Is it REALLY epilepsy?

Epilepsy is the most common primary neurological disorder affecting the brain

1 person in every 140 has epilepsy

350 epileptics in the crowd!

Single seizure prevalence

The lifetime risk of having a single seizure is around 1 chance in 12

Epilepsy: diagnostic accuracy?

ORIGINAL ARTICLE

The misdiagnosis of epilepsy in children admitted to a tertiary epilepsy centre with paroxysmal events

P Uldall, J Alving, L K Hansen, M Kibæk, J Buchholt

Arch Dis Child 2006;**91**:219–221. doi: 10.1136/adc.2004.064477

Seizure 1998; **7**: 403–406

The misdiagnosis of epilepsy: findings of a population study*

BRUCE SCHEEPERS, PETER CLOUGH & CHRIS PICKLES

The David Lewis Centre for Epilepsy, Mill Lane, Alderley Edge, Cheshire, SK9 7UD UK

The misdiagnosis of epilepsy and the management of refractory epilepsy in a specialist clinic

D. SMITH, B.A. DEFALLA[1] and D.W. CHADWICK

From the Walton Centre for Neurology and Neurosurgery, Liverpool, and [1]Huddersfield Royal Infirmary, Huddersfield, UK

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Is it REALLY epilepsy?

1. How do you diagnose it?

Is it REALLY epilepsy?

1. How do you diagnose it?
2. What are the common mis-diagnoses?

Is it REALLY epilepsy?

1. How do you diagnose it?
2. What are the common mis-diagnoses?
3. How do you recognise the epilepsy look-alikes?

1. How do you diagnose it?

How do you diagnose it?

1. Clinical features on history

How do you diagnose it?

1. Clinical features on history
2. Clinical findings on examination

How do you diagnose it?

1. Clinical features on history
2. Clinical findings on examination
3. Laboratory test findings:
   - EEG
   - Brain scan

How do you diagnose it?

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How do you diagnose it?

1. Clinical features on history
2. Clinical findings on examination
3. Laboratory test findings:

   - EEG : > 50% is NORMAL

How do you diagnose it?

1. Clinical features on history
2. Clinical findings on examination
3. Laboratory test findings:
   - EEG : > 50% is NORMAL
   - Brain scan: usually NORMAL

How do you diagnose it?

1. **Clinical features on history**
2. Clinical findings on examination
3. Laboratory test findings:
   - EEG
   - Brain scan

'In the diagnosis of epilepsy, history is the key…'

Principles of Neurology, Adams & Victor, 2005

'The diagnosis of epilepsy is clinical and is based on a detailed description of events experienced by the patient before, during and after a seizure and, more importantly, on an eyewitness account'

A Textbook of Epilepsy, Laidlaw

Diagnosing tonic-clonic epilepsy

Clinical features I find 'reassuring'

Clinical features I find 'reassuring'

1. Spontaneous and unexpected

Clinical features I find 'reassuring'

1. Spontaneous and unexpected
2. No warning or 'aura'

Clinical features I find 'reassuring'

1. Spontaneous and unexpected
2. No warning or 'aura'
3. Lengthy duration of coma/amnesia

Clinical features I find 'reassuring'

1. Spontaneous and unexpected
2. No warning or 'aura'
3. Lengthy duration of coma/amnesia
4. Post-ictal confusion

Clinical features I find 'reassuring'

1. Spontaneous and unexpected
2. No warning or 'aura'
3. Lengthy duration of coma/amnesia
4. Post-ictal confusion
5. Tonic-clonic motor activity

Clinical features I find 'reassuring'

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2. No warning or 'aura'
3. Lengthy duration of coma/amnesia
4. Post-ictal confusion
5. Tonic-clonic motor activity
6. Biting of the side of the tongue

Clinical features I find 'reassuring'

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6. Biting of the side of the tongue
7. Urinary incontinence

Clinical features I find 'reassuring'

1. Spontaneous and unexpected
2. No warning or 'aura'
3. Lengthy duration of coma/amnesia
4. Post-ictal confusion
5. Tonic-clonic motor activity
6. Biting of the side of the tongue
7. Urinary incontinence
8. Cyanosis

What disorders can look like epilepsy?

