AVC Normandie

Epilepsie et AVC

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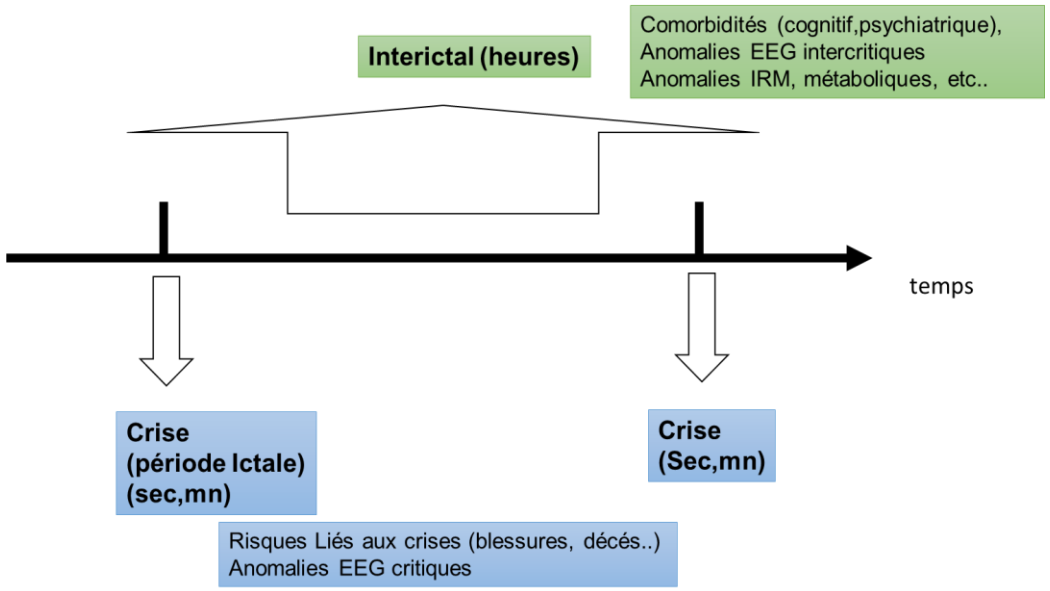
CHU ROUEN NORMANDIE

Définition

Epilepsie

= Pathologie cérébrale caractérisée par une prédisposition durable à générer des crises et par les conséquences cognitives, comportementales, psychologiques et sociales de cette condition.



ILAE, Epilepsia 2014

Définition opérationnelle de l'épilepsie

- Au moins **2 crises** non occasionnelles séparées d'au moins 24 heures
- Au moins **1 crise** non occasionnelle et un **risque de récurrence** de plus de 60 %
- Syndrome Epileptique diagnostiqué : ex Epilepsie généralisée idiopathique

Définition

2 situations : **Crise symptomatique** versus **maladie**

Dans AVC : Crise précoce versus crise tardive *Beghi et al, 2010*

Risque de récidive de crise après

crise précoce : 30 %

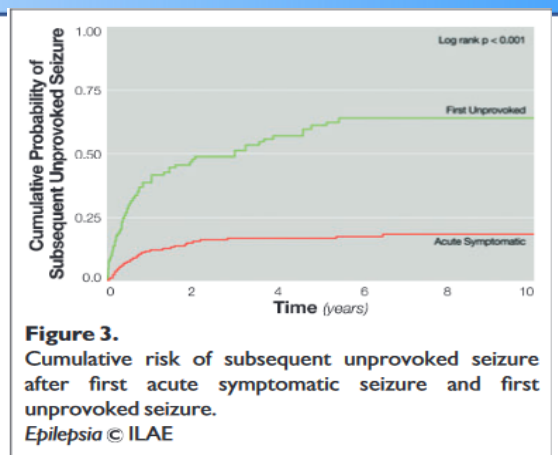


Figure 3.
Cumulative risk of subsequent unprovoked seizure after first acute symptomatic seizure and first unprovoked seizure.
Epilepsia © ILAE

crise tardive : > 60 %

Hesdorffer et al, 2009

Physiopatholgie

Crise précoce

Crise tardive

Agression neuronale aiguë

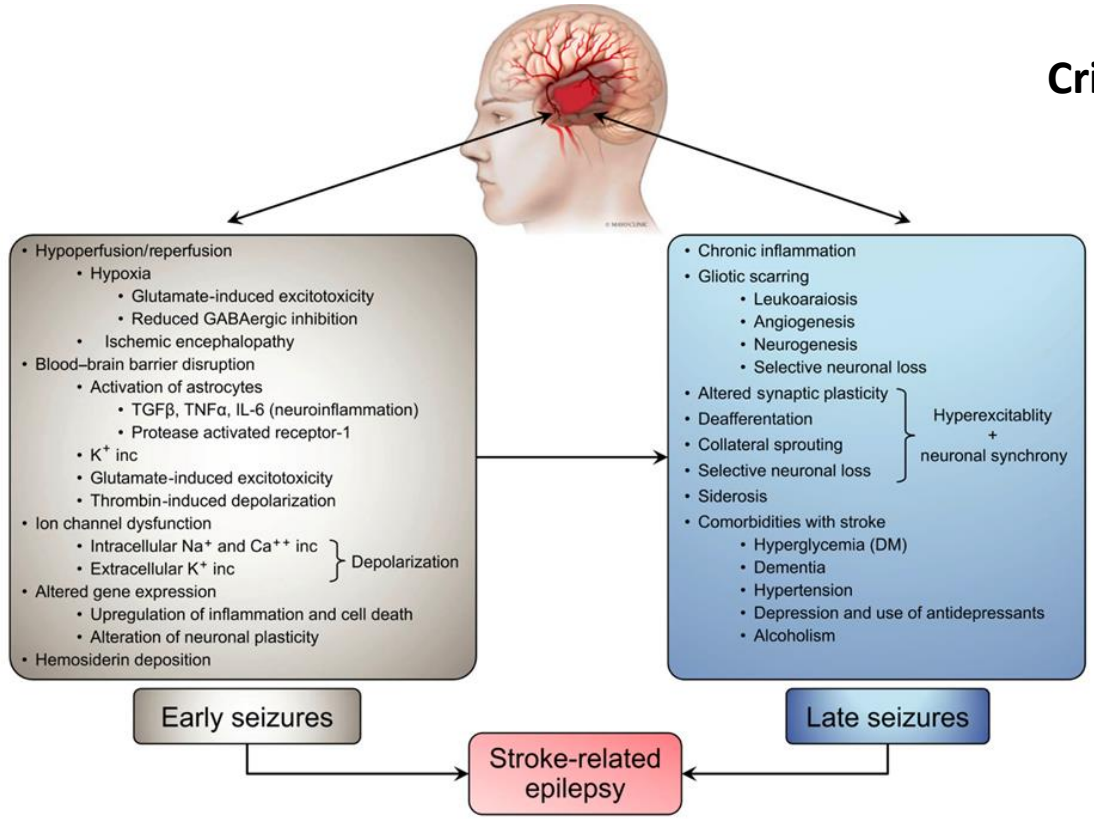


Figure 1 Proposed mechanisms of epileptogenesis in stroke-related epilepsy. Ca^{2+}, calcium; DM, diabetes mellitus; GABA, gamma-aminobutyric acid; IL-6, interleukin 6; inc, increased/upregulation; K^+, potassium ion; Na^+, sodium; TGFβ, transforming growth factor-beta; TNFα, tumor necrosis factor-alpha. [Color figure can be viewed at wileyonlinelibrary.com]

Hyperexcitabilité chronique du cortex cérébral

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Enjeux

Crises précoces

Majoration stress métabolique et mort cellulaire

→Augmentation zone infarcie
→Dégradation pronostic fonctionnel

Jung et al, 2012

Crises tardives

- Blessures
- Impact sur la cognition

→ qualité de vie

Epidémiologie : crise tardive

- AVC : principale cause épilepsie de l'adulte
  - 15%
  - 50% après 60 ans

- Epilepsie : 6% post AVC
  - Ischémie : jusqu'à 15% dans les centres de thrombolyse
  - Hémorragie : 12%

