Encéphalites aiguës en réanimation

Romain Sonneville

Réanimation Médicale et Infectieuse

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université
PARIS
DIDEROT
PARIS 7

Encéphalites aiguës en réanimation

- Définitions et épidémiologie des encéphalites en 2013
- Diagnostiquer et prendre en charge les causes infectieuses justifiant un traitement spécifique
- Reconnaître et traiter causes “non-infectieuses”
  - Encéphalites post-infectieuses
  - Autres encéphalites auto-immunes
- Pronostic

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Case Definitions, Diagnostic Algorithms, and Priorities in Encephalitis: Consensus Statement of the International Encephalitis Consortium

- **CRITERE MAJEUR : trouble de conscience, confusion, troubles du comportement (durée ≥ 24 H)**

- **CRITERES MINEURS (au moins 3 éléments suivants)**
  - Fièvre (dans les 72H encadrant l'admission)
  - Convulsions "*de novo*"
  - Signes focaux d'apparition récente
  - LCR: ≥ 5 cellules/mm^3
  - Imagerie cérébrale: anomalies parenchymateuses
  - EEG: anomalies

A. Venkatesan, Clin Infect Dis 2013

Case Definitions, Diagnostic Algorithms, and Priorities in Encephalitis: Consensus Statement of the International Encephalitis Consortium

ENCEPHALITE AIGUË
Confirmée si mise en évidence

- d'une inflammation du parenchyme cérébral
(histologie)

- d'un pathogène pourvoyeur d'encéphalite
(histologie, microbiologie, sérologie)

- d'un "contexte dysimmunitaire" pourvoyeur de manifestations encéphalitiques
(examens immunologiques sang, LCR)

Probable sinon

A. Venkatesan, Clin Infect Dis 2013

Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study

Julia Granerod, Helen E Ambrose, Nicholas W S Davies, Jonathan P Clewley, Amanda L Walsh, Dilys Morgan, Richard Cunningham, Mark Zuckerman, Ken J Mutton, Tom Solomon, Katherine N Ward, Michael P T Lunn, Sarosh R Irani, Angela Vincent, David W G Brown, Natasha S Crowcroft, on behalf of the UK Health Protection Agency (HPA) Aetiology of Encephalitis Study Group

203 patients
Adults > 16 yrs
18 months, 2008-2009

J Granerod, Lancet Infectious Diseases 2010

Causes of encephalitis and differences in their clinical presentations in England: a multicentre, population-based prospective study

Julia Granerod, Helen E Ambrose, Nicholas W S Davies, Jonathan P Clewley, Amanda L Walsh, Dilys Morgan, Richard Cunningham, Mark Zuckerman, Ken J Mutton, Tom Solomon, Katherine N Ward, Michael P T Lunn, Sarosh R Irani, Angela Vincent, David W G Brown, Natasha S Crowcroft, on behalf of the UK Health Protection Agency (HPA) Aetiology of Encephalitis Study Group

Infectieuses 42%

HSV-1: 38 (19%)
BK:10 (5%)
VZV: 10 (5%)

Cause inconnue 37%

Dysimmunitaires 21%

Acute Disseminated Encephalomyelitis (ADEM): 23 (11%)
NMDA-R Encephalitis: 9 (4%)
VGKC Encephalitis: 7 (3%)
Systemic vasculitis: 1 (0.5%)
Multiple Sclerosis: 1 (0.5%)

J Granerod, Lancet Infectious Diseases 2010

Beyond Viruses: Clinical Profiles and Etiologies Associated with Encephalitis

Clin Infect Dis, 2006

C. A. Glaser,[1] S. Honarmand,[1] L. J. Anderson,[3] D. P. Schnurr,[1] B. Forghani,[1] C. K. Cossen,[1] F. L. Schuster,[1] L. J. Christie,[1] and J. H. Tureen[2]

- **1998-2005: 1570 patients (adultes et enfants)**
- **Admission réanimation 58%**

Infectious Encephalitis in France in 2007: A National Prospective Study

Clin Infect Dis 2009

Alexandra Mailles[1] and Jean-Paul Stahl,[2] on behalf of the Steering Committee and the Investigators Group[a]

[1]Institut de Veille Sanitaire, Saint-Maurice, and [2]Infectious Diseases Unit, University Hospital of Grenoble, Grenoble, France

- **2007: 253 patients (adultes)**
- **Admision réanimation 46%**

404 patients identified
(CIM-10)

Bichat Medical ICU
1991-2012

125 patients excluded

Missing data (n=31)
Alternate diagnosis (n = 29)
No encephalitic signs (n = 25)
Bacterial meningitis (n = 23)
AIDS-defining CNS diseases (n= 12)
Brain abscesses (n= 6)

279 patients with encephalitis
Period 1: 1991-2001, n=153 patients
Period 2: 2002-2012, n=126 patients

Infections
159 (53%)

Immune-mediated
41 (15%)

Unknown
89 (32%)

CAUSES	Period 1 (1991-2001) N = 153	Period 2 (2002-2012) N = 126
INFECTIONS	88 (58%)	61 (48%)
BK	40 (26%)	25 (20%)
HSV	22 (14%)	18 (14%)
Listeria	15 (10%)	4 (3%)
VZV	6 (4%)	8 (6%)
Autres	5 (3%)	6 (5%)
IMMUNE-MEDIATED	15 (10%)	26 (21%)
ADEM	10 (7%)	14 (11%)
Other	5 (3%)	12 (10%)
UNKNOWN	50 (33%)	39 (31%)

Bichat Medical ICU
1991-2012

Data are n (%)

SRLF 2013

CAUSES	Period 1* (1991-2001) N = 153	Period 2* (2002-2012) N = 126
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Bichat Medical ICU
1991-2012

***Chi-2, P=0.04**

Data are n (%)

SRLF 2013

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The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America

IDSA GUIDELINES

EPIDEMIOLOGICAL DATA	CLINICAL EXAMINATION	OTHER EXAMS
• Medical history • Immunosuppresion • Medications • Seasonal/epidemic context ? • Recent travel ?	• Neurological signs • Optic nerve • Extra-neurological signs	• **BRAIN MRI with gd** • **CSF (cultures, PCR)** • EEG • Serologies • Immunology tests

ALWAYS CONSIDER THE MOST FREQUENT DIAGNOSES REQUIRING SPECIFIC THERAPY

  - Insects
- Recent Immunization

Tunkel CID 2008

Case Definitions, Diagnostic Algorithms, and Priorities in Encephalitis: Consensus Statement of the International Encephalitis Consortium

ROUTINE STUDIES
CSF
Collect at least 20 cc fluid, if possible; freeze at least 5–10 cc fluid, if possible
Opening pressure, WBC count with differential, RBC count, protein, glucose
Gram stain and bacterial culture
HSV-1/2 PCR (if test available, consider HSV CSF IgG and IgM in addition)
VZV PCR (sensitivity may be low; if test available, consider VZV CSF IgG and IgM in addition)
Enterovirus PCR
Cryptococcal antigen and/or India Ink staining
Oligoclonal bands and IgG index
VDRL

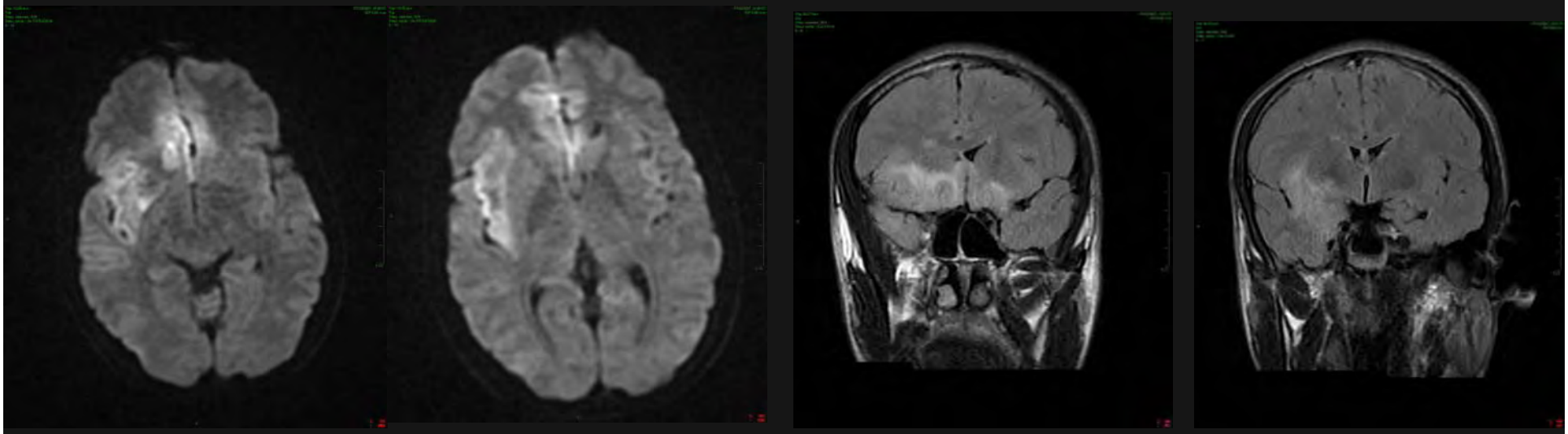
PCR CMV, HHV6, PCR HIV, JC virus
PCR *Toxoplasma gondii*
M. tuberculosis

