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The New Seizure and Epilepsy Classification: Tips for Implementing to Clinical practice

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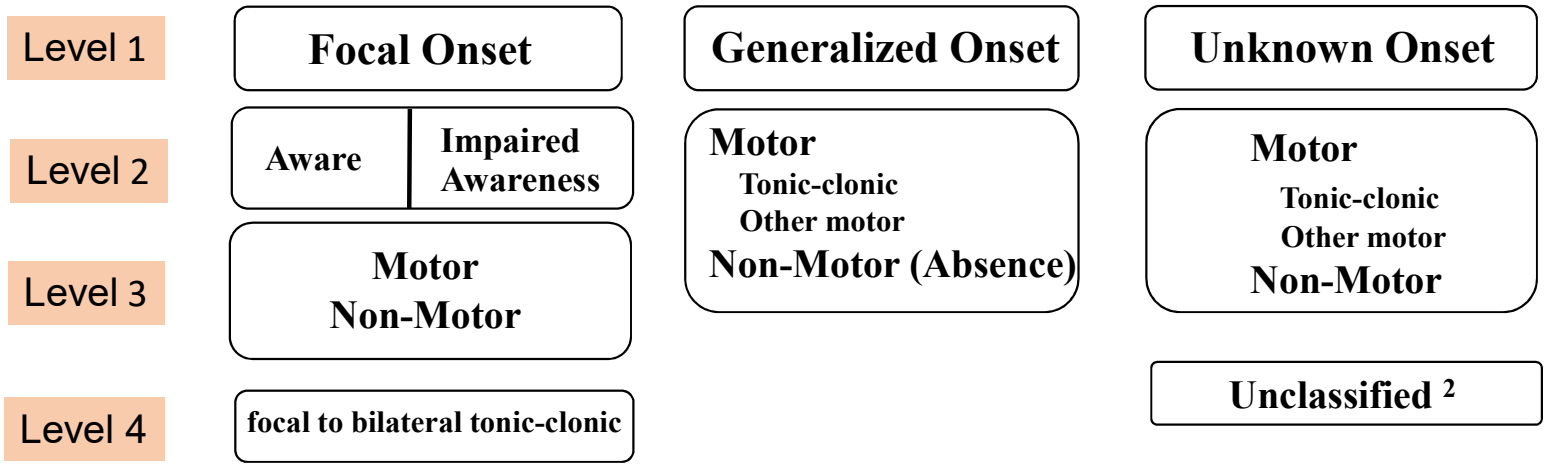
Seizure classification

Case 1

- 18 yo man presented to the ER after an episode of sudden loss of consciousness, body stiffened followed by rhythmic jerking of the whole body, which lasted for 1-2 minutes. After the event, he remained confused for few minutes. The event occurred early in the morning and he reported that before he passed out, he felt that his arms jerked several times.
- He was previously healthy with no underlying disease.
- Neurological examination was within normal limits.

What is the seizure classification in this case?

ILAE 2017 Classification of Seizure Types Basic Version [1]

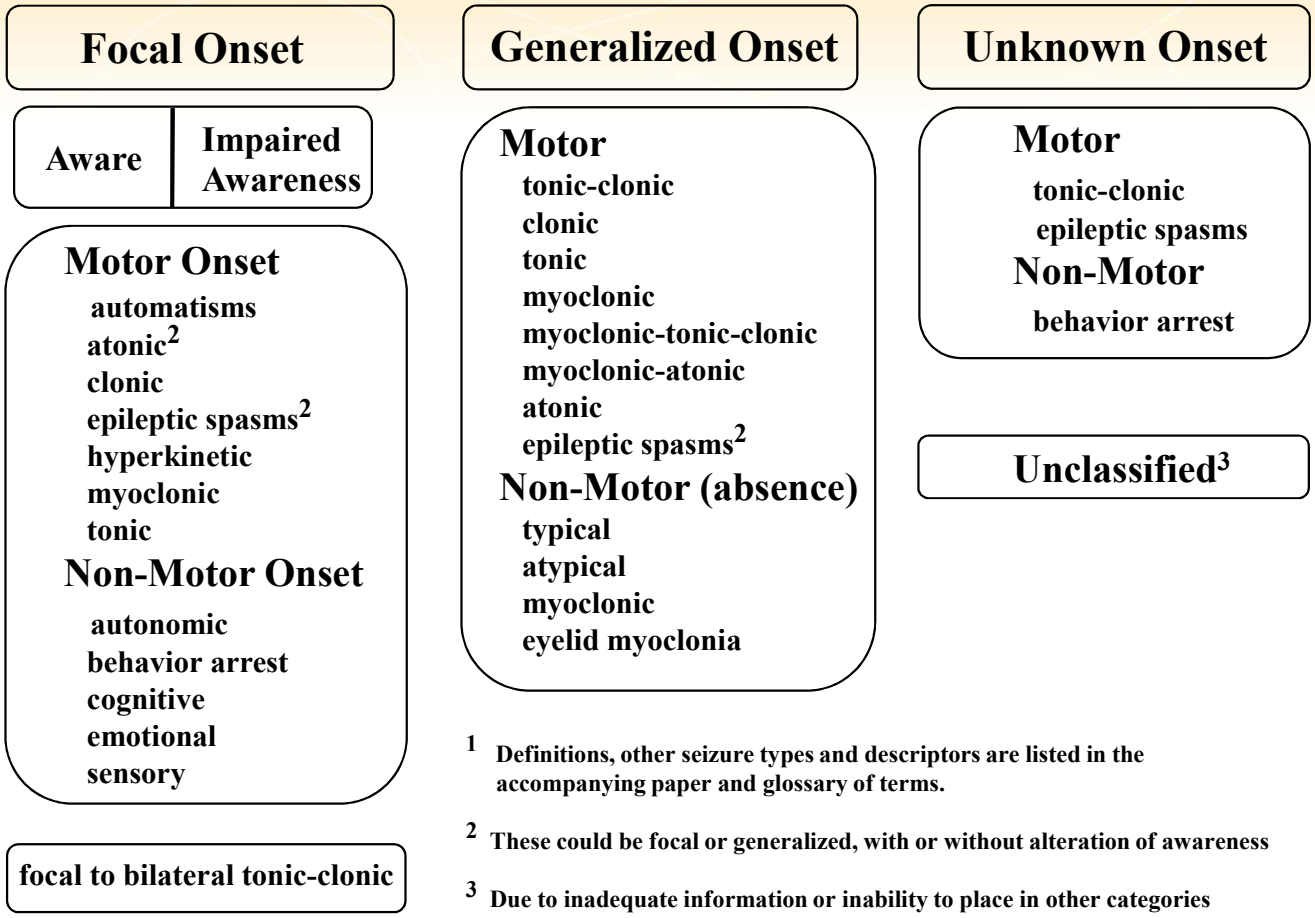


[1] Definitions, other seizure types and descriptors are listed in the accompanying paper & glossary of terms

[2] Due to inadequate information or inability to place in other categories

From *Fisher et al. Instruction manual for the ILAE 2017 operational classification of seizure types. Epilepsia doi: 10.1111/epi.13671*

ILAE 2017 Classification of Seizure Types Expanded Version[1]



