Scenario: C8 - 1 Unstable Myocardial Infarction	**Patient:** Alf Stewart	**Simulator** SIMMAN
Case Summary: 75 year-old-man. History of diabetes, high blood pressure, heavy smoker, stress and previous CABG 8 years ago It is 0530 in the morning and Alf is being brought to the ED with new onset shortness of breath. He is suffering from a myocardial infarction and has pulmonary oedema as a result of this. He is heading into cardiogenic shock		**Participant Briefing:** You receive a call over the "bat phone" (or regional equivalent). The paramedics have picked up a 75-year-old gentleman who woke up with shortness of breath. They have initiated oxygen therapy and cannulated him. He has received 5mg of nebulised salbutamol and 300mg of aspirin, he sounds wheezy and has a cardiac history. RR raised at 35/min, BP 100/60, HR 110 irregular and his sats are 95% on oxygen. They will arrive in a couple of minutes. Is there anything that you would like to organise in the next couple of minutes?
Clinical Issues		**Human factors / Non technical issues**
Unwell patient with cardiogenic shock precipitated by a myocardial infarction. He is cardiovascularly unstable and will require non-invasive/invasive respiratory support. He would benefit from early revascularisation and further anticoagulation.		Team leadership – role allocation Communication with patient and team and other specialities Prompt decision making to stop deterioration of patient Situational awareness re severity of illness, available resources (especially at that time of day), need for 2 organ support, need for specialist involvement as early as possible
Learning Objectives: Initial team assessment and management of a patient with unstable myocardial infarction and heart failure. **Communicate** With the patient and team about severity of illness, plans. Communicate need for further specialised investigation and management. Role allocation, support of team, teaching of medical students as appropriate. **Conduct** A structured initial assessment and management of a critically ill cardiac patient as a team. **Demonstrate** Good team and medical skills. Knowledge of management of unstable cardiac patients. Knowledge of local facilities and protocols around the treatment and transfer of cardiac patients **Interpret** History, examination and investigation results relating to an unstable cardiac patient.		
Faculty Actors: Faculty ED resus nurse. Faculty may also need to play a radiographer for the CXR. Faculty could also play ED senior or cardiology senior as appropriate. Person playing Alf through the mannequin		
Patient Moulage: SIMMAN 3G or METI ECS – as appropriate. 2 x IV cannula in situ. Oxygen on and attached to oxygen. Mannequin sat up on a trolley in distress!		

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Monitor: ED setting – 3 wave forms 3-lead ECG Saturations NIBP	**Investigations:** Laminated ECGs x 3 as above Blood results laminated as above Raised troponin Hypoxaemic on ABG with mixed metabolic and respiratory acidosis and lactic acidosis CXR as above	Sheet over mannequin whilst the team prepares for the arrival of the ambulance crew.
Patient presentation	**Expected response by participants**	**Faculty /Actors Notes**
Initial Presentation Patient in respiratory distress and very anxious. Unable to complete sentences. Tires very easily on questioning. Sats – 92% on NRB mask RR – 35/min Breath sounds – Wheeze with bibasal crepitations NIBP – 110/55 HR – 110 SR with occasional ectopics	Rapid team assessment of the patient – history taking as able, monitoring, IV access, blood tests, arranging ECG, switching oxygen to wall supply (if not already done. Optimise patient's posture – sit Alf up. Communicate findings of assessment and initiate treatment – Nitrates, Morphine.	**Site faculty nurse** - remove sheet from mannequin after a couple of minutes has passed, to start the scenario. Facilitate the team to find equipment and set up for ECG, IV access, Sitting the patient up, finding and preparing medications/infusions. Once the ECG stickers have been placed give the team the first laminated ECG. **Control and Voice of Alf –** Alf has difficulty answering questions due to his shortness of breath. He is agitated and wants to sit up if the team does not do so. He is also in tremendous pain with his chest. He allows all interventions and tests easily as he is too unwell to put up a fight.