SI IMMUNODEPRIME

A. Venkatesan, CID 2013

The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America

“ MRI is the most sensitive neuroimaging test to evaluate patients with encephalitis” (A-I).



H 26 ans
Méningo-encéphalite aiguë
IRM H6 admission réanimation

Tunkel CID 2008

The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America

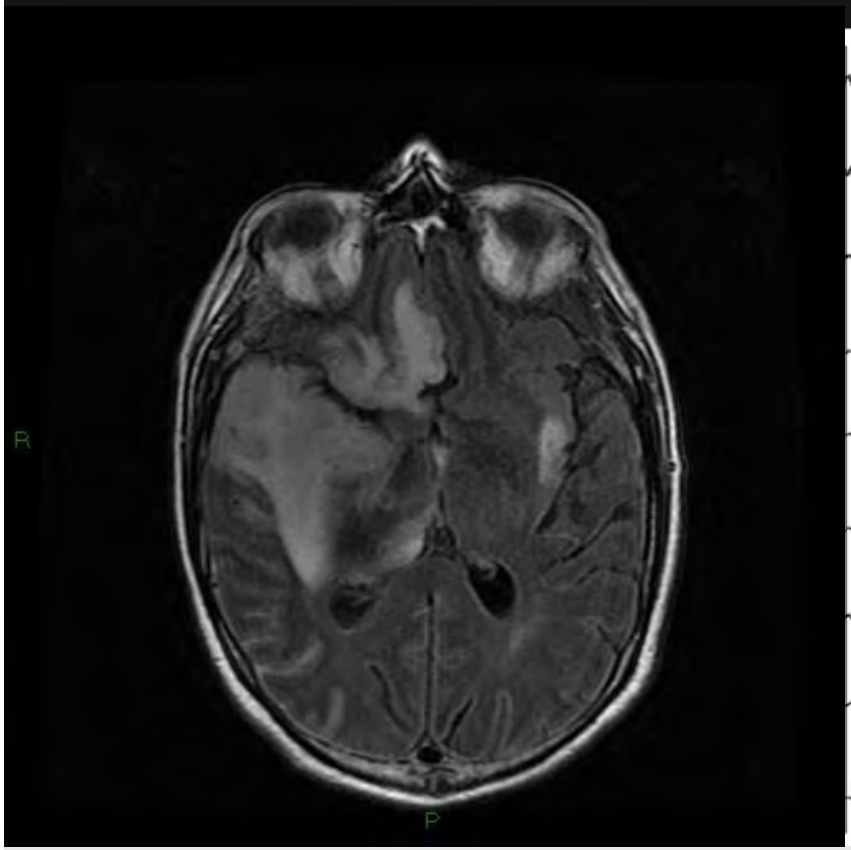
[redacted]

14. Electroencephalography (EEG) is rarely helpful in establishing an etiology in patients with encephalitis, but it has a role in identifying patients with nonconvulsive seizure activity who are confused, obtunded, or comatose and should be performed in all patients with encephalitis (A-III).

[redacted]

Tunkel CID 2008

PLEDs



PLEDs

Complexe bi-, tri-, ou polyphasique, comportant une composante d'ondes lentes et/ou une composante de pointes, pointes lentes, voire de polypointes.

Durée du complexe : 60—600 ms (en moyenne 200 ms)

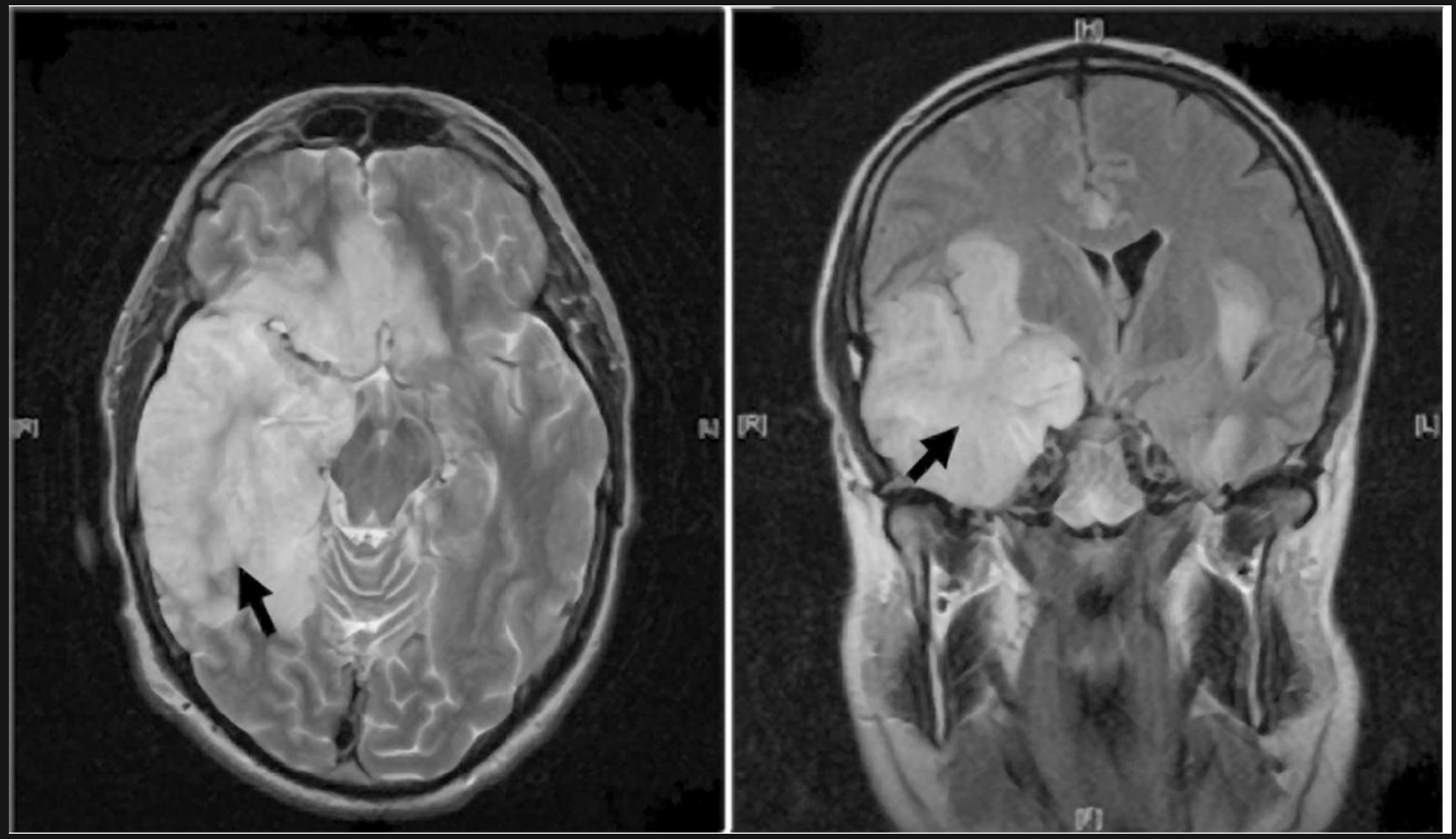
Amplitude : 50—300 μV (habituellement jusqu'à 150 μV)

Fréquence : 0,2—3 Hz (habituellement 0,5—2 Hz)

Persistance : un minimum de 10 minutes durant un enregistrement standard (de 20 minutes).