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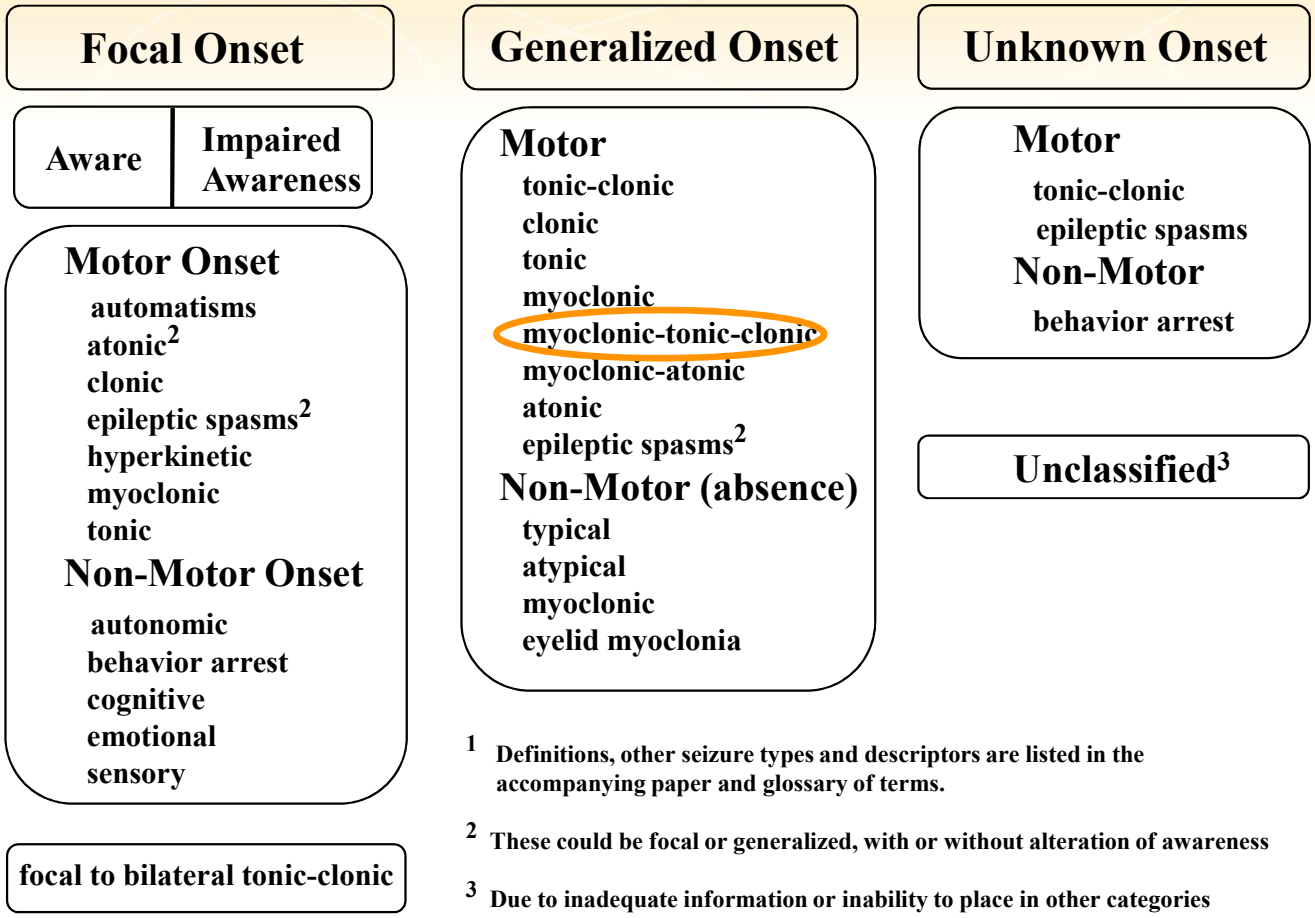

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The Elements of Change

- Allow some seizures to be either focal or generalized onset
- Classify seizures of unknown onset
- Clarify “impairment of consciousness”
- Include a few previously unclassified types
- Update word usage for greater public clarity
- Validate use of supportive information, e.g. EEG
- Conform with ICD 11 and 12
- Update the 2001 glossary of seizure terms
- Standardize common descriptors to describe seizures
- Map old to new terms

New Seizure Types

New Focal Seizures

Motor	Non-Motor
atonic	behavior arrest
automatisms	(autonomic)
clonic	(cognitive)
epileptic spasms	emotional
hyperkinetic	(sensory)
myoclonic	
tonic	

New generalized seizures

absence with eyelid myoclonia
epileptic spasms (infantile spasms)
myoclonic-atonic (e.g., Doose)
myoclonic-tonic-clonic (e.g., JME)

New combined seizures

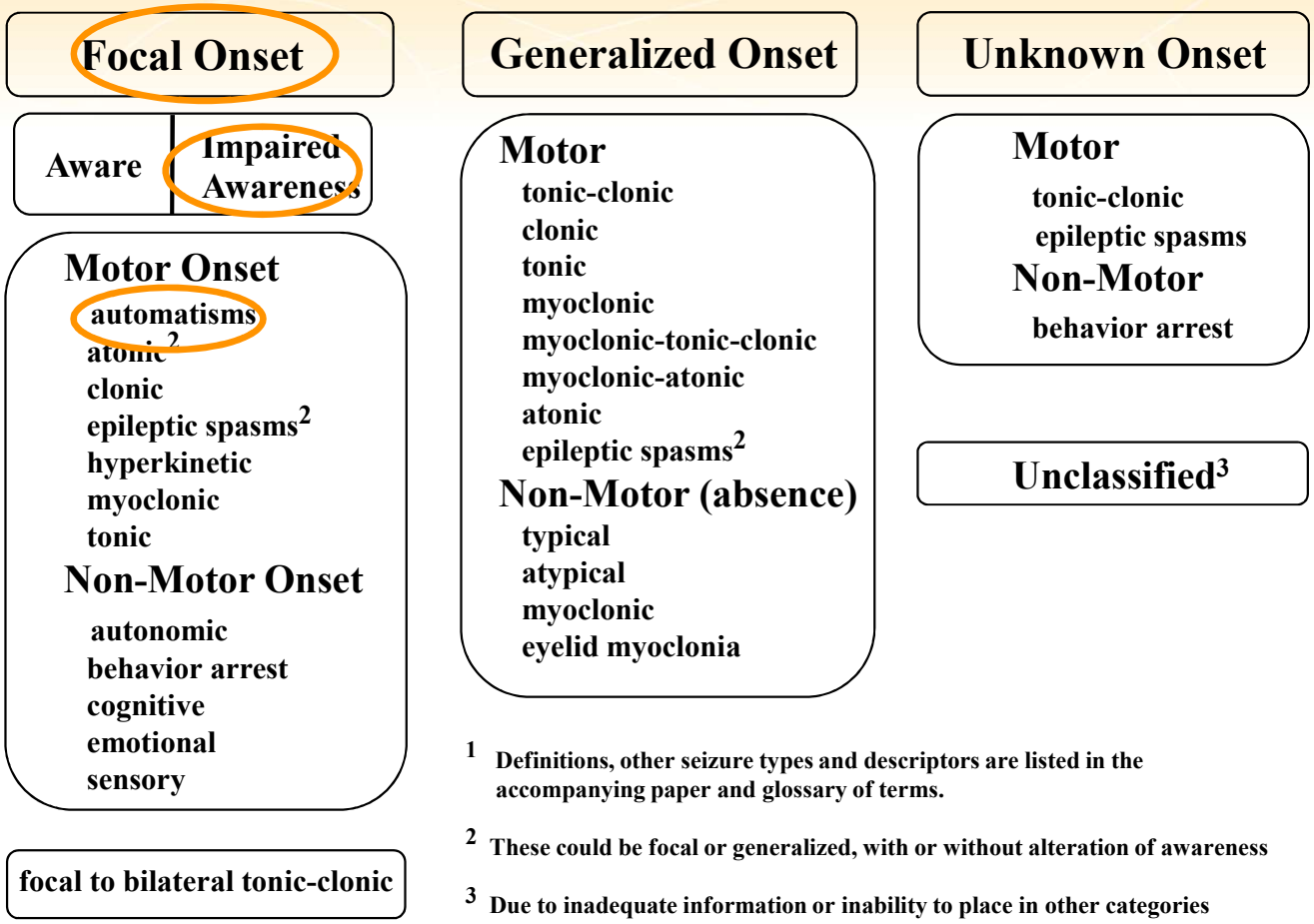
(focal to bilateral tonic-clonic)

(parentheses) indicates prior existence, but renaming

Case 2

- A 32 year-old man has an episode of loss of consciousness, repetitive chewing, blurting out repetitive phrases, such as “help me, help me” and then forcibly turns to the right, followed by stiffening of the right arm. He has no awareness or memory of the seizure.

ILAE 2017 Classification of Seizure Types Expanded Version[1]



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Optional further descriptions

- **Focal aware or impaired awareness** seizures optionally may be further characterized by one of the listed motor onset or nonmotor onset symptoms, reflecting **the first prominent sign or symptom in the seizure**, for example, **focal impaired awareness automatism seizure**

- A focal seizure name **can omit mention of awareness** when awareness is not applicable or unknown, thereby classifying the seizure directly by motor onset or nonmotor onset characteristics

The Elements of Change

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- Classify seizures of unknown onset
- Clarify “impairment of consciousness”
- Include a few previously unclassified types
- Update word usage for greater public clarity
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- Standardize common descriptors to describe seizures
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Wording Changes

OLD TERM	NEW TERM
Unconscious (still used, not in name)	Impaired awareness (surrogate)
Partial	Focal
Simple partial	Focal aware
Complex partial	Focal impaired awareness
Dyscognitive (word discontinued)	Focal impaired awareness
Psychic	Cognitive
Secondarily generalized tonic-clonic	Focal to bilateral tonic-clonic
Arrest, freeze, pause, interruption	Behavior arrest

Case 3

- A 36 year-old woman has a sudden inappropriate feeling of ecstatic joy, followed by loss of awareness, and then bilateral limb stiffening, then bilateral jerking and falling to the ground with incontinence and tongue-biting.

ILAE 2017 Classification of Seizure Types Expanded Version[1]

Focal Onset

Aware | Impaired Awareness

Motor Onset
- automatisms
- atonic[2]
- clonic
- epileptic spasms[2]
- hyperkinetic
- myoclonic
- tonic

Non-Motor Onset
- autonomic
- behavior arrest
- cognitive
- emotional
- sensory

focal to bilateral tonic-clonic

Generalized Onset

Motor
- tonic-clonic
- clonic
- tonic
- myoclonic
- myoclonic-tonic-clonic
- myoclonic-atonic
- atonic
- epileptic spasms[2]

Non-Motor (absence)
- typical
- atypical
- myoclonic
- eyelid myoclonia

Unknown Onset

Motor
- tonic-clonic
- epileptic spasms

Non-Motor
- behavior arrest

Unclassified[3]

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Case 4

- A 22 year-old woman has 10-second episodes of involuntary vigorous pedaling leg movements with preserved awareness and responsiveness.

