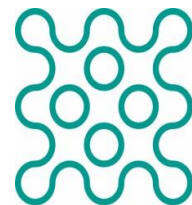


Abcès cérébraux DES MIT, Octobre 2025

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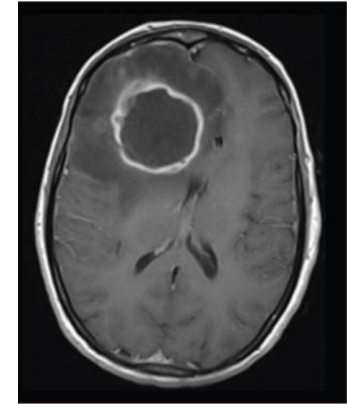
ESGIB

ESCMID STUDY GROUP
FOR INFECTIOUS DISEASES
OF THE BRAIN

European Society of Clinical Microbiology and Infectious Diseases

Abcès cérébraux

- **Infection focale** du SNC => **cavité néoformée**
- **Physiopathologie**
 - Cérébrite localisée (J1-J3)
 - Collection (J4-J7)
 - Capsule hypervascularisée (J8-J10)
- **Etiologies** : pyogènes, mycobactéries, champignons, parasites
- **Pathologie rare** :
 - Incidence <1 cas / 100 000 hab. / an
 - Plus importante chez immunodéprimés



Physiopathologie

Infection par contiguïté: 50%

Traumatisme crânien, neurochirurgie

Craniotomy with separation of skull and skin

Abscess

Infection ORL

Edema

Mastoid air cells

Abscess

Mastoiditis

Inconnue
????
15-20%

Dissémination hémato-gène: 30-35%

(endocardite, cardiopathie congénitale, foyers dentaires ou pulmonaires, shunts artério-veineux pulmonaires => Rendu Osler)

Septic embolus

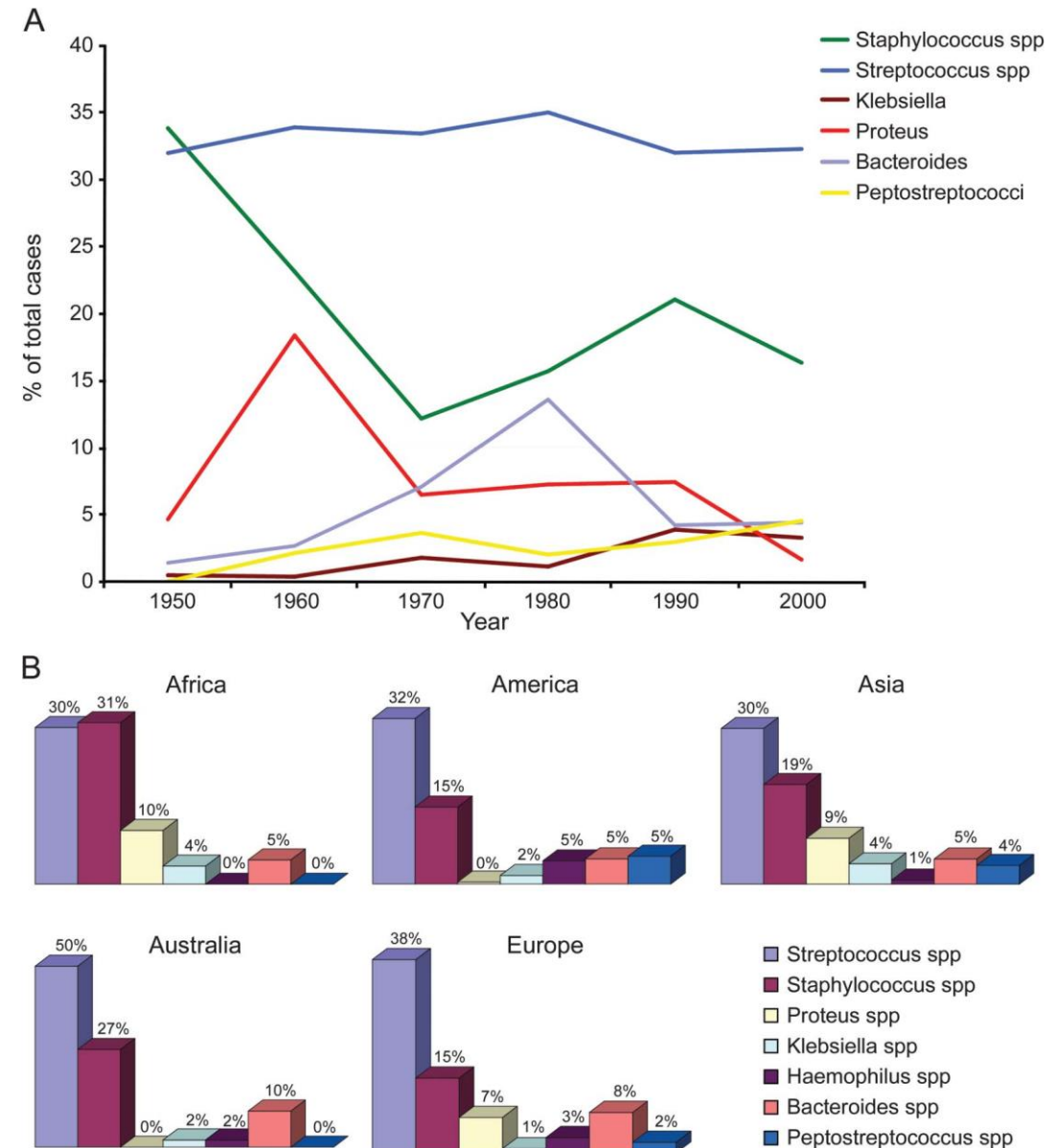
Endocarditis

Microbiology (1)

■ Meta-analysis (1935-2012)

