Case History

Syncope Conference May 17th 2019

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Clinical Presentation

- 70F; seated syncope at breakfast
- Unwitnessed; short prodrome (nausea/ lightheaded)
- Fell onto floor; bruising left eye & forehead
- Husband heard 'bang' upstairs; found on floor
- Orientated on regaining consciousness
- Unwell with nausea & vomiting x 2/52
- Dyspnoea x 3/12– on mild/mod exertion

Past History

- Fall 1 month previously as walking – accidental
- Syncope at bus stop 1 year previously with soft tissue injuries to head; attributed to IECOPD
- COPD / TIAs x2 / Alcohol misuse / hypertension/ depression
- Coronary angiogram 2015 – non significant coronary heart disease
- Ex smoker- 50 pack years

Medications

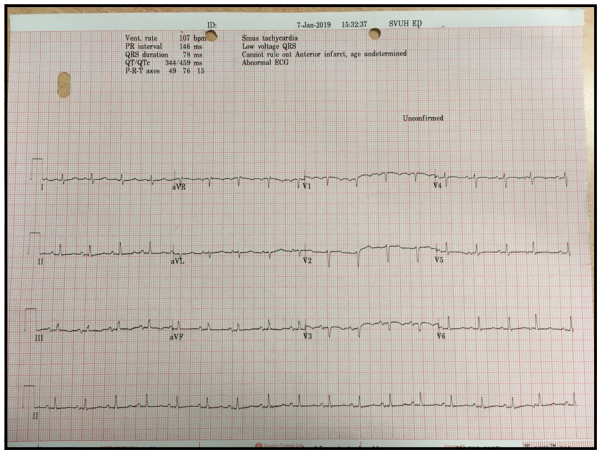
- Aspirin 75 mg od
- Pantoprazole 40 mg od
- Perindopril 5 mg od
- Atorvastatin 20 mg od
- Calchichew D3 Forte 1 bd
- Citolopram 20 mg od
- Anora Ellipta 99/12 inhaler

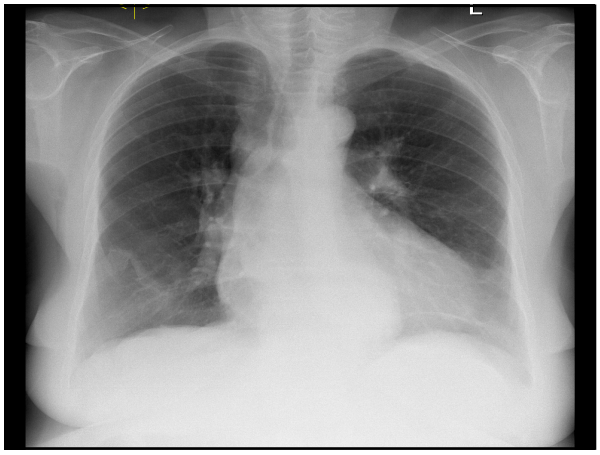
Clinical Examination

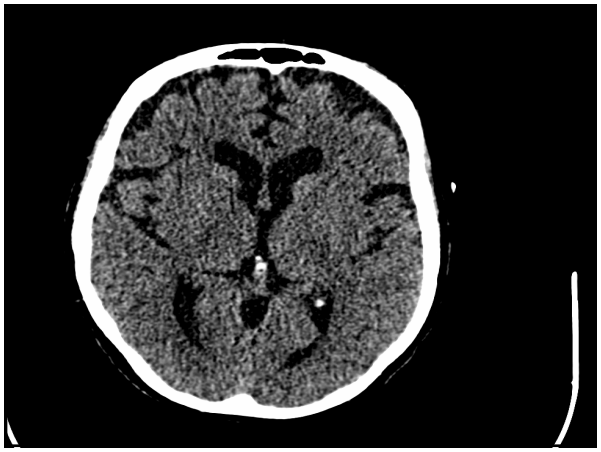
- GCS 15; AMT 4 =4
- BP 105/57 – no postural drop; HR 100 regular; T 36C, Mild hypoxia 92% SaO2 RA
- CVS – NAD; CNS - NAD
- Periorbital & left frontal ecchymosis with superficial laceration
- Gait - normal

Labs in ED (7/1/2019)

