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Back to life in 4 hours: a return of spontaneous circulation after cardiac arrest

Matthew Moran, FY2 and Sapphire Cartledge, FY2
North Manchester General Hospital

The winning Presentation from the
National Foundation Doctors Presentation Day 2025

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Case Report

Back to life in 4 hours: a return of spontaneous circulation after cardiac arrest

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North Manchester General Hospital

Overview and Aims

1. Explore the case of a woman in her mid 50s at North Manchester General Hospital who suffered a cardiac arrest and had delayed ROSC 4½ hours after CPR was stopped.

2. Explore the initial presentation, background and Resuscitation attempts

3. Subsequent recovery and follow up

4. Brief Comparison to current Literature

5. Proposals of mechanisms for this remarkable recovery

Background

PC:

- Presented to the ED with chest pain, breathlessness, a productive cough
- O/E - bilateral pitting oedema with raised JVP.

PMH:

- ***Extensive cardiac history*** – HTN, Heart failure, acute STEMI treated with PCI (2022), atrial flutter, ischaemic cardiomyopathy.
- Recent admission 2 months prior - treated for an NSTEMI (echo showed EF < 35%)

Investigations:

- Echocardiogram: Severe MR with an EF of <20%.
- Holter showed atrial flutter/ fibrillation with a variable conduction
- Angiogram - severe disease in the RCA and subtotal circumflex occlusion with a patent previous LMS-LAD stent.

Treatment:

- Treated for decompensated HF + Reviewed by cardiology for discussions for a cardiac pacemaker device.

Background

PC

- Presented to the ED with chest pain, breathlessness, a productive cough
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- ***Extensive cardiac history*** – HTN, Heart failure, acute STEMI treated with PCI (2022), atrial flutter, ischaemic cardiomyopathy.
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Investigations

- Echo: Severe MR with an EF of <20%.
- Holter: atrial flutter/ fibrillation with a variable conduction
- Angio: severe disease in the RCA and subtotal circumflex occlusion

Treatment

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Cardiac Arrest

Day 4 of admission

Bleep: 'Patient unresponsive with a pulse'

2222

03:50: VF --> PEA

Unresponsive and pulseless: CPR commenced

36 mins of CPR, 2x adrenaline, 2 shocks

04:15: ROSC

BP 127/88, HR 111, 98% on 15L

04:17: PEA

Pulse non-palpable; CPR re-commenced

Anaesthetics team: no carotid flow on USS

04:26: PEA

Pulse non-palpable. Team decision to stop CPR.

Anticipatories prescribed

07:30; 8:53: Medical r/v

Agonal breathing, pulseless

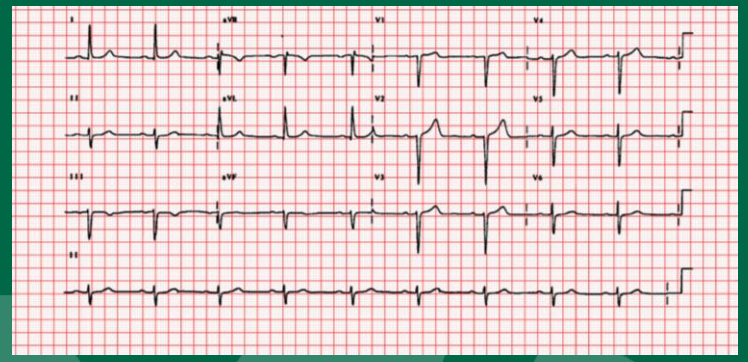
09:30 Pt opened her eyes

RR 24, sats 98% 15L, BP 109/88, GCS 9, temp 37.2

Investigations

1) **ABG:** High Po2, lactate 6.8

2) **Bloods:** Hb 119, WCC 11.5 Na 128, K 4.8, Ur 10.6, Cr 151, Trop 126 eGFR 17 (baseline 60-70)



3) **ECG:** SR, 1st degree AV block septal Q wave and poor R wave progression, right axis deviation, no ST elevation of signs of acute ischaemia

4) CXR- bilateral effusion and fluid overload

5) CT head: no acute infarct, vertebro basiliar artery occlusion should be considered given the level of dense calcification