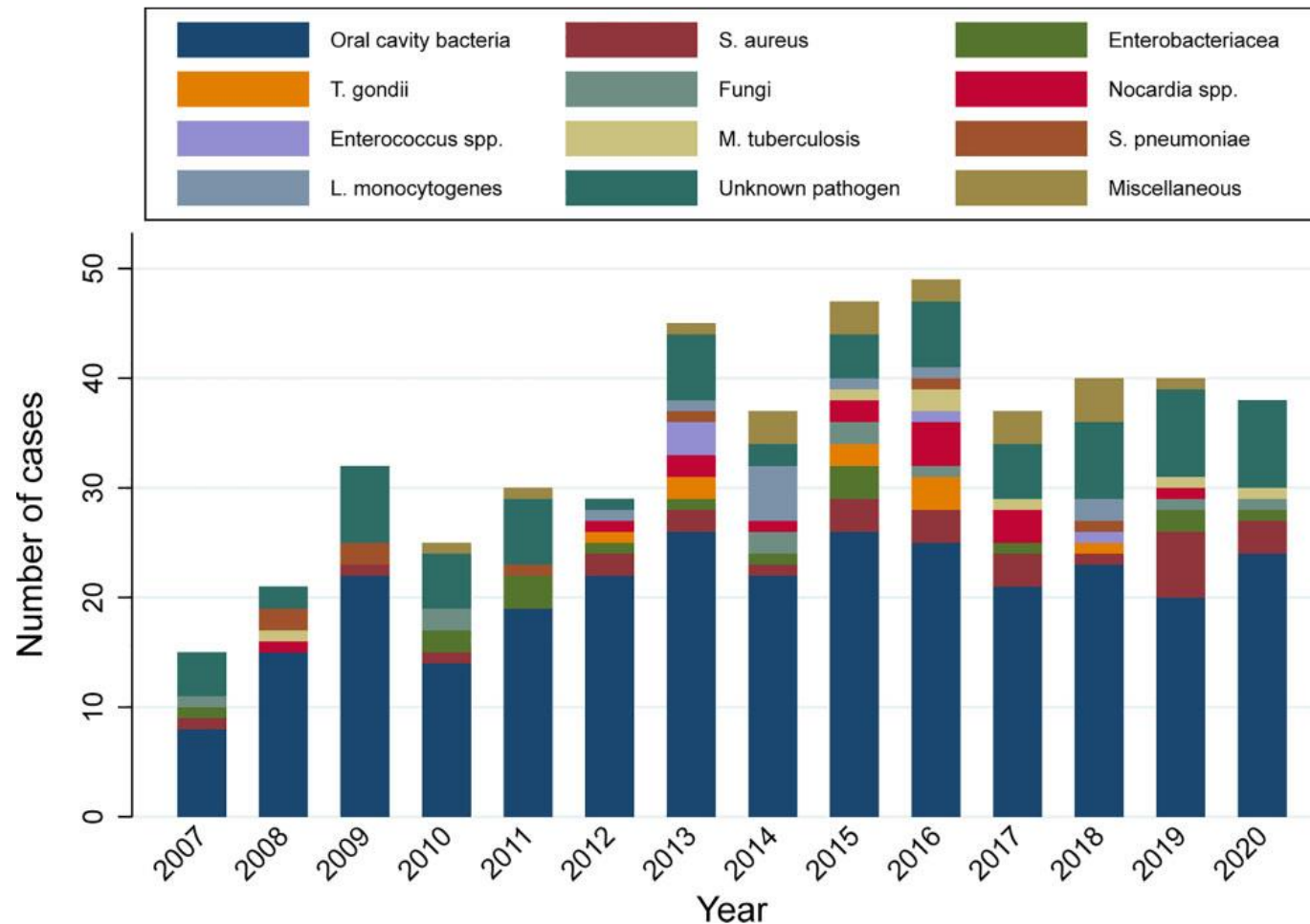
- 6,700 cases with microbiology
- Polymicrobial 25%
 1. streptococci
 2. staphylococci
 3. strict anaerobes
 4. *Enterobacterales*

Figure 1 Distribution of causative microorganisms through time and per continent

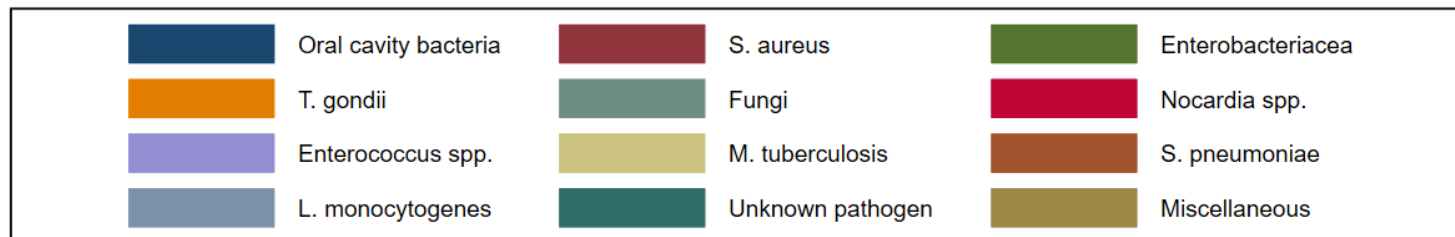
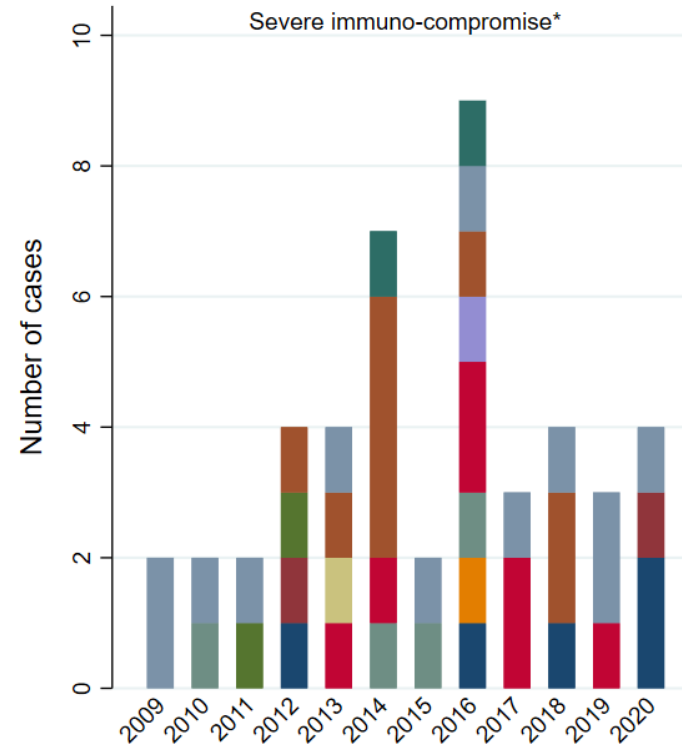
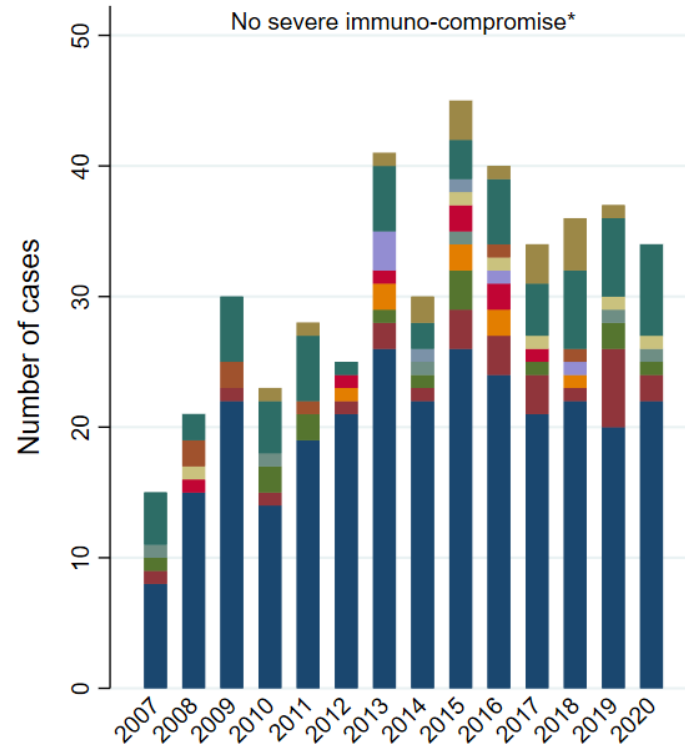


Microbiology (2)

Causative pathogens among 485 adults hospitalized with brain abscess in Denmark from 2007 through 2020



Microbiology (3)



*Severe immune-compromise was defined as solid organ transplant recipients, haematological malignancies, or immune-suppressive treatment. Please note differences in y-axis. Adopted with permission from Bodilsen et al, Brain, 2020, <https://doi.org/10.1093/brain/awac312>.

