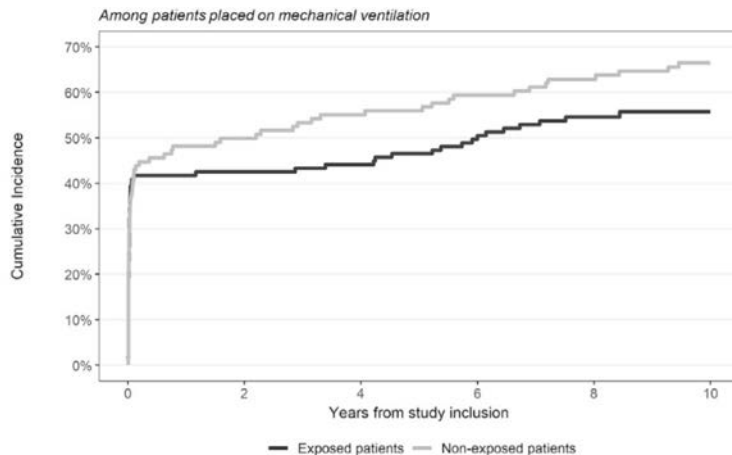
Mortality and sequelae associated with regional use of intracranial devices among patients with pneumococcal meningitis; a nationwide, population-based cohort study

	Exposé	Non exposé
Total	305	333
Age (année)	60 [43-70]	59 [28-69]
Sexe F	156 (51)	163 (49)
Score Charlson	95 (31)	86 (26)
Ventilation Mécanique	157 (51)	136 (41)
Monitoring PIC	66 (22)	4 (1)
Parenchyme	42 (14)	≤3 (≤3)
DVE	9 (3)	≤3 (≤3)
Parenchyme puis DVE	15 (5)	0 (0)

Mortality and sequelae associated with regional use of intracranial devices among patients with pneumococcal meningitis; a nationwide, population-based cohort study

Outcome

Risk of death
Risk of epilepsy
Risk of antiepileptics rede
Risk of hearing loss
Risk of hearing aid
Risk of brain damage
Risk of disability pension^d
Time to discharge^e



	Number at risk					
Exposed patients	157	72	70	62	47	25
Non-exposed patients	136	58	52	47	41	37

HR (95% CI) aMRR/aHR (95% CI)

1.8–1.6) 1.0 (0.7–1.6)
1.6–3.6) 1.1 (0.4–3.1)
1.6–1.9) 0.8 (0.4–1.5)
1.1–5.0) 1.5 (0.7–3.5)
1.1–3.8) 1.8 (0.9–3.6)
1.6–2.9) 1.0 (0.4–2.5)
1.5–2.4) 1.1 (0.5–2.7)
NA^d