Epilepsy look-alikes

- Dissociative state
- Tonic attack of multiple sclerosis
- Episodic dyscontrol syndrome
- Vestibular disorder
- Movement induced dyskinesia
- Non-epileptic myoclonus
- Fugue state
- Non-epileptic pseudoseizures
- TIA
- Migraine equivalent
- Parasomnia
- Transient global amnesia
- Metabolic syndrome
- Narcolepsy/cataplexy
- Intermittent CSF obstruction
- Syncope

1. Syncope


0:19:03:8
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Syncope: A Videometric Analysis of 56 Episodes of Transient Cerebral Hypoxia

T. Lempert, MD, M. Bauer, MD, and D. Schmidt, MD

To investigate the clinical features of transient cerebral hypoxia, syncope was induced in 56 of 59 healthy volunteers through a sequence of hyperventilation, orthostasis, and Valsalva maneuver. All events were monitored on video by two cameras. Complete syncope with falling and loss of consciousness was observed in 42 subjects, lasting 12.1 ± 4.4 seconds. Myoclonic activity occurred in 38 of these 42 episodes (90%). The predominant movement pattern consisted of multifocal arrhythmic jerks both in proximal and distal muscles. Superposition of generalized myoclonus was common. Additional movements such as head turns, oral automatisms, and righting movements occurred in 79%. Eyes remained open throughout syncope in most subjects and initial upward deviation was common. Sixty percent reported visual and auditory hallucinations. Thirteen subjects had incomplete syncope with falls but partially preserved consciousness. These episodes were shorter and usually not accompanied by myoclonus and hallucinations. Transient amnesia and unresponsiveness without falling occurred in 1 subject.

Lempert T, Bauer M, Schmidt D. Syncope: a videometric analysis of 56 episodes of transient cerebral hypoxia. Ann Neurol 1994;36:233–237

Clinical manifestations of syncope

- Myoclonic jerks:

Clinical manifestations of syncope

- Myoclonic jerks: 90% !

Clinical manifestations of syncope

- Myoclonic jerks: 90% !
- Other motor movements:

Clinical manifestations of syncope

- Myoclonic jerks: 90% !
- Other motor movements: 79% !

Clinical manifestations of syncope

- Myoclonic jerks: 90% !
- Other motor movements: 79% !
  - Head turns
  - Oral automatisms

Clinical manifestations of syncope

- Myoclonic jerks: 90% !
- Other motor movements: 79% !
  - Head turns
  - Oral automatisms
- Vocalisations 40%

Clinical manifestations of syncope

- Myoclonic jerks: 90% !
- Other motor movements: 79% !
  - Head turns
  - Oral automatisms
- Vocalisations 40% !
- One bit his tongue!


1:53:21:5
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	Epilepsy	Syncope

	Epilepsy	Syncope
Circumstances		

	Epilepsy	Syncope
Circumstances	--	+

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'		

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset		

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity		

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity	Longer (minutes)	Shorter (seconds)

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity	Longer (minutes)	Shorter (seconds)
Coma/amnesia		

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity	Longer (minutes)	Shorter (seconds)
Coma/amnesia	Long (minutes)	Short (seconds)

	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity	Longer (minutes)	Shorter (seconds)
Coma/amnesia	Long (minutes)	Short (seconds)
Complexion		

