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Near-Infrared Spectroscopy (NIRS) in the Evaluation of Psychogenic Pseudosyncope – a helpful tool?

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Start with a Case…

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22yo Female

c/o TLOC episodes x 6years

Began aged 16 in LC year

Increasing in frequency – approx. 15 in last yr

- **Once/ 3 weeks**

Non-injurious

Occur seated (some) at desk at work, a taxi, dance class

Can feel a prodrome of visual disturbance, orthostatic intolerance

TLOC usually seconds followed by amnesia

Father feels "she just looked asleep"

BG: Depression – sertraline, Asthma

No family hx

GP did bloods – hypothyroidism

Referred Endocrinology

Presented to ED

Referred FASU

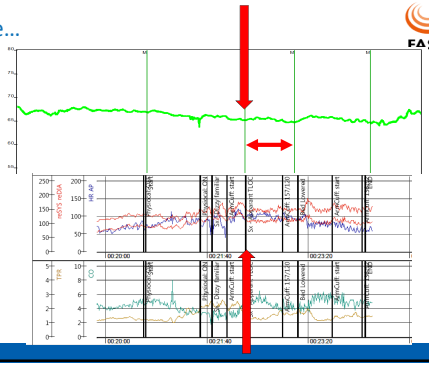
ECG sinus

No OH on Active Stand

Proceeded to Plain HUT…

Start with a Case…

FASU



What is PPS?

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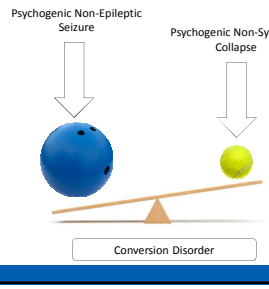
TLOC is defined as a state of real or ***apparent*** LOC with loss of awareness, characterized by amnesia for the period of unconsciousness, abnormal motor control, loss of responsiveness, and a short duration.

In psychogenic TLOC there is ***no gross somatic brain dysfunction***, but the attacks fulfil the criteria for TLOC

ESC
European Society of Cardiology



Terminology

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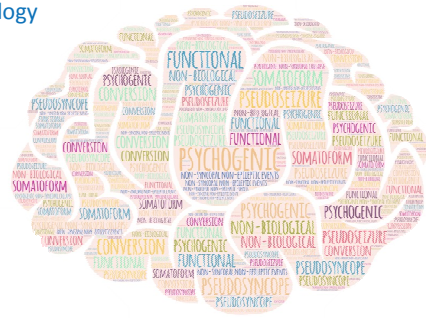

What is PPS?

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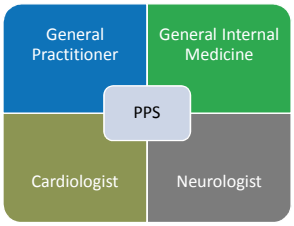


What PPS is not…

Mal[illegible]ering

Factitio[illegible] Disorder

PPS: Prevalence

Source	N	Setting	Classification system	VVS (%)	OH (%)	Cardiac (%)	Epileptic seizures (%)	PPS (%)	Unexplained (%)
Brignole et al., 2003 [4]	279	ED with syncope unit (6 centers)	ESC 2001	56	4	8	≤ 15[2]		16
Strano et al., 2005 [7]	521	Outpatient	Syncope is TLOC [1]	53.6	6.3	2.5	1.3	2.9	8.4
Brignole et al., 2006 [8]	712	19 general hospitals	ESC 2001	65	10	13	≤ 6[2]		5
Ammirati et al., 2008 [9]	96	In- and outpatients	ESC 2009	65	1	6	1[2]	1	18
Brignole et al., 2010 [10]	941	9 general hospitals	ESC 2004	67	4	6	1	1	18
Mitro et al., 2011 [11]	501	Teaching hospital	ESC 2009	46.2	4.8	35.3	0	1.4	10.9
Sousa et al., 2013 [12]	245	General hospital, in- and outpatient	ESC 2009	52.2	15.6	20.0	0	0	12.2
Shin et al., 2013 [13]	128	ED, training hospital	'Largely ESC 2009'	65.5	11.7	8.2	0	0	12.5
Wieling, 2014, unpublished	1651	Outpatient tertiary referrals	ESC 2001–2009	67.5	14.9	0.8	0.8	10.2	5.7
Van Dijk, 2014, unpublished	174	Outpatient tertiary referrals	ESC 2009	54.6	19.0	0.6	4.6[2]	12.1	6.3
Mean and range				59.3 (46.2–67.5)	9.1 (1–19.0)	10.4 (0.6–35.3)	1.1 (0–4.6)	3.6 (0–12.1)	11.3 (5–18)