Resources for session	**<u>Provided by EdWISE</u>** Video Conference unit with computer and screen SIMMAN 2x cannulae in situ EdWISE Airway Box EdWISE Cardiac Box Defibrillator	**<u>Provided by Facility</u>** Oxygen – piped or cylinder Local Airway trolley (optional) Local Resus Trolley (optional) NIV (BiPAP) if available or mask & headstrap without machine Oxylog or local transport ventilator (optional) Whiteboard

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Resources for session continued Used during scenario	**Airway & Breathing** Oxygen masks – Nasal prongs, Hudson mask, Non re-breath and nebuliser masks should be available 2 x Laryngoscopes – size 3 and 4 MAC blades Endotracheal tubes sizes 6.0-6.5-7.0-7.5-8.0-8.5- all cuffed Gum elastic bougie or blue bougie as per host site Tape to tie the ETT in place Bag-valve-mask with size 4+5 masks PEEP valve for the Bag-Valve-Mask Oropharyngeal airways sizes 3, 4 and 5 Nasopharyngeal airways size 7 Laryngeal Mask Airways size 3-4-5 **Drugs** (facsimile or real) Cardiac arrest minijets. Aspirin in a tablet cup Clopidogrel in a tablet cup GTN spray for below the tongue Fentanyl, Morphine, Thiopentone, Suxamethonium, Propofol, Ketamine, Metaraminol, Morphine / Midazolam GTN infusion	**Circulation** Assorted syringes Giving sets IV fluids (Saline or Hartmanns) Infusion sets for 50 ml syringes Three-way taps x 4 Blood test tubes and ABG syringe **Other** Syringe pump X-Ray plate (real or facsimile) Laminated 12 lead ECG – AF with lateral ST elevation (2mm in 2 or more consecutive leads – just 2mm!) Laminated 12 lead ECG – AF with lateral ST elevation (obvious) CXR showing pulmonary oedema – printed on paper and laminated Blood results – Serial ABGs - laminated End tidal CO_2 measurement device (as per host site) Saturation probe ECG cable NIBP cuff Stethoscope x 2 Gloves and appropriate PPE MIST AMBO handover card

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Progression Over about 5 minutes Alf deteriorates further. He is more tired and not really able to answer questions, due to this. He still has severe pain Sats – 89% despite any type of oxygen therapy RR – 40/min Breath sounds – Reduced air entry globally with continued wheeze and bibasal crepitations NIBP – 85/40 HR – 125 SR with frequent ectopics	Initial therapies should be instituted within the first 5-7 minutes. Serial reassessment of the patient after every intervention. Serial ECGs, CXR, ABG/VBG should be assessed. Other blood tests should have been sent. Therapies may include – NIV (bag-valve-mask with PEEP valve if no CPAP machine); cautious use of nitrates; ionotropic support with metaraminol/ephedrine; cautious use of morphine analgesia; LMWH; cautious use of furosemide. Awareness and communication of deterioration of patient. Seeking help/advice/specialist intervention. This patient may need intubation – preparing for this. If the team is giving furosemide then consideration should be given to catheterisation.	**Site faculty nurse –** Assist the team to realise the continuous assessment and treatment of this patient. May need to have infusions ready and primed. If they ask for another ECG (As long as they have left the stickers in place) hand them the next ECG in the series. If you run out of ECGs then there is no change from the last ECG. A couple of minutes after CXR "taken" hand the team the laminated CXR sheet. If VBGs/ABGs have been taken – hand over the laminated results after a few minutes of them being taken. Alf will not be able to say very much so if the team feel that the mannequin is unresponsive then ask Alf a question and say that he was able to nod or shake his head in response to you. If further help has not been asked for then prompt the team by asking questions like "does this patient need to go somewhere", "what's the plan", how are we going to make Alf better?" Try not to come out of your role as the ED nurse. The team may want to place NIV on ALF. It is likely that the machine will alarm as the mannequin is not able to supply an expiratory volume that the machine would sense as a breath. The apnoea alarm should be switched off (if possible on your machine) and the facilitator nurse should be ready to press the alarm button as needed. It may be that the mask can be placed and the machine switched off. The team can then be told that the CPAP is in place correctly and whichever setting that they wish are set and working. **Control and Voice of Alf –** Alf is slowly deteriorating despite the efforts of the team. He will respond with grunts or a yes or no to some questions.