Évolution : statique, avec une faible variabilité (< 50 %) de ses caractéristiques.

Méningo-encéphalite herpétique



Factors associated with delay to acyclovir administration in 184 patients with herpes simplex virus encephalitis

J. Poissy[1], M. Wolff[2], A. Dewilde[3], F.Rozenberg[4], F. Raschilas[5], M. Blas[1], H. Georges[6], C. Chaffaut[7] and Y. Yazdanpanah[1,8,9]

184 patients with PCR-proven HSV-1 encephalitis

Temperature (°C), median (IQR 25–75)	39.0 (38.4–39.5)
GCS score, median (IQR 25–75)	14 (13–15)
Neurological signs (%)	
Language disturbances	47.3
Temporal–spatial disorientation	43.6
Seizures	36.7
Behavioural changes	34.9
CSF parameters	
Leukocyte count cells/mL × 10^3, median (IQR 25–75)	83.5 (21.0–195.5)
Lymphocytes (%)	80.5 (58.0–95.0)
Polynuclear neutrophils (%)	4.0 (1.0–16.0)
Protein concentrationl (g/L), median (IQR 25–75)	0.67 (0.5–1)

Clin Microbiol Infect 2009; **15**: 560–564

Herpes simplex encephalitis

Why is it missed?

- Signes neurologiques frustres
- Formes cliniques sans fièvre (10-15%)
- LCR : absence de pléiocytose (10-15%)
- TDM initial normal : 33% des patients avt J7
- PCR HSV négative au début des symptômes

M sabah, BMJ 2012

Outcome of and Prognostic Factors for Herpes Simplex Encephalitis in Adult Patients: Results of a Multicenter Study

Franck Raschilas,[1,2] Michel Wolff,[2] Frédérique Delatour,[3] Cendrine Chaffaut,[4] Thomas De Broucker,[5] Sylvie Chevret,[4] Pierre Lebon,[1] Philippe Canton,[6] and Flore Rozenberg,[1] for the French Herpes Simplex Encephalitis Study Group[a]

Adverse outcome at 6-month: 84 adults

Variables	OR	CI 95%	p
SAPS 2 > 27	3.7	1.3-10.6	0.014
Admission – Acyclovir Rx > 2 days	3.1	1.1-9.1	0.037

Clin Infect Dis 2002

Vidarabine versus Acyclovir Therapy in Herpes Simplex Encephalitis

Richard J. Whitley, M.D., Charles A. Alford, M.D., Martin S. Hirsch, M.D., Robert T. Schooley, M.D., James P. Luby, M.D., Fred Y. Aoki, M.D., Daniel Hanley, M.D., Andre J. Nahmias, M.D., Seng-Jaw Soong, P.D., and The NIAID Collaborative Antiviral Study Group*

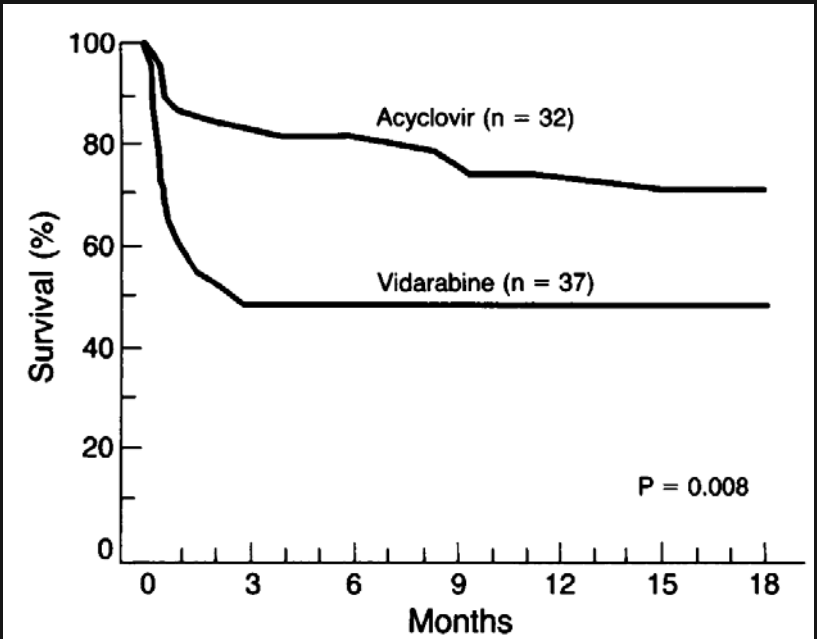
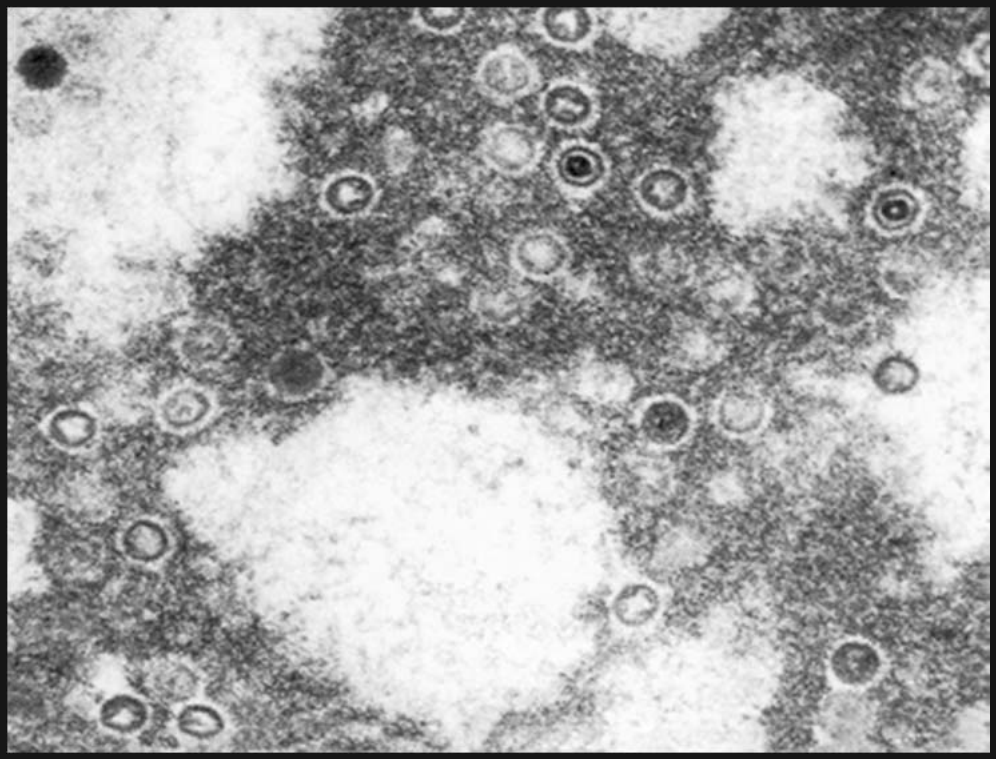


Figure 3. Comparison of Survival in Patients with Biopsy-Proved Herpes Simplex Encephalitis Treated with Vidarabine or Acyclovir.



