

ENDGAMES

We welcome contributions that would help doctors with postgraduate examinations. We also welcome submissions relevant to primary care. ▶ See thebmj.com/endgames for details

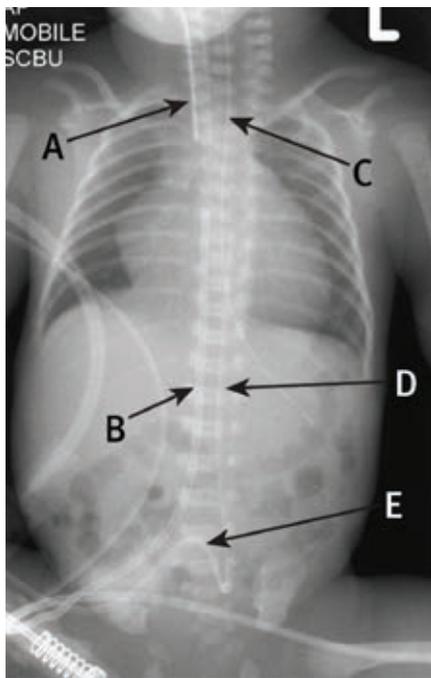
FOLLOW ENDGAMES ON TWITTER

@BMJEndgames

FOR SHORT ANSWERS See p 32

FOR LONG ANSWERS

Go to the Education channel on thebmj.com



ANATOMY QUIZ Neonatal chest and abdominal radiograph: identification of tubes and lines

Identify the devices labelled A, B, C, D, and E on this neonatal chest and abdominal radiograph and identify the anatomical structures in which they are located.

Submitted by Rohit Malliwal and Mohammed Akhtar

Cite this as: BMJ 2014;349:g6074

PICTURE QUIZ An elderly woman with chest pain and constipation

An 89 year old woman with chronic obstructive pulmonary disease presented to the emergency department with worsening shortness of breath (87% oxygen saturation in room air), retrosternal chest pain, mild abdominal pain, and subacute partial bowel obstruction over the past six days. On physical examination she was dehydrated and she had tachycardia (105 beats/min), diffusely decreased breath sounds, audible crackles at the base of the right lung, and absent breath sounds on the left side pulmonary base. Her abdomen was distended but soft overall, the epigastrium and right hypochondrium were slightly tender on deep palpation, and her rectum was empty. Her blood pressure was 130/85 mm Hg. Electrocardiography and troponin (measured at admittance and checked again after six and 12 hours) excluded myocardial infarction. Laboratory studies were unremarkable except for a mild microcytic anaemia (haemoglobin 115 g/L (reference range 120-160)), mean cell volume 78.6 fl (80-96). Urgent chest radiography was requested (figure).



- 1 On the basis of the radiograph and clinical findings, what is your differential diagnosis?
- 2 How would you confirm the diagnosis?
- 3 What complications may develop in a patient with this condition?
- 4 What immediate management should be implemented?
- 5 What definitive treatment options should be considered?
- 6 What would you recommend to the patient after discharge?

Submitted by Salomone Di Saverio, Raffaele Lombardi, Elisa Bianchi, Gregorio Tugnoli, and Elio Jovine

Patient consent obtained.

Cite this as: BMJ 2015;350:h166

STATISTICAL QUESTION Bias in observational study designs: case-control studies

Researchers investigated the association between sun exposure and risk of multiple sclerosis. A population based case-control study was performed. The participants were recruited from residents of Tasmania, Australia, who were aged under 60 years and had at least one grandparent born in Tasmania. Cases were people with multiple sclerosis who volunteered after information evenings at local multiple sclerosis societies, or after having been invited by a healthcare professional. In total, 136 people with a diagnosis of multiple sclerosis, as defined by clinical and magnetic resonance imaging criteria, were included as cases. For each case, two controls matched for sex and year of birth were randomly selected from the community. In total, 359 eligible controls were approached and the response rate was 76%.