Microbiology - Summary

Source	Pathogens
Ear, nose and throat - Otitis - Mastoiditis - Paranasal sinusitis	Oral streptococci Strict anaerobes - <i>Prevotella</i> sp. - <i>Bacteroides</i> sp. <i>Enterobacterales</i>
Dental infections	Polymicrobial Oral streptococci Strict anaerobes <i>Actinomycetes</i>
Trauma / Neurosurgery	Staphylococci (primarily <i>S. aureus</i>) Streptococci <i>Enterobacterales</i>
Cardiovascular	<i>S. aureus</i> Streptococci

Immunodepression	Pathogens
HIV	Toxoplasmosis Tuberculosis Cryptococcosis
Haematological malignancies	<i>Aspergillus</i> sp. Nocardiosis Listeriosis <i>Mucorales</i> sp.
Solid organ transplant	Nocardiosis <i>Aspergillus</i> sp. Listeriosis Toxoplasmosis
Immunosuppressive agents (including corticosteroids)	Listeriosis Nocardiosis <i>Aspergillus</i> sp.

Clinical presentation (1935-2010)

Characteristic	n/N (%) ^a
Symptoms and signs	
Headache	4,526/6,575 (69)
Nausea/vomiting	1,993/4,286 (47)
Fever	3,718/6,970 (53)
Altered consciousness	3,207/7,479 (43)
Neurologic deficits	2,996/6,241 (48)
Seizures	1,647/6,581 (25)
Mean duration of symptoms ^f	8.3 d
Triad of fever, headache, focal neurologic deficits	131/668 (20)

Clinical presentation - contemporary

Symptoms and findings	n (%) or median (IQR)
Headache	270 (66)
History of fever	208 (54)
Triad of headache, history of fever, and any neurological deficit	97 (20)
Any neurological deficit	396 (82)
Symptom duration, days	3 (1–7)

Only 50% of patients present with fever !

Investigations (1935-2010)

Characteristic	n/N (%) ^a
Blood investigation	
Leukocytosis	1,366/2,273 (60)
Elevated CRP	196/316 (60)
Elevated ESR	311/434 (72)
Positive blood culture	135/484 (28)

Investigations (1935-2010)

CSF investigation	1,392/3,955 (35)
LP	1,286/1,298 (99)
Normal CSF	96/588 (16)
Pleocytosis	758/1,063 (71)
Elevated CSF protein	222/381 (58)
Culture positive	263/1,108 (24)
Clinical deterioration attributed to LP	76/1,030 (7)

Investigations - contemporary

Symptoms and findings	n (%) or median (IQR)
C-reactive protein, mg/l	27 (7–87)
Lumbar puncture within 72 h of admission	118 (24)
CSF leukocytes, 10 ⁶ /l ^b	798 (31–4303)
CSF protein, g/l	1.2 (0.7–2.5)
Blood:CSF glucose ratio	0.39 (0.09–0.50)
CSF lactate, mmol/l	3.5 (2.5–8.2)

Risk and diagnostic yield of lumbar puncture in patients with brain abscess

TABLE 1. STUDIES OF LUMBAR PUNCTURE IN PATIENTS WITH A BRAIN ABSCESS.

VARIABLE	YANG, ¹ 1952–1972	CHUN ET AL., ² 1970–1983	SCHLIAMSER ET AL., ³ 1973–1985	SEYDOUX AND FRANCIOLI, ⁴ 1977–1987	HÔPITAL BICHAT– CLAUDE BERNARD, 1980–1999
No. of patients	400	45	54	39	94
Lumbar punctures — no. (%)	173 (43)	27 (60)	24 (44)	17 (44)	55 (59)
Brain herniation after lumbar puncture — no./total no. (%)	2/173 (1)	0	1/24 (4)	0	1/55 (2)
Cerebrospinal fluid culture positive for bacteria — no./total no. (%)	NA*	2/27 (7)	8/24 (33)	0	26/65 (40)†

*NA denotes not available.

†In 10 of these 65 cases, a sample of ventricular cerebrospinal fluid was obtained during surgery.

Brain abscess location

Temporal: 25%

Parietal: 33%

Frontal: 44%

■ In text books:

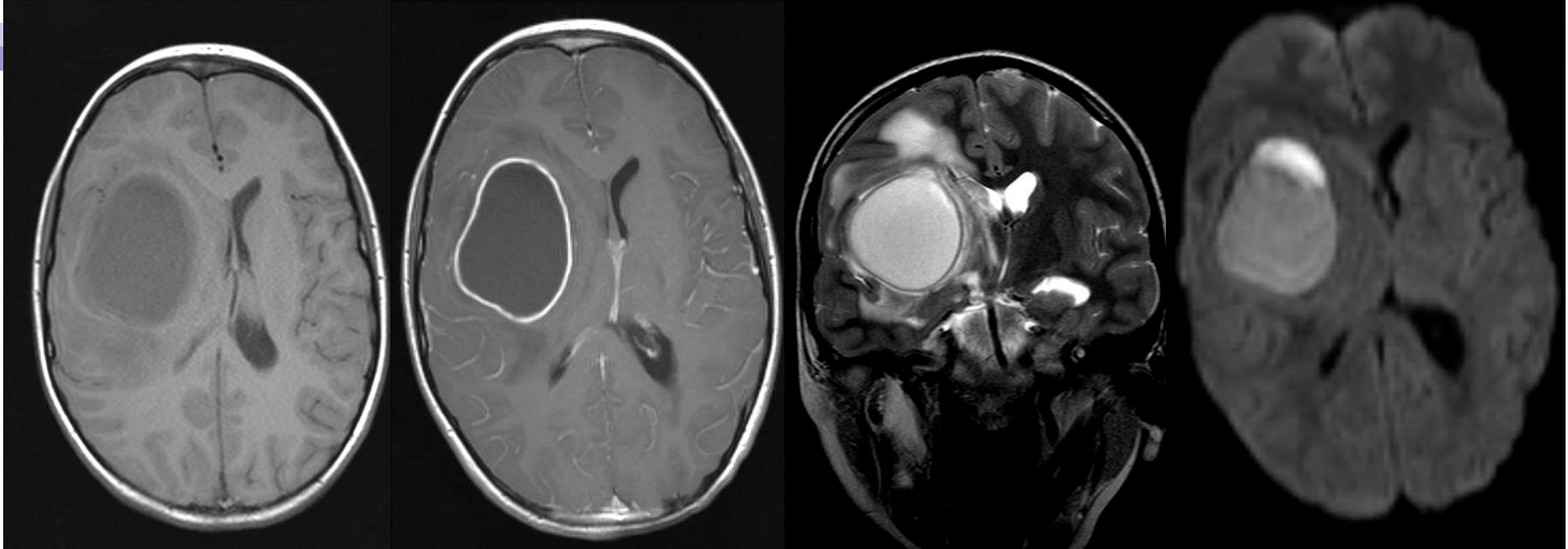
- Otitis => temporal, cerebellum
- Paranasal sinusitis => frontal, temporal
- Dental infections => frontal, temporal