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Deterioration Alf slightly deteriorates further despite treatment. Sats – 85% on any type of oxygen RR – 40/min Breath sounds as above NIBP – 80/38 HR – 120 SR with frequent ectopics	Team should be thinking about taking over Alf's breathing through intubation. He is still a little conscious so sedation drugs should be considered. His BP is also dropping so consideration to insertion of a central line for ionotropic support should be given. Invasive arterial access may also be considered. Specialist intervention and support is needed (if available). If not consideration needs to be given as to discussion with the family about patient's wishes and likely outcomes.	**Site Faculty Nurse –** If team has not noticed the slight deterioration of the patient then this should be pointed out to them "Alf's sats are 85% now". If invasive monitoring is being considered then say that you have asked someone to come and help set up for central line or arterial line. If intubation is being considered please help the team to set up for intubation with equipment, drugs, infusions etc. Infusion pumps can be set up for ionotropes. A metaraminol infusion may be given peripherally and could be started as a stopgap to centrally administered drugs. If the team do not consider the family, mention that the wife is still in the waiting room. "Should I get the wife in from the waiting room?" **Control and Voice of Alf –** You are still able to grunt occasionally but you are drowsier than you were. The observations do not change from those set in this part of the scenario.
Recovery Scenario will end when objectives met or		

Debrief Guide	
Key clinical issues Assessment and diagnosis of cardiogenic shock patients Treatment of pulmonary oedema and cardiogenic shock Escalating treatment in a deteriorating cardiogenic shock patient Use of NIV/ionotropes Knowledge of specialist involvement needed for these patients	**Key non technical issues** Allocation of roles Clear communication pathways Team leadership **and** followership Situational awareness about deterioration of patient and communicating that to the rest of the team. Need for specialist involvement and help

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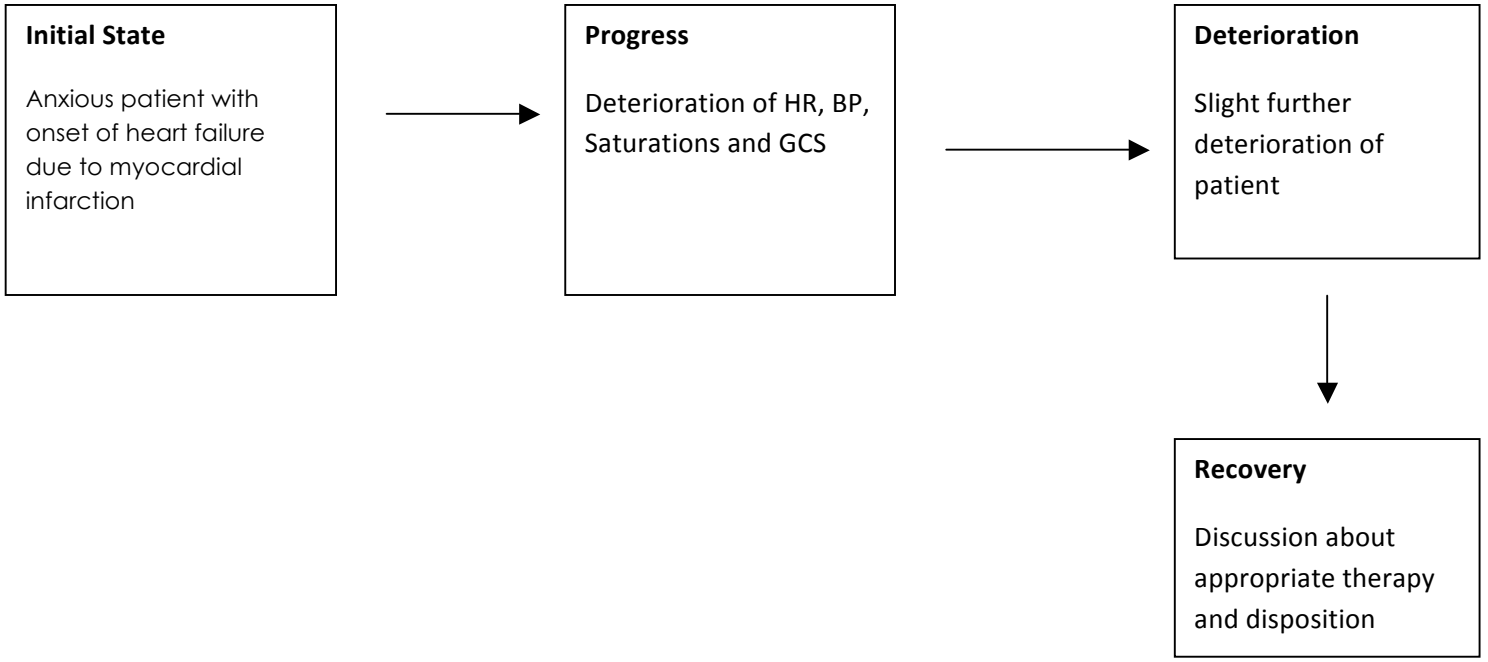