- FBC -WBC 11.3 / Hb 12.9 / Plt 192
- Renal /Liver –NAD
- CRP 8
- Troponin-T 51 ng/dL; 18 hours later-56 ng/L







Questions

- Is this a 'high' or 'neither high nor low' risk syncope?
- Admit or discharge?
- What's next most important investigation?
  - Telemetry
  - D-dimers
  - Echo
  - BNP

Risk stratification at the initial evaluation (I)

ESC European Society of Cardiology

Low-risk	High-risk (red flag)
Syncopal event	
1. Associated with prodrome typical of reflex syncope (e.g. light-headedness, feeling of warmth, sweating, nausea, vomiting) 2. After sudden unexpected unpleasant sight, sound, smell, or pain 3. After prolonged standing or crowded, hot places 4. During a meal or postprandial 5. Triggered by cough, defaecation, or micturition 6. With head rotation or pressure on carotid sinus (e.g. tumour, shaving, tight collars) 7. Standing from supine/sitting position	**Major** 1. New onset of chest discomfort, breathlessness, abdominal pain, or headache 2. Syncope during exertion or when supine. 3. Sudden onset palpitation immediately followed by syncope **Minor** (high risk only if associated with structural heart disease or abnormal ECG): 1. No warning symptoms or short (<10 s) prodrome 2. Family history of SCD at young age 3. Syncope in the sitting position

www.escardio.org/guidelines

2018 ESC Guidelines on Syncope – Michele Brignole & Angel Moya
European Heart Journal 2018;39:1883–1948 - Doi:10.1093/eurheartj/ehy037

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Risk stratification at the initial evaluation (2)

ESC European Society of Cardiology

Low-risk	High-risk (red flag)
Past medical history	
1. Long history (years) of recurrent syncope with low-risk features with the same characteristics of the current episode 2. Absence of structural heart disease	**Major** 1. Severe structural or coronary artery disease (heart failure, low LVEF or previous myocardial infarction)
Physical examination	
1. Normal examination	**Major** 1. Unexplained systolic BP in the ED <90 mmHg 2. Suggestion of gastrointestinal bleed on rectal examination 3. Persistent bradycardia (<40 b.p.m.) in awake state and in absence of physical training 4. Undiagnosed systolic murmur

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Risk stratification at the initial evaluation (3)

ESC European Society of Cardiology

Low-risk	High-risk (red flag)
ECG	
1. Normal ECG	**Major** 1. ECG changes consistent with acute ischaemia 2. Mobitz II second- and third-degree AV block 3. Slow AF (<40 b.p.m.) 4. Persistent sinus bradycardia (<40 b.p.m.) 5. Bundle branch block or IVCD 6. Q waves consistent with CAD or cardiomyopathy 7. Sustained and non-sustained VT 8. Dysfunction of a pacemaker or ICD 9. Type 1 Brugada pattern 10. Long QT

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Working Diagnosis

Arrived in AMAU at 1645hours

- Syncope – cardiogenic > OH/PPH
- Dyspnoea – ? PE; CCF or COPD more likley
- Nausea & vomiting - ? Dyspepsia

- More hypoxic 89% SaO2PA
- D-Dimers (IL method) : 4.30ug
- Commenced on LMWH, Oxygen, PPI

Management Plan

- Next available telemetry
- LBP & SBP
- BNP, Echo
- CTPA
- OGD as in or out patient
- PFTs
- Liaise with cardiology

Pro BNP 8099pg/L

At 0050 hours

- Collapsed on floor as mobilizing to bathroom
- Helped back to chair
- Very nauseated
- Gradual reduction in GCS to 3
- Weak pulse initially and slow breathing then both stopped
- Cardiac arrest

ACLS

- CPR commenced
- 0056 hrs: PEA arrest
- Adrenaline 1mg x 4; magnesium sulphate 2 g
- 0115 hrs : Asystole
- CPR discontinue. Time of death: 0115 hrs
- Case discussed with coroner – for post mortem

Autopsy report - External

- Caucasian woman; 71 kg /157cms BMI 28.8kg/m2
- 10cm diameter ecchymosis on the left frontal/ periorbital area of head
- Bipedal mild oedema

