

# Case 14

You are an F2 working in the Emergency Department (ED) at General Hospital. Your consultant is Dr Snook.

Your bleep number is 1997

Patient name: Tanya Blair

Date of birth: 23<sup>rd</sup> September 1964

Patient number: X010279910

Mrs. Blair presents to ED with sudden onset dizziness, breathlessness, and pleuritic chest pain. She had orthopaedic surgery to repair a broken left ankle 7 days ago and has been 'resting up' at home.

The patient has a past medical history of asthma and hypertension.

Her medications include lisinopril, codeine and a salbutamol inhaler (PRN).

On examination the patient is pale and tachypnoeic, her airway is patent and both lungs are clear on auscultation. Heart sounds I – II + 0. Capillary refill time is <3 seconds. Abdomen soft and non-tender. There is pain and swelling and tenderness in the patient's left calf.

## Investigations

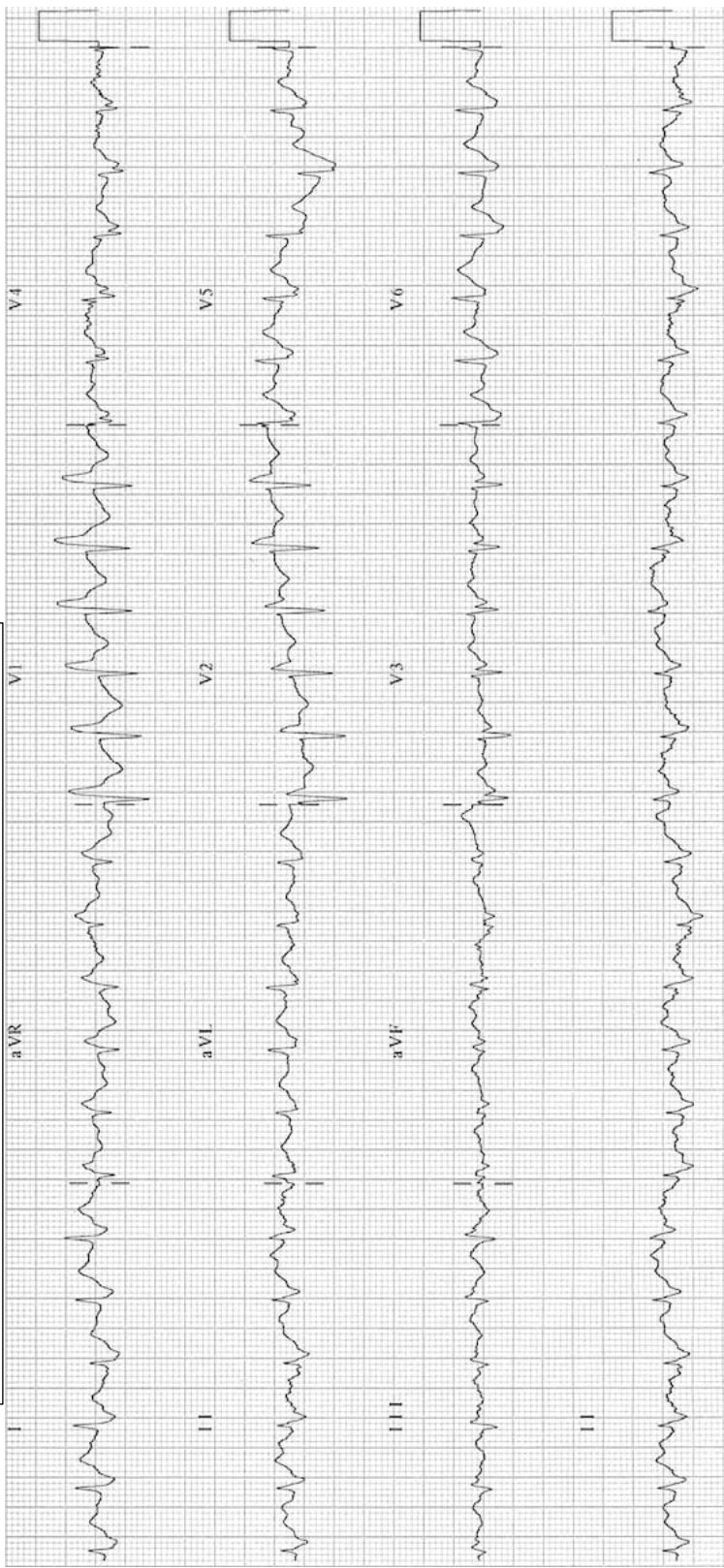
Pulse	144 beats per minute
Blood pressure	105/64 mmHg
Respiratory rate	20 breathes per minute
Oxygen saturations	90% (room air)
Temperature	36.2 degrees Celsius

The patient is given high-flow oxygen through a non-rebreather mask.