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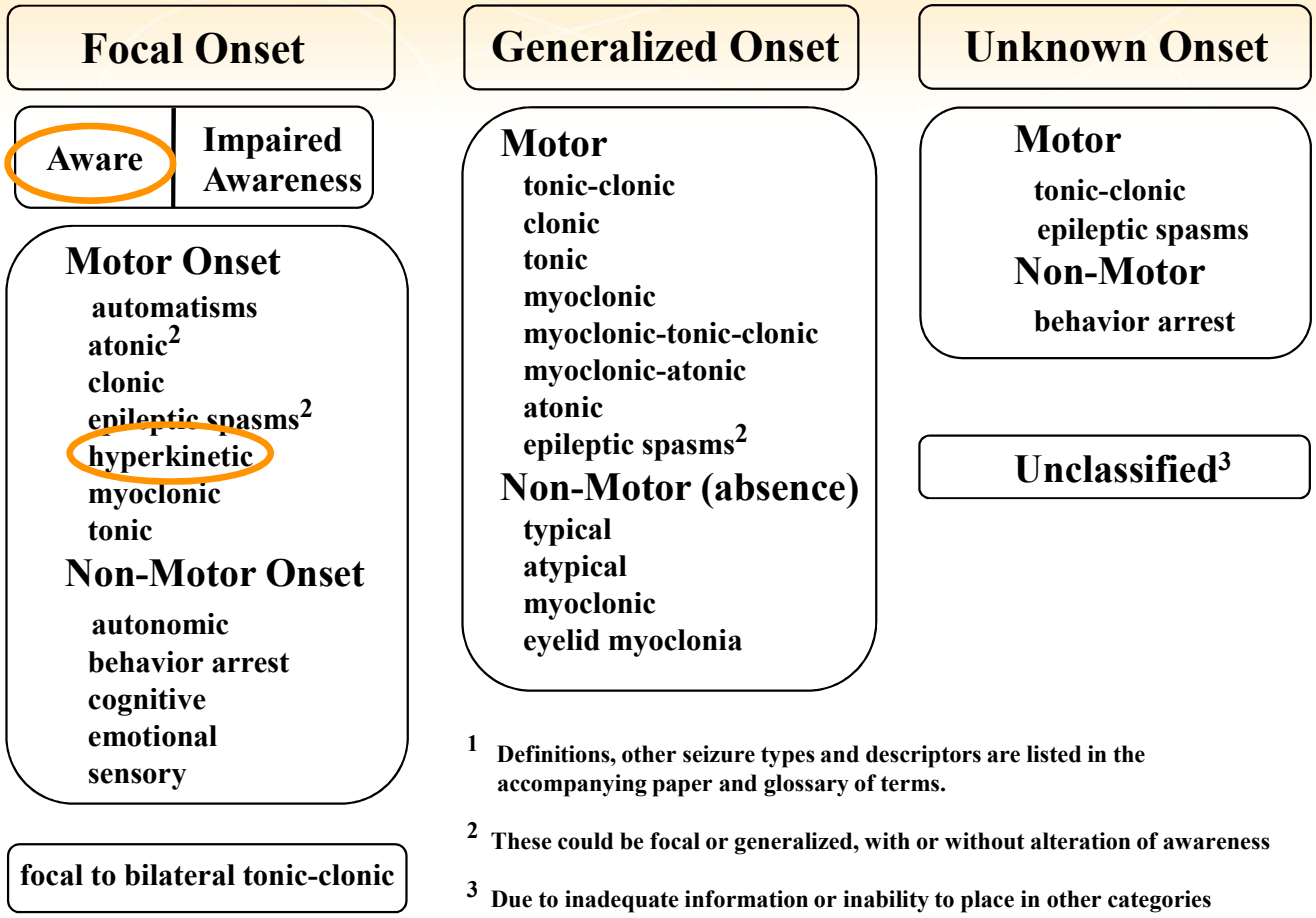

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Case 5

- A 62 year-old man had his first lifetime seizure. His wife heard a cry and a thud, and then came into the room to find her husband with bilateral limb stiffening followed by bilateral limb jerking for about 2 minutes. He has no retrospective recall of the time before or during the event.
-

ILAE 2017 Classification of Seizure Types Expanded Version[1]

Focal Onset

Aware | Impaired Awareness

Motor Onset
- automatisms
- atonic[2]
- clonic
- epileptic spasms[2]
- hyperkinetic
- myoclonic
- tonic

Non-Motor Onset
- autonomic
- behavior arrest
- cognitive
- emotional
- sensory

focal to bilateral tonic-clonic

Generalized Onset

Motor
- tonic-clonic
- clonic
- tonic
- myoclonic
- myoclonic-tonic-clonic
- myoclonic-atonic
- atonic
- epileptic spasms[2]

Non-Motor (absence)
- typical
- atypical
- myoclonic
- eyelid myoclonia

Unknown Onset

Motor
- tonic-clonic
- epileptic spasms

Non-Motor
- behavior arrest

Unclassified[3]

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Case 6

- A 33 year-old woman has a sudden sense of panic lasting about 30 seconds, which she recalls very clearly. Her EEG shows left temporal spikes.

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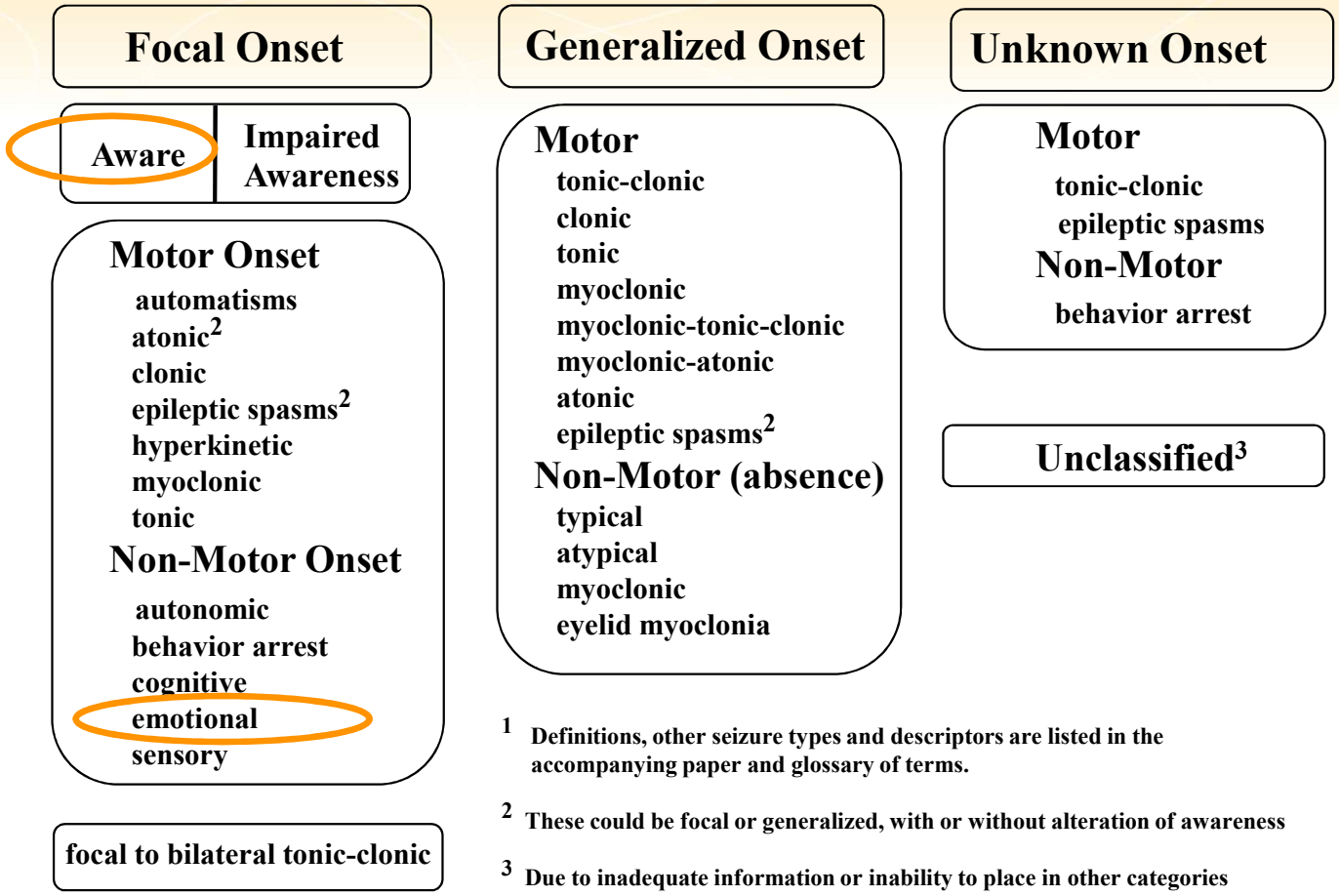

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Case 7

- A woman awakens to find her husband having a seizure in bed. The onset is not witnessed, but she is able to describe bilateral stiffening followed by bilateral shaking. EEG and MRI are normal.