Occipital: 19%

Cerebellum: 8%

Deep brain, brain stem: 17%



T1



Hypointense

T1 gado



Contrast-
enhanced
capsule

T2



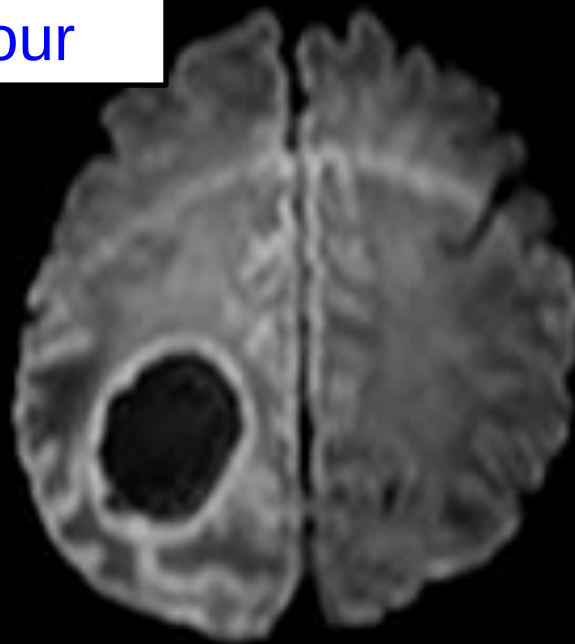
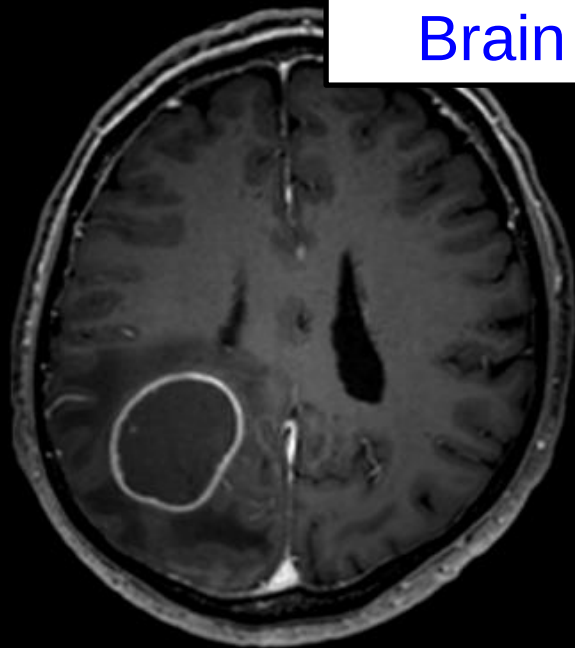
Hyperintense
lesion
Hypointense
capsule

Diffusion
B1000



Hyperintense
=> Abscess

Brain tumour

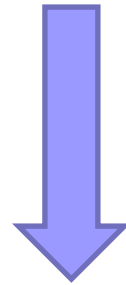


T1

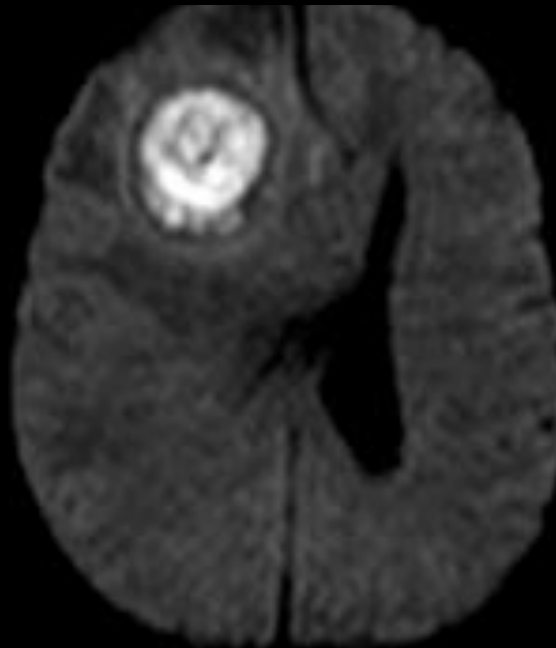
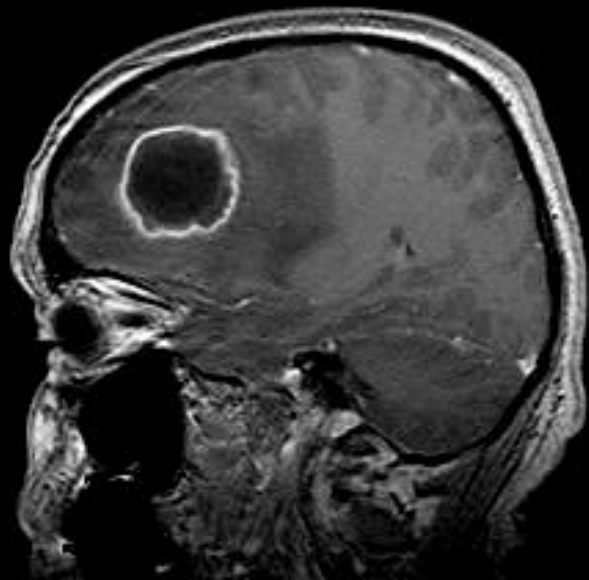
T1 Gado