Acyclovir IV 10mg/kg/8H
Durée 10 jours

N Engl J Med 1986

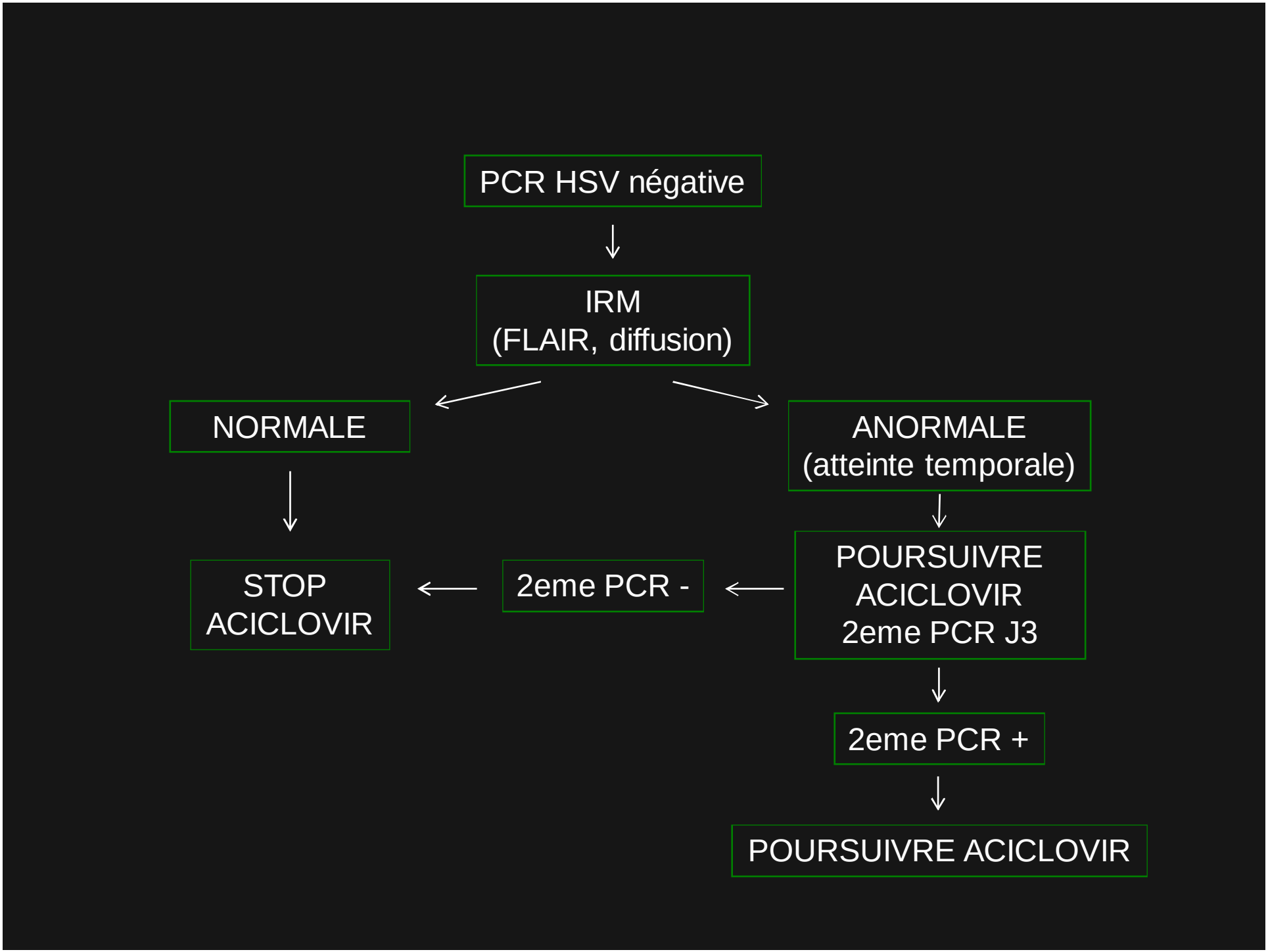
Méningo-encéphalite herpétique

- Acyclovir IV : 10 mg/kg/8h IVL si fonction rénale normale

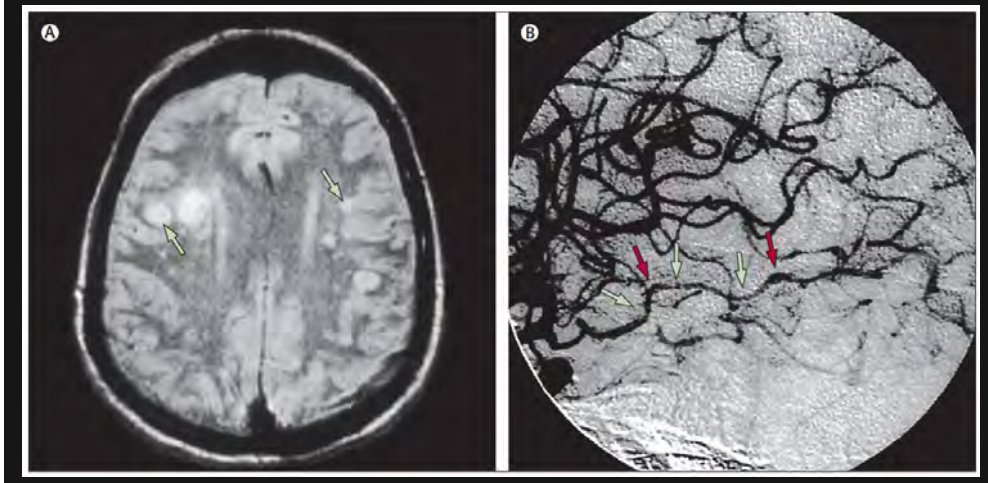
- Durée ACV : 14 à 21 jours CAR
  - Existence de rechutes à l'arrêt à J10
  - Persistence de PCR + au delà de 10 jours chez certains patients

- PCR de contrôle à l'arrêt du traitement

(+++ si évolution clinique imparfaite sur le plan neurologique)

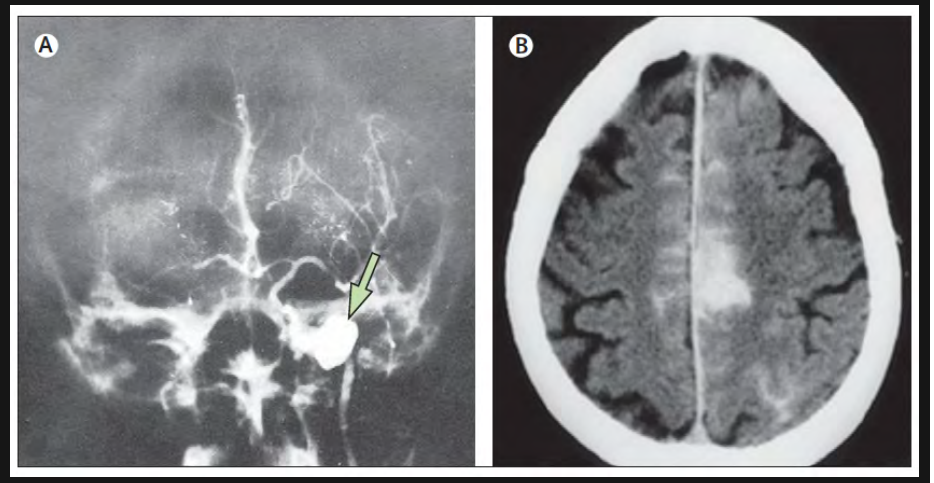

PCR HSV négative
IRM
(FLAIR, diffusion)
NORMALE
ANORMALE
(atteinte temporale)
STOP
ACICLOVIR
2eme PCR -
POURSUIVRE
ACICLOVIR
2eme PCR J3
2eme PCR +
POURSUIVRE ACICLOVIR

Varicella zoster virus vasculopathies: diverse clinical manifestations, laboratory features, pathogenesis, and treatment



SMALL VESSEL MULTIFOCAL VASCULOPATHY

LARGE VESSEL GRANULOMATOUS ARTERITIS



MCA ANEURYSM AND SAH

D Gilden, Lancet Neurol 2009

British Infection Society guidelines for the diagnosis and treatment of tuberculosis of the central nervous system in adults and children

- Liquide clair, pression d'ouverture > 25 cmH_20 (50%)
- Pléïocytose: 5 -1000 éléments /mm^3
  - Neutrophiles: 10-70%
  - Lymphocytes: 30-90%
- Protéinorachie: 0.45-3 g/l , > 1g/l +++

(supérieure si «blocage spinal»)

- Glucose LCR/sang < 0.5 : 95%
- Lactate: 5-10 mmol/l

Thwaites, J Infection 2009

British Infection Society guidelines for the diagnosis and treatment of tuberculosis of the central nervous system in adults and children

- **Recherche de BAAR dans le LCR +++ (A II)**
  - Volume à analyser > 5 ml (A II)
  - Analyses répétées
  - Examen direct + jusqu'à 80% des malades
  - Négativation rapide après début ttt anti BK