Platz, CMI fev 2025

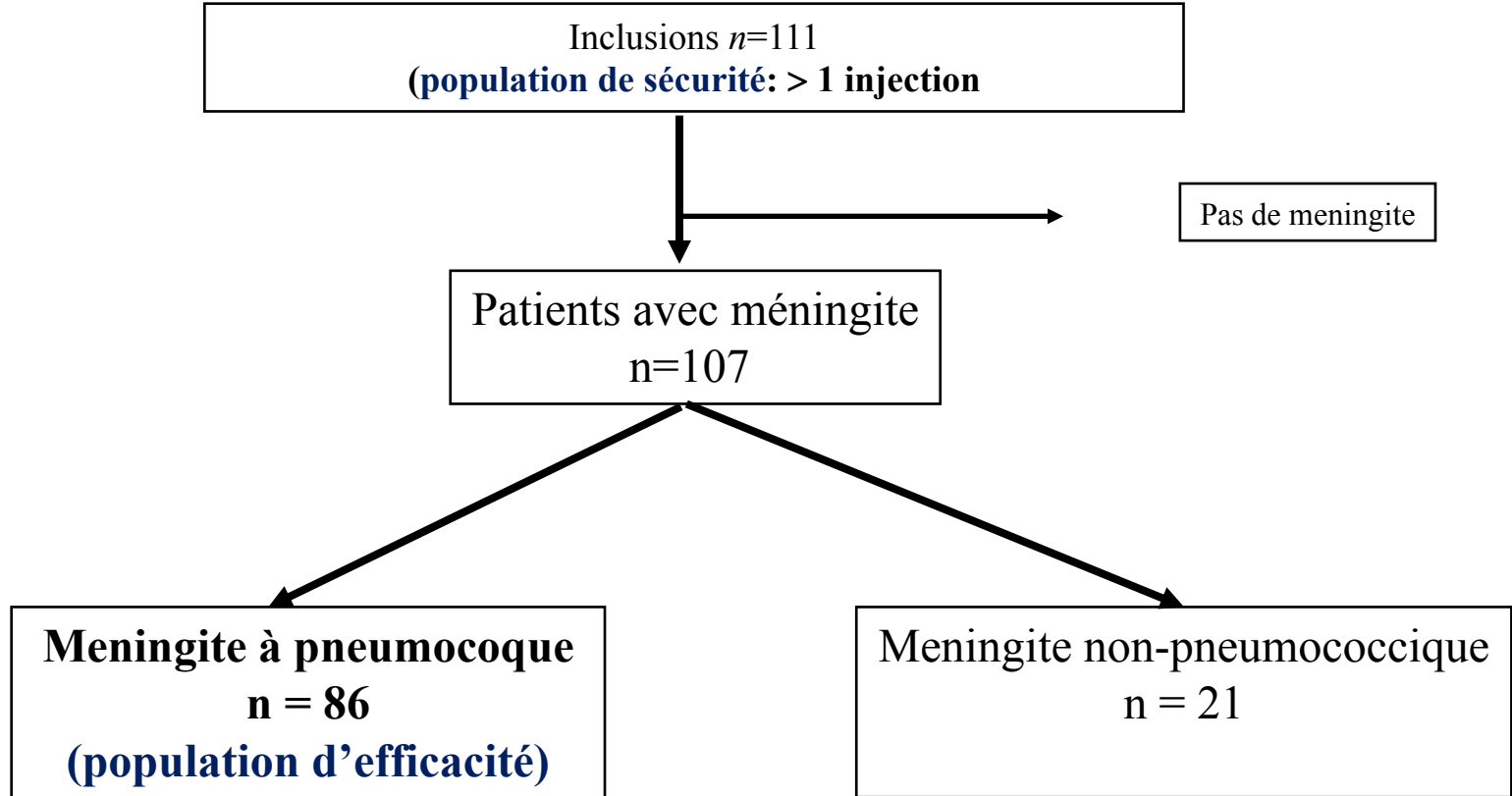
Clinical features, etiologies, and outcomes in adult patients with meningoencephalitis requiring intensive care (EURECA): an international prospective multicenter cohort study

Variable	ICP monitoring N = 35	No ICP monitoring N = 196	Univariable analysis			Multivariable analysis		
			OR	95% CI	p value	OR	95% CI	p value
Baseline characteristics								
Age, years	52 [32; 66]	61.5 [44; 71]	0.97	[0.95; 0.99]	<0.01	0.96	[0.94; 0.98]	<0.01
Male sex	15 (42.9)	118 (60.2)	0.46	[0.21; 1]	0.05	0.38	[0.15; 0.95]	0.04
Time from hospital to ICU admission, days	2 [1; 3]	1 [1; 3]	0.99	[0.92; 1.05]	0.65			
GCS score at ICU admission	8 [6; 10]	9 [6; 12]	0.85	[0.74; 0.96]	0.01	0.83	[0.71; 0.96]	0.01
Temperature ≥ 38°, indicating fever	17 (48.6)	133 (67.9)	0.33	[0.14; 0.78]	0.01	0.43	[0.16; 1.15]	0.09
Hemiparesis/hemiplegia	5 (14.3)	30 (15.3)	0.89	[0.29; 2.73]	0.84			
Seizures	10 (28.6)	50 (25.5)	1.25	[0.53; 2.96]	0.61			
CSF leukocytes, cell/mm ³	500 [96; 3000]	139 [22; 810]	1.00	[1; 1]	0.88			
CSF protein level, g/l	2.7 [1.1; 4.6]	1.2 [0.6; 3.2]	1.08	[0.93; 1.26]	0.32			
Normal CT scan	13 (37.1)	109 (55.6)	0.43	[0.2; 0.96]	0.04	0.34	[0.14; 0.83]	0.02
Etiology					0.23			
Acute bacterial meningitis	22 (62.9)	84 (42.9)	1.62	[0.56; 4.73]				
Infectious encephalitis	5 (14.3)	51 (26)	0.63	[0.17; 2.41]				
Autoimmune	1 (2.9)	13 (6.6)	0.28	[0.02; 3.18]				
Neoplastic/toxic	1 (2.9)	4 (2)	3.57	[0.3; 42.17]				
Unknown	6 (17.1)	44 (22.4)	1.00	Ref				