A chest x-ray and appropriate blood tests are ordered.

ECG results are below:

Patient: Tanya Blair  
DOB: 23/09/1964 Hospital #: X010279910  
Time: 09:50 Date: 25/03/2023  
Paper speed 25mm/sec. Calibration 10mm/mV  
QT/QTc: 280ms/434ms



**Task**

Please report and interpret the results of the ECG on hospital notepaper. Comment on the rate, rhythm, axis, P waves, PR interval, QRS complex, T waves, ST segment and QT interval.

Make sure to include the most likely diagnosis and what the next steps in management should be.

Hospital: General Hospital

Patient name: Tanya Blair

Ward: ED

Date of birth: 23/09/1964

Consultant: Dr Snook

Hospital number: X010279910

Date/Time	Documentation
25/03/2023	FRED JONES FY2
1000	Report on 12-lead ECG for Tanya Blair, DOB 23/09/1964
<i>i.e. today's date</i>	recorded today (25/03/23) at 0950 due to presentation with acute shortness of breath, chest pain and dizziness.
	Paper speed: 25mm/sec, calibration gain: 10mm/mV
	Rate: 144bpm
	Rhythm: Regular sinus rhythm
	Axis: normal
	P waves: Present
	PR interval: 0.14s normal
	QRS: >0.12, broad. RSR' pattern in V1-V3. Wide slurred S wave in V5 and V6.
	T waves: Inverted in leads V1 and V2. SI, Q3, T3 pattern.
	ST segment: normal
	QTc: 434 ( $\geq 450$ for men, $\geq 460$ women = abnormal)
	No previous ECGs for comparison
	Impression: Sinus tachycardia with right bundle branch block
	- ?massive pulmonary embolism
	Plan:
	1. Calculate Wells Score ( <i>should be ~9</i> )
	2. ?Interim anticoagulation (w/ DOAC) F. Jones
	3. CTPA FRED JONES (FY2)
	4. Review with senior ?thrombolysis Bleep: 1997

## Interpretation

This patient has a number of features in her presenting complaint and recent medical history suggestive of pulmonary embolism. These are best illustrated by calculating a Wells Score:

### 2-level PE Wells test

Criteria	Points
Clinical signs and symptoms of DVT (minimum of leg swelling and pain with palpation of the deep veins)	3
An alternative diagnosis is less likely than PE	3
Heart rate > 100	1.5
Immobilisation for more than 3 days or surgery in the previous 4 weeks	1.5
Previous DVT/PE	1.5
Haemoptysis	1
Malignancy (on treatment, treated in the last 6 months, or palliative)	1

PassMedicine

**Score > 4 points → PE likely**

**Score ≤ 4 points → PE unlikely**

As we can see, the patient with her tachycardia, heart rate >100bpm, recent immobilisation/surgery and swollen left calf (suggestive of DVT) would score meaning PE is very likely. Given the likelihood of PE a D-dimer is not needed and CTPA should be arranged immediately.

There are also a number of features on the patient's ECG strongly suggestive of PE:

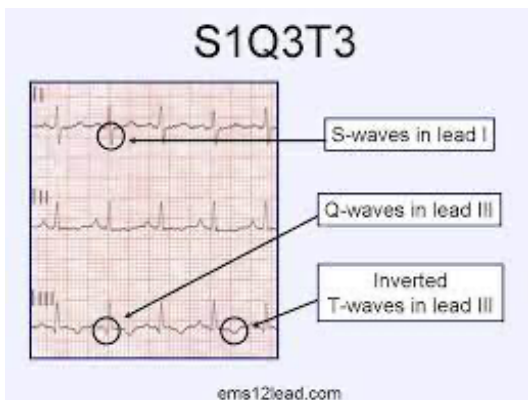
1. tachycardia (sometimes this is the only ECG change seen in PE)
  2. Right bundle branch block
  3. S1Q3T3 pattern
- } Both suggestive of right heart strain / cor pulmonale.

Typical right bundle branch block features include RSR' pattern in V1-V3, broad slurred S wave in V5 and V6, as well as broad QRS complexes (>0.12s).



<https://litfl.com/right-bundle-branch-block-rbbb-ecg-library/>

S1Q3T3 is a pattern in which there is a defined S wave in lead I, a Q wave in lead III with T wave inversion in lead III.



The ECG was taken from *Life on the Fast Line* website – loads of excellent information on ECG interpretation can be found there:

<https://litfl.com/ecg-changes-in-pulmonary-embolism/>

Further information on management of pulmonary embolism can be found on the NICE website:

<https://cks.nice.org.uk/topics/pulmonary-embolism/>

And, usefully for written skills exams, in the BNF under *Venous thromboembolism*:

<https://bnf.nice.org.uk/treatment-summaries/venous-thromboembolism/>