Managing psychogenic pseudosyncope: Facts and experiences

Martijn R. Tannemaat[1], Roland D. Thijs[1,2,3], J. Gert van Dijk[1]

PPS: Aetiology

Neurobiochemical mechanisms remain poorly understood

Arise from involuntary/ unconscious processes that can viewed as dissociative responses to emotional arousal

Psychological stressors/ trauma may be a feature of history but not always

'Manifestation of stress' but often patients deny any stress / anxiety / stressors

Some studies have reported on the activation of the autonomic system in PPS – making it particularly difficult to differentiate from VVS which can coexist

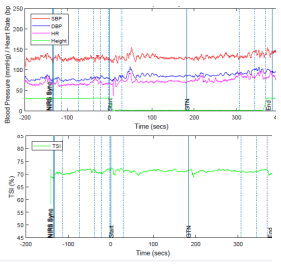
Psychological stress is postulated to activate the HPA axis releasing adrenaline

PPS: Clinical Features

Key features from history

- Often bizarre presentation
- Younger females
- Long duration of apparent LOC
- Eyes closed during event
- Frequency, can be multiple times per day
- Non-injurious
- Increase in frequency prior to evaluation
- Psychiatric comorbidity
- Other medically unexplained symptoms

Another Case…



47yo M referred from another hospital with Falls & "Collapses" assoc with complete retrograde amnesia

Worse in last 6/12 – now having daily "blackouts"

Prolonged T-LOC

Fell down stairs – non-injurious

No warning

BG: Chronic Back Pain, Diverticular Disease, Estranged from family members, started on Citalopram by GP

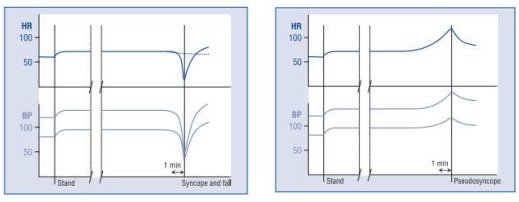
Witness: Eyes always closed; Sometimes shaky

Multiple hospitalisations and Investigations and now not working.

Achieved Exact Symptom Reproduction on HUT

No peripheral or central haemodynamic changes

PPS: Diagnosis



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PPS: Diagnosis

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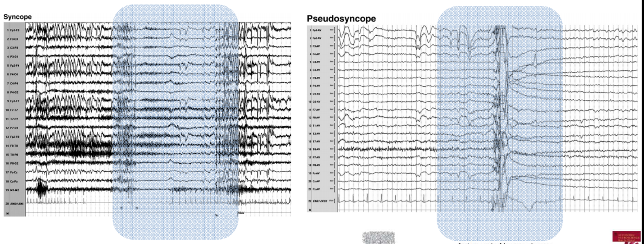

Autonomic Neuroscience
Volume 184, September 2014, Pages 66-72

Psychogenic Pseudosyncope: Diagnosis and Management
Vidya Raj [a], Ama A. Rowe [a], Sheryl B. Fleisch [a], Sachin Y. Paranjape [b], Amir M. Arain [c], Stephen E. Nicolson

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PPS: Diagnosis

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Table 2 Clinical signs in PPS, mixed PPS (PPS followed or preceded by [pre]syncope), and VVS[a]

	Pure PPS (n = 27)	Mixed PPS (n = 9)	VVS (n = 69)	p Value (pure PPS vs VVS)
Before the event				
Yawning	0/27	3/9 (33)	10/68 (15)	NS
Sweating	0/27	0/9	7/7 (100)	<0.001
Pallor	1/27 (4)	1/9 (11)	42/45 (93)	<0.0001
During the event				
Eyes closed at start of apparent TLOC	26/27 (96)	7/9 (78)[b]	5/68 (7)	<0.0001
Head dropping	16/27 (59)	6/9 (67)	19/69 (28)	<0.01
Moving down tilt table	13/27 (48)	4/9 (44)	0/69	<0.0001
Falling forward against restraints	2/27 (7)	2/9 (22)	0/69	NS
Jerking limbs or body	5/27 (19)	1/9 (11)	41/68 (60)	<0.0001
After the event				
Yawning	1/27 (4)	1/9 (11)	3/69 (4)	NS
Sweating	0/27	1/9 (11)	28/30 (93)	<0.0001
Pallor	0/27	0/9	45/53 (85)	<0.0001
Crying	5/27 (19)	1/9 (11)	3/69 (4)	<0.05