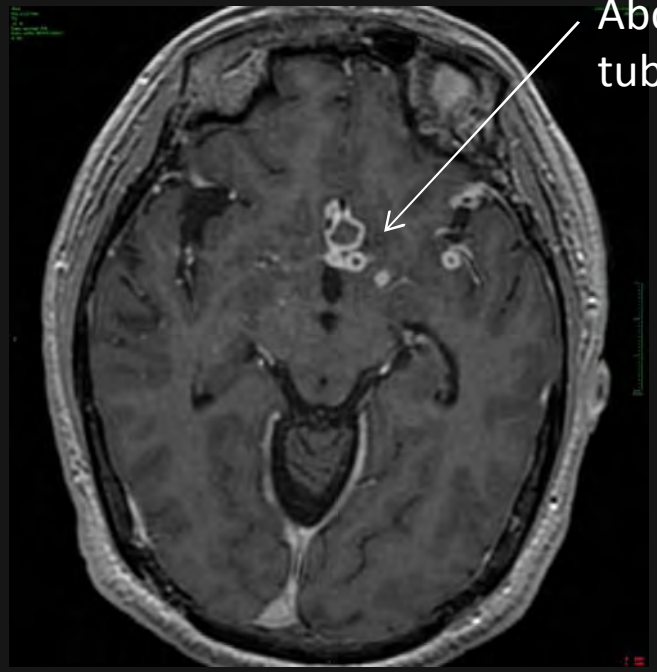
- **PCR BK (B II):**
  - Sensibilité 56% (IC 95: 46-66%)
  - Spécificité 98% (IC 95: 97-99%)
  - ADN reste détectable longtemps après début ttt anti BK

- Adénosine déaminase (ADA): non recommandé en routine

Thwaites, J Infection 2009

Prise de contraste méningée
« Arachnoïdite »

Tuberculomes
Abcès
tuberculeux



Dilatation
ventriculaire

« Cérébrite »

Vascularite

The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America

43. *Mycobacterium tuberculosis:* 4-drug antituberculous therapy should be initiated (A-III); adjunctive dexamethasone should be added in patients with meningitis (B-I).

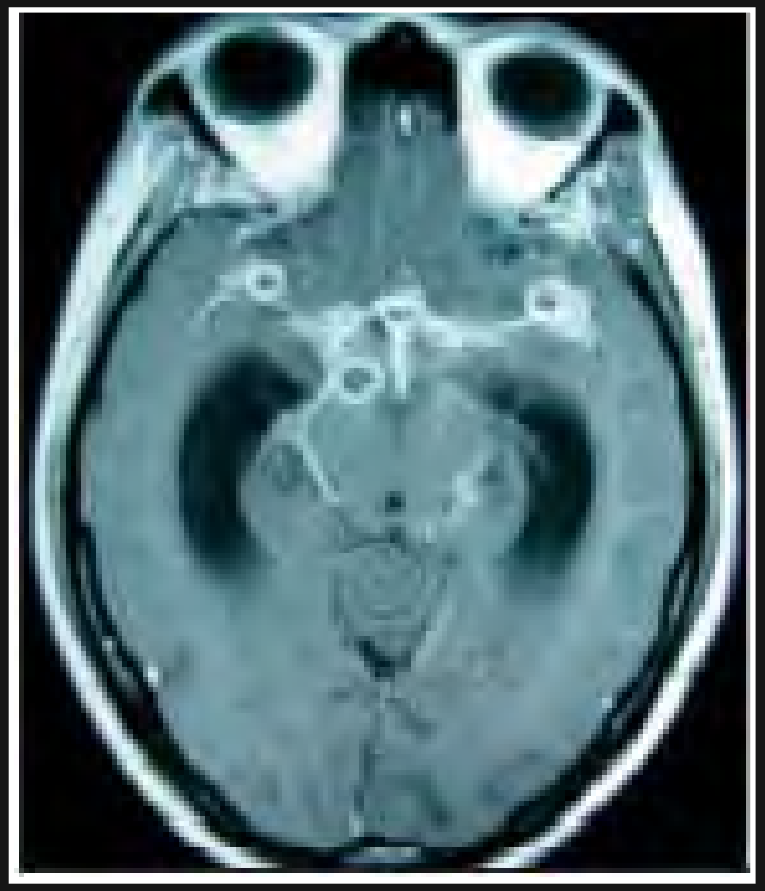
Drug	Daily dose		Route	Duration
	Children	Adults		
British Thoracic Society guidelines, 1998				
Isoniazid	5 mg/kg	300 mg	Oral	9–12 months
Rifampicin	10 mg/kg	450 mg (<50 kg)		
		600 mg (>50 kg)	Oral	9–12 months
Pyrazinamide	35 mg/kg	1·5 g (<50 kg)		
		2·0 g (>50 kg)	Oral	2 months
Ethambutol	15 mg/kg	15 mg/kg	Oral	2 months
or streptomycin	15 mg/kg	15 mg/kg (maximum 1 g)	Intramuscular	2 months
Guidelines of the joint committee of the ATS, IDSA, and CDC, 2003				
Isoniazid	10–15 mg/kg (MD 300 mg)	5 mg/kg (MD 300 mg)	Oral	9–12 months
Rifampicin	10–20 mg/kg (MD 600 mg)	10 mg/kg (MD 600 mg)	Oral	9–12 months
Pyrazinamide	15–30 mg/kg (MD 2000 mg)	40–55 kg person: 1000 mg	Oral	2 months
		56–75 kg person: 1500 mg		
		76–90 kg: 2000 mg		
Ethambutol	15–20 mg/kg (MD 1000 mg)	40–55 kg person: 800 mg	Oral	2 months
		56–75 kg person: 1200 mg		
		76–90 kg person: 1600 mg		

MD=maximum dose. ATS=American Thoracic Society; IDSA=Infectious Diseases Society of America; CDC=Centers for Disease Control.

Table 2: British and American guidelines for the treatment of TM[44,47]

Dexamethasone for the Treatment of Tuberculous Meningitis in Adolescents and Adults

Guy E. Thwaites et al., N Engl J Med 2004 ; 351 : 1741-51



The NEW ENGLAND JOURNAL of MEDICINE

Mortalité 9 mois

Outcome and Group	Dexamethasone	Placebo	Relative Risk (95% CI)	P Value
	no./total no. (%)			
Death				
All patients	87/274 (31.8)	112/271 (41.3)	0.69 (0.52–0.92)	0.01
Grade				
I	15/90 (16.7)	26/86 (30.2)	0.47 (0.25–0.90)	0.02
II	38/122 (31.1)	50/125 (40.0)	0.71 (0.46–1.1)	0.11
III	34/62 (54.8)	36/60 (60.0)	0.81 (0.51–1.29)	0.38
Relative risk of death stratified according to grade†			0.68 (0.52–0.91)	0.007
HIV status				
Negative	57/227 (25.1)	67/209 (32.1)	0.72 (0.51–1.02)	0.07
Positive	27/44 (61.4)	37/54 (68.5)	0.86 (0.52–1.41)	0.55
Undetermined	3/3 (100)	8/8 (100)	1.16 (0.71–1.91)	0.71
Relative risk of death stratified according to HIV status‡			0.78 (0.59–1.04)	0.08

DXM : réduction significative mortalité (Groupe I)

Thwaites, NEJM 2004

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Intensive Care Med (2008) 34:528–532
DOI 10.1007/s00134-007-0926-2