AddaMap – le déroulé

2018

2024



AddaMap : les patients

n = 86

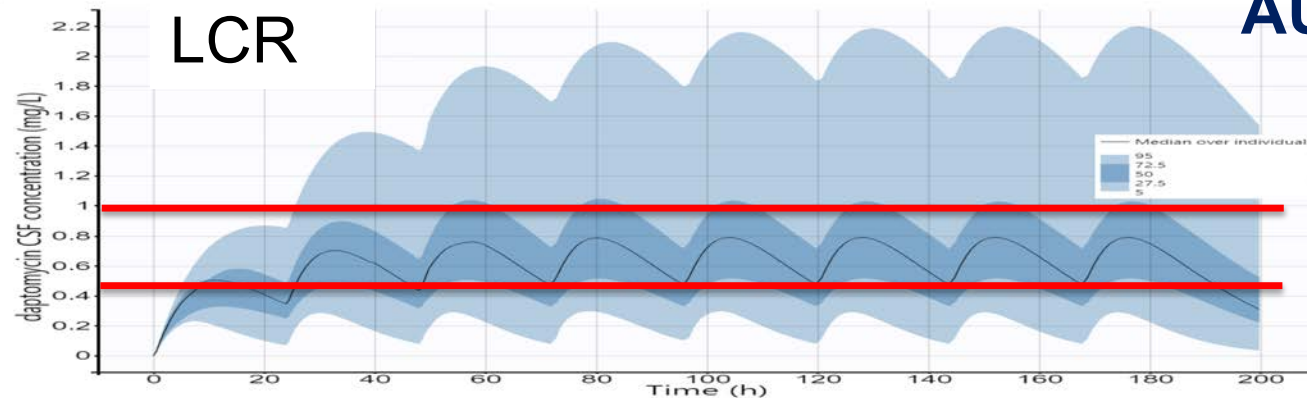
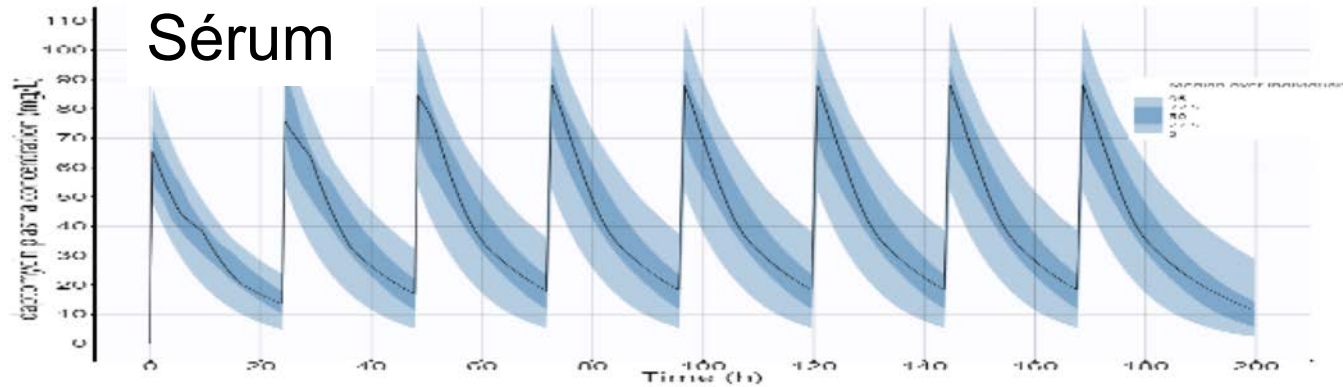
❖ Caractéristiques

Age	60 [21 – 90]
H/F	70%/30%
Alcool	17%
Immunodep	19%
Vaccination	6%
Septicémie	20%
Pneumonie	15%
GCS	10 [3-15]