Neurology® The semiology of tilt-induced psychogenic pseudosyncope
Martijn R. Tannemaat, Julius van Niekerk, Robert H. Reijntjes, Roland D. Thijs, Richard Sutton and J. Gert van Dijk

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PPS: Treatment Approach

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Involves limiting unnecessary interventions

Provide patient with needed structure

Encouraging functionality

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PPS: Management

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Positive and Non-Judgemental discussion

Evidence from HUT helps – BP & NIRS - as does video of event

'We brought about one of your typical episodes … we found that it was not related to heart rhythm or BP disturbance or brain blood flow… does not resemble seizure … likely that they represent manifestation of underlying stress even though you may not perceive it as such… these episodes are real … not 'put on' or malingering… have a psychological basis / cause… can significantly impact your QOL … but can be managed with appropriate therapy … first step towards this is having this conversation …'

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PPS: Management

FASU

CBT: Limited data in PPS but has shown benefit in other conversion disorders and PNES

- We tend to ask GP to identify local CBT provider

Psychiatry: Refer if comorbid psych issues / disorder

Pharmacological Tx only if comorbid psychiatric illness identified

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PPS: Prognosis

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54% admitted to hospital prior to diagnosis

After diagnosis, attack frequency reduced from mean 4.0 +/- 4.9 in moth prior to 1.7 +/- 3.5 in month after (p = 0.007).

No patients visited ED / were admitted to hospital in 6 months before follow-up (mean f/u 50 months).

Neurology® Long-term follow-up of psychogenic pseudosyncope
Dirk P. Saal, M. Jolein Overdijk, Roland D. Thijs, Irene M. van Vliet and J. Gert van Dijk

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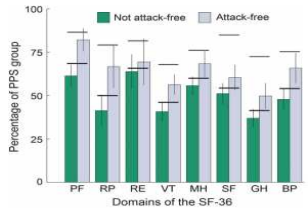
PPS: Prognosis

FASU

Figure 2 Attack freedom and quality of life



Neurology

Long-term follow-up of psychogenic pseudosyncope

Dirk P. Sadi, M. Jolein Overdijk, Roland D. Thijs, Irene M. van Vliet and J. Gert van Dijk

PPS: Outcomes

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All Cause Syncope is Associated with Worse QoL

- Perceptions of low overall physical health
- Mental health
- Increased fear
- Somatization
- Depression and anxiety
- ADL impairments e.g. driving, working, school attendance
- Greater comorbidity at baseline

Predictors of worse QoL over time include

- **Advanced age**
- **Recurrent syncope**
- **Neurologic or psychogenic reason for syncope**

What about our cases?

FASU

Case 1

2 x ED Presentations

11 x OPD Visits

Nil since diagnosis

Engaged with CBT

Case 2

4 x CT Brain, 2 x MRI

Has not engaged with services to date

Continuing to have blackouts – 1 further admission

Is NIRS Useful?

FASU

- Previously felt that PPS was dx of exclusion - now we can demonstrate it is provable. The dx of both PNES and PPS must not rely on exclusion but on positive evidence.
- Additional tests serve to confirm the diagnosis and exclude others and secondly to increase confidence in being able to convince patients, their relatives and other physicians that episodes are indeed non-organic.
- Changes in peripheral haemodynamic parameters provide only indirect evidence that apparent LOC is not organic. NIRS is capable of determining whether an LOC is related to decreased blood flow. Clinicians may feel less uncomfortable delivering the diagnosis based on direct measurement of cerebral perfusion
- Patients are typically invested in receiving medical care. In practice, we have found that patients often require further investigations before accepting the diagnosis. NIRS may be an appropriate alternative to EEG.

PPS: Conclusions

FASU

Significant proportion of unexplained syncope

Key findings from history can suggest. Confirm with HUT and Video/NIRS.

Significant impact on QOL

Discussion and appropriate referral can impact significantly on further episodes / healthcare use

NIRS is a useful replacement for EEG in its evaluation – increases diagnostic accuracy, crucial in diagnosis feedback and may increase likelihood of accepting the diagnosis

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Thank you! Any Questions…Comments?

FALLS & SYNCOPE UNIT
(Aonad Titimí & Sioncóipé)

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