  - Pic de fréquence 6-12 mois
  - 85% dans les 2 ans

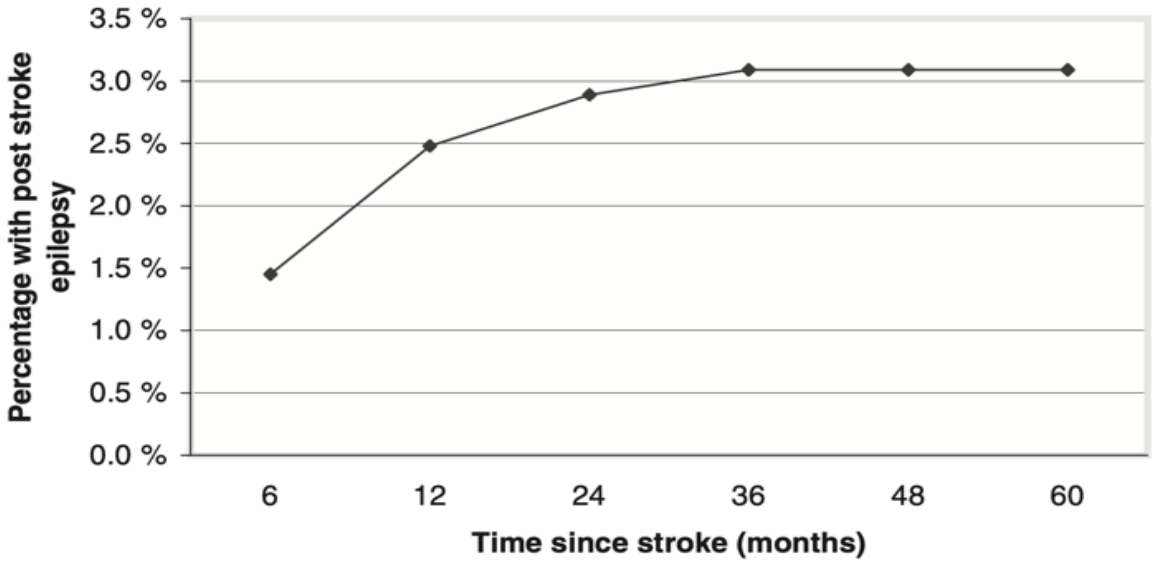

FIG. 1. Time to development of poststroke epilepsy

Epidémiologie : crise précoce

- AVC ischémique : 1-4 %
- AVC hémorragique : 16 %

Beghi et al, 2011

Facteur de risque : crise précoce

1. Hémorragie
2. Atteinte corticale
3. Sévérité AVC :
   NIH ou imagerie

Table 1 – Risk factors for acute symptomatic seizures: summary of some study results.

	Stroke subtype	Hemorrhage[a]	Cortical involvement	Size/severity	Young age	Hyponatremia	Hyperglycemia	Other factors
Serafini et al., 2015 [37]	I, H, SAH	Yes	US only	#	#	Yes	No	
Lamy et al., 2003 [21]	I	#	Yes	Yes	No	#	#	
Roivainem et al., 2013 [20]	I	Yes	#	Yes	No	Yes	No	Anxiolytic, tobacco use
Neshige et al., 2015 [38]	H	#	Yes	Yes	Yes	#	#	
Labovitz et al., 2001 [26]	I, H, SAH	No	Yes	No	No	#	#	
Alberti et al., 2008 [58]	I, H	Yes	Yes	Yes	No	#	#	
Beghi et al., 2011 [25]	I, H	Yes	Yes	No	No	#	#	
De Herdt et al., 2011 [10]	H	#	Yes	Onset only	Onset only	#	#	
Procaccianti et al., 2012 [59]	I, H	Yes	Yes	Yes	No	No	Yes	
Goswami et al., 2012 [60]	I, H	Yes	Yes	Yes	No	#	#	Alcoholism
Denier et al., 2010 [6]	I	#	Yes	No	No	#	#	Watershed infarcts
Leung et al., 2017 [23]	I	Yes	#	#	#	#	#	Cardioembolism, multiple territory infarcts

I: ischemic stroke; H: intracerebral hemorrhage; SAH: subarachnoid hemorrhage; US: unprovoked seizure; #: not studied or not applicable.
[a] Intracerebral or hemorrhagic transformation of ischemic stroke.

Facteur de risque : Crises tardives

Ischémie

Score SeLECT

Severity of stroke

Large-artery atherosclerotic aetiology

Early seizures

Cortical involvement

Territory of middle cerebral artery involvement

Score 9

63% risque épilepsie à 1 an

80 % risque épilepsie à 5 ans

Galovic et al, 2018

	SeLECT score (points)
(Se) Severity of stroke	
NIHSS ≤3	0
NIHSS 4–10	1
NIHSS ≥11	2
(L) Large-artery atherosclerosis	
No	0
Yes	1
(E) Early seizure (≤7 days)	
No	0
Yes	3
(C) Cortical involvement	
No	0
Yes	2
(T) Territory of MCA	
No	0
Yes	1

To calculate an individual's SeLECT score, the points associated with each predictor can be added to obtain the total risk score. As an example, a person who has a stroke with initially 12 points on NIHSS due to large-artery atherosclerosis, no early seizures, and with infarction involving the cortex in the MCA territory, will have a risk score of 2+1+0+2+1=6 points. According to figure 3, 6 points corresponds to a late seizure risk of 18% within 1 year and of 29% within 5 years after stroke. NIHSS=National Institutes of Health Stroke Scale. MCA=middle cerebral artery.

Table 4: **Calculation of the SeLECT score**

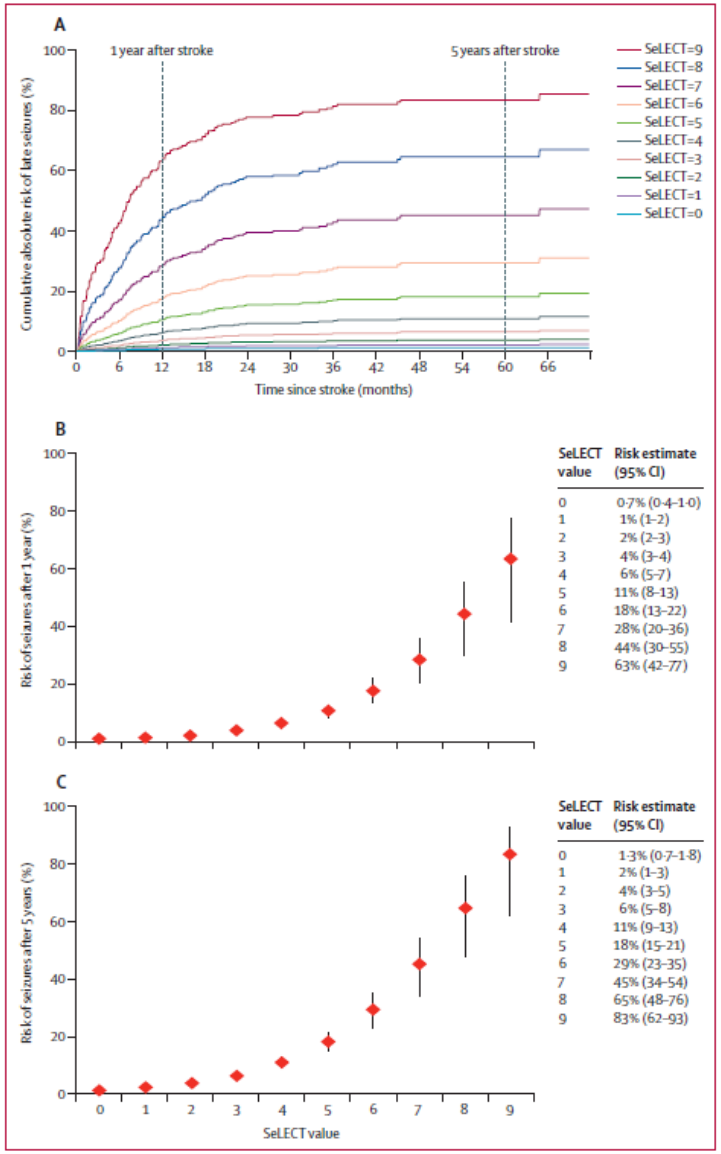

Figure 3: **Predicted risk of late seizures according to SeLECT score**
(A) The predicted risk of late seizures 0–72 months after stroke. Each curve represents the estimates for a SeLECT value, ranging from 0 to 10. Risk estimate charts of late seizures 1 year (B) and 5 years (C) after stroke according to SeLECT score values. Vertical lines are 95% CIs.

Facteur de risque : Crises tardives

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Score SeLECT 2.0 : type de crise précoce