❖ Imagerie cérébrale

AVC	3%
Ventriculite	19%
Vascularite	10%
Hydrocéphalie	6%
Abcès	3%
Otite/sinusite	22%

Diffusion de la daptomycine dans le LCR



$$AUC_{lcr}/AUC_{ser} \approx 2\%$$

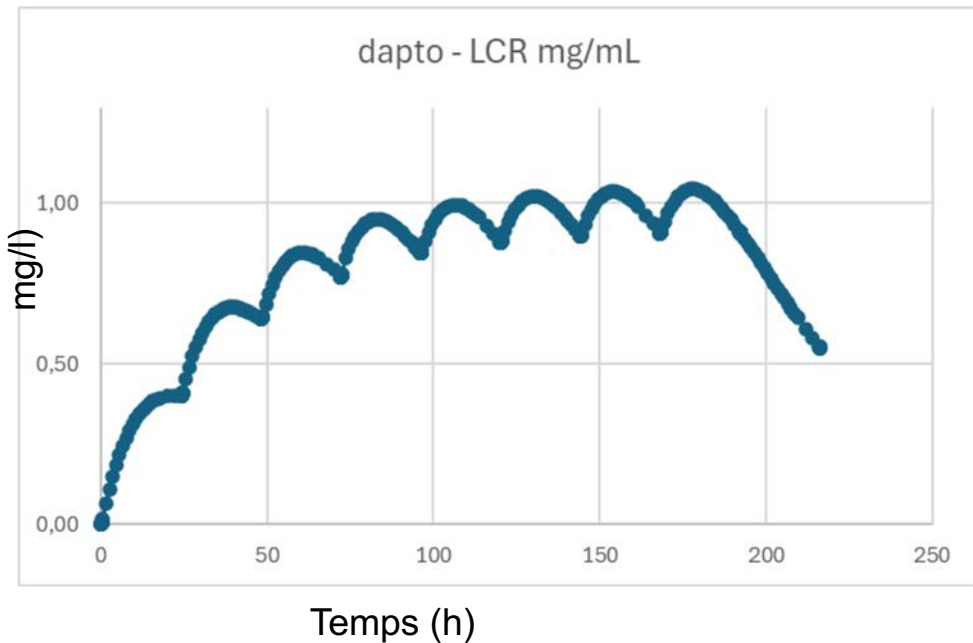
CMI 100%

CMI 95%

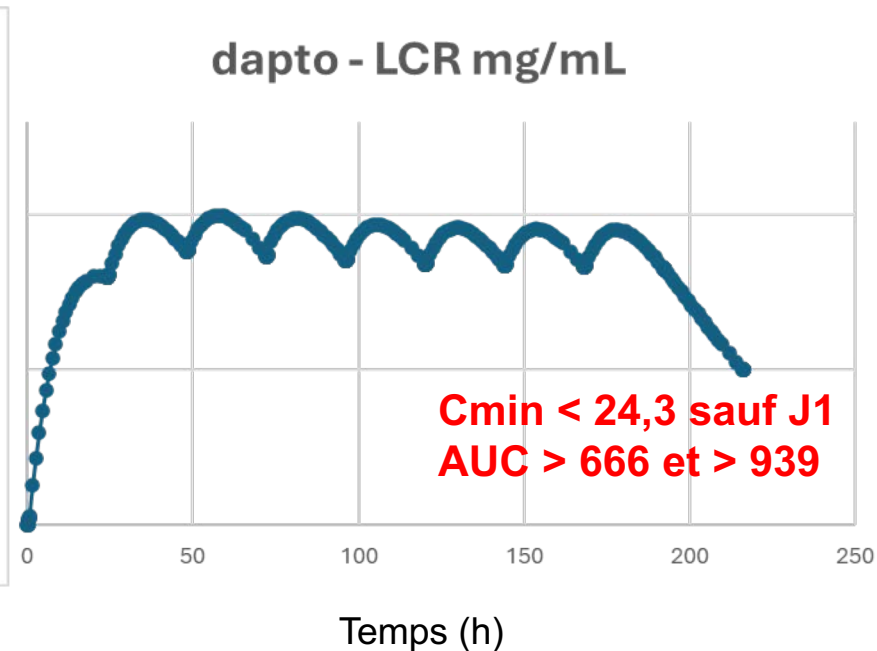
AddaMap – daptomycine dans le LCR

dose de charge ?