A validated questionnaire was used to record the amount of time participants would normally have spent in the sun during weekends and holidays in winter and summer before the age of 16 years. Actin damage was used as a marker of cumulative lifetime sun exposure. Silicone casts of the skin surface of the hand were obtained and graded by the researchers from 1 (undamaged skin) to 6 (severe deterioration).

The researchers reported that greater sun exposure when aged 6-15 years (average two to three hours or more a day in summer during weekends and holidays) was associated with a reduced risk of multiple sclerosis (adjusted odds ratio 0.31, 95% confidence interval 0.16 to 0.59). Greater actinic damage (disease grades 4-6) was also independently associated with a reduced risk of multiple sclerosis (0.32, 0.11 to 0.88). It

was concluded that higher sun exposure during childhood and early adolescence was associated with a reduced risk of multiple sclerosis. Insufficient ultraviolet radiation may therefore influence the development of multiple sclerosis.

Which of the following, if any, might the above case-control study and its results have been prone to?

- a) Allocation bias
- b) Ascertainment bias
- c) Assessor bias
- d) Confounding
- e) Recall bias
- f) Response bias
- g) Selection bias

Submitted by Philip Sedgwick

Cite this as: BMJ 2015;350:h560

ANSWERS TO ENDGAMES, p 35 [For long answers go to the Education channel on thebmj.com](#)

STATISTICAL QUESTION

Bias in observational study designs: case-control studies

Answers *b, c, d, e, f,* and *g* are true, whereas *a* is false.

ANATOMY QUIZ

Neonatal chest and abdominal radiograph: identification of tubes and lines

- A: Endotracheal tube with its tip lying at the level of the thoracic inlet (clavicles)
- B: Umbilical venous catheter positioned at the junction between the right atrium and the superior vena cava
- C: Nasogastric tube with its tip lying in the gastric fundus
- D: Umbilical arterial catheter positioned with the distal end in the thoracic aorta at the level of the T7 vertebral body. Positioning between T6 and T10 is acceptable
- E: Proximal portion of the umbilical arterial catheter in the right internal iliac artery. This allows for differentiation from the umbilical venous catheter, particularly in unclear and rotated radiographs

PICTURE QUIZ

An elderly woman with chest pain and constipation

- 1 The radiograph shows a large round shadow behind the heart with an air-fluid level. The right lung appears displaced and compressed. Differential diagnoses include cardiomegaly, huge pneumomediastinum and oesophageal perforation, epiphrenic oesophageal diverticulum, large pulmonary hydatid cyst, huge diaphragmatic hernia, delayed presentation of a large traumatic rupture of the diaphragm, paralysis of the left hemidiaphragm, mediastinal abscess, pulmonary tuberculosis, and gastrointestinal perforation with air migration above the diaphragm.
- 2 The easiest way is to look at previous imaging if available. A definitive diagnosis is needed before making treatment decisions. Computed tomography of the chest and abdomen with intravenous contrast medium is most useful for confirming the diagnosis of a hiatus hernia and for differential diagnosis. The introduction of multi-slice computed tomography with sagittal, coronal, and three dimensional reformatted images has greatly increased sensitivity. Use of both intravenous and oral contrast improves diagnostic accuracy, especially in the case of cephalad migration of the gastroesophageal junction or gastric fundus through the hiatus, or to rule out perforation and extraluminal leaks.
- 3 PEHs may evolve into potentially life threatening complications, such as incarceration and obstruction, and may acutely evolve into strangulation with ischaemia, gangrene, and perforation of the stomach, small bowel, or colonic loops (if type IV PEHs).
- 4 Fluid resuscitation, electrolyte replacement, oxygen administration, and nasogastric decompression.
- 5 Emergency surgery is mandatory for complicated PEHs, whereas symptomatic uncomplicated ones should be considered for elective repair if the operative risks are acceptable. Routine elective repair for completely asymptomatic hiatus hernias may not be indicated.
- 6 Symptoms of acid reflux should initially be managed by behavioural changes and lifestyle measures and then the addition of drugs. When conservative management of a large PEH is thought to be the most suitable option, long term treatment should be aimed at preventing the potentially life threatening complications.