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ABG @ 5 Min

pH		**7.31**	**(7.35-7.45)**
$paCO_2$	**53**		**(35-45 mmHg)**
paO_2		**72**	**(80-100 mmHg)**
HCO_3		**18**	**(22-26 mEq/L)**
BE		**- 4.3**	**(-2 to +2)**
Lac		**3.3**	**(0-2)**
Glu		**8.6**	
Hb		**126**	

VBG @ 5 Min

pH		**7.28**	**(7.35-7.45)**
$paCO_2$	**57**		**(35-45 mmHg)**
paO_2		**33**	**(80-100 mmHg)**
HCO_3		**17**	**(2-26 mEq/L)**
BE		**- 4.8**	**(-2 to +2)**
Lac		**3.5**	**(0-2)**
Glu		**8.6**	
Hb		**127**	

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ABG @ 10 Min

pH	**7.23**	**(7.35-7.45)**
pCO_2	**61**	**(35-45 mmHg)**
pO_2	**68**	**(80-100 mmHg)**
HCO_3	**14**	**(22-26 mEq/L)**
BE	**-6.3**	**(-2 to +2)**
Lac	**4.7**	**(0-2)**
Glu	**7.3**	
Hb	**119**	

VBG @ 10Min

pH	**7.20**	**(7.35-7.45)**
pCO_2	**63**	**(35-45 mmHg)**
pO_2	**29**	**(80-100 mmHg)**
HCO_3	**15**	**(22-26 mEq/L)**
BE	**- 6.7**	**(-2 to +2)**
Lac	**4.8**	**(0-2)**
Glu	**7.1**	
Hb	**130**	

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ABG @ 15 Min

pH	**7.13**	**(7.35-7.45)**
pCO_2	**58**	**(35-45 mmHg)**
pO_2	**64**	**(80-100 mmHg)**
HCO_3	**12**	**(22-26 mEq/L)**
BE	**- 8.8**	**(-2 to +2)**
Lac	**6.1**	**(0-2)**
Glu	**6.6**	
Hb	**122**	

VBG @ 15 Min

pH	**7.11**	**(7.35-7.45)**
pCO_2	**61**	**(35-45 mmHg)**
pO_2	**31**	**(80-100 mmHg)**
HCO_3	**10**	**(22-26mEq/L)**
BE	**-9.1**	**(-2 to +2)**
Lac	**6.3**	**(0-2)**
Glu	**6.6**	
Hb	**122**	