10 mg/kg

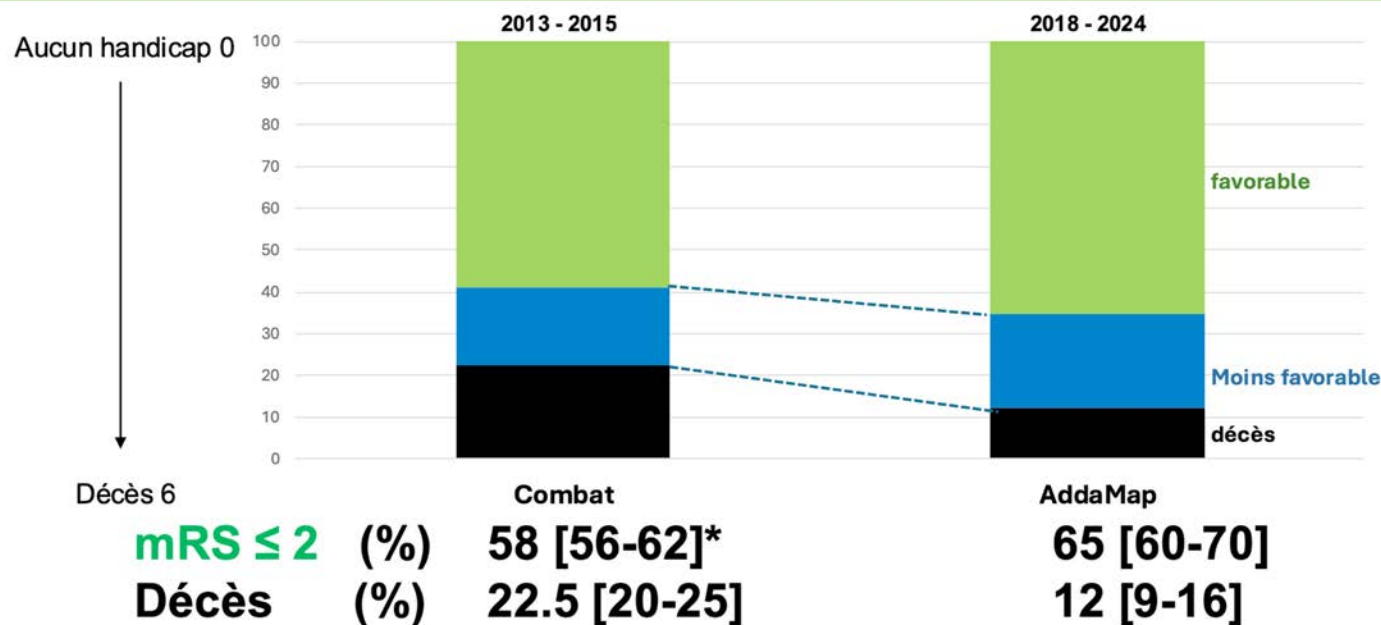


20 mg/kg puis 9 mg/kg



Ajout de daptomycine dans le traitement des méningites à pneumocoque

AddaMap : efficacité – échelle de Rankin



Tubiana S et al, CMI 2020

Pronostic

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	Pneumo (%)	Méningo (%)
1 (décès)	18	3
2 (état végétatif)	0	0
3 (handicap sévère)	5	2
4 (handicap modéré)	18	9
5 (handicap léger ou nul)	58	86
Surdit�	38	15
D�ficit focal	9	1
Alt�ration fonctions sup�rieures	26	14