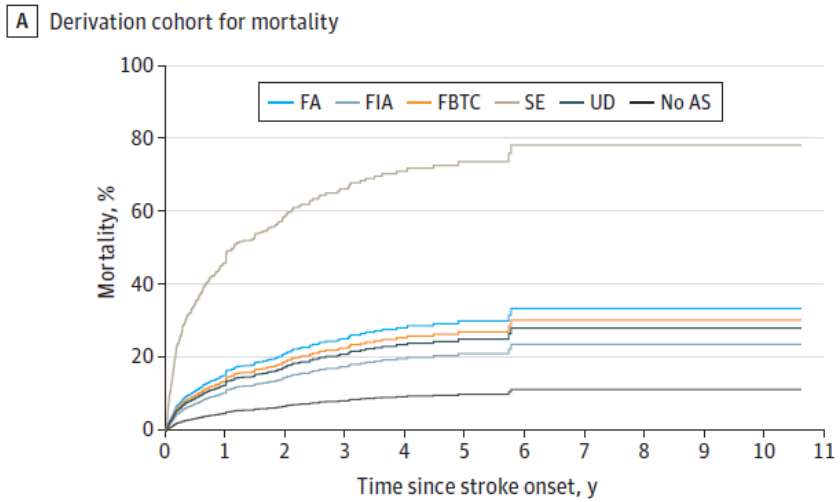
EME initial

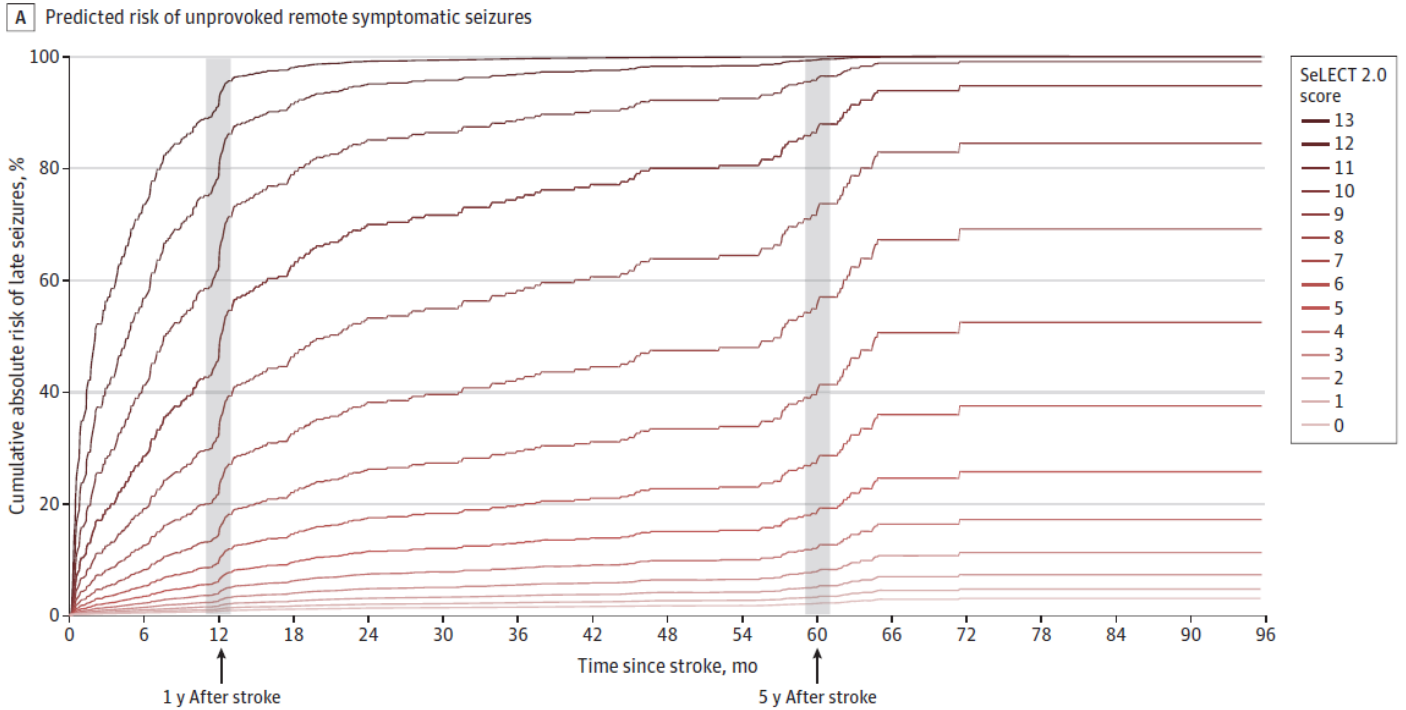
mortalité à 1 an : 48 % ; à 10 ans : 76%

épilepsie à 1 an 52 % ; à 10 ans 88 %

Table 3. Comparison of the Original SeLECT Scoring System and the Modified SeLECT Score Including Acute Symptomatic Status Epilepticus (SeLECT 2.0)

Original SeLECT	No. of points	SeLECT 2.0	No. of points
NIHSS score 4-10	1	NIHSS score 4-10	1
NIHSS score ≥11	2	NIHSS score ≥11	2
Large-artery atherosclerosis	1	Large-artery atherosclerosis	1
Any acute symptomatic seizure	3	Short acute symptomatic seizure	3
		Acute symptomatic status epilepticus	7
Cortical involvement	2	Cortical involvement	2
Territory of MCA involvement	1	Territory of MCA involvement	1
Maximum	**9**	**Maximum**	**13**





Sinka et al, 2023

Facteur de risque : Crises tardives

Hémorragie

Score CAVE

Cortical involvement

younger **A**ge

large hematoma **V**olume

acute symptomatic s**E**izure

Score 4 : 46 % risque épilepsie

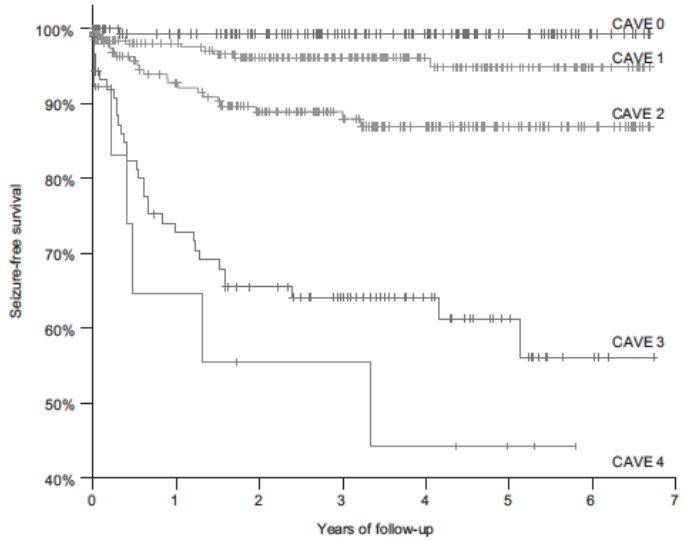
Haapaniemi et al, 2014

a Calculation of CAVE score

	Points
Cortical involvement	
No	0
Yes	1
Age	
≥ 65 years	0
< 65 years	1
Haemorrhage volume	
≤ 10 mL	0
> 10 mL	1
Acute symptomatic seizure	
No	0
Yes	1

b Risk of remote symptomatic seizures

CAVE score	Seizure risk	
	Derivation	Validation
0 points	0.6%	3.1%
1 point	3.6%	5.0%
2 points	9.8%	15.8%
3 points	34.8%	13.5%
4 points	46.2%	37.5%



Phase Diagnostique

Clinique

crise à début focal

Chez la personne âgée : 4 pièges diagnostiques

- **État confusionnel aigu**
  - Etat de mal à expression confusionnel : femme, sevrage brutal en psychotrope, réponse par l'EEG, cède après rivotril
- Manifestation purement **comportementale**
  - Stéréotypies gestuelles, déambulations (avec début et fin)
- Manifestation purement **cognitive**
  - Amnésie épileptique transitoire : trouble mnésique bref stéréotypés
- **Déficit focal** moteur, sensitif ou visuel critique ou postcritique
  - Peut durer des jours après la crise

Table 6 Shorter diagnostic algorithm.

	Major criteria	Minor criteria
Clinical signs	Confusional state with sudden onset and end Rhythmic muscular contractions in a focal territory Paroxysmal behavioral disorder associated to a focal neurological sign	Impairment of consciousness Isolated paroxysmal behavioral disorder
History		History of epilepsy
Provocative factors		
EEG		Focal slow waves

Dupont et al, 2010

Phase Diagnostique

EEG

- EEG standard : 8% figures paroxystiques après AVC *Bentes et al, 2017*
  - *Crise*
  - *Figures paroxystiques : LPDs Lateralized Periodic Discharges*

- Monitoring continu EEG : 17 %
  - AVC ischémique : *Claassen et al, 2004*
    - 11% crises
    - 9 % crises non convulsives
    - 7% état de mal non convulsivant

  → recommandation de monitoring EEG 24h
    1. trouble de conscience persistant après crise
    2. Trouble de conscience et LPDs
    3. Suspicion de crise

Table 1. Main indications for continuous EEG monitoring in patients with acute stroke to identify non-convulsive seizures and non-convulsive status epilepticus.

Continuous EEG monitoring is recommended in critically acute stroke patients with: • Persistently abnormal mental status following generalized convulsive status epilepticus or other clinically-diagnosed seizures. • Altered or fluctuating mental status or unexplained alteration of mental status.///Generalized periodic discharges, lateralized periodic discharges, or bilateral independent periodic discharges on routine or emergent EEG. • Clinical paroxysmal events suspected to be seizures, to determine if they are ictal or non-ictal.
Concurrent video recording is strongly recommended as supplementary to neurologic examination to evaluate clinical behavior and assess whether electrographic seizures are associated with clinical changes.
Continuous EEG should be initiated as soon as possible when non-convulsive seizures are suspected. Recording for at least 24 hours is recommended, but shorter or longer periods of recording may be required. In patients who are comatose, have periodic discharges, or are pharmacologically sedated, prolonged monitoring (48 hours or more) may be advised as non-convulsive seizures can occur later.

Adapted from: Herman *et al.* (2015).