ILAE 2017 Classification of Seizure Types Expanded Version[1]

Focal Onset

Aware | Impaired Awareness

Motor Onset
- automatisms
- atonic[2]
- clonic
- epileptic spasms[2]
- hyperkinetic
- myoclonic
- tonic

Non-Motor Onset
- autonomic
- behavior arrest
- cognitive
- emotional
- sensory

focal to bilateral tonic-clonic

Generalized Onset

Motor
- tonic-clonic
- clonic
- tonic
- myoclonic
- myoclonic-tonic-clonic
- myoclonic-atonic
- atonic
- epileptic spasms[2]

Non-Motor (absence)
- typical
- atypical
- myoclonic
- eyelid myoclonia

Unknown Onset

Motor
- tonic-clonic
- epileptic spasms

Non-Motor
- behavior arrest

Unclassified[3]

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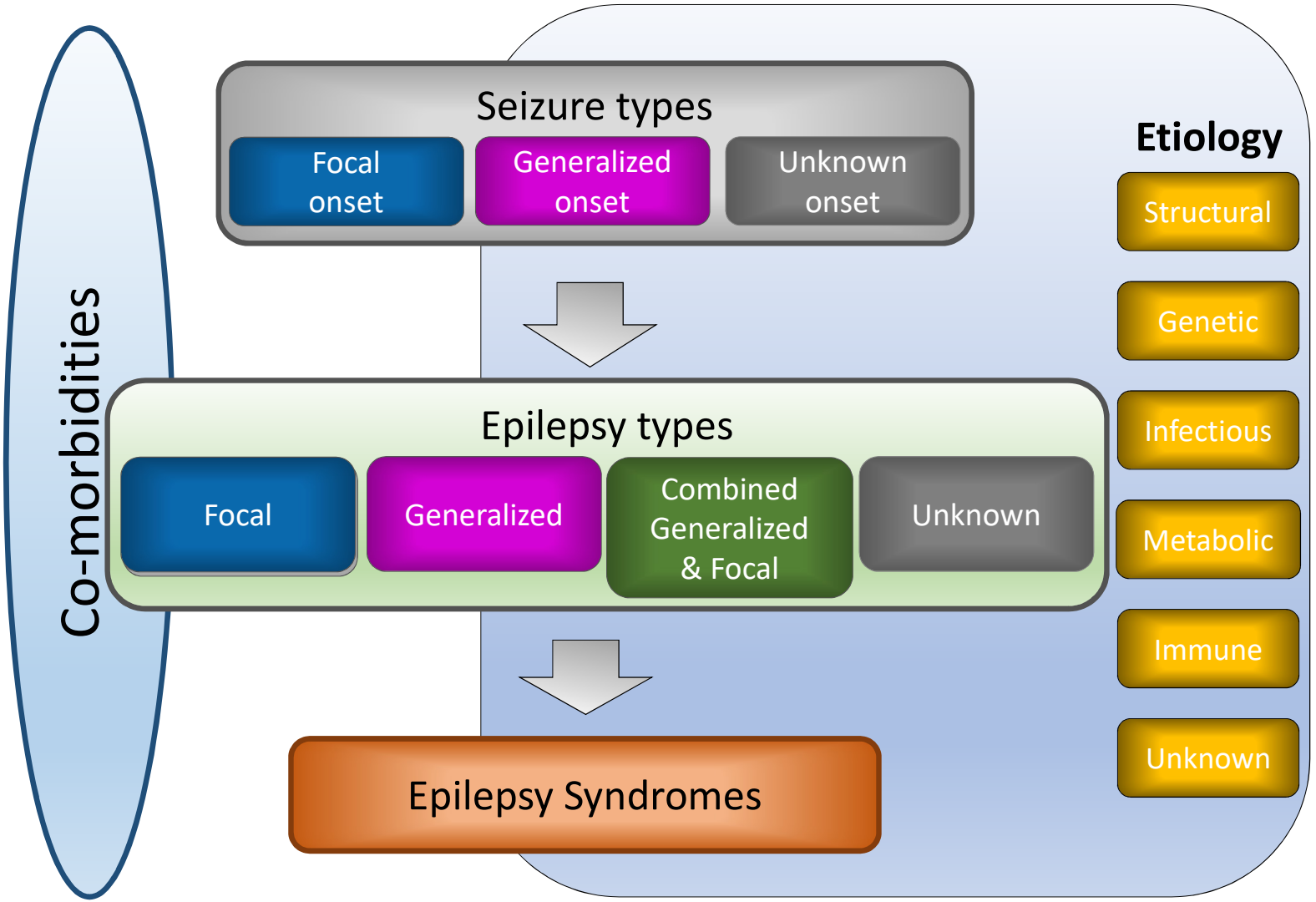
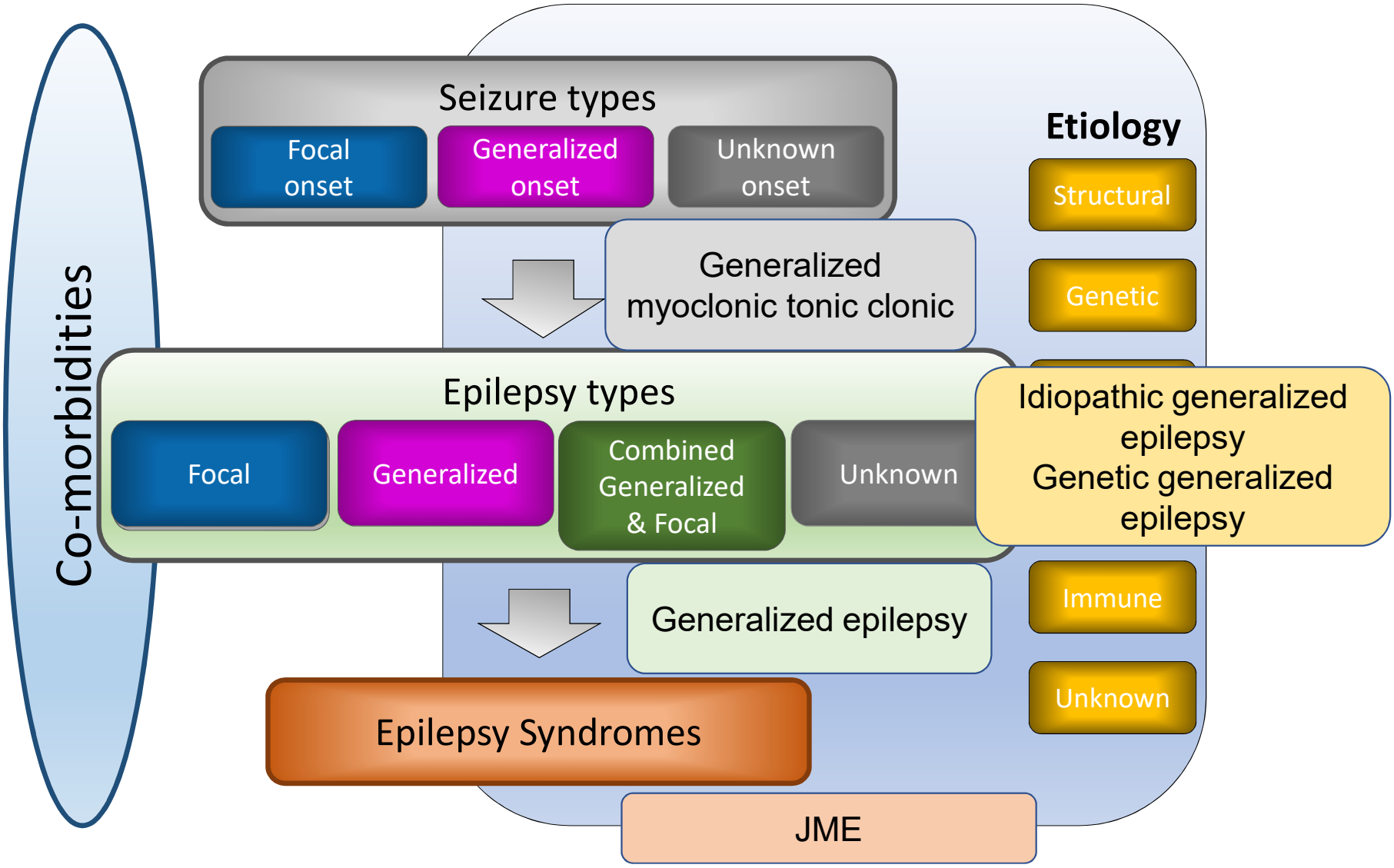
Epilepsy classification