Recovery

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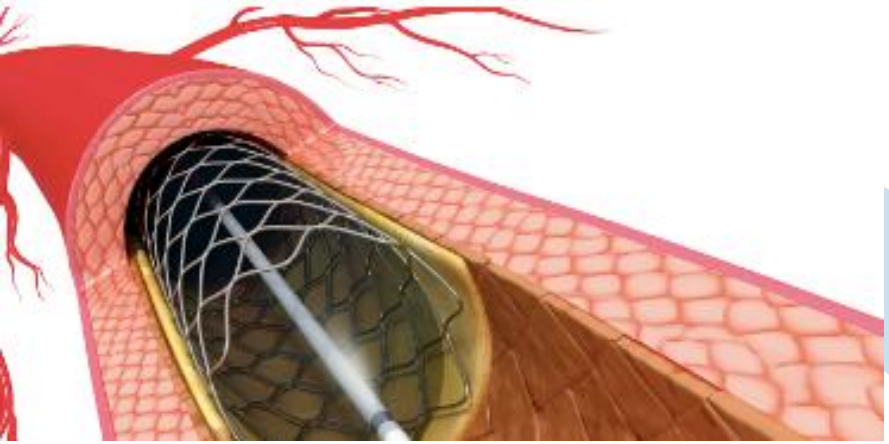
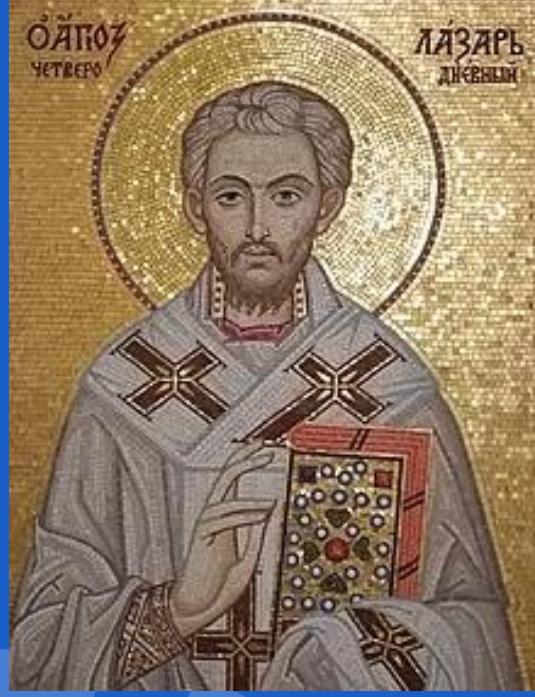
- IV co-amoxiclav to cover aspiration pnuemonia
- IV furosemide
- **Cardiology:**
  - Start ACS treatment
  - Move to CCU



- 2 days later: GCS 15 and NEWS 0
- 12 days post-arrest: ICD implantation
- **PCI:**
  - Severe right vessel occlusion (thought to be mechanism of arrest)
  - Unsuccessful PCI attempt
  - Medical management with cardio FU

Comparison to Literature



- **Lazurus Syndrome:** Lazarus syndrome, describes a return of spontaneous circulation (ROSC) following termination of cardio-pulmonary resuscitation (CPR) after a cardiac arrest. This phenomenon was first described in 1982 and continues to be reported in the literature to date(1)
- In the bible Lazarus arose from the dead without any CPR attempts, however there are no recorded cases of Lazarus syndrome without CPR before-hand (2)

- **Gordon et al:** scoping review(3)
  - 53 papers describing 65 patients with ROSC following cessation of CPR
  - Median duration of resuscitation was 30 minutes
  - Signs of life: <5 mins (47%); 6-10 mins (22%)
  - 35% of patients survived to be discharged; 78% died (data missing for 2 patients)

1. Linko K, Honkavaara P, Salmenpera M. Recovery after discontinued cardiopulmonary resuscitation. Lancet. 1982;1(8263):106–7.
2. Hornby K, Hornby L, Shemie SD. A systematic review of autoresuscitation after cardiac arrest. Crit Care Med. 2010;38(5):1246–53.
3. Gordon, L., Pasquier, M., Brugger, H. *et al.* Autoresuscitation (Lazarus phenomenon) after termination of cardiopulmonary resuscitation - a scoping review. *Scand J Trauma Resusc Emerg Med* **28**, 14 (2020). https://doi.org/10.1186/s13049-019-0685-4

Possible hypotheses for Lazarus phenomenon?

Proposed mechanism:	Explanation:
Air trapping causing hyperinflation of the lungs	-High tidal volumes and rapid ventilation rates mean insufficient time for exhalation. The release of +ve intra-thoracic pressure enables venous return and restores circulation. -Delays injected CPR drugs from reaching heart
Delayed drug effects	Severe acidosis or impaired delivery via peripheral line
Myocardial reperfusion	Spontaneous dislodging of endovascular plaque from coronary artery
Procedural	Misdiagnosis of death Unobserved minimal vital signs by the team

Table 1: Proposed mechanism of Lazarus syndrome. Based off table 4 Gordon et al(3).

Lessons to learn?

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- Importance of the death verification
- Royal college of physicians: 5 mins and specific criteria
- Luckily not verified due to agonal breathing

- Awareness of Lazarus phenomenon and auto-resuscitation

- Importance of team decision to terminate CPR

- Difficulty of palpating pulse in a low output state
- If there is doubt, consider USS assessment


Lessons to learn?


SUFC
TONY CURRIE STAND


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Manchester University
Thank You!
Any Questions?

What we learnt from others

- **Learning from other presentations on a wide range of topics:**
  - Quality Improvement initiatives
  - Research Projects
  - Education Projects

- **Poster Presentations**

- **Keynote Speaker:** Dr Navina Evans, CBE: *Chief Workforce, Training & Education Officer, NHS England*

National Foundation Doctors Presentation Day

UK Foundation Programme

NFDPD reflections – Sapphire Cartledge & Matthew Moran

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Reflections on the day

- Great opportunity to present our work, network, and be inspired by other projects
- Great day out to Sheffield! (Free food!)
- Would highly recommend to future Foundation Doctors!

Session Chair / Panel Questions

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Thank you for joining

If you have any webinar topic suggestions or feedback, please email them to: foundation.educationandsupport@nhs.net

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