T2

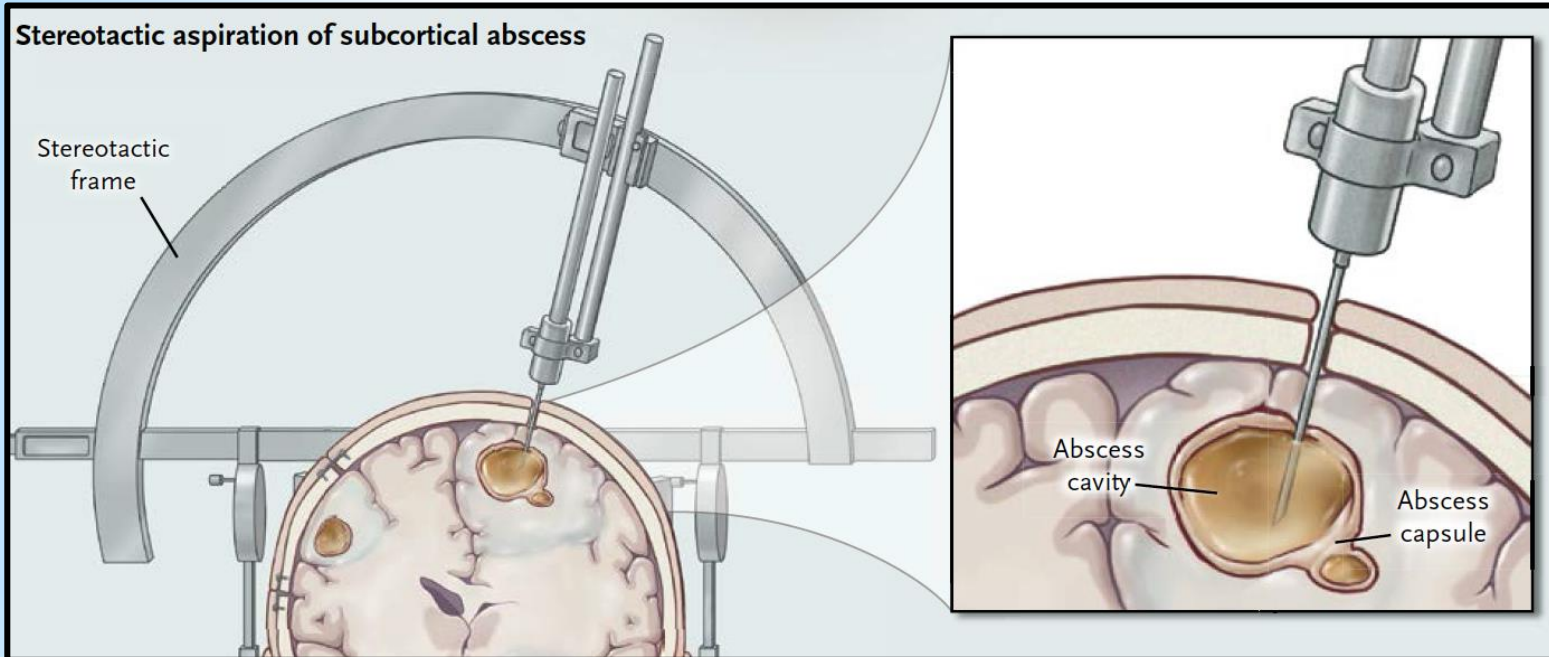
Diffusion



100% abscess



Ponction-aspiration stéréotaxique



Diagnostic de certitude / **risques mineurs**

Documentation microbiologique

Drainage, réduction inoculum

Diminution effet de masse

=> Indication large, dès que lésion ≥ 10 mm

+ indispensable pour lésion ≥ 25 mm

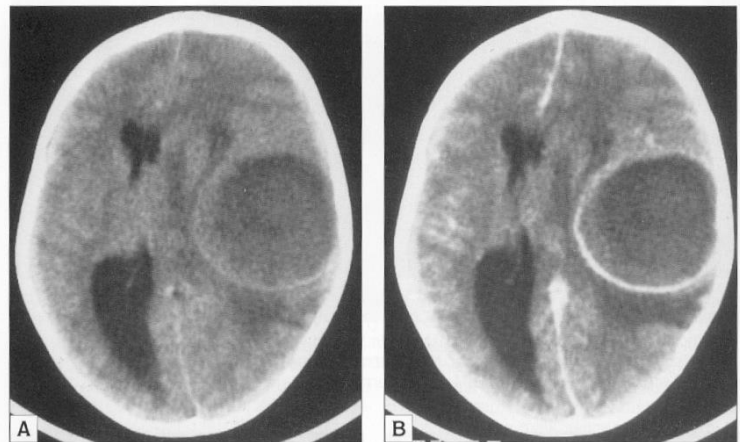
Prélèvements précieux => procédures écrites



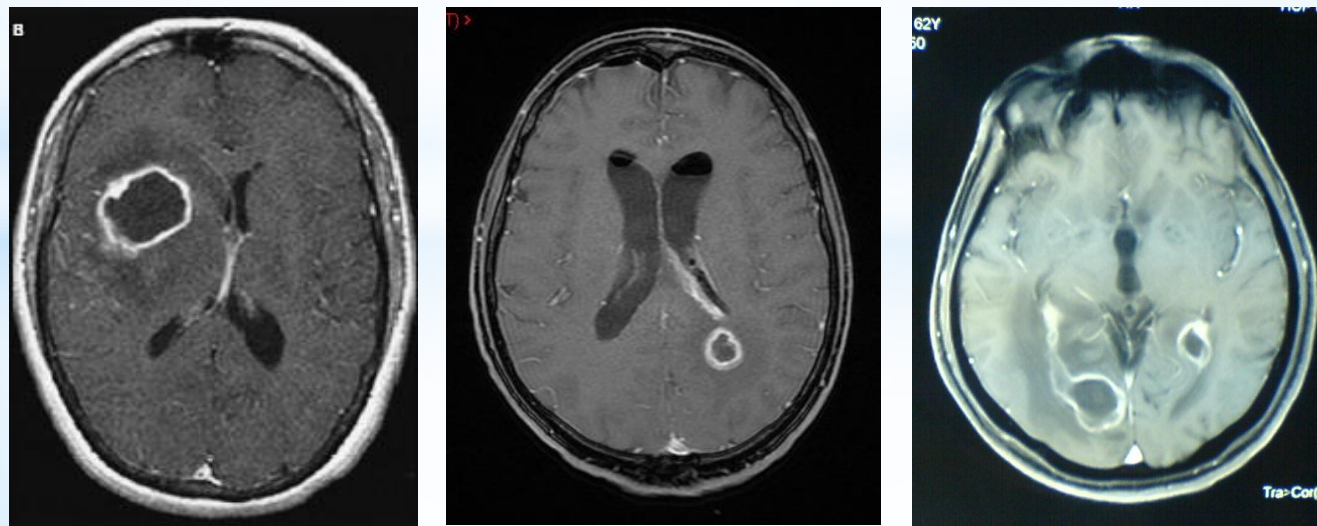
Laboratoire	Prélèvement	Type de recherche
Bactériologie (bon violet)	1) flacons 'hémocultures <u>aéro/anaérobie</u> à ensemercer au bloc	Milieu d'enrichissement : recherche standard notamment si <u>ATBthérapie</u> débutée
	2) 2 tubes type tube à ponction lombaire	- examen direct - recherche standard - biologie moléculaire : ne sera réalisée qu'en cas de négativité à 48 h de culture (PCR spécifiques, PCR ARN 16S) - mycobactérie
Anatomopathologie	3) 1 tube	Diagnostic différentiel
Mycologie- Parasitologie (bon jaune)	4) 1 tube type tube à ponction lombaire : A réaliser en cas d'immunodépression (infection par le VIH, hémopathie, chimiothérapie ou autre traitement immunosuppresseur, corticothérapie au long cours quelque soit l'indication)	Bon précisant « abcès cérébral, immunodépression en précisant le type d'immunodépression et la notion ou non de voyage à l'étranger » : cultures fongiques et biologie moléculaire (toxoplasme, PCR fongiques si cultures négatives)

+ Réalisation d'une hémoculture (flacon aéro/anaérobie) dans les minutes qui suivent le prélèvement intracérébral et avant la mise sous antibiotique

Effet de masse ?