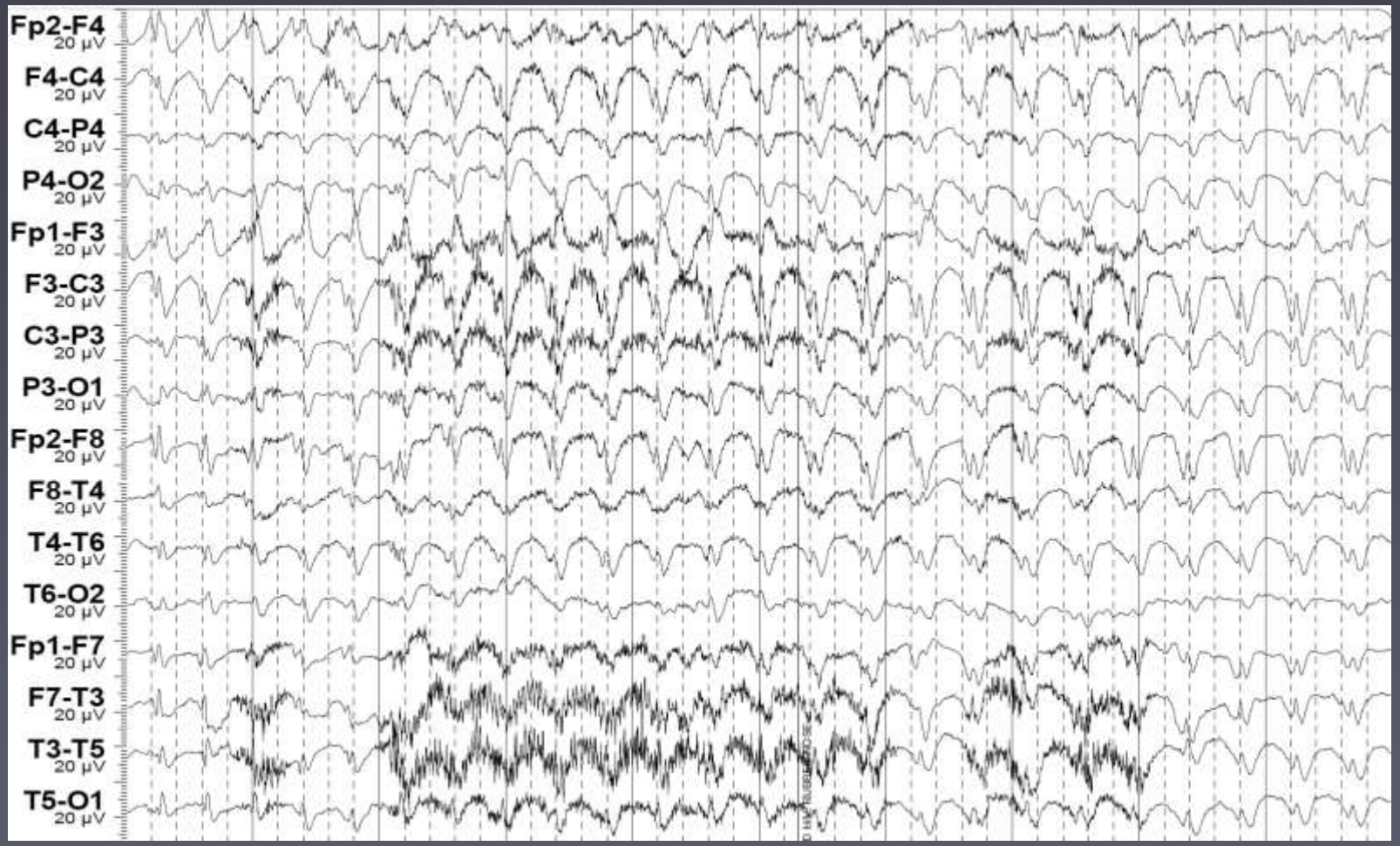
	Epilepsy	Syncope
Circumstances	--	+
Warning/'aura'	-- (Or +)	++
Onset	Instant	Build-up
Motor activity	Longer (minutes)	Shorter (seconds)
Coma/amnesia	Long (minutes)	Short (seconds)
Complexion	Red or blue	Pallor ++

Epilepsy look-alikes

- Dissociative state
- Tonic attack of multiple sclerosis
- Episodic dyscontrol syndrome
- Vestibular disorder
- Movement induced dyskinesia
- Non-epileptic myoclonus
- Fugue state
- Non-epileptic pseudoseizures
- TIA
- Migraine equivalent
- Parasomnia
- Transient global amnesia
- Metabolic syndrome
- Narcolepsy/cataplexy
- Intermittent CSF obstruction
- **Syncope**