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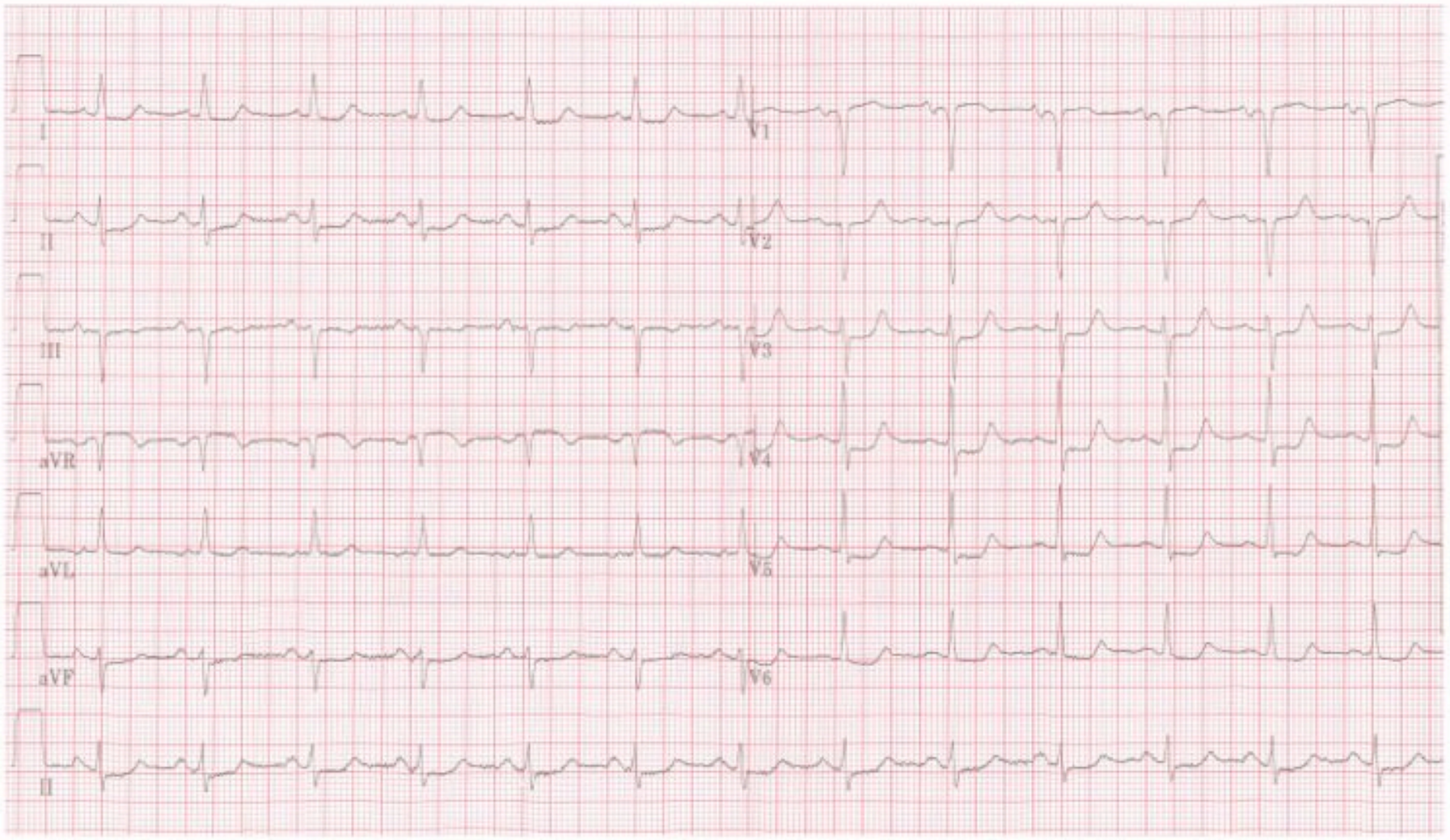

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Ambulance Hand Over

M – Alf Stewart a 75-year-old gentleman woke at about 0430 with difficulty breathing. He felt light headed and anxious and his wife phoned for an ambulance.

I – He sounds wheezy and has a strong history of ischaemic heart disease. He has had a previous CABG, smokes and has diabetes and high blood pressure.

S – At the scene Alf's observations were: RR – 40/min, Sats – 93% on air, HR – 110 irregular and NIBP was 110/75. Just before arrival at the ED his observations were: RR – 35/min, Sats 95% on a Hudson mask, HR – 110 irregular and NIBP – 100/60.

T – Alf has been cannulated with an 18G cannula. Oxygen started and 5mg of nebulised salbutamol given en route. He has also received 300mg of aspirin.