D. Van de Beek, CID 2023 and The Lancet Regional Health–Europe 2026

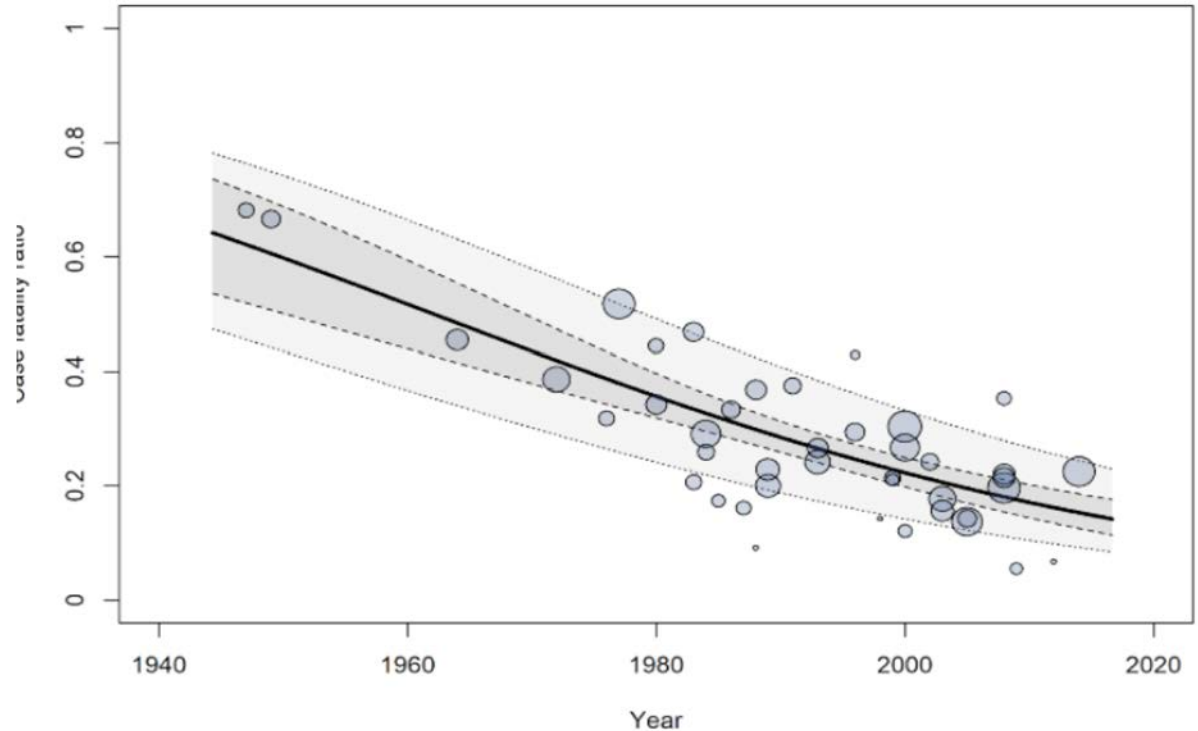
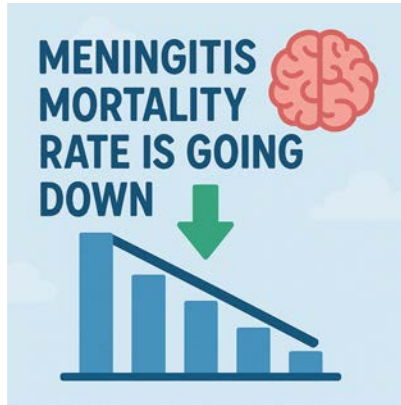
	Pneumo (%)	M�ningo (%)
6 (d�c�s)	22,5	4,5
4-5 (�tat v�g�tatif)	12,4	0
3 (handicap s�v�re)	11,9	5
2 (handicap mod�r�)	15,8	8
0-1 (handicap l�ger ou nul)	59,9	86
Surdit�	22	8
D�ficit focal	7	1
Alt�ration fonctions sup�rieures	25	4