Case 1

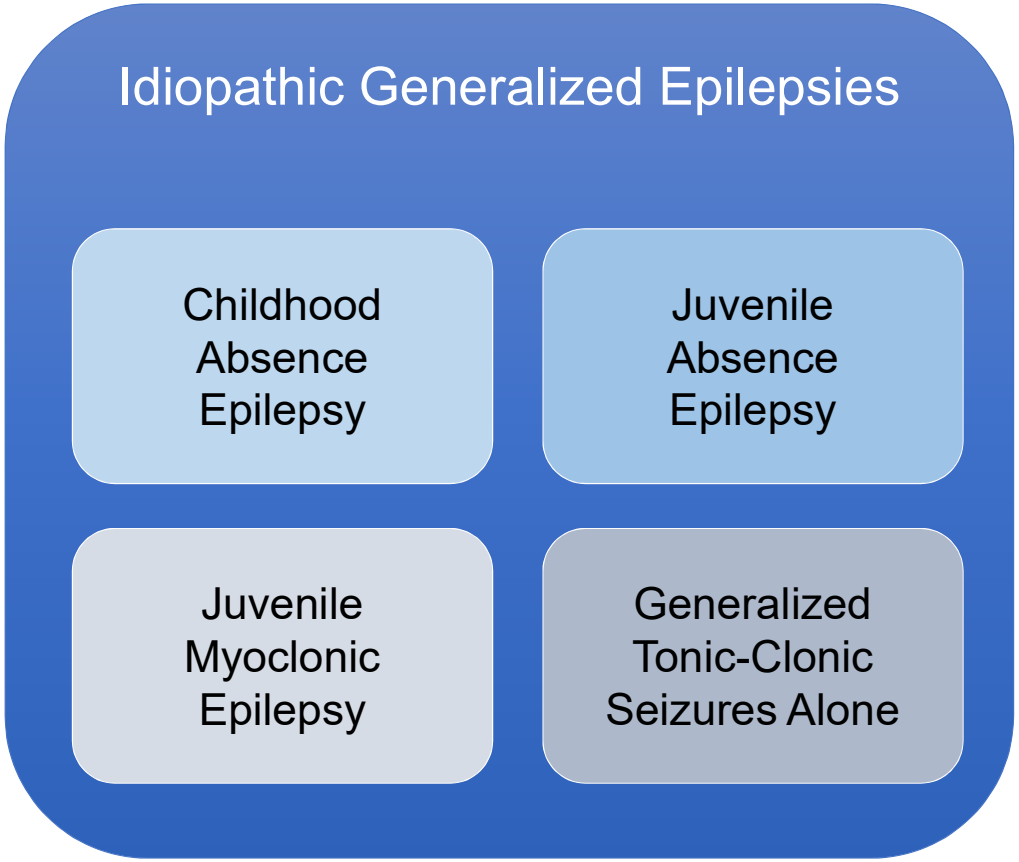
- 18 yo man presented to the ER after an episode of sudden loss of consciousness, body stiffened followed by rhythmic jerking of the whole body, which lasted for 1-2 minutes. After the event, he remained confused for few minutes. The event occurred early in the morning and he reported that before he passed out, he felt that his arms jerked several times.
- He was previously healthy with no underlying disease.
- Neurological examination was within normal limits.


FP1-F7
F7-T3
T3-T5
T5-O1
FP1-F3
F3-C3
C3 P3
P3-O1
FP2-F4
F4-C4
C4-P4
P4-O2
FP2-F8
F8-T4
T4-T6
T6-O2
50 µV
1 sec


Co-morbidities
Seizure types
Focal onset
Generalized onset
Unknown onset
Epilepsy types
Focal
Generalized
Combined Generalized & Focal
Unknown
Epilepsy Syndromes
Etiology
Structural
Genetic
Infectious
Metabolic
Immune
Unknown


Co-morbidities
Seizure types
Focal onset
Generalized onset
Unknown onset
Etiology
Structural
Genetic
Immune
Unknown
Generalized myoclonic tonic clonic
Epilepsy types
Focal
Generalized
Combined Generalized & Focal
Unknown
Idiopathic generalized epilepsy
Genetic generalized epilepsy
Generalized epilepsy
Epilepsy Syndromes
JME

Retention of Old term ‘Idiopathic Generalized Epilepsies’



Case 2

- 27 year old man presented to ER with an episode of generalized tonic clonic seizure.
- He had recurrent seizures since age 12.
- His seizures consisted of loss of awareness, blank stares for 1-2 minutes, followed by postictal confusion. These seizures occurred 1-3 times/ month.

Case 2

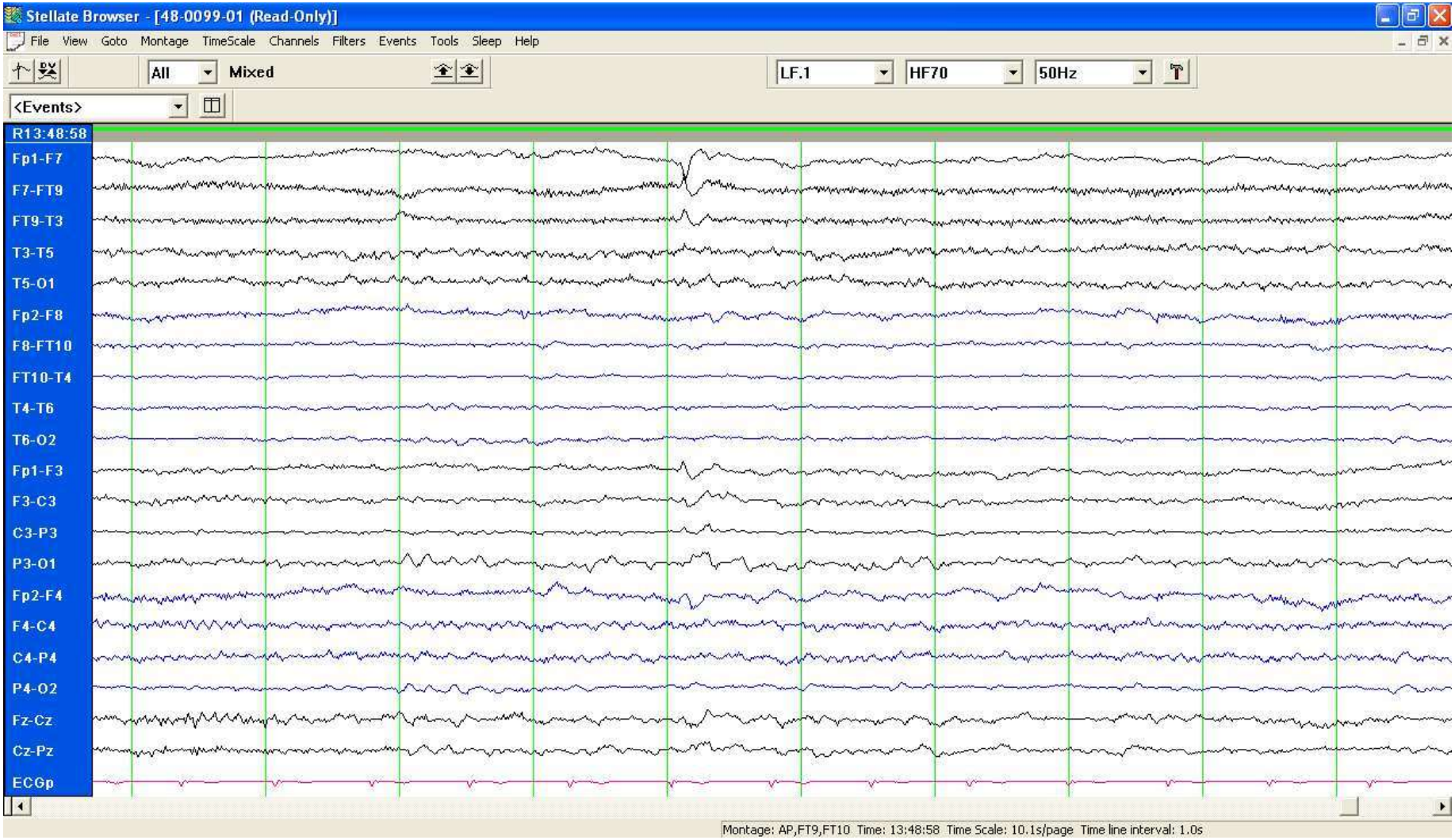
- He was started on antiepileptic medication and his seizures were quite well controlled with 0-1 breakthrough seizures per year often precipitated by lack of sleep.

- 3 years ago, his seizure frequency started to increase to 2-4 seizures per month. Each seizures would started with rising sensation in the epigastric area. He still took his medication regularly.