A – No Known Allergies

M – Aspirin-75mg, Ramipril-5mg, Atenolol-50mg, Simvastatin-20mg, Omeprazole-20mg, Diet control for his diabetes

B – CABG 8 years ago, Hx of diabetes, hypertension, smoking and GORD

O – Wife followed in her car. She was told to check-in at reception and someone would be out to talk her when they could.

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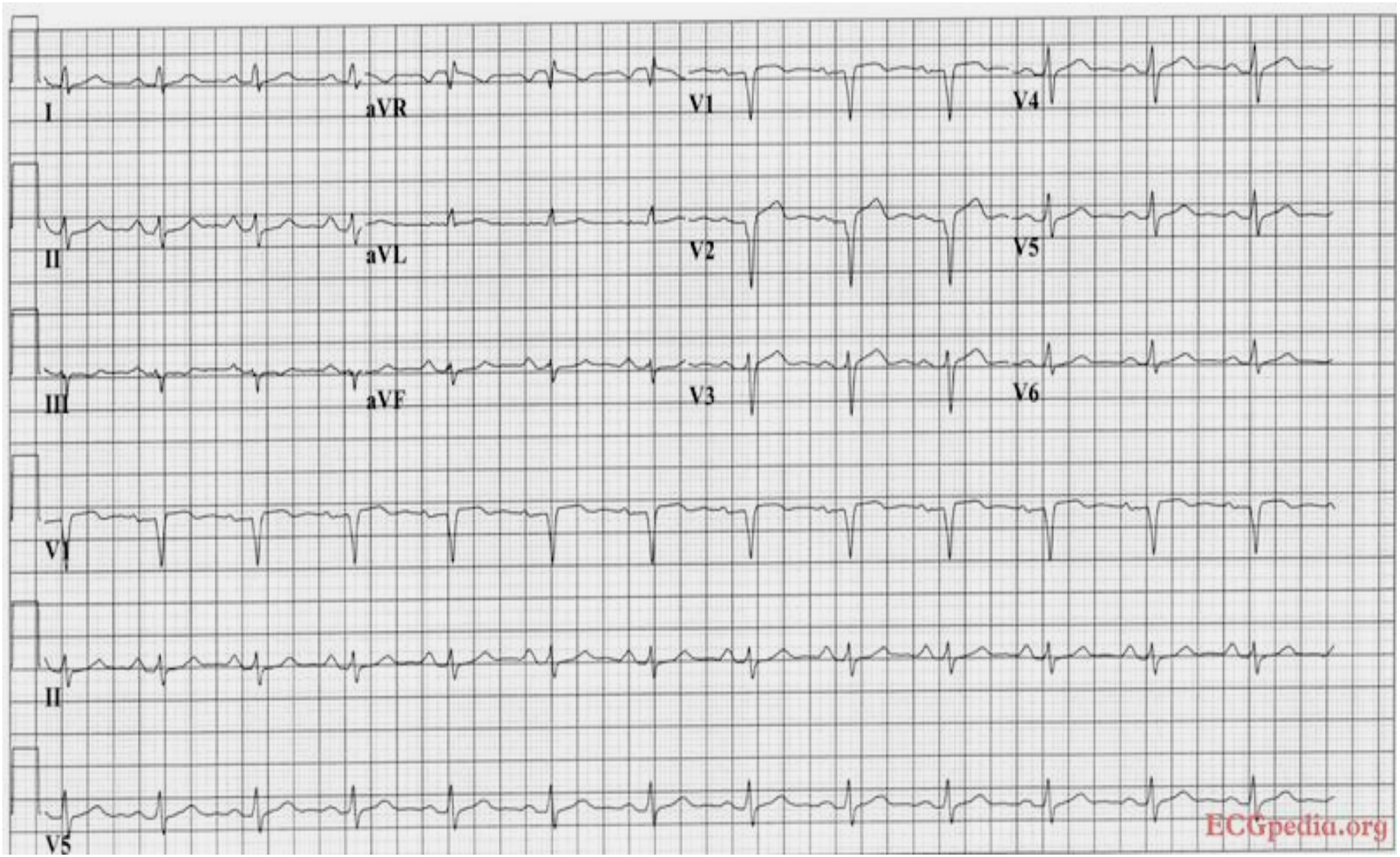