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Phase Diagnostique

IRM

Anomalies de signal liées à la crise :

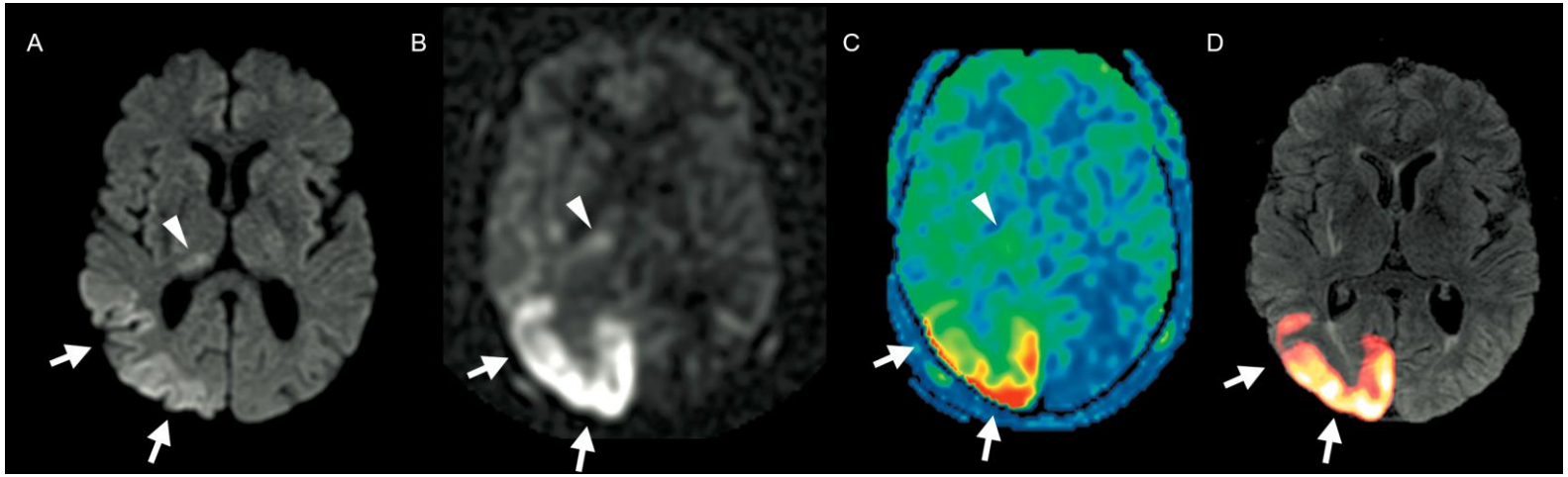
diffusion : hypersignal, hypo ADC ; topographie corticale, sans systématisation artérielle

Flair : hypersignal et épaississement du ruban cortical

ASL : augmentation du débit sanguin cérébral non systématisé à un territoire vasculaire

Table 2. Seizure-related abnormalities on conventional and advanced Magnetic Resonance Imaging.

MRI techniques		Seizure related signal change	Mechanism
T1-weighted		Iso- to hypointense	Oedema + increased cortical thickness
T2-weighted		Hyperintense	Oedema + increased cortical thickness
Fluid attenuated inversion recovery (FLAIR)		Hyperintense	Oedema + increased cortical thickness
Gradient-echo (GRE or T2*)		Iso- to hypointense	Presence of blood products
Gadolinium-enhanced T1-weighted or Arterial Spin Labelling (ASL)		None to increased enhancement	Reperfusion injury or blood-brain barrier loss or increased collateral flow
Diffusion weighted imaging (DWI)		Hyperintense or isointense	Cytotoxic *versus* vasogenic edema in a non vascular territory
Perfusion weighted imaging (PWI)		Hyperperfusion (during symptom onset) or hypoperfusion (delayed imaging)	Blood flow is directly proportional to neuronal depolarization activity
Magnetic resonance spectroscopy (MRS)	N-acetylaspartate	Normal to decreased	Presence of ischemic tissue
	Lactate	Normal to increased	Anaerobic glycolysis
	Glutamate/ glutamine (Glx)	Normal to increased	Imbalance of excitotoxic and inhibitory neurons
	Choline	Normal to increased	Damage to cell membranes
Susceptibility weighted imaging (SWI)		Iso- to hypointense	Dilation and/or recruitment of venous vessels in areas of hypoperfusion



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Phase thérapeutique

Guideline

EUROPEAN STROKE JOURNAL

European Stroke Journal
2017, Vol. 2(2) 103–115

DOI: 10.1177/2396987317705536
journals.sagepub.com/home/eso
SAGE

European Stroke Organisation guidelines for the management of post-stroke seizures and epilepsy

Martin Holtkamp[1], Ettore Beghi[2], Felix Benninger[3], Reetta Kälviäinen[4], Rodrigo Rocamora[5] and Hanne Christensen[6]; For the European Stroke Organisation

Abstract

Background: Following stroke, acute symptomatic seizures (manifestation within seven days) and epilepsy, i.e. occurrence of at least one unprovoked seizure (manifestation after more than seven days), are reported in 3–6% and up to 12% of patients, respectively. Incidence of acute symptomatic seizures is higher in intracranial haemorrhage (10–16%) than in ischaemic stroke (2–4%). Acute symptomatic seizures and unprovoked seizure may be associated with unfavourable functional outcome and increased mortality. In view of the clinical relevance, the European Stroke Organisation has issued evidence-based guidelines on the management of post-stroke seizures and epilepsy.

Method: A writing committee of six clinicians and researchers from five European countries and Israel identified seven questions relating to prevention of (further) post-stroke seizures and epilepsy and to amelioration of functional outcome and prevention of mortality. Recommendations are based on findings in randomised controlled trials and observational studies using the grading of recommendations assessment, development and evaluation approach.

Results: In the absence of adequately powered randomised controlled trials, evidence for all recommendations is very low. Based on findings in observational studies, some weak recommendations have been made. In most instances, we suggest not to administer antiepileptic drugs. Due to high incidence of seizure recurrence after one post-stroke unprovoked seizure, secondary antiepileptic drugs prophylaxis needs to be considered.

Conclusion: Due to very low evidence, these guidelines only give some weak recommendations on prevention of occurrence and recurrence of post-stroke acute symptomatic seizures and unprovoked seizure. Adequately powered randomised controlled trials are required to assess interventions for post-stroke seizure management.

Keywords

Acute symptomatic seizure, antiepileptic drugs, cerebral infarction, intracerebral/subarachnoid haemorrhage, primary/secondary prophylaxis, unprovoked seizure

Date received: 19 February 2017; accepted: 21 March 2017

Box 4. Summary of recommendations and suggestions.

Recommendation on PICO question	Quality of evidence	Strength of recommendation
In the presence of only one underpowered RCT, there is no evidence if immediate primary prophylaxis with an antiepileptic drug compared to no treatment prevents occurrence of ASS in ischaemic stroke or intracranial (intracerebral or subarachnoidal) haemorrhage. Based on low incidence of ASS in observational studies, we make a weak recommendation against primary AED prophylaxis	Very low (⊕)	Weak against strong intervention (↓?)
In the absence of RCTs, we cannot make strong recommendations when and in whom to treat ASS with immediate secondary AED prophylaxis compared to no treatment for prevention of further ASS. Low incidence of ASS recurrence suggests not implementing secondary prophylaxis	Very low (⊕)	Weak against intervention (↓?).
In the absence of RCTs, we cannot make strong recommendations when to start immediate primary prophylaxis with an AED to prevent occurrence of post-stroke US. Low incidence of US occurrence suggests not implementing secondary prophylaxis	Very low (⊕)	Weak against intervention (↓?).
In the absence of RCTs but on the basis of observation study finding we cannot make strong recommendations. Due to high seizure recurrence risk, we suggest considering secondary AED prophylaxis.	Very low (⊕)	Weak against intervention (↑?)
There is insufficient evidence from RCTs to recommend temporary treatment with an AED or any other pharmacological substance in order to reduce the risk of subsequent US. But due to overall low incidence of post-stroke US, we suggest not employing temporary AED treatment	Very low (⊕)	Weak against intervention (↓?)
There is no consistent evidence from RCTs to support use against of AED to improve functional outcome after stroke. We suggest not administering AED treatment	Very low (⊕)	Weak against intervention (↓?)
There is insufficient evidence from RCTs to recommend temporary treatment with an AED to reduce mortality. We suggest not administering AED treatment	Very low (⊕)	Weak against intervention (↓?).

PICO: patient, intervention, comparator, outcome; RCT: randomised controlled trial; ASS: acute symptomatic seizure; AED: antiepileptic drug; US: unprovoked seizure.

Phase thérapeutique

Qui traiter ?