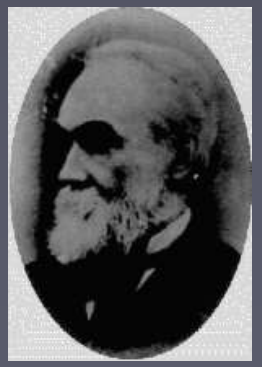

12:13 21

2. Pseudoseizures


Fp2-F4
20 µV
F4-C4
20 µV
C4-P4
20 µV
P4-O2
20 µV
Fp1-F3
20 µV
F3-C3
20 µV
C3-P3
20 µV
P3-O1
20 µV
Fp2-F8
20 µV
F8-T4
20 µV
T4-T6
20 µV
T6-O2
20 µV
Fp1-F7
20 µV
F7-T3
20 µV
T3-T5
20 µV
T5-O1
20 µV

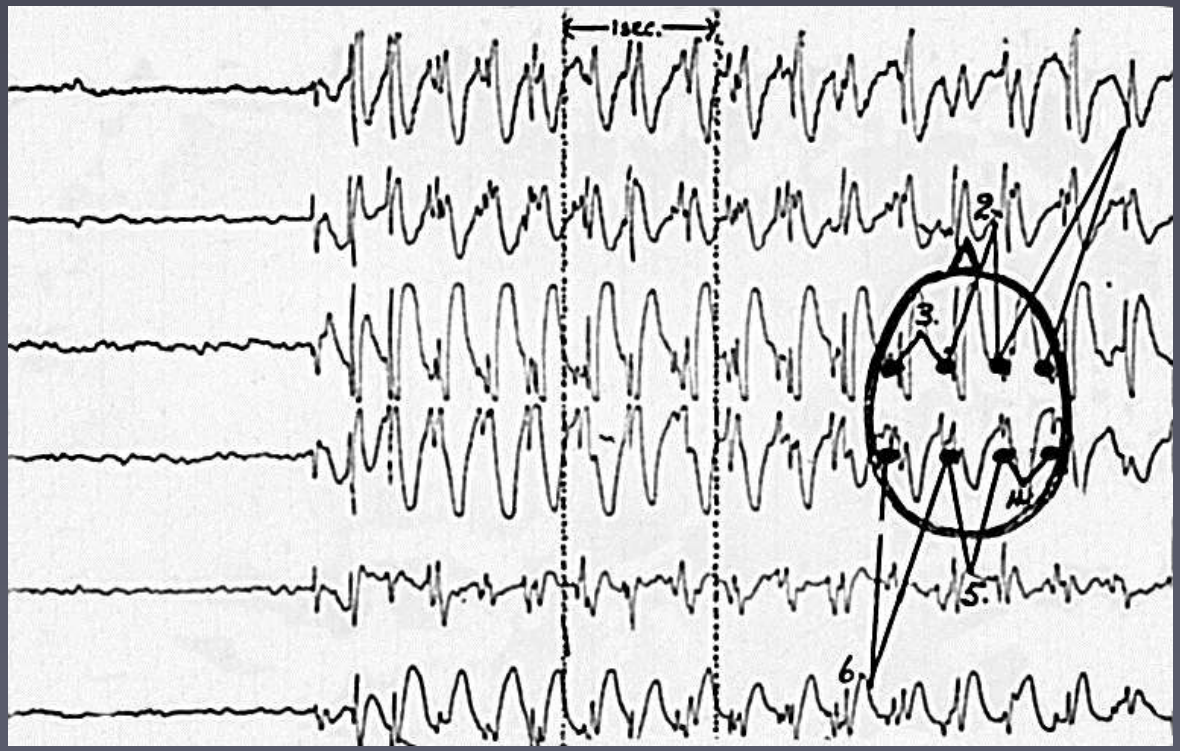
Epilepsy: definition……

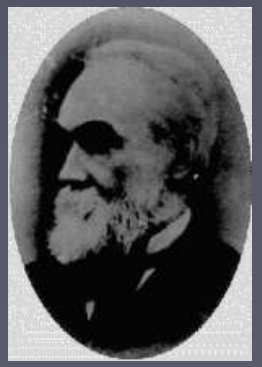
"Epilepsy is ….a sudden, excessive, disorderly discharge of nerve cells"



Hughlings Jackson 1871

"Epilepsy is ….a sudden, excessive, disorderly discharge of nerve cells"