BRIEF REPORT

Romain Sonneville
Sophie Demeret
Isabelle Klein
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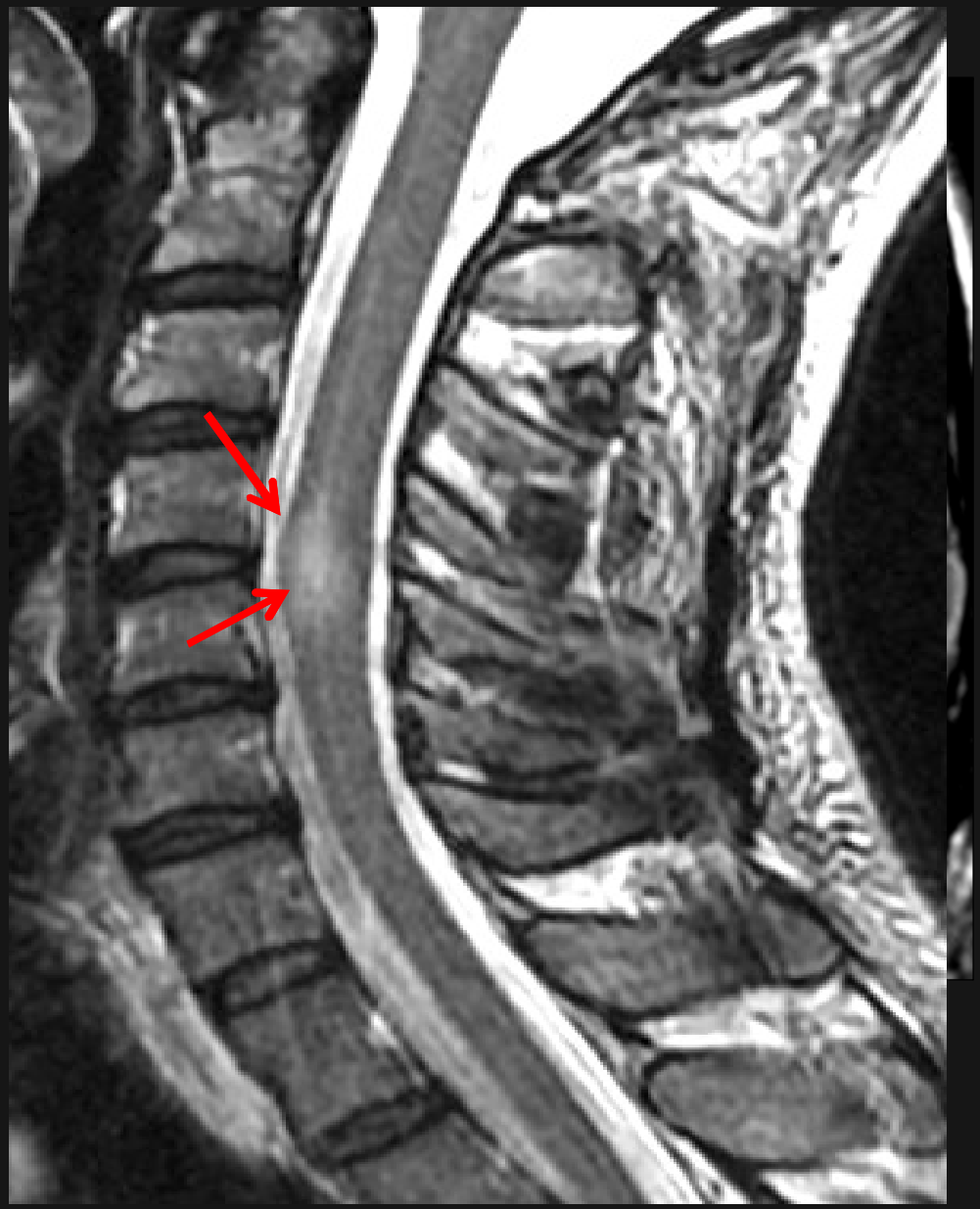
Bruno Mourvillier
Juliette Audibert
Stéphane Legriel
Francis Bolgert
Bernard Regnier
Michel Wolff

Acute disseminated encephalomyelitis in the intensive care unit: clinical features and outcome of 20 adults

Parameter	All patients ($n = 20$)
Age, years	37 (27–51)[a]
Fernale sex, *n* (%)	11 (55)
Preceding infectious disease, *n* (%)	14 (70)
Latency period, days	8 (6–14)
SAPS II	33 (15–45)
[illegible]	[illegible]
Temperature, °C	39 (38–39)
Neck stiffness, *n* (%)	10 (50)
GCS	7 (4–13)
Seizures, *n* (%)	6 (30)
Motor deficit, *n* (%)	17 (85)
[illegible]	[illegible]

Acute disseminated encephalomyelitis (ADEM)



Pathophysiology

MOLECULAR MIMICRY

« viral » infection

Pathogen = structure homology with myelin components

MBP (Myelin Basic Protein)

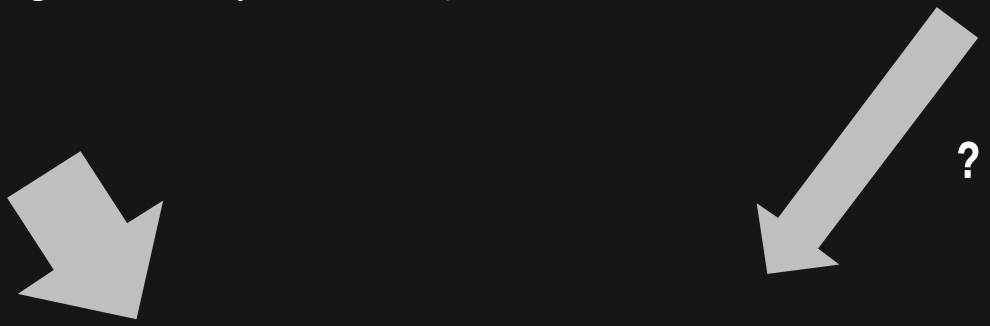
MOG (Myelin Oligodendrocyte Protein)

PRIMITIVE CNS INFECTION

Neurotropic pathogen

BBB disruption

CNS Ab release in peripheral circulation



Auto-immune response against CNS components

Tunkel, Clinical Infectious Diseases 2007

The Management of Encephalitis: Clinical Practice Guidelines by the Infectious Diseases Society of America

IDSA GUIDELINES

ADEM

Although not fully assessed in randomized, placebo-controlled trials **high-dose intravenous corticosteroids (methylprednisolone, 1 g IV/day, 3–5 days) are generally recommended for ADEM**

Reports of successful treatment with PLEX have also been documented, although no data from randomized trials are available.

PLEX should be considered in patients who respond poorly to corticosteroids

Tunkel CID 2008

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Anti-NMDA-receptor encephalitis: case series and analysis of the effects of antibodies

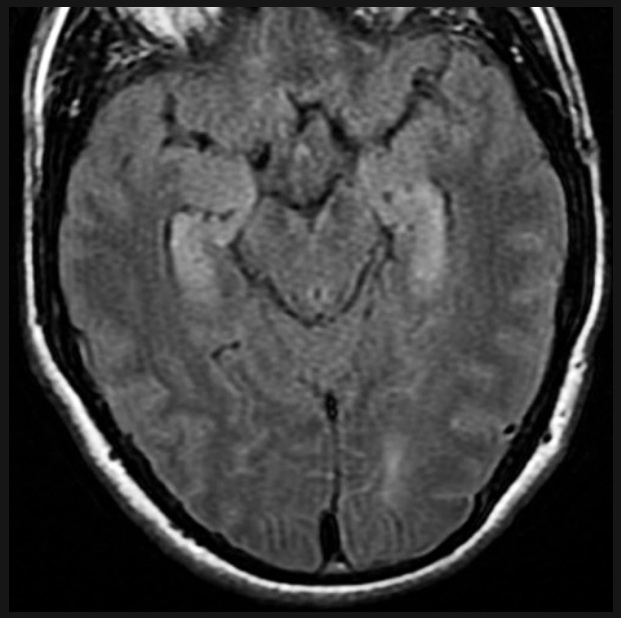
100 patients

	Patients
Women and girls	91
Median age, range (years)	23, 5–76
Prodromal symptoms (information available for 84 patients)	72
Symptom presentation	
Psychiatric (first seen by psychiatrist)	77
Neuropsychiatric (first seen by neurologists)	23
Seizures	
Any type	76
Generalised tonic-clonic	45
Partial complex	10
Other*	30
Dyskinesias and movement disorders	
Any type	86
Orofacial	55
Choreoathetoid and complex movements with extremities, abdomen or pelvis	47
Abnormal postures (dystonic, extension), muscle rigidity, or increased tone	47
Other†	25
Autonomic instability‡	69
Central hypoventilation	66

Dalmau Lancet Neurol 2008

Anti-NMDA-receptor encephalitis: case series and analysis of the effects of antibodies