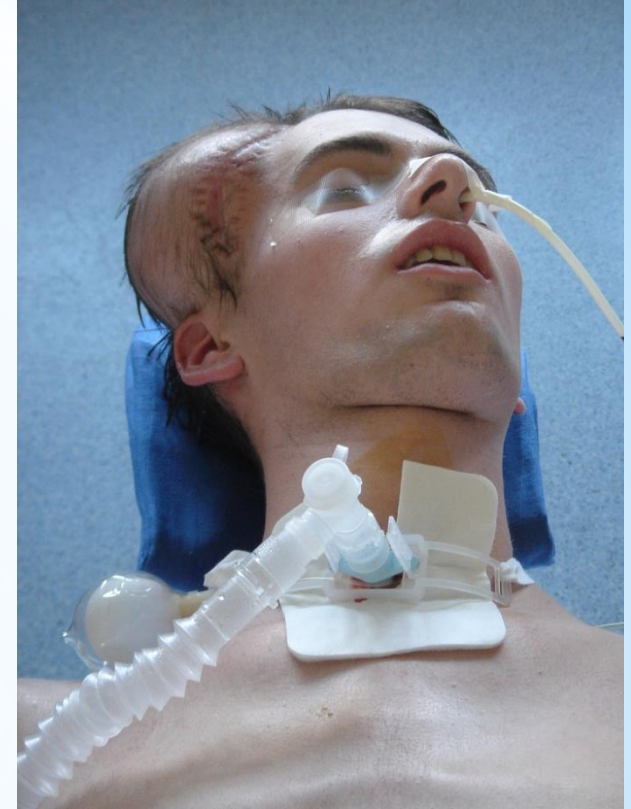


Risque de rupture intraventriculaire ?



CRANIECTOMIE large, DECOMPRESSIVE (ou si empyème sous-dural associé)

- hémisphérique
- ouverture large dure-mère (H)
- pas de plastie synthétique
- volet en nourrice ou cranioplastie secondaire
- repositionnement précoce



Antibiothérapie

Préalable: VIH & hémocultures pour tous !

Timing ?

Rapidement (<24 h, ESCMID 2023), *si possible après ponction*

NB. Ne pas attendre si altération conscience, sepsis

Désescalade ?

Possible, si pathogène(s) identifié(s) et prélèvements fiables

Se méfier des anaérobies (fragiles, parfois 'ratés')

Durée ?

6 semaines si situation simple, évolution rapidement favorable

(4 semaines pour métronidazole: fragilité anaérobies + EIG)

Relai per os ? Essai Européen en cours = ORAL

Seulement avec les bonnes molécules (absorption/diffusion SNC):

Rifampicine, FQ, TMP-SMX, METRONIDAZOLE, LINEZOLIDE

Antibiothérapie initiale

PATIENT IMMUNOCOMPÉTENT

Infection « communautaire » (contiguïté / orig. indéterminée)

Céfotaxime : 2 g x 6 / jour IVL

(ou ceftriaxone 2 g x 2 / j IVL)

+

Métronidazole : 500 mg x 3/ j

Infection post-opératoire

Méropénème : 2 g x 3 / jour IVL

(ou céfépime ou ceftazidime)

+

Linézolide 600 mg x 3/j

(ou vancomycine, dose de charge puis IVSE fortes doses)

Antibiothérapie initiale

PATIENT IMMUNODEPRIME

À discuter, toujours

Céfotaxime : 2 g x 6 / j IVL

(ou ceftriaxone 2 g x 2 / j IVL)

+

Métronidazole : 500 mg x 3/ j

+ si transplanté d'organe solide / hémato :

- Cotrimoxazole fortes doses (*Nocardia*)
- Voriconazole avec monitoring (*Aspergillus*)

+ si patient VIH +

- Cotrimoxazole fortes doses (si séro toxo+ & CD4<200/mm3)
- Antituberculeux si FDR (zone d'endémie, etc...)

Outcome (1)

■ Numerous studies on prognostic factors

➤ Patient 'at baseline'

- Age > 65 years
- Charlson comorbidity index
- Immunosuppression

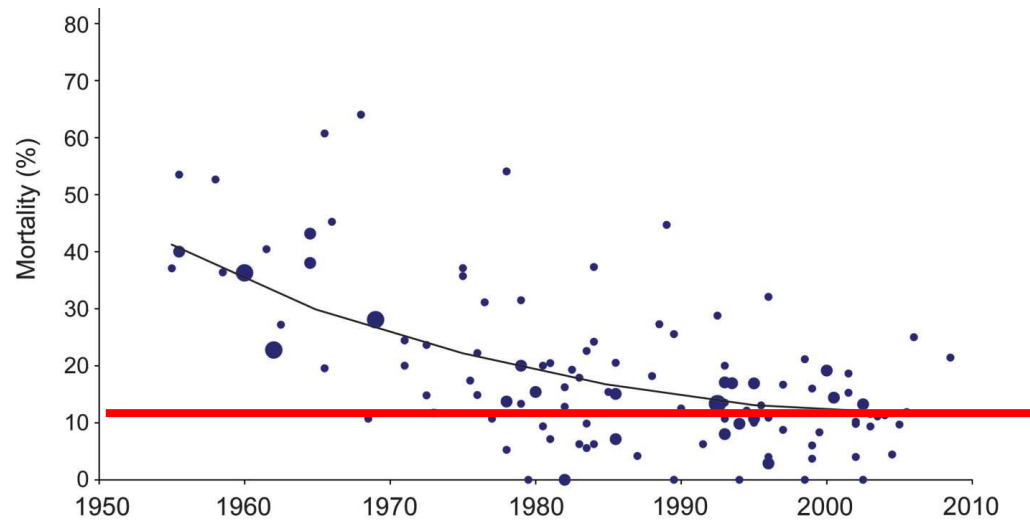
➤ The extent of disease by time of diagnosis

