

# ENDGAMES

We welcome contributions that would help doctors with postgraduate examinations  
▶ See [bmj.com/endgames](http://bmj.com/endgames) for details

FOLLOW ENDGAMES ON TWITTER  
@BMJEndgames  
FOR SHORT ANSWERS See p 33  
FOR LONG ANSWERS  
Go to the Education channel on [bmj.com](http://bmj.com)



## STATISTICAL QUESTION Normal ranges

Researchers used cardiac magnetic radial images with radial long axis orientation to establish normal ranges of left ventricular function. Participants were 40 apparently healthy people (20 men, average age 32.3 years, age range 19-58; 20 women, average age 37.4 years, age range 21-54). Investigations were conducted using a steady state free precession pulse sequence.

Measurements of left ventricular function included end diastolic volume adjusted for body surface area. Men had a sample mean volume of 90.9 mL/m<sup>2</sup> (standard deviation 14.3) and women 80.7 mL/m<sup>2</sup> (11.2). Normal ranges for left ventricular volume were calculated as two standard deviations either side of the sample mean. The