Findings of 100 pts with encephalitis and NR1-NR2 antibodies



Brain MRI	
Total with abnormal findings	55
Medial temporal lobes	22
Cerebral cortex	17
Cerebellum	6
Brainstem	6
Basal ganglia	5
Contrast enhancement in cortex, meninges, basal ganglia	14
Other†	8

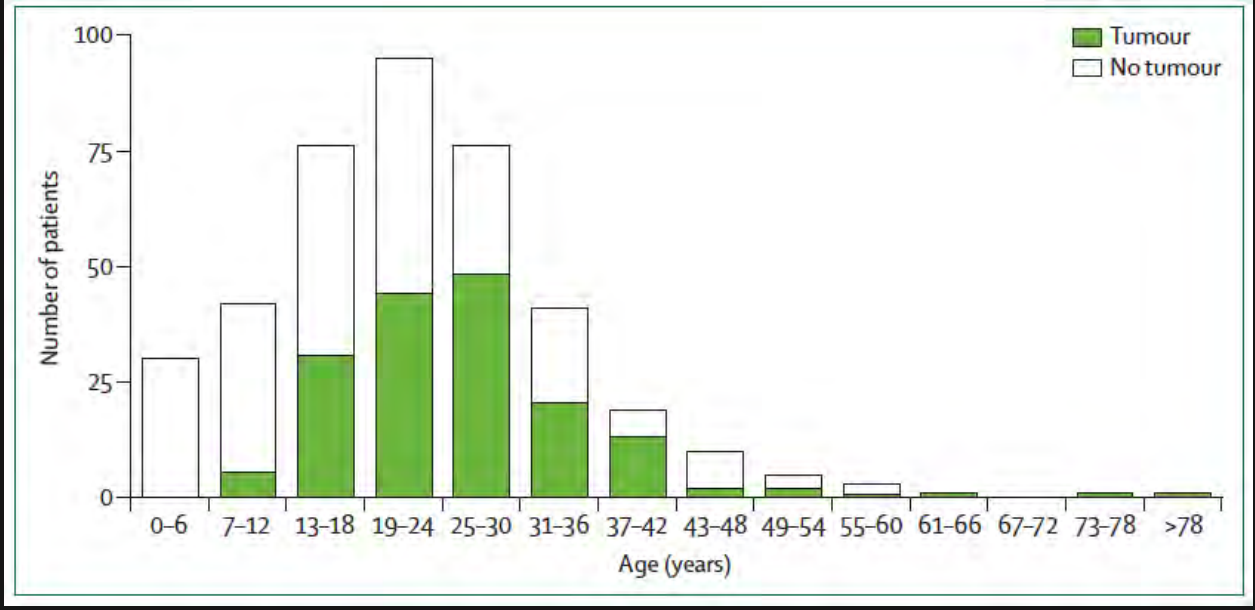
MRI Normal in 45% of patients

Dalmau Lancet Neurol 2008

Clinical experience and laboratory investigations in patients with anti-NMDAR encephalitis

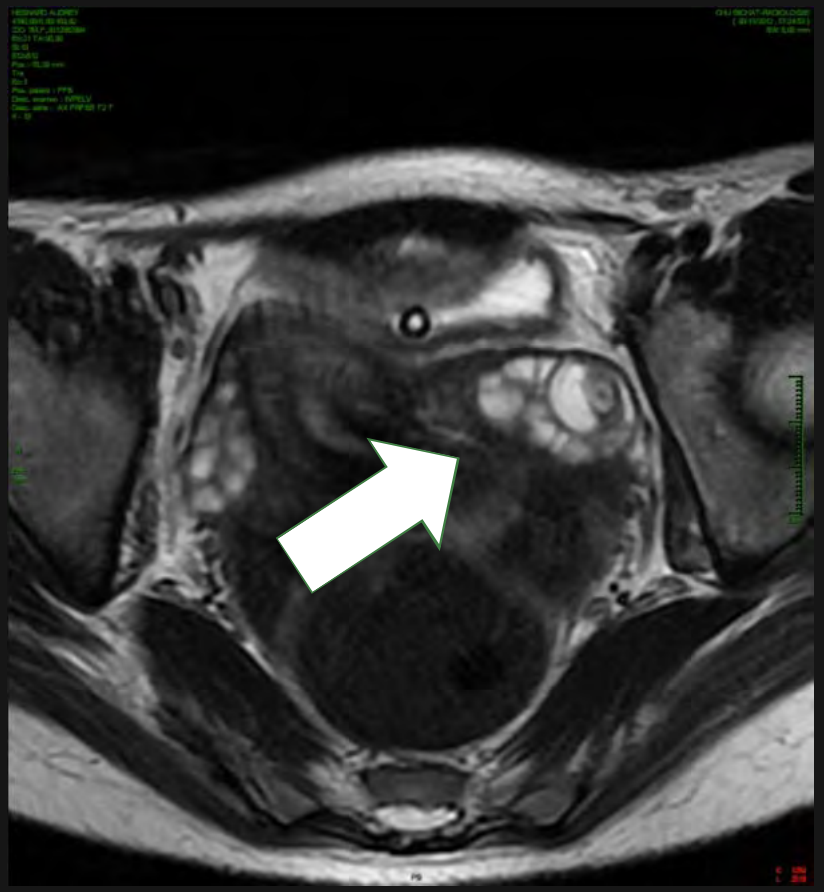
Josep Dalmau, Eric Lancaster, Eugenia Martinez-Hernandez, Myrna R Rosenfeld, Rita Balice-Gordon

Femme jeune
+/- associé à tumeur
(Tératome ovarien > 50% +++)



Lancet Neurology 2011

IRM PELVIENNE



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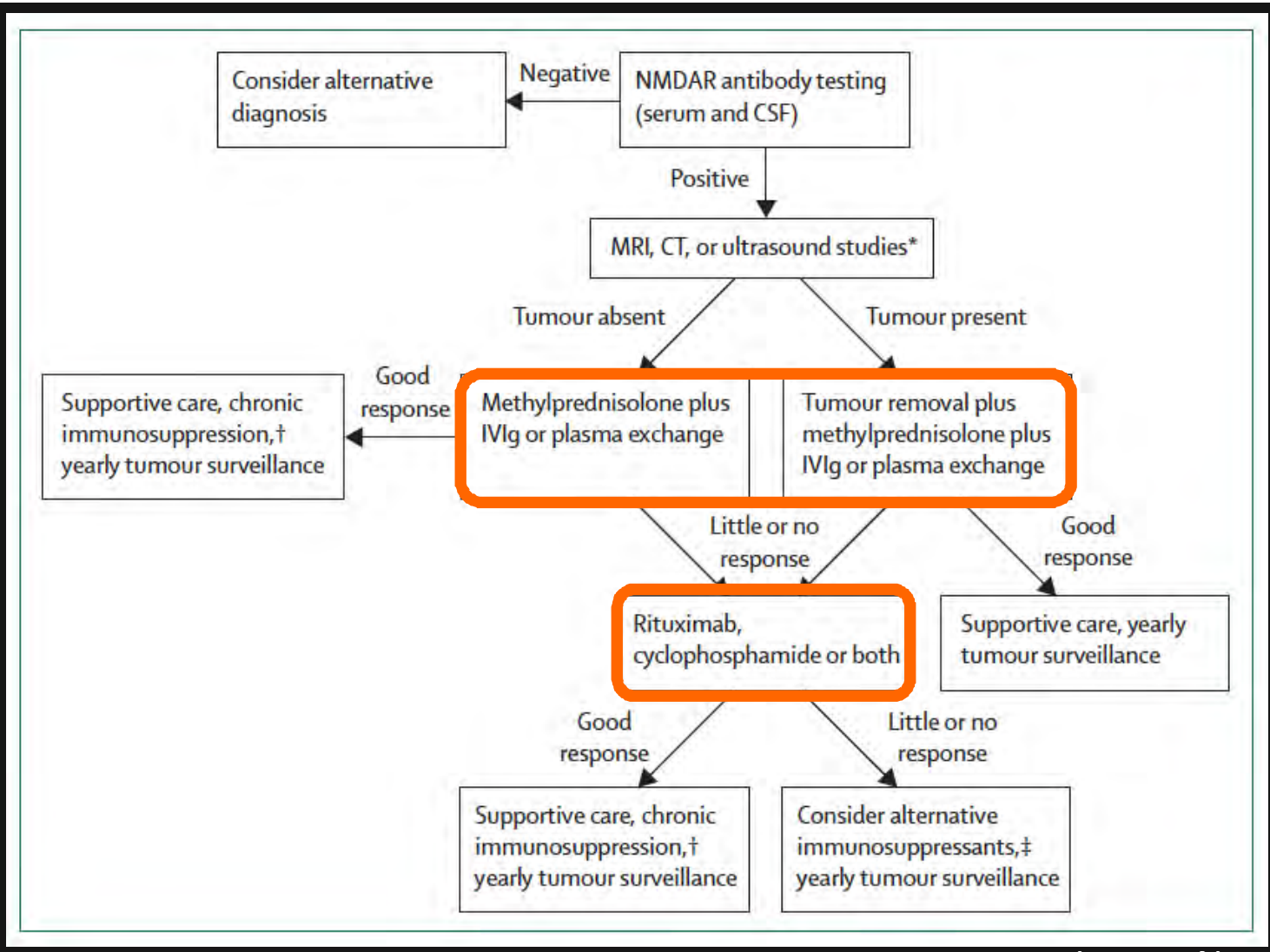

