

# Case 17

You are a Foundation Year 2 doctor working on Paediatric Emergency Department at General Hospital.

Your bleep number is 0865.

The consultant is Dr Doukrou.

## Patient details

Patient name: Thomas Gump

Date of birth: 7<sup>th</sup> June 2009

Patient number: X653192847

## History

Thomas Gump attends emergency department with acute shortness of breath and left-sided chest pain which occurred following a 5km charity run one hour ago. He has no cough and has suffered no trauma. He has no significant medical history and describes being generally fit and well, running for his school's athletics team.

He has no known drug allergies.

## Examination

On examination, Thomas, a tall slim young man, is using his accessory muscles to breathe. There is decreased air entry on the left side of his chest and lung sounds are diminished. Heart sounds I - II + 0. Capillary refill time is 3 seconds.

## Observations

Oxygen saturations: 94% (room air)

Respiratory rate: 24bpm

Heart rate: 110bpm

Blood pressure: 110/70mmHg

Temperature: 36.5°C

The patient is given 15L high-flow oxygen through a non-rebreather mask. An arterial blood gas is taken.

An PA chest x-ray is recorded, which is shown below:

Patient: Thomas Gump

DOB: 07/06/2009 Hospital #: X653192847

Time: 09:50

Date: 29/03/2023

Position: PA



*Image courtesy of Case courtesy of Ian Bickle, Radiopaedia.org, rID: 74856*

### Task

Please report the chest radiograph on hospital notepaper using an appropriate structure. Suggest the most likely diagnosis and suggest the next step(s) in management.

Hospital: General Hospital

Patient name: Thomas Gump

Ward: ED

Date of birth: 07/06/2009

Consultant: Dr Doukrou

Hospital number: X653192847

Date/Time	Documentation
29/03/2023	FRED JONES FY2
1000	Report on chest radiograph of Thomas Gump, DOB
<i>i.e. today's date</i>	29/03/2009 recorded today (29/03/23) at 0950 due to
	shortness of breath and reduced left-sided air entry.
	Position is PA. Rotation, inspiration and exposure are adequate.
	Airway: trachea and mediastinum central. <i>(Appears shifted to right due to rotation)</i>
	Breathing: right lung normal. Large (>2cm) left pneumothorax
	with a deep costophrenic angle.
	Cardiovascular: cardiothoracic ratio <0.5. Normal.
	Diaphragm: no free air under the diaphragm. Sharp
	costophrenic
	angles.
	External objects: no sign of fracture or soft tissue injury.
	Impression: spontaneous pneumothorax
	Plan:
	1. Seek senior opinion on chest X-Ray
	2. Seek senior opinion on further management options
	<i>(Further management options here are likely chest drain or needle decompression if unstable but this will depend on local circumstances and in children should always be done with senior guidance – Suggesting specific management options here is acceptable but there MUST be senior input in your answer)</i>
	<i>F. Jones</i>
	FRED JONES (FY2)
	Bleep: 0865

## Explanation

The patient has presented with shortness of breath and one-sided chest pain with no trauma. His oxygen saturations are low on room air and he is tachypnoeic, tachycardic and afebrile. Already, a spontaneous pneumothorax should be a primary differential.

He is a tall and thin young male – therefore at high risk of the condition. Other risk factors include smoking, connective tissue disease (also present in tall thin males), scuba diving, high altitudes and flying. Exercise itself is not a risk factor – in fact, spontaneous pneumothorax mostly occurs at rest. In children, the majority of spontaneous pneumothoraces occur due to the rupture of blebs formed by underlying disease processes (I.e. CF, asthma etc) or connective tissue diseases (I.e. Marfans syndrome).

When reporting an x-ray it's a good idea to take a systemic approach.

Firstly, the RIPE approach could be used to assess the quality of the film:

1. Rotation – most easily assessed by looking at the clavicles.
2. Inspiration – ideally 5-6 anterior ribs should be visible.
3. Position – either posteroanterior (PA) and anteroposterior (AP) (note anteroposterior is usually from a portable x-ray and cannot be used to assess the cardiothoracic ratio, as it enlarges the size of the heart.)
4. Exposure – vertebrae should be visible behind the heart. Comment if the x-ray is under/overexposed.

Secondly, we can use the mnemonic ABCDE. More details can be found at geekymedics: <https://geekymedics.com/chest-x-ray-interpretation-a-methodical-approach/>

When a pneumothorax is suspected, make sure to pay particular attention to the lung markings and fields: follow the chest wall and ensure lung markings extend all the way. The edge of the lung may be seen as a thin, sharp line. If there is a pneumothorax, no lung markings will be seen peripheral to this line.

<https://radiopaedia.org/articles/pneumothorax?lang=gb>

If it is a tension pneumothorax, the trachea will shift away from the collapsed lung (due to increased pressure in the pleural space.)

British thoracic society guidelines on management of spontaneous pneumothorax can be found here:

<https://www.bsuh.nhs.uk/library/wp-content/uploads/sites/8/2020/06/BTS-pneumothorax-guideline.pdf>