- Glasgow coma scale
- ICU admission
- Number / size of brain lesions

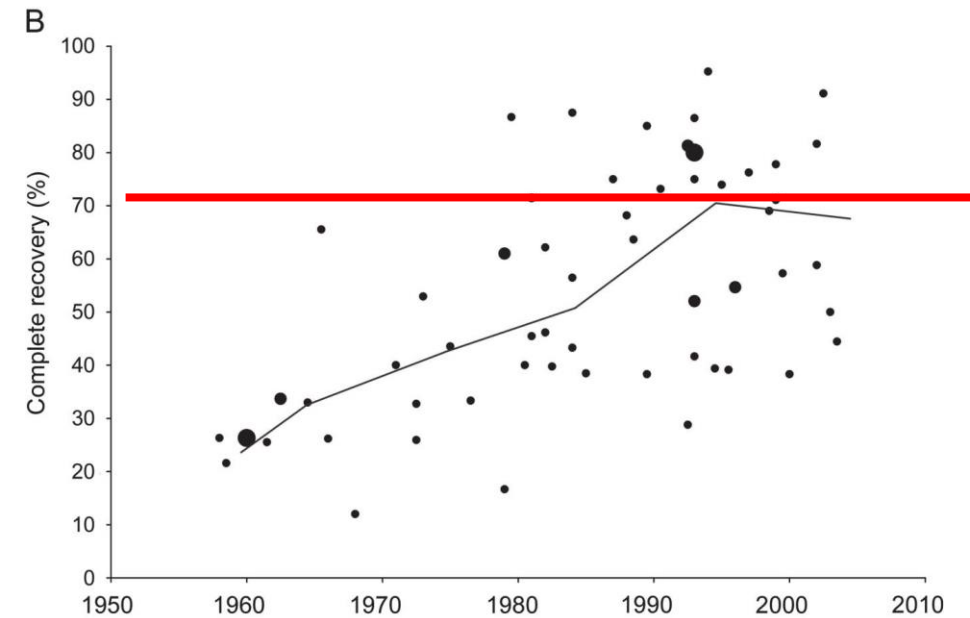
➤ Intraventricular rupture of brain abscess (IVROBA)

- Sudden worsening of headache / neurological status / meningeal signs
- Catastrophic event => low survival & heavy sequels

Outcome (2)

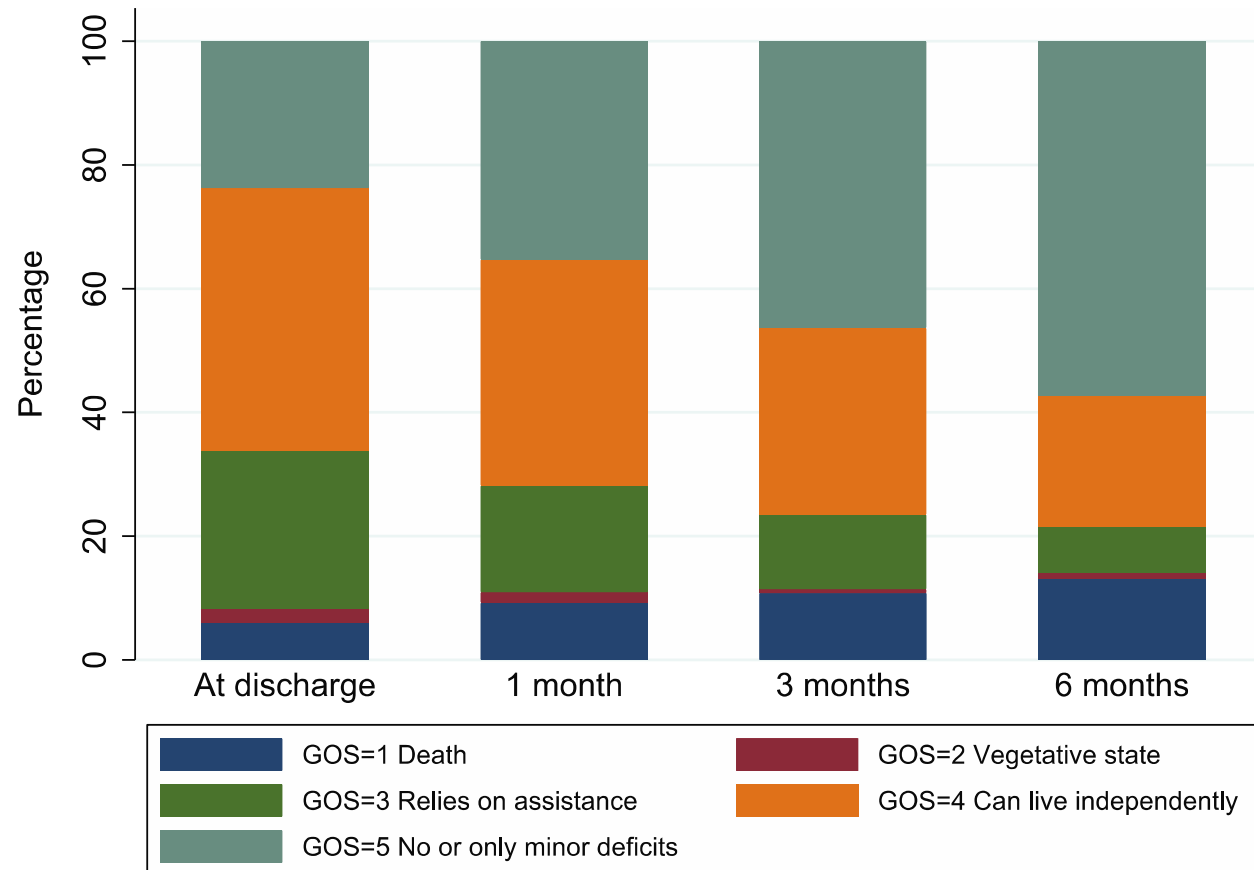


B
100
7



Outcome (3)

Outcome according to duration of follow-up among 485 adults hospitalized with brain abscess in Denmark from 2007 through 2020.



Take-home messages

■ Screening of predisposing condition is key

- **Source** (ENT or dental infection, hematogeneous, trauma/neurosurgery)
- **Underlying disease** (HIV, etc.)