Lancet Neurology 2011

Encéphalites aiguës en réanimation

- Définitions et épidémiologie des encéphalites en 2013
- Diagnostiquer et prendre en charge les causes infectieuses justifiant un traitement spécifique
- Reconnaître et traiter causes “non-infectieuses”
  - Encéphalites post-infectieuses
  - Autres encéphalites auto-immunes
- Pronostic

Long-term Outcome of Patients Presenting With Acute Infectious Encephalitis of Various Causes in France

- 2007: 253 patients (adultes)
- Mortalité 9 (5%)
- Survie sans aucune séquelles : 71 (40%) patients

Table 2. Demographic Features of Patients Enrolled in Follow-up, by Causative Agent

Causative Agent	Patients, No. (%)	Age, Median (Range)	Age <16 y	Male-Female Ratio	Favorable Outcome: (GOS Score, 5)	Full Recovery	Encephalitis-Related Deaths
All patients	176 (100)	53.5 y (1 mo to 89 y)	23 (13)	1.6	108 (61)	71 (40)	9 (5.1)
HSV[a]	43 (24)	58 y (1 mo to 85 y)	1 (2)	1.3	18 (42)	6 (14)	3 (7.0)
VZV	15 (9)	63 y (6 mo–to 86 y)	3 (20)	4	7 (47)	5 (33)	1 (6.7)
M. tuberculosis	10 (6)	64 y (17–75 y)	0	1	7 (70)	5 (50)	1 (10.0)
Other cause[b]	23 (13)	51 y (6 mo to 87 y)	8 (35)	2.8	16 (70)	12 (52)	1 (4.3)
Unknown	85 (48)	43 y (1–89 y)	11 (13)	1.4	60 (71%)	43 (51)	3 (3.5)

Data are No. (%) of patients unless otherwise indicated.

Abbreviations: GOS, Glasgow Outcome Scale; HSV, herpes simplex virus; *M. tuberculosis, Mycobacterium tuberculosis*; VZV, varicella-zoster virus.

[a] In 2007, all adult patients with HSV encephalitis were treated with acyclovir for 2 or 3 weeks at a dosage of 10–15 mg/kg/8 hours. The 1-month-old patient received 20 mg/kg/8 hours for 3 weeks. Acyclovir was started 0–10 days after onset (mean, 1 day) [19].

[b] Causative agents included *Listeria monocytogenes* (n = 4), tick-borne encephalitis (n = 3), *Mycoplasma pneumoniae* (n = 2), Epstein-Barr virus (n = 2), cytomegalovirus (n = 2), enterovirus (n = 2), *Legionella pneumophila* (n = 1), influenza A (n = 1), *Borrelia burgdoferi* (n = 1), *Rickettsia coronii* (n = 1), *Francisella tularensis* (n = 1), *Cryptococcus neoformans* (n = 1), and Toscana virus (n = 2).

Mailles, CID 2012

Long-term Outcome of Patients Presenting With Acute Infectious Encephalitis of Various Causes in France

Table 4. Factors Associated With Favorable Outcome, Final Logistic Regression Model (n = 128)

Variable	Favorable Outcome	Poor Outcome	Multivariate Analysis	
			OR (95% CI)	*P*
Comorbid conditions[a]	14 (18)	19 (37)	0.25 (.08–.73)[a]	.01
Age, mean (range), years (OR for 5-y increase)[b]	50 (19–89)	63 (28–85)	0.83 (.72–.96)	.01
Level of education, years				.02
None	3 (4)	9 (17)	Reference	
<6 (stopped before high school)	16 (21)	16 (31)	4.0 (.73–22.22)	.11
6–9 (high school)	13 (17)	16 (31)	1.4 (.25–8.34)	.69
10–13 (college)	21 (28)	5 (10)	10.5 (1.5–74.2)	.02
>13 (university)	23 (30)	6 (12)	6.4 (.99–40.77)	.05
Causative agent				.05
Herpes simplex virus	15 (19)	21 (40)	Reference	
Varicella-zoster virus	5 (6.5)	5 (9)	1.9 (.3–11.1)	.5
M. tuberculosis	6 (6.9)	3 (6)	6.0 (1.1–33.6)	.04
Other	9 (10)	3 (6)	8.4 (1.6–44.1)	.01
Unknown	41 (54)	20 (38)	3.2 (1.2–9.0)	.03

The final model was obtained by a step-by-step descending procedure. Data are No. (%) of patients unless otherwise indicated.

Abbreviations: CI, confidence interval; *M. tuberculosis*, *Mycobacterium tuberculosis*; OR, odds ratio.

[a] Equivalent to comorbid conditions associated with poor outcome with OR = 4 (1.4–12.0).

[b] Equivalent to age associated with poor outcome with OR = 1.5 (1.1–1.9) for an increase of 10 years.

Mailles, CID 2012

Facteurs pronostiques

279 patients
Séquelles sévères ou décès: 71 (25%) patients

Bichat Medical ICU
1991-2012

Variable	Odd Ratio	95% CI
KNAUS score 3-4	6.3	2.0-21.2
Coma	7.1	3.1-17.0
Température (par °C)	0.7	0.5-0.9
Pneumonie d'inhalation	4.0	1.5-11.0
Protéinorachie, par g/l	1.6	1.2-2.1
Délai d'admission en réanimation / jour	1.04	1.01-1.07

Predictors of outcome in acute encephalitis

Table 3 Multivariate analysis of factors associated with death in patients with all-cause encephalitis[a]

Died before discharge (n = 19)	OR	95% CI	Average marginal effects, %	*p* Value
Age ≥65 y	2.10	0.44–10.02	7.47	0.35
Male	3.63	0.97–13.54	13.00	0.04
Thrombocytopenia	6.28	1.41–28.03	18.54	0.01
Cerebral edema	18.06	3.14–103.92	29.20	<0.01
Status epilepticus	8.16	1.55–43.10	21.19	0.01
Immunosuppression	1.86	0.27–12.6	6.28	0.50
Charlson comorbidity	1.16	0.84–1.60	1.49	0.37

A Venkatesan, Neurology 2013

	Bon pronostic N=206	Mauvais pronostic N=73
HSV	33 (16%)	7 (10%)
VZV	9 (4%)	5 (7%)
BK	36 (18%)	29 (40%)
ADEM	16 (8%)	8 (11%)
autre A-I	12 (6%)	5 (7%)
autre infectieux	8 (4%)	3 (4%)
listeria	15 (7%)	4 (6%)
indéterminé	77 (37%)	12 (16%)

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autre infectieux	8 (4%)	3 (4%)
listeria	15 (7%)	4 (6%)
indéterminé	77 (37%)	12 (16%)

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En conclusion

- Un syndrome qui comporte des entités très diverses
- IRM CEREBRALE ++++
- Penser aux urgences non-infectieuses « traitables »
  - ADEM
  - autres encéphalites auto-immunes
- Très peu d'études pronostiques en réanimation
  - Admission précoce ?
  - Prise en charge des complications

  (inhalation, œdème cérébral, convulsions…)