Hughlings Jackson 1871

Warning clues:

Warning clues:

- Failure to respond to anti-epilepsy medication

Warning clues:

- Failure to respond to anti-epilepsy medication
- Prolonged 'aura' or warning

Warning clues:

- Failure to respond to anti-epilepsy medication
- Prolonged 'aura' or warning
- Unusual seizure description

Warning clues:

- Failure to respond to anti-epilepsy medication
- Prolonged 'aura' or warning
- Unusual seizure description
- Variable seizure pattern

Warning clues:

- Failure to respond to anti-epilepsy medication
- Prolonged 'aura' or warning
- Unusual seizure description
- Variable seizure pattern
- Influenced by external stimuli

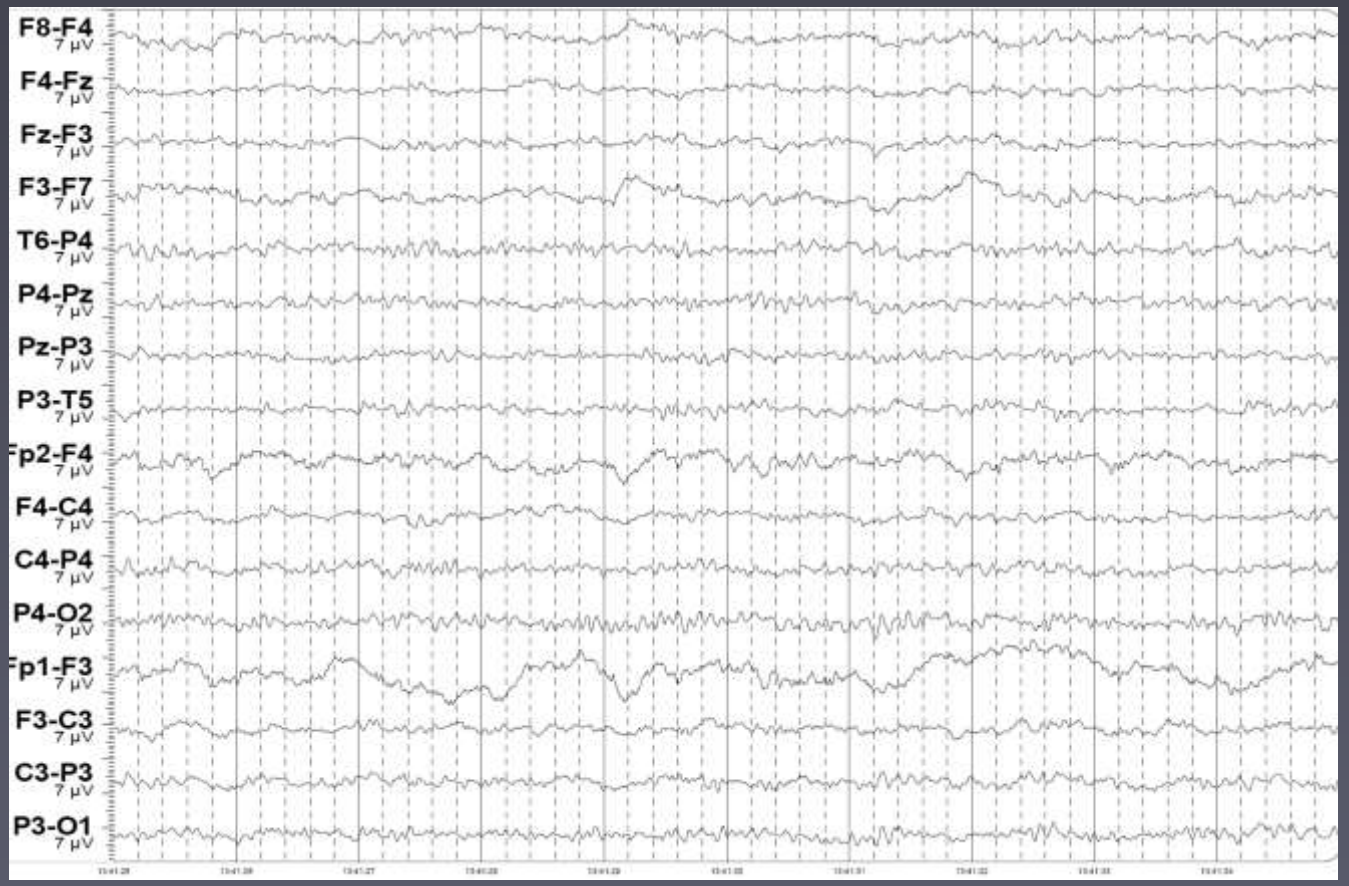
Distinguishing pseudoseizures from epileptic seizures……