Internal Examination

- Heart 464 g; no dilation or mural thrombus of ventricles or atria, valves thin & mobile, myocardium uniformly red-brown, without scarring or mottling (histology – diffuse lymphocytic myocarditis of right ventricle)
- Coronary arteries: Atherosclerosis – LMA 10%, LAD 50%, LCx 20%, RCA 10%
- Lungs: Mild basal congestion & oedema
- Neuropathology(histology): brainstem (medulla) encephalitis, low grade T-cell mediated, of unknown aetiology + old infarctions (caudate nucleus)

Cause of Death

- Sudden cardiac death secondary to right ventricular myocarditis on a background of ischaemic heart disease & lymphocytic encephalitis
- Presence of myocardial inflammation & encephalitis suggests either a viral or autoimmune aetiology causing both processes

Myocarditis

- 'Inflammatory disease of myocardium'
- Under diagnosed cause of acute heart failure, sudden death & chronic dilated cardiomyopathy
- Viral infections most common cause in developed countries
- Non specific symptoms
- Acute, sub-acute or chronic presentation
- Age varies – typically 20-50 years

Selected Classification For Myocarditis

Sagar et al; Lancet 2012;379: 738-47

Cause
- Viral
- Bacterial Protozoal
- Trypanosomal
- Toxic
- Hypersensitivity

Enterovirus –Coxsachie B
Erythrovirus -Parvovirus B19
Adenoviruses
Herpes virus

Histology
- Eosinophilic
- Giant cell
- Granulomatous
- Lymphocytic

Immunohistological (not mutually exclusive)
- WHF : ≥ 14 CD3+ or CD68+ cells /high power field
- Increased expression of HLA eg HLA –DR
- Increased expression of adhesion molecules (eg IAM1

Clinicopathological
- Fulminant
- Acute
- Chronic
- Chronic persistent

Clinically
- Acute heart failure
- Syncope
- Chest pain resembling acute MI
- Myopericarditis

Acute Myocarditis – HF < 3 months

- Acute coronary syndrome like: chest pain, ST or T wave changes, global or regional LV or RV dysfunction on echo + / - ↑ troponin
- New or worsening heart failure; over 2 weeks – 3 months, ↓ LV or RV dysfunction, ECG (BBB, AV, vent arrhythmias)
- Life threatening conditions – life threatening arrhythmias, cardiogenic shock, severely impaired LV function

Three Tiered Clinical Classification for the diagnosis of myocarditis on the basis of diagnostic certainty

	Criteria	Histological Confirmation	Biomarkers, ECG or imaging abnormalities	Treatment
Possible subclinical acute myocarditis	In clinical context of possible myocardial injury without cardiac symptoms but ≥ 1 of 1. Biomarkers of cardiac injury raised 2. ECG findings suggestive cardiac injury 3. Abnormal cardiac function on Echo or cardiac MRI	Absent	Needed	Not known
Probable acute myocarditis	In clinical context of possible myocardial injury with cardiac symptoms but ≥ 1 of 1. Biomarkers of cardiac injury raised 2. ECG findings suggestive cardiac injury 3. Abnormal cardiac function on Echo or cardiac MRI	Absent	Needed	Per clinical syndrome
Definite Myocarditis	Histological or immunological evidence of myocarditis	Needed	Not needed	Tailored to specific cause

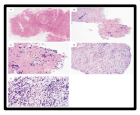
Sagar et al; Lancet 2012;379: 738-47

Syncope in Context of Myocarditis

- 6% (3/50)patients with unexplained AV block had myocarditis*(Uemera et al; Jpn Hrt J 2001)*
- HB or symptomatic ventricular arrhythmias raise suspicion for specific causes of myocarditis (HB – lyme disease, VT/VF/HB - sarcoidosis)
- Patients should be admitted to hospital for cardiac monitoring & early consideration to ICD

Approach to Diagnosis

- History & examination
- ECG, CRP, WBC, Troponin, CXR, BNP
- Echocardiogram
- Cardiac MRI
- Cardiac angiography /catheterization
- Endomyocardial biopsy 'Dallas criteria'



On Reflection

- High risk features of syncopal event
  - ↑ Dyspnoea x 3/12 (COPD) (major)
  - Short prodrome (minor)
  - Syncope in sitting position (minor)
- ECG – borderline ↑ QTc
- Cardiac injury biomarkers ↑ TN, ProBNP
- Telemetry, ? Urgent echo