- Traitement préventif ?
  - Pas de bénéfice établi Van Tuijl et al, 2011

Phase thérapeutique

- Traitement crise précoce ? Débat

Le pour

Relation entre activité épileptique EEG et dégradation neurologique post AVC → augmentation de besoin métabolique

Importance de le savoir dans des situations plus particulières ? sténose hémodynamiquement significative, œdème cérébral, vasospasme…

Le contre

Faible risque de récidive de crise *Benninger et al, 2017*

Phase thérapeutique

- Traitement crise précoce ? Débat
  - Les recommandations
    - Pas de traitement au long cours
    - Arrêt du traitement en sortie d'UNV
  - Les pratiques
    - MAE fréquemment initié
    - Durée ?
      - Utilisation des scores SeLECT, CAVE ?
        - Poursuite MAE si score SeLECT > 9 ?

	SeLECT score (points)
(Se) Severity of stroke	
NIHSS ≤3	0
NIHSS 4–10	1
NIHSS ≥11	2
(L) Large-artery atherosclerosis	
No	0
Yes	1
(E) Early seizure (≤7 days)	
No	0
Yes	3
(C) Cortical involvement	
No	0
Yes	2
(T) Territory of MCA	
No	0
Yes	1

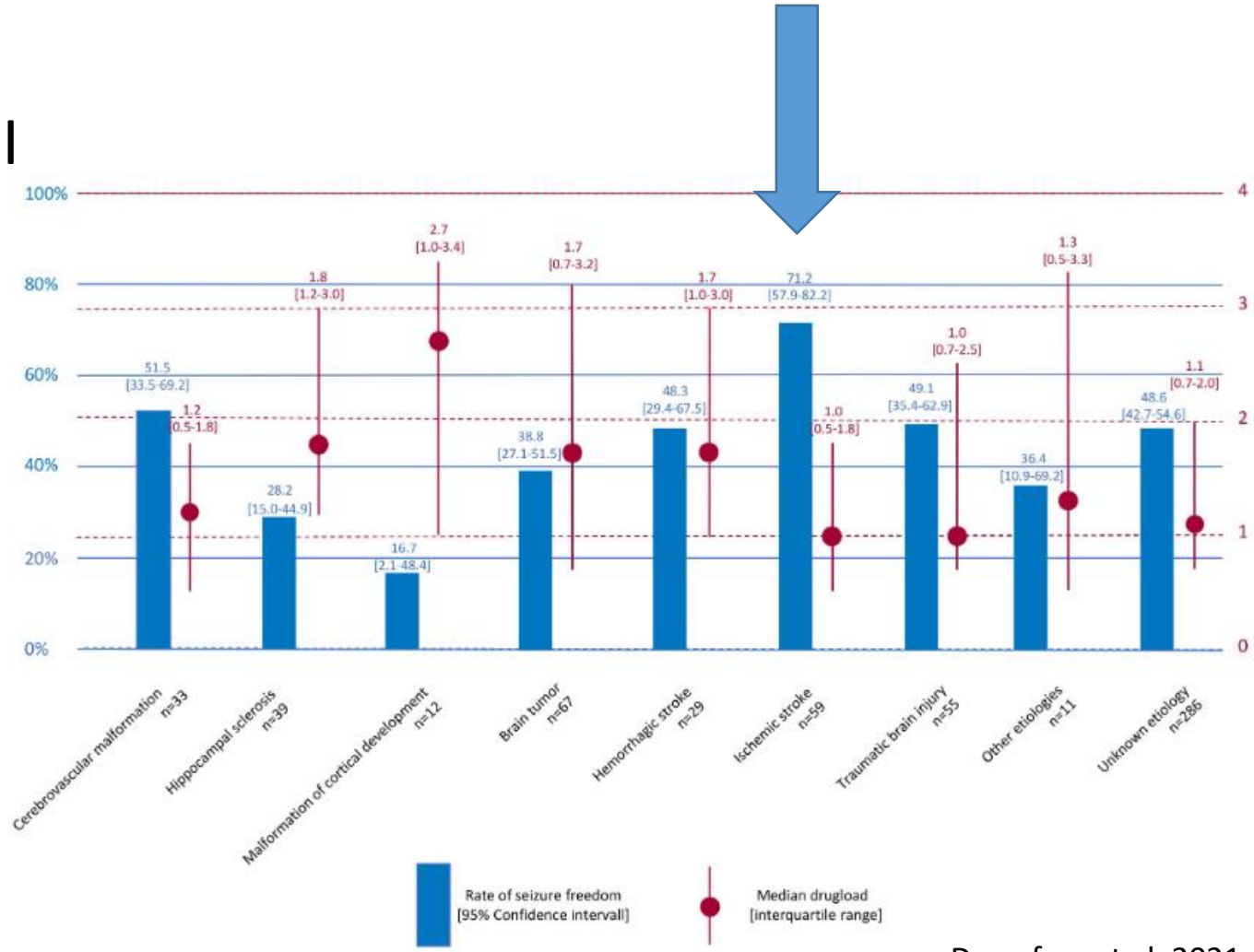
To calculate an individual's SeLECT score, the points associated with each predictor can be added to obtain the total risk score. As an example, a person who has a stroke with initially 12 points on NIHSS due to large-artery atherosclerosis, no early seizures, and with infarction involving the cortex in the MCA territory, will have a risk score of 2+1+0+2+1=6 points. According to figure 3, 6 points corresponds to a late seizure risk of 18% within 1 year and of 29% within 5 years after stroke. NIHSS=National Institutes of Health Stroke Scale. MCA=middle cerebral artery.

Table 4: **Calculation of the SeLECT score**

Phase thérapeutique

- Traitement crise tardive ? OUI
  - Bonne réponse au MAE 71%
  - Monothérapie

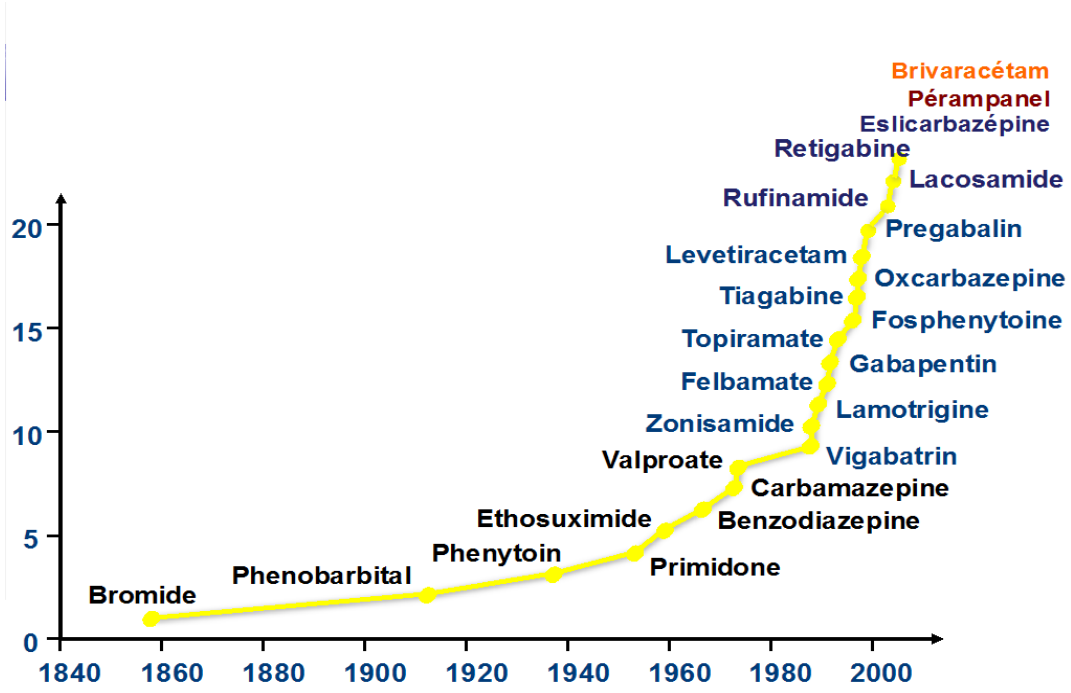
→« Start slow, aim low »



Doerrfuss et al, 2021

Phase thérapeutique

- Quel traitement ?