Distinguishing pseudoseizures from epileptic seizures……

1. Video/EEG monitoring

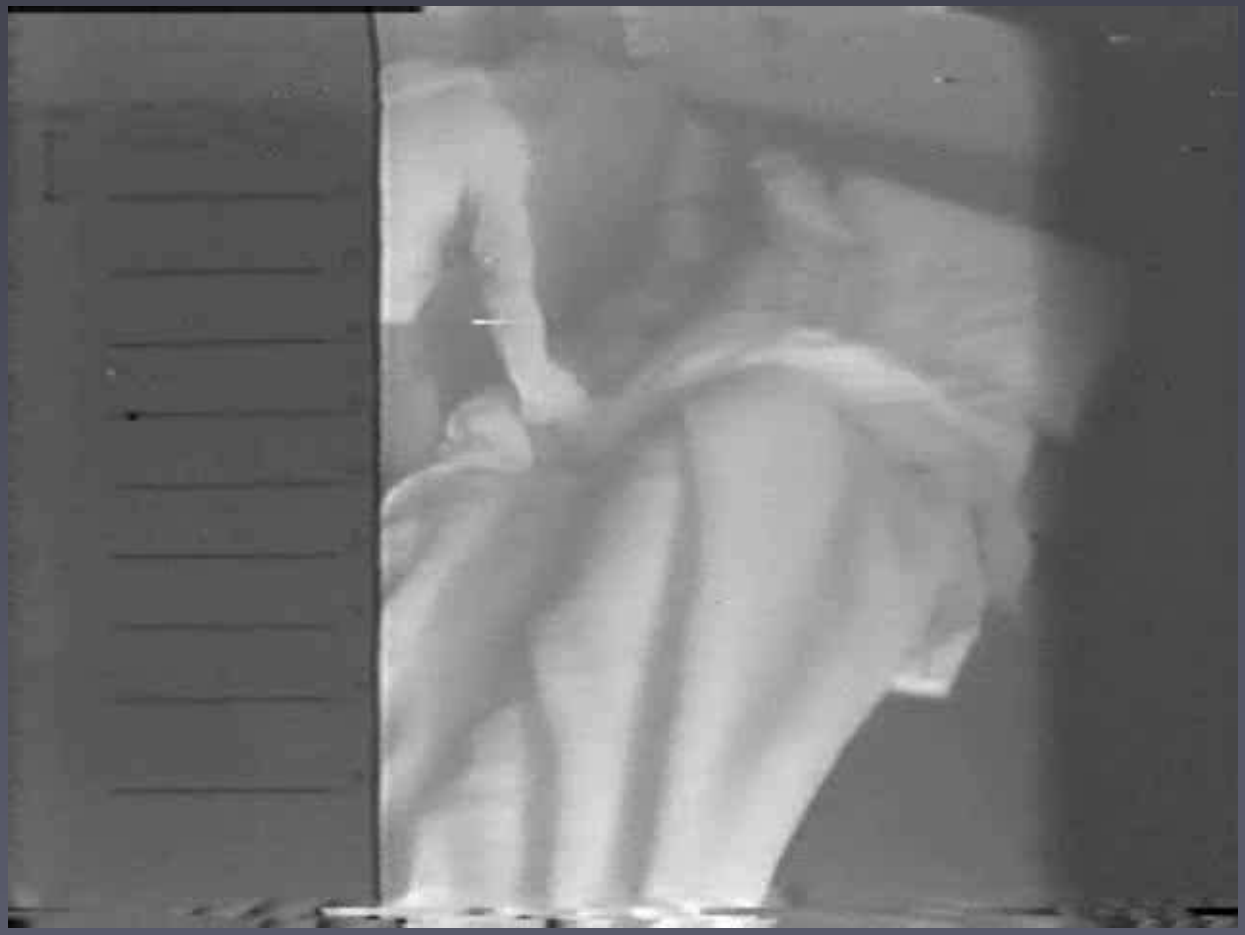

19:54:03


Fp2-F4
30 µV
F4-C4
30 µV
C4-P4
30 µV
P4-O2
30 µV
Fp1-F3
30 µV
F3-C3
30 µV
C3-P3
30 µV
P3-O1
30 µV
Fp2-F8
30 µV
F8-T4
30 µV
T4-T6
30 µV
T6-O2
30 µV
Fp1-F7
30 µV
F7-T3
30 µV
T3-T5
30 µV
T5-O1
30 µV


F8-F4
7 µV
F4-Fz
7 µV
Fz-F3
7 µV
F3-F7
7 µV
T6-P4
7 µV
P4-Pz
7 µV
Pz-P3
7 µV
P3-T5
7 µV
Fp2-F4
7 µV
F4-C4
7 µV
C4-P4
7 µV
P4-O2
7 µV
Fp1-F3
7 µV
F3-C3
7 µV
C3-P3
7 µV
P3-O1
7 µV

Distinguishing pseudoseizures from epileptic seizures……

2. Observe a spontaneously occurring turn



Distinguishing pseudoseizures from epileptic seizures……

3. Observe a deliberately provoked turn

Distinguishing pseudoseizures from epileptic seizures……

4. Indirect observation of a recorded turn


MOTOROLA
vodafone live!
Select
Back
vodafone

Final thoughts……

Consequences of epilepsy misdiagnosis -

- anti-epilepsy drug side effects……
- social consequences of epilepsy
- employment implications of epilepsy
- risks of treating of ICU admission……
- repeated hospital presentations……
- health professional anxiety……
- patient and family anxiety ……
- driving implications……

Finally……

Is it Really epilepsy?

Consequences of epilepsy misdiagnosis -

- anti-epilepsy drug side effects……

Consequences of epilepsy misdiagnosis -

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Consequences of epilepsy misdiagnosis -

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Seizure (2006) 15, 598–605

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The costs of epilepsy misdiagnosis in England and Wales

Ariadna Juarez-Garcia [a], Tim Stokes [b,*], Beth Shaw [b], Janette Camosso-Stefinovic [b], Richard Baker [b]

[a] Health Services Management Centre, University of Birmingham, Park House, Birmingham B15 2RT, UK