Case 2

- No prior history of CNS infection or febrile seizures
- His neurological examination were within normal limits

- MRI brain: Normal
- Routine EEG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F7-FT9
FT9-T3
T3-T5
T5-O1
Fp2-F8
F8-FT10
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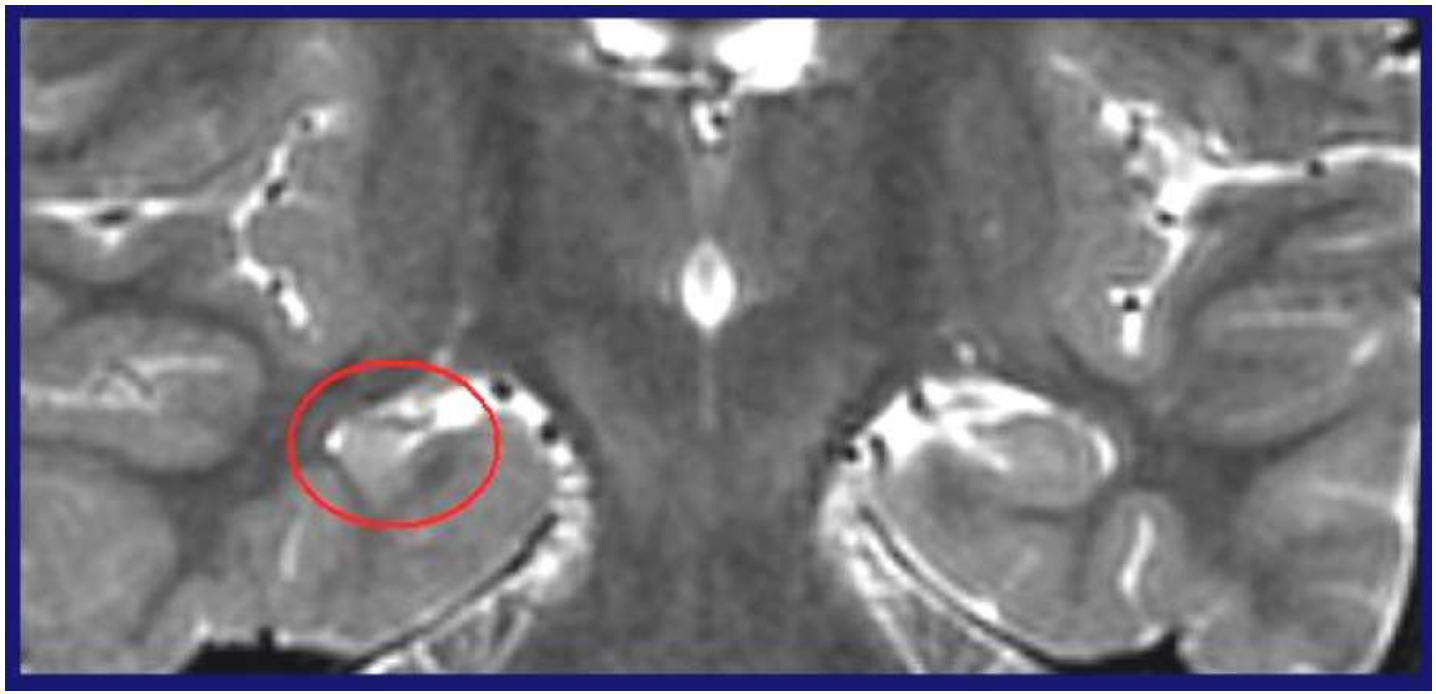
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Cz
Cz-Pz
ECGp
Montage: AP,FT9,FT10 Time: 13:48:58 Time Scale: 10.1s/page Time line interval: 1.0s

Case 2

- He was previously on phenytoin, which could not control his seizures. The AEDs was changed to carbamazepine and sodium valproate and then carmazepine, lamotrigine and levetiracetam but still could not control his seizures.
- He took all of his medication regularly.

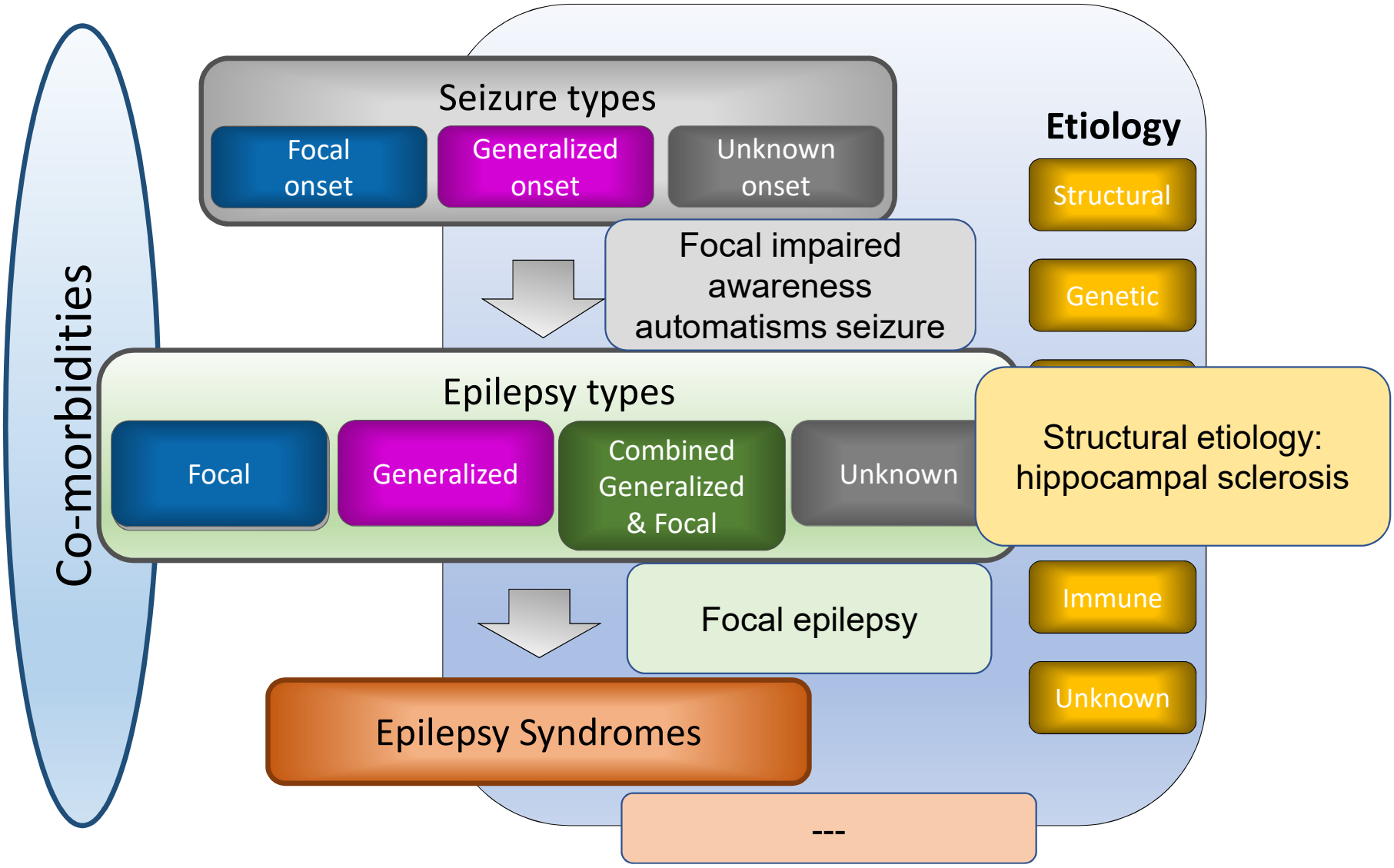
- He later on had MRI brain (temporal epilepsy protocol), which showed:



Atrophy

Increased signal in T2 or FLAIR sequence

Loss of internal architectures


Co-morbidities
Seizure types
Focal onset
Generalized onset
Unknown onset
Etiology
Structural
Genetic
Immune
Unknown
Focal impaired awareness automatisms seizure
Epilepsy types
Focal
Generalized
Combined Generalized & Focal
Unknown
Structural etiology: hippocampal sclerosis
Focal epilepsy
Epilepsy Syndromes

Case 3

- 33 year old man was brought to the ER after an episode of generalized tonic clonic seizure
- He had history of epilepsy since age 22
- His seizures consisted of loss of consciousness, staring and automatism and lasted for 1-2 minutes, followed by postictal confusion

Case 3

- He had been taking antiepileptic medication for the last 6 years but still had 2-4 episodes of seizure per year
- He stated that his seizures started with seeing bright colorful spots over the right side