■ Diagnosis

- **Headache 65%, fever 50%, neurological deficit 50%, triad 20%**
- **Microbiology:** oral streptococci / *S. aureus* / strict anaerobes / *Enterobacterales*

■ Empirical treatment

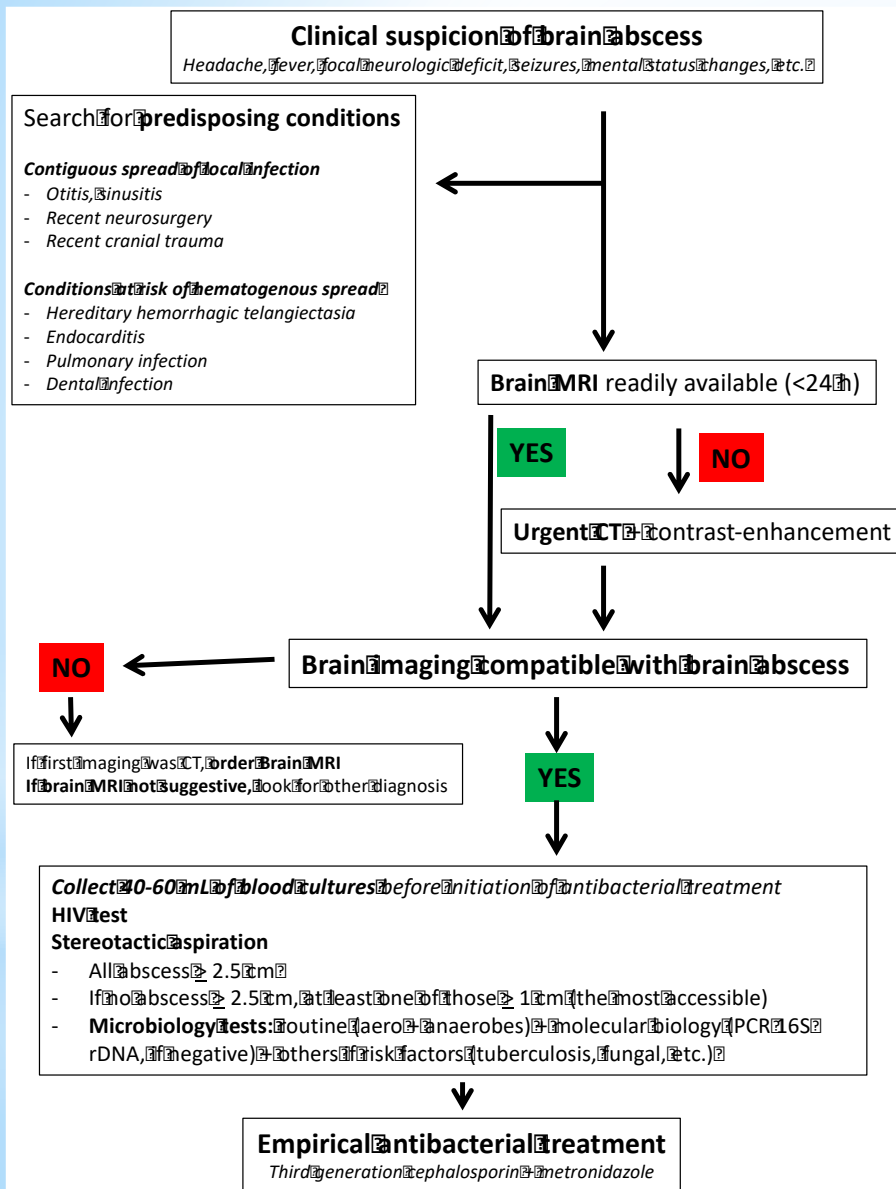
- **Immunocompetent community-acquired:** 3G cephalosporin + metronidazole
- **Immunocompromised:** cotrimoxazole + voriconazole

■ Outcome

- **No or minor sequel, 80%**
- **Prognostic factors:** 1. baseline status; 2. extent of the disease; 3. IVROBA

An update on bacterial brain abscess in immunocompetent patients

R. Sonnevile¹, R. Ruimy², N. Benzonana³, L. Riffaud⁴, A. Carsin⁵, J.-M. Tadié⁶, C. Piau⁷, M. Revest⁶, P. Tattevin^{6,*}, the ESCMID Study Group for Infectious Diseases of the Brain



European society of Clinical Microbiology and Infectious Diseases guidelines on diagnosis and treatment of brain abscess in children and adults

Jacob Bodilsen^{1,2,3,*}, Quintino Giorgio D'Alessandris^{4,5}, Hilary Humphreys⁶, Mildred A. Iro⁷, Matthias Klein^{3,8,9}, Katharina Last^{3,10}, Inmaculada López Montesinos^{11,12}, Pasquale Pagliano^{3,13,14}, Oğuz Reşat Sipahi^{3,15,16}, Rafael San-Juan^{12,17,18}, Pierre Tattevin^{3,19}, Majda Thurnher²⁰, Rogelio de J. Treviño-Rangel^{21,22,23,24}, Matthijs C. Brouwer^{3,25}, for the ESCMID Study Group for Infections of the Brain (ESGIB)

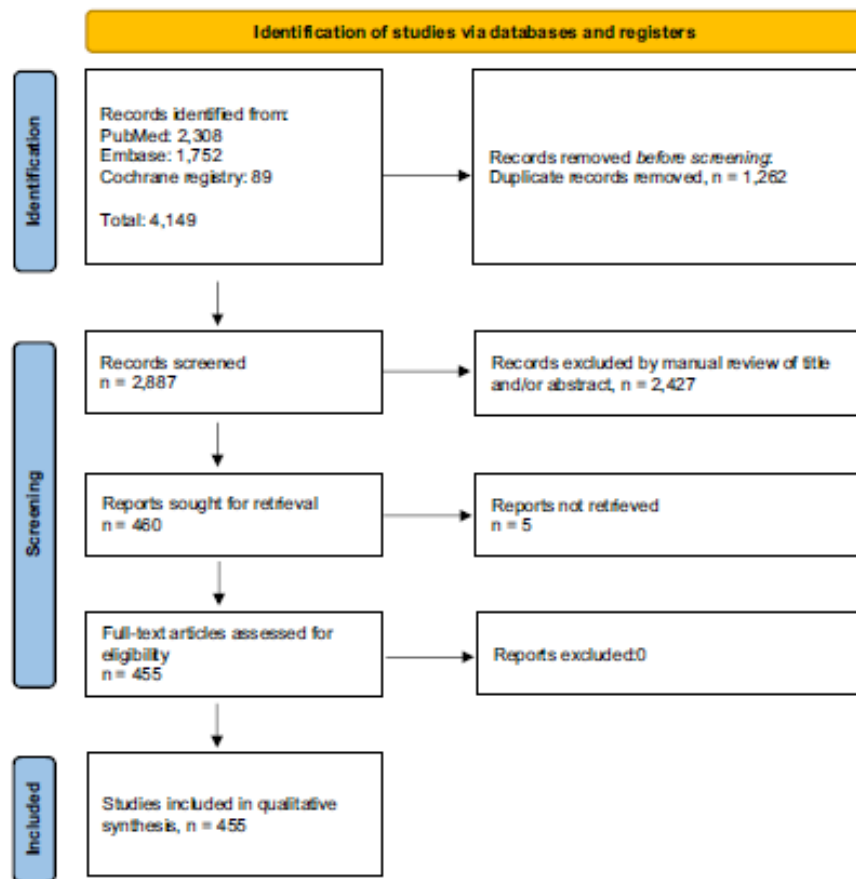


Fig. 1. Study flowchart.