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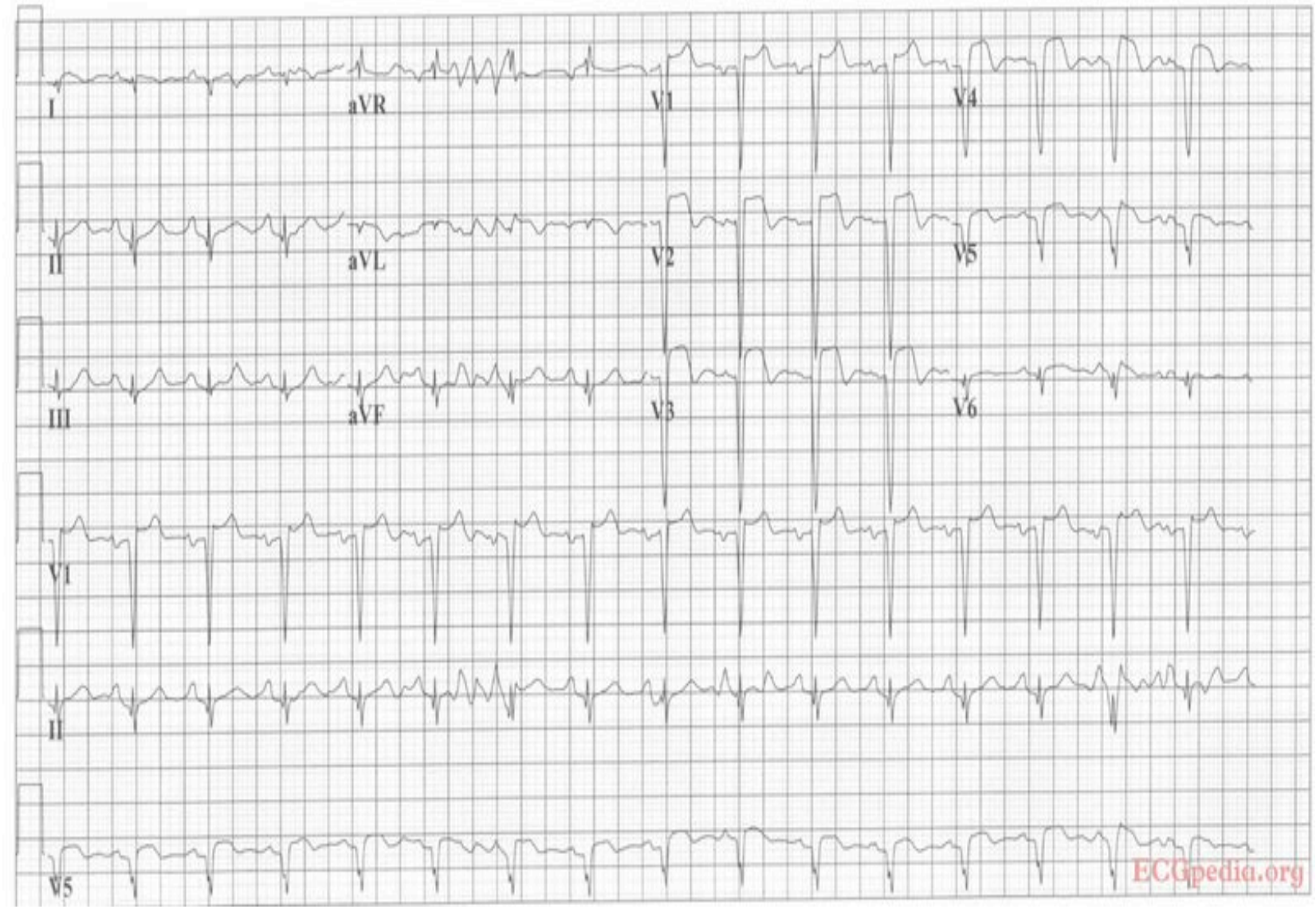

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