SAGE.Com

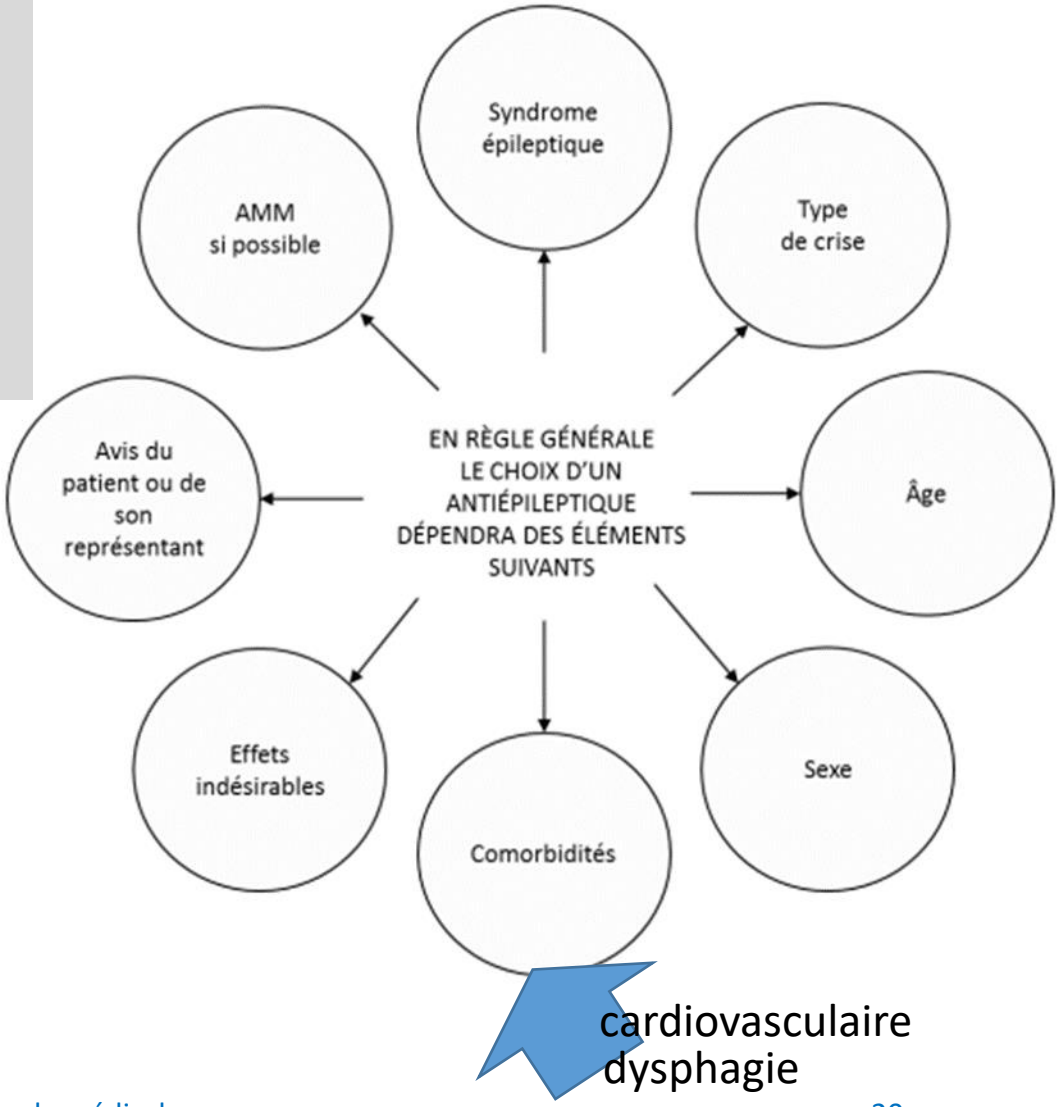
Syndrome

Age

Genre

Etio

Comorbidités



Phase thérapeutique

- Quel traitement ?

	AMM monothérapie FOCALE	AMM monothérapie GENERALISEE	Méca	Titration	Poso cible	ES	Teratogène	Inducteur	Avantages
Lamotrigine		aggrave myoclonies	Na, Ca	25mg/15j	100-400 en 1 ou 2 prises	tox cutanée, insomnie, céphalée			thymorégulateur
Levetiracetam			SV2A	500mg/7j	1000-3000 en 2 prises	psy			IV
Acide valproique			Na, Gaba	500mg/7j	1000-3000 en 2 prises	poids, ralentissement, hépatite		inhibiteur	thymorégulateur
Carbamazépine		aggrave Absences, Myoclonies	Na	200mg/7j	600-1200mg en 2 prises	vertige, hypoNa			thymorégulateur
Oxcarbazépine		aggrave Absences, Myoclonies	Na	300mg/7j	600-2400 en 2 prises	vertige, hypoNa			thymorégulateur
Eslicarbazépine		aggrave Absences, Myoclonies	Na	400mg/7j	800-1200 en 1 prise	vertige, hypoNa			thymorégulateur
Lacosamide			Na	50mg/7j	200-400 en 2 prises	vertige, tb conduction			IV
Zonisamide			Ca, Na, Gaba	50mg/15j	100-500 en 1 ou 2 prises	anorexie, lithiase rénale, psy			
Topiramate			Ca, Na, Glut	50mg/15j	100-300 en 2 prises	tb langage, psy		>200	anti-migraineux

Phase thérapeutique

- Quel traitement ? Etudes comparatives

Population âgée

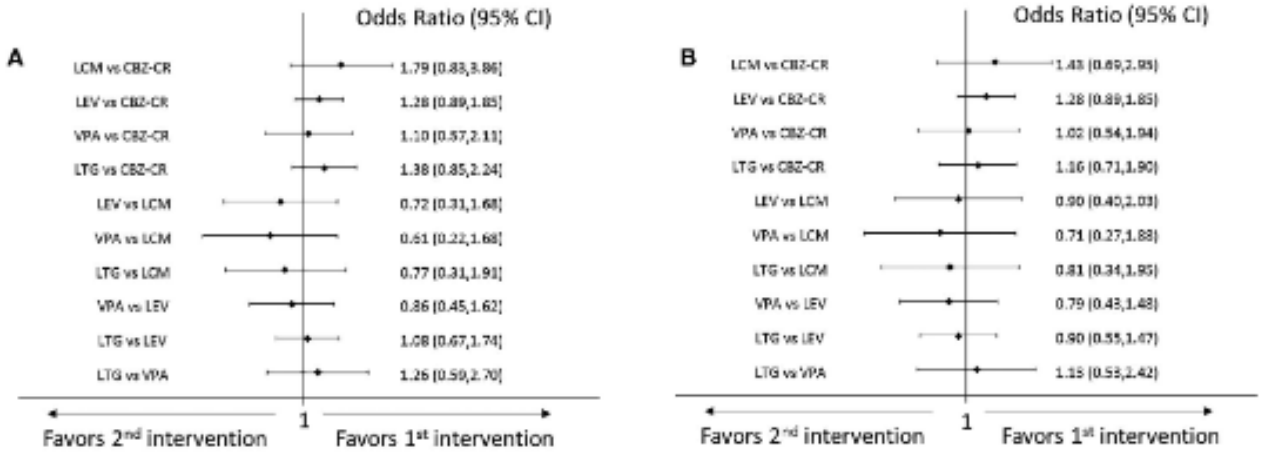
Table 1
Summary of the main double-blind and open-label studies evaluating antiepileptic drugs in new-onset epilepsy of elderly.

References	Study design	Investigated drugs	Main findings
Brodie et al. [77]	Double-blind, RCT	LTG vs. immediate release CBZ	LTG equally effective and better tolerated than CBZ
Rowan [78]	Double-blind, RCT	LTG vs. immediate release CBZ vs. GBP	Three drugs equally effective; CBZ less tolerated
Saetre et al. [79]	Double-blind, RCT	LTG vs. controlled-release CBZ	Equal efficacy and tolerability
Werhahn et al. [80]	Double-blind, RCT	LTG vs. LEV vs controlled-release CBZ	Equal efficacy; CBZ less tolerated
Ramsay et al. [81]	Double-blind, RCT	TPM 50 mg/day vs. TPM 200 mg/day	Good efficacy; sufficient tolerability for both dosages
Kutlu et al. [83]	Open label	LEV	Good efficacy and tolerability
Belcastro et al. [84]	Open label	LEV	Good efficacy and tolerability
Consoli et al. [85]	Open label RCT	LEV vs. controlled-release CBZ	Equal efficacy; LEV better tolerated
Belcastro et al. [86]	Open label	LEV	Good efficacy and tolerability
Stefan et al. [87]	Open label	TPM	Good efficacy and tolerability

CBZ: carbamazepine; GBP: gabapentin; LEV: levetiracetam; LTG: lamotrigine; RCT: randomized clinical trials; TPM; topiramate.

Efficacité
- 1° CBZ
- 2° LTG, LEV

Tolérance
- 1° LTG
- 2° LEV
- 3° CBZ



Lattanzi et al, 2019

Population AVC

Table 5
Clinical studies of oral ASMs and post-stroke epilepsy.

ASMs	Study design	Number of patients	Age (y)	Gender (M/F)	Stroke type
LCS	Prospective, cohort study	61	≥16	NE	NC
LEV/CBZ	Prospective, cohort study	106	≥18	58/48	IS, ICH
LTG/CBZ	Prospective, cohort study	64	38–90	46/18	IS
GBP	Prospective, cohort study	71	≥18	39/32	IS, ICH
LEV	Prospective, cohort study	34	≥60	19/15	IS, ICH

Follow-up	Main results	Reference
118 w	LCS has better efficacy than CBZ	(Rosenow et al., 2020)
54 w	LEV and CBZ were equally efficacious in adults with PSE Time to the first recurrence tended to be longer among patients on LEV LEV caused significantly fewer side effects than CBZ LEV in monotherapy is a safe and effective therapeutic option in elderly PSE patients	(Consoli et al., 2012)
12 m	LTG treatment for PSE is as effective as CBZ and relatively better tolerated	(Gilad et al., 2007)
30 m	GBP monotherapy is useful and safe for PSE	(Alvarez-Sabín et al., 2002)
≥1 y	LEV monotherapy can be effective and well tolerated in elderly patients with PSE	(Kutlu, Gomceli, Unal, & Inan, 2008)

PSE: post-stroke epilepsy; M/F: male/female; ASMs: antiseizure medications; NC: not classified; NE: not evaluated; ICH: intracerebral hemorrhage; IS: ischemic stroke; LCS: lacosamide; LEV: levetiracetam; CBZ: carbamazepine; GBP: gabapentin; y: year/years; m: months; w: weeks.