Case 3

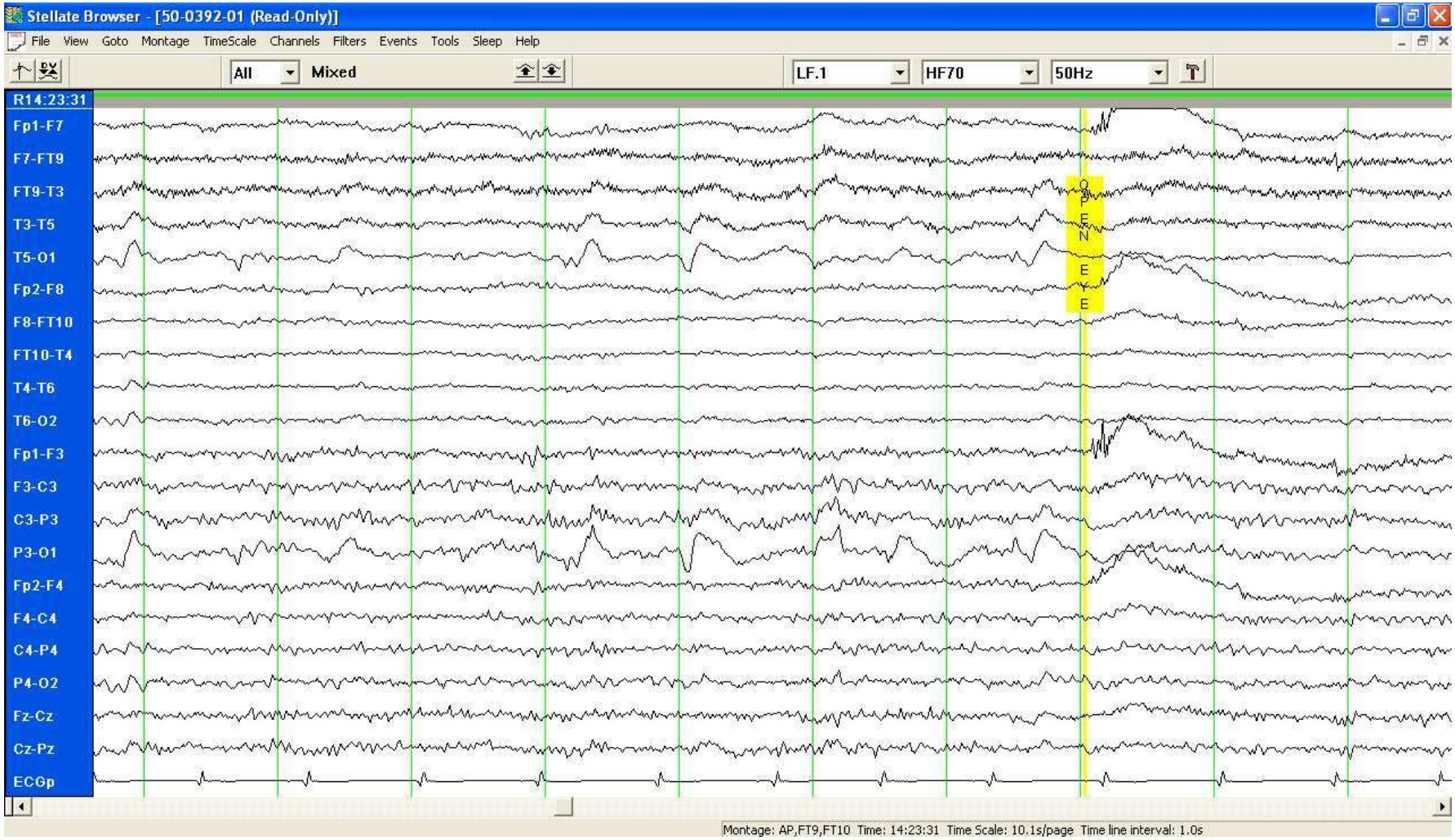
- He had history of motorcycle accident when he was 15 years old. At that time he suffered from left frontal contusion and small hematoma at frontal region
- No prior history of CNS infection or febrile seizures
- His neurological examination were within normal limits

Case 3

- Review of his previous investigation
- CT brain without contrast: left frontal encephalomalacia (The CT film was not available for review
- EEG: presence of epileptiform activities