[b] Clinical Governance Research and Development Unit, Department of Health Sciences, University of Leicester, Leicester General Hospital, Leicester LE5 4PW, UK

Summary

Background: The management of epilepsy incurs significant costs to the United Kingdom (UK) National Health Service (NHS). Making a diagnosis of epilepsy can, however, be difficult and misdiagnosis frequently occurs when patients are seen by non-specialists. This study estimates the financial costs of epilepsy misdiagnosis in the NHS in England and Wales.

Methods: Standard costing methods were applied to estimate the costs attributable to epilepsy misdiagnosis. The primary data were published in UK studies on the prevalence of epilepsy, epilepsy misdiagnosis and costs identified from Medline, Cinahl and Embase (1996–May 2006).

Results: An estimated total of 92,000 people were misdiagnosed with epilepsy in England and Wales in 2002. The average medical cost per patient per year of misdiagnosis was £316, with the chief economic burdens being inpatient admissions (45%), inappropriate prescribing of antiepileptic drugs (AEDs) (26%), outpatient attendances (16%) and general practitioner (GP) care (8%). The estimated annual medical costs in England and Wales were £29,000,000, while total costs could reach up to £138,000,000 a year.

Conclusions: Allowing for uncertainty, and considering the analysis exclusively from the NHS/CBS (community based services) perspective the opportunity costs of misdiagnosis are substantial. There is a need for health care commissioners to ensure that misdiagnosis is kept to a minimum by ensuring that individuals with a recent onset suspected seizure are seen as soon as possible by a specialist medical practitioner with training and expertise in epilepsy.

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