S. Tubiana, CMI 2020, 26: 1192-1200.

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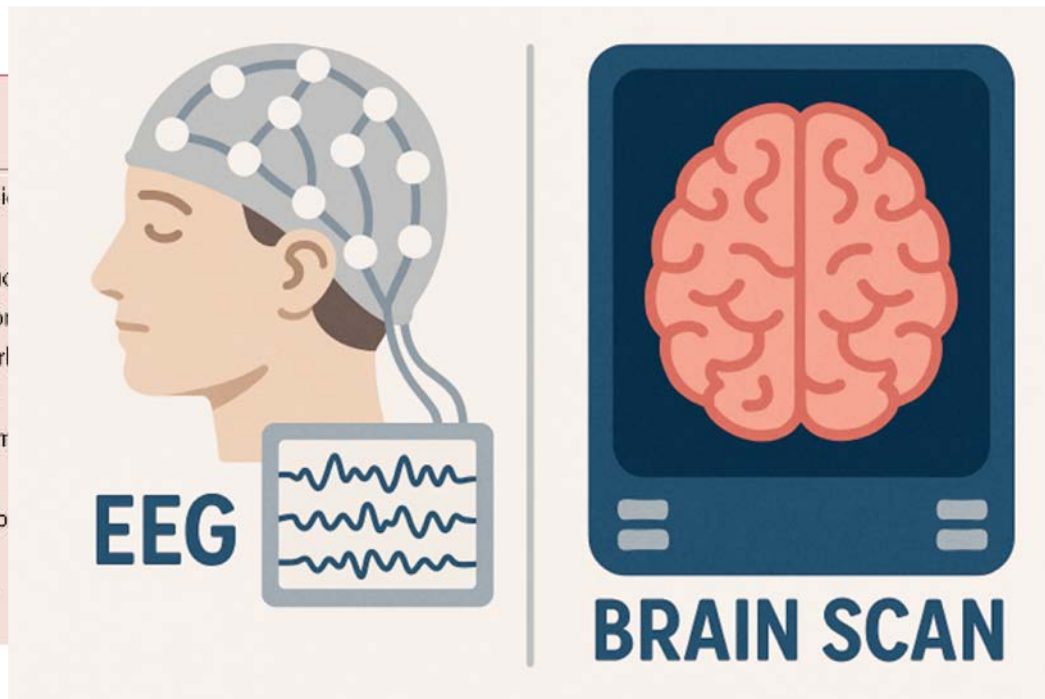
Méningites dans les pays à fort revenu

Adults, high-income countries



En l'absence d'évolution favorable

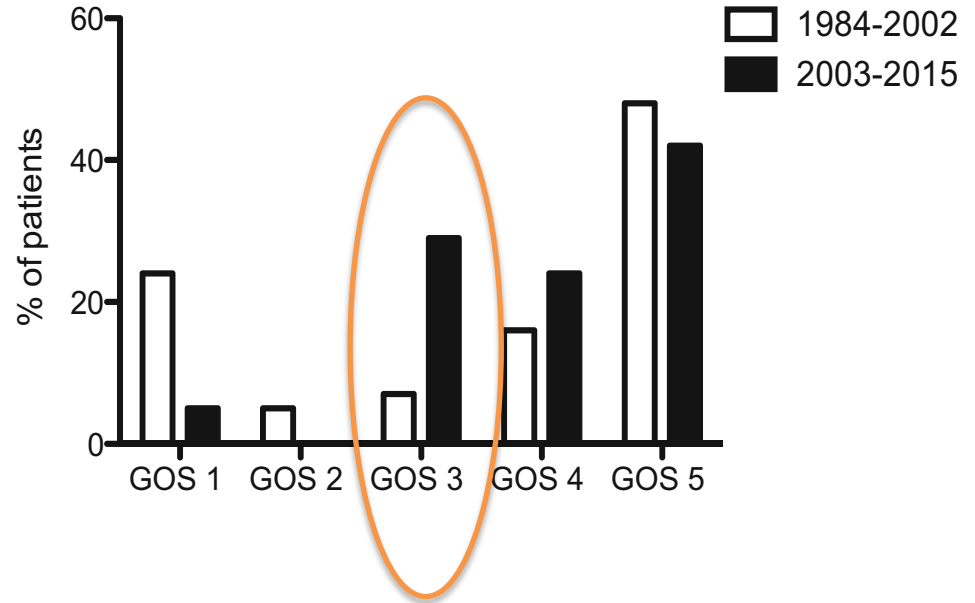
Characteristic
Neurological complications
Seizures
Neurological deficits
Cerebral infarction
Cerebral haemorrhage
Cerebral abscess
Subdural empyema
Hydrocephalus
Generalized cerebral oedema
Cerebral venous thrombosis



Cytogenetic
163 (47%)
182 (17%)
165 (21%)
167 (4%)
167 (2%)
156 (5%)
157 (0%)
166 (11%)
156 (3%)
167 (0%)

Quel est notre objectif ?

- Admission réanimation neurologique
- Surveillance neurologique horaire
- Imagerie immédiate en cas aggravation
- DTC toutes les 48H



Conclusions

- Méningite bactérienne toujours sujet actualité
- Identification précoce des patients
- Corticothérapie et Antibiothérapie précoces
- Pas d'argument formel pour monitoring PIC
- Imagerie si doute sur évolution défavorable
- Place de la daptomycine?