Case 3

- Repeat EEG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Fp1-F7
F7-FT9
FT9-T3
T3-T5
T5-O1
Fp2-F8
F8-FT10
FT10-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Cz
Cz-Pz
ECGp
EYES OPEN
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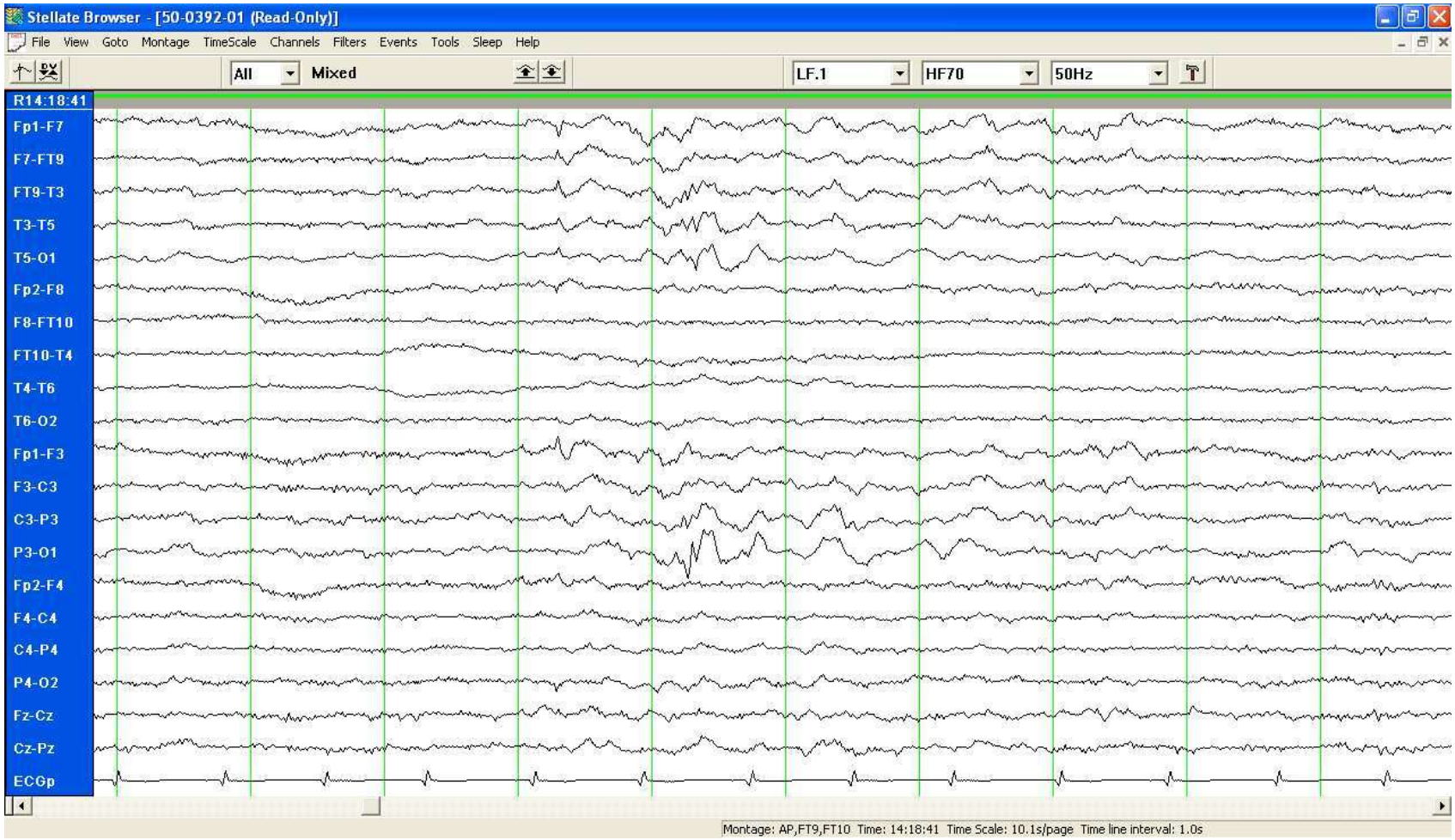
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HF70
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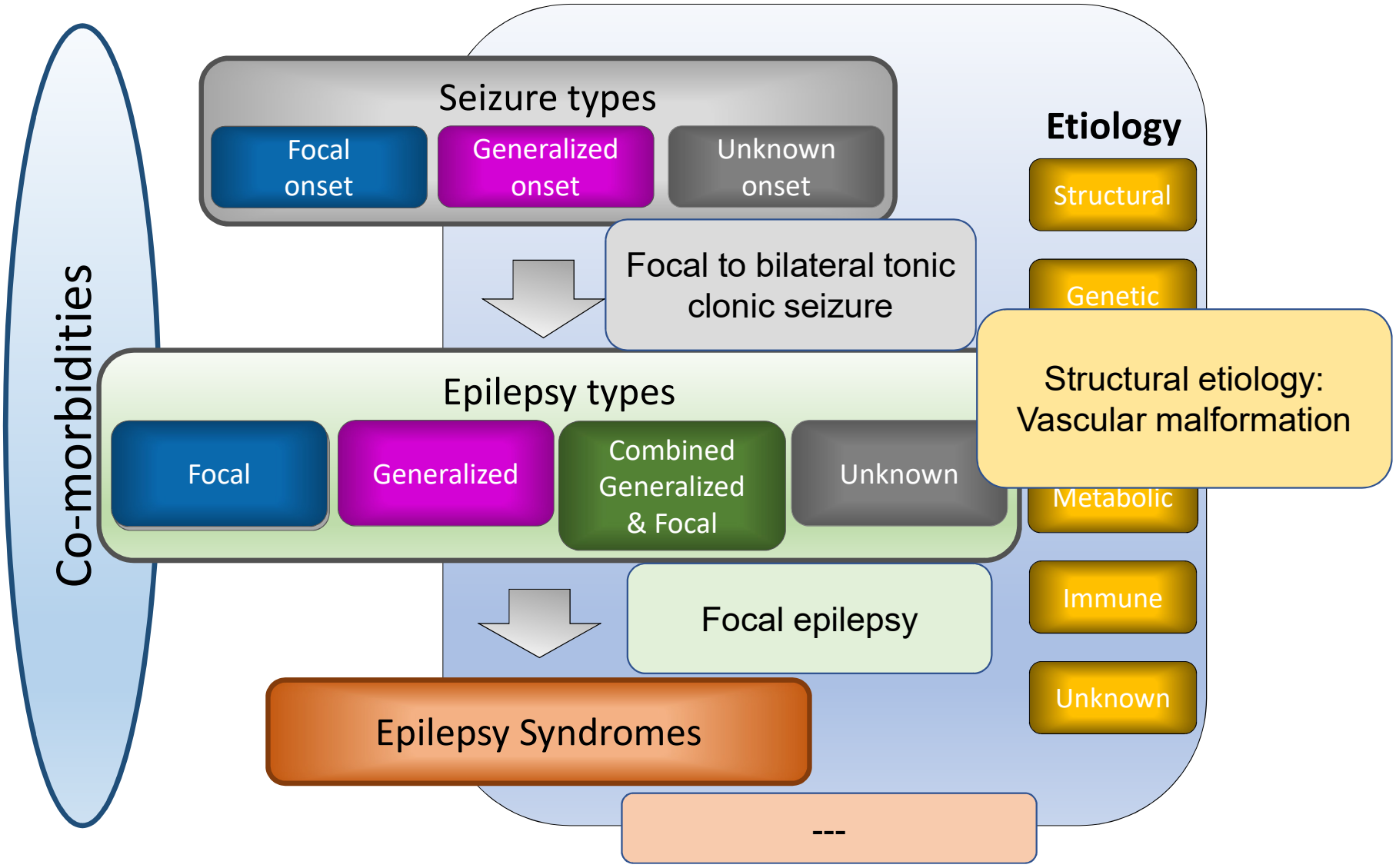
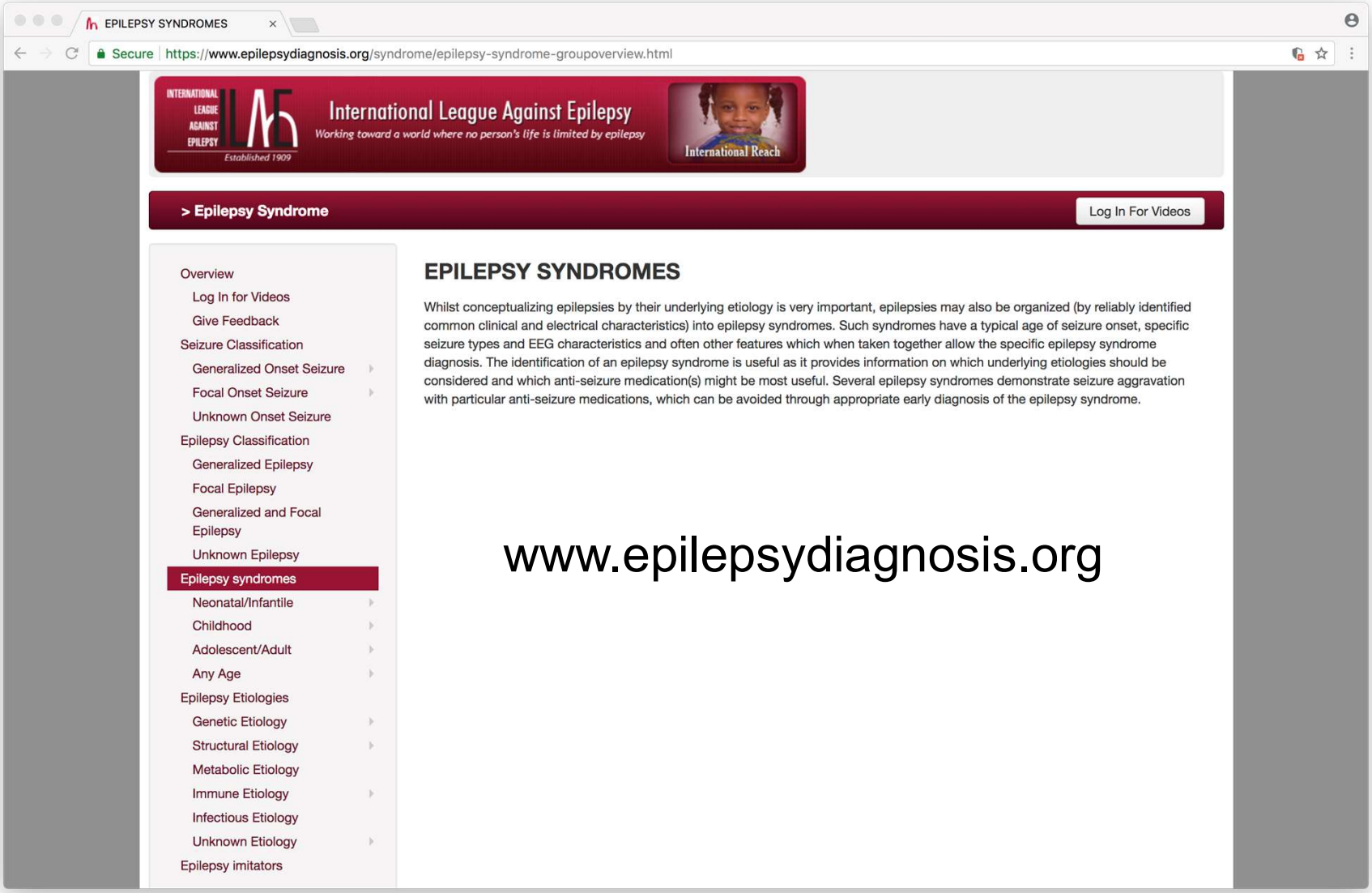
Fp1-F7
F7-FT9
FT9-T3
T3-T5
T5-O1
Fp2-F8
F8-FT10
FT10-T4
T4-T6
T6-O2
Fp1-F3
F3-C3
C3-P3
P3-O1
Fp2-F4
F4-C4
C4-P4
P4-O2
Fz-Cz
Cz-Pz
ECGp
Montage: AP,FT9,FT10 Time: 14:18:41 Time Scale: 10.1s/page Time line interval: 1.0s

Case 3

- CT brain with contrast: Left occipital AVM


Co-morbidities
Seizure types
Focal onset
Generalized onset
Unknown onset
Focal to bilateral tonic clonic seizure
Epilepsy types
Focal
Generalized
Combined Generalized & Focal
Unknown
Focal epilepsy
Epilepsy Syndromes

Etiology
Structural
Genetic
Metabolic
Immune
Unknown
Structural etiology: Vascular malformation


EPILEPSY SYNDROMES
Secure https://www.epilepsydiagnosis.org/syndrome/epilepsy-syndrome-groupoverview.html
INTERNATIONAL LEAGUE AGAINST EPILEPSY
Established 1909
International League Against Epilepsy
Working toward a world where no person's life is limited by epilepsy
International Reach
> Epilepsy Syndrome
Log In For Videos
Overview
Log In for Videos
Give Feedback
Seizure Classification
Generalized Onset Seizure
Focal Onset Seizure
Unknown Onset Seizure
Epilepsy Classification
Generalized Epilepsy
Focal Epilepsy
Generalized and Focal Epilepsy
Unknown Epilepsy
Epilepsy syndromes
Neonatal/Infantile
Childhood
Adolescent/Adult
Any Age
Epilepsy Etiologies
Genetic Etiology
Structural Etiology
Metabolic Etiology
Immune Etiology
Infectious Etiology
Unknown Etiology
Epilepsy imitators
EPILEPSY SYNDROMES
Whilst conceptualizing epilepsies by their underlying etiology is very important, epilepsies may also be organized (by reliably identified common clinical and electrical characteristics) into epilepsy syndromes. Such syndromes have a typical age of seizure onset, specific seizure types and EEG characteristics and often other features which when taken together allow the specific epilepsy syndrome diagnosis. The identification of an epilepsy syndrome is useful as it provides information on which underlying etiologies should be considered and which anti-seizure medication(s) might be most useful. Several epilepsy syndromes demonstrate seizure aggravation with particular anti-seizure medications, which can be avoided through appropriate early diagnosis of the epilepsy syndrome.
www.epilepsydiagnosis.org