Phase thérapeutique

- Quel traitement ? Etudes de vie réelle

Tolerability of lacosamide or zonisamide in elderly patients with seizures

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ABSTRACT

Purpose: The prevalence of seizures in the elderly will increase as populations age. Data is currently limited regarding treatment and especially tolerability of newer antiseizure medications (ASMs). In the current study we aimed to investigate the tolerability of lacosamide (LCS) and zonisamide (ZNS).
Method: We performed a retrospective chart review of patients with seizures older than 60 treated with LCS or ZNS in the outpatient setting. We examined seizure variables, medical comorbidities, and concomitant medications. Primary outcomes were the retention rates at last follow up, and the discontinuation rate due to side effects.
Results: Seventy-one (71) LCS and 39 ZNS patients were identified. Average age at LCS initiation was 71.0 ± 7.0 years and 49% were medically refractory. Average duration of follow up was 23.1 ± 21.2 months. At last follow up, the retention rate was 60% and seizure freedom rate 52%. Of the 19 discontinuations due to side effects, 7 (37%) were due to dizziness/gait instability. No predictors of discontinuation were identified. Average age at ZNS initiation was 69.7 ± 6.9 years and 51% were medically refractory. Average duration of follow up was 46.3 ± 38.3 months. At last follow up, the retention rate was 64% and seizure freedom rate was 67%. Of the 12 discontinuations due to side effects, 4 (33%) were due to cognitive or behavioral side effects. Predictors of discontinuation included a lower starting dose.
Conclusions: Lacosamide and zonisamide are viable options for the treatment of epilepsy in the elderly and have similar retention rates.

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ORIGINAL RESEARCH

Effectiveness and Safety/Tolerability of Eslicarbazepine Acetate in Epilepsy Patients Aged ≥ 60 Versus < 60 Years: A Subanalysis from the Euro-Esli Study

Charlotte Lawthom · Pedro Bermejo · Dulce Campos · Rob McMurray · Vicente Villanueva

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ORIGINAL ARTICLE

Acta Neurologica Scandinavica WILEY

Lacosamide in patients with epilepsy of cerebrovascular etiology

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Objectives: To assess tolerability and efficacy of lacosamide in adults with cerebrovascular epilepsy etiology (CVEE).

Tolérance :

meilleure avec les nouveaux AE

Phase thérapeutique

Complication cardiovasculaire des AE

- **Arythmie** : Bloqueurs sodiques, récepteurs communs cœur cerveau :
  - Carbamazepine, phenytoine, lamotrigine, lacosamide
  - Brady arythmie, BAV
- **Hypercholestérolémie** : inducteur enzymatique
- **Poids** : valproate de sodium, syndrome métabolique

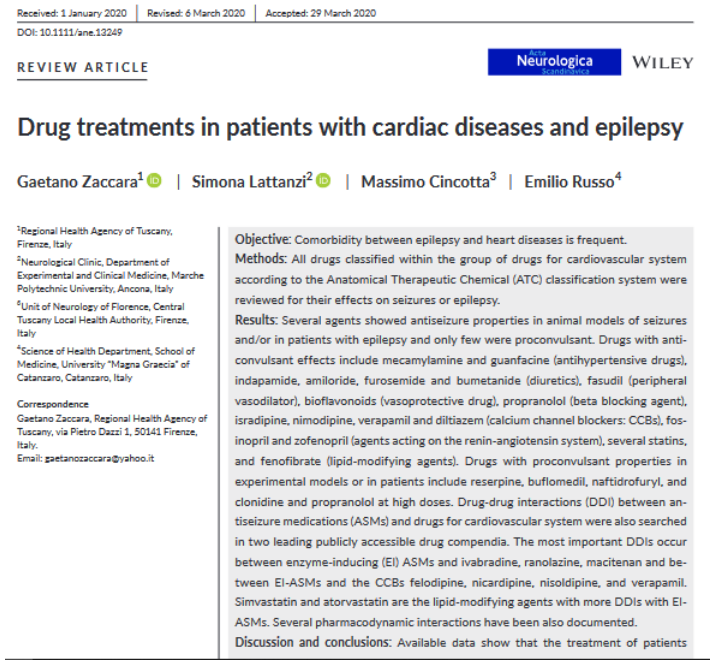
Interaction avec AE

Surtout inducteurs enzymatiques :

carbamazépine, esclicarbazépine, oxcarbazépine :

baisse efficacité du ttt vasculo protecteur

- AVK
- NACO (levetiracetam in vitro)
- Statines : simvastatine, atorvastatine
- Inhibiteurs Ca : amlodipine verapamil



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REVIEW ARTICLE

Neurologica Scandinavica | WILEY

Drug treatments in patients with cardiac diseases and epilepsy

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Objective: Comorbidity between epilepsy and heart diseases is frequent.
Methods: All drugs classified within the group of drugs for cardiovascular system according to the Anatomical Therapeutic Chemical (ATC) classification system were reviewed for their effects on seizures or epilepsy.
Results: Several agents showed antiseizure properties in animal models of seizures and/or in patients with epilepsy and only few were proconvulsant. Drugs with anticonvulsant effects include mecamylamine and guanfacine (antihypertensive drugs), indapamide, amiloride, furosemide and bumetanide (diuretics), fasudil (peripheral vasodilator), bioflavonoids (vasoprotective drug), propranolol (beta blocking agent), isradipine, nimodipine, verapamil and diltiazem (calcium channel blockers: CCBs), fosinopril and zofenopril (agents acting on the renin-angiotensin system), several statins, and fenofibrate (lipid-modifying agents). Drugs with proconvulsant properties in experimental models or in patients include reserpine, buflomedil, naftidrofuryl, and clonidine and propranolol at high doses. Drug-drug interactions (DDI) between antiseizure medications (ASMs) and drugs for cardiovascular system were also searched in two leading publicly accessible drug compendia. The most important DDIs occur between enzyme-inducing (EI) ASMs and ivabradine, ranolazine, macitenan and between EI-ASMs and the CCBs felodipine, nicardipine, nisoldipine, and verapamil. Simvastatin and atorvastatin are the lipid-modifying agents with more DDIs with EI-ASMs. Several pharmacodynamic interactions have been also documented.
Discussion and conclusions: Available data show that the treatment of patients

Eviter les inducteurs enzymatiques en 1° intention

AVC Normandie

Phase thérapeutique

- Quel traitement ?

	AMM monothérapie FOCALE	AMM monothérapie GENERALISEE	Méca	Titration	Poso cible	ES	Teratogène	Inducteur	Avantages
Lamotrigine		aggrave myoclonies	Na, Ca	25mg/15j	100-400 en 1 ou 2 prises	tox cutanée, insomnie, céphalée			thymorégulateur
Levetiracetam			SV2A	500mg/7j	1000-3000 en 2 prises	psy			IV
Acide valproique			Na, Gaba	500mg/7j	1000-3000 en 2 prises	poids, ralentissement, hépatite		inhibiteur	thymorégulateur
Carbamazépine		aggrave Absences, Myoclonies	Na	200mg/7j	600-1200mg en 2 prises	vertige, hypoNa			thymorégulateur
Oxcarbazépine		aggrave Absences, Myoclonies	Na	300mg/7j	600-2400 en 2 prises	vertige, hypoNa			thymorégulateur
Eslicarbazépine		aggrave Absences, Myoclonies	Na	400mg/7j	800-1200 en 1 prise	vertige, hypoNa			thymorégulateur
Lacosamide			Na	50mg/7j	200-400 en 2 prises	vertige, tb conduction			IV
Zonisamide			Ca, Na, Gaba	50mg/15j	100-500 en 1 ou 2 prises	anorexie, lithiase rénale, psy			
Topiramate			Ca, Na, Glut	50mg/15j	100-300 en 2 prises	tb langage, psy		>200	anti-migraineux

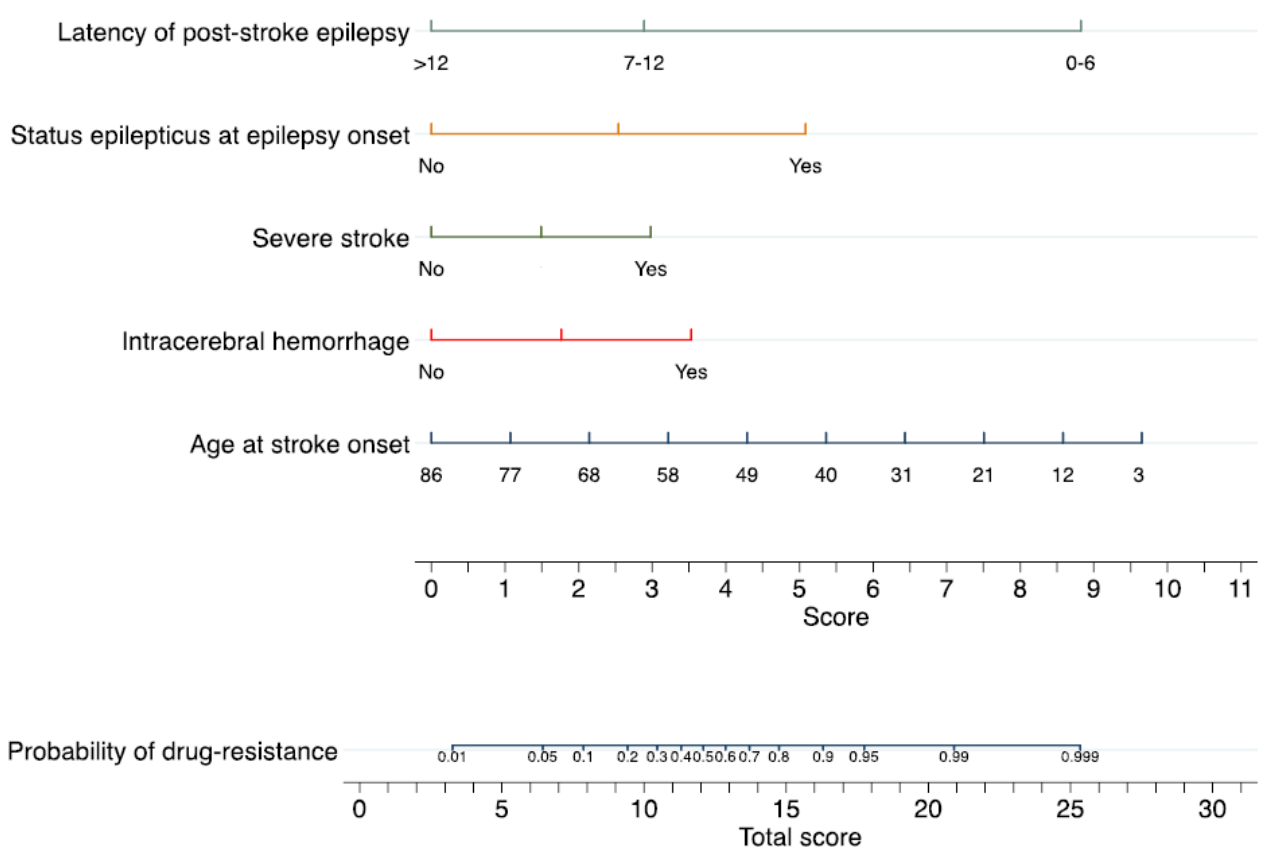
Phase thérapeutique

FR pharmaco résistance

20 %

Lattanzi et al, 2023

1. *Age*
2. *Hémorragie intracérébrale*
3. *Sévérité AVC*
4. *Délai épilepsie < 12 mois*
5. *EME initial*



Phase thérapeutique

- Quel traitement ? Add on

Seizure: European Journal of Epilepsy 97 (2022) 37–42

Contents lists available at ScienceDirect

Seizure: European Journal of Epilepsy

journal homepage: www.elsevier.com/locate/seizure

Brivaracetam as add-on treatment in patients with post-stroke epilepsy: real-world data from the BRIVAracetam add-on First Italian netwoRk Study (BRIVAFIRST)

Simona Lattanzi [a,*], Laura Canafoglia [b], Maria Paola Canevini [c,d], Sara Casciato [e], Emanuele Cerulli Irelli [f], Valentina Chiesa [c], Filippo Dainese [g], Giovanni De Maria [h], Giuseppe Didato [i], Giancarlo Di Gennaro [e], Giovanni Falcicchio [j], Martina Fanella [f], Edoardo Ferlazzo [k], Massimo Gangitano [l], Angela La Neve [j], Oriano Mecarelli [f], Elisa Montalenti [m], Alessandra Morano [f], Federico Piazza [n], Chiara Pizzanelli [o,p], Patrizia Pulitano [f], Federica Ranzato [q], Eleonora Rosati [r], Laura Tassi [s], Carlo Di Bonaventura [f], on behalf of theBRIVAFIRST Group Membership[1]

Epilepsy & Behavior 126 (2022) 108483

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Epilepsy & Behavior

journal homepage: www.elsevier.com/locate/yebeh

A post-approval observational study to evaluate the safety and tolerability of perampanel as an add-on therapy in adolescent, adult, and elderly patients with epilepsy

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Phase thérapeutique

Surveillance

- **Avant tout clinique**
  - Effets indésirables
  - Efficacité

- **Surveillance biologique**
  - Aucune surveillance biologique avec la plupart des antiépileptiques de nouvelle génération
  - Ionogramme sanguin à la recherche d'un hyponatrémie avec les carboxémides (carbamazépine, oxcarbazépine, eslicarbazépine)
  - NFS, plaquettes et bilan hépatique (à 3 mois) pour le valproate de sodium

- **Dosages des antiépileptiques**
  - Le plus souvent non nécessaire, en particulier en cas de polythérapie (interactions pharmacodynamiques) et avec les nouveaux antiépileptiques
  - *Intérêt lors suspicion de toxicité*

AVC Normandie

Mesures associées

- Permis de conduire

1 crise : 6 mois

2 crises : 1 an

Provoquée : à l'appréciation du neurologue

Arrêt ttt : 3 mois

4.4 Troubles neurologiques	**4.4.1 Épilepsie :** Les crises d'épilepsie ou autres perturbations brutales de l'état de conscience constituent un danger grave pour la sécurité routière lorsqu'elles surviennent lors de la conduite. Un usager est considéré comme souffrant « d'épilepsie » lorsqu'elle subit deux crises d'épilepsie ou plus espacées de plus de 24h au cours d'une période de cinq ans, selon la définition officielle de l'International league against epilepsie (ILAE). Une crise d'épilepsie provoquée est définie comme une crise déclenchée par un facteur causal identifiable qui peut être évité. Il est essentiel que le type de crise et le syndrome épileptique de la personne concernée soient identifiés, y compris et dans la mesure du possible, dès après une 1ère crise, afin d'évaluer le	**4.4.1.1 Première crise initiale d'épilepsie isolée non provoquée :** **Incompatibilité temporaire de 6 mois :** lorsque le neurologue estime, avant l'expiration des six mois, que le risque de nouvelle crise est négligeable, il transmet son avis en le motivant médicalement. Au vu de cet avis, le médecin agréé peut donner un avis favorable à la reprise de la conduite avant l'expiration du délai des 6 mois ; **Puis,** **Compatibilité temporaire :** l'usager, qui a été victime d'une crise initiale d'épilepsie non provoquée, peut être déclaré « apte à la conduite », après une période de 6 mois sans aucune crise, sans ou avec traitement, et si le neurologue estime que le risque de nouvelle crise est négligeable au vu des éléments diagnostiques, pronostiques et thérapeutiques. Si le conducteur prend un traitement, celui-ci doit être compatible avec la conduite ; **Puis,** **Compatibilité définitive** : à l'issue des cinq ans, sans aucune crise pendant cette période sous réserve que le neurologue estime que le risque de crise est négligeable au vu des éléments diagnostiques, pronostiques et thérapeutiques. Si une nouvelle crise survient, durant cette période de 5 ans, se reporter au paragraphe suivant **4.4.1.2 épilepsie**. **4.4.1.2 Usager souffrant d'épilepsie :** l'existence d'une nouvelle crise, durant la période de cinq ans qui suit la première crise ou la nécessité d'un traitement antiépileptique, fait passer la situation

4.4.1.3 Crise d'épilepsie provoquée :

Compatibilité temporaire ou définitive possible : lorsque le conducteur a été victime d'une crise d'épilepsie provoquée par un facteur causal identifiable, non susceptible de se reproduire au volant, et après avis d'un neurologue qui estime que le risque de nouvelle crise est négligeable, en motivant sa proposition avec les éléments diagnostiques, pronostiques et thérapeutiques.

Dans les autres cas d'épilepsie provoquée, l'évaluation est faite conformément aux autres sections pertinentes de la présente annexe (relatives, par exemple, à l'alcool ou à d'autres facteurs de comorbidité).

4.4.1.6 Modification ou arrêt du traitement antiépileptique :

1. **Modification ou arrêt du traitement antiépileptique sans récidive :**

Incompatibilité temporaire trois mois : si le traitement médicamenteux est modifié ou arrêté sur avis d'un médecin, le conducteur cesse de conduire pendant trois mois.

Conclusion

- Crise précoce versus crise tardive
- Monitoring EEG
- Traitement
  - Poursuite du traitement des crises précoces si score SeLECT > 9 ? CAVE > 4 ?
  - Traitement après première crise tardive :
    - lamotrigine, lacosamide (selon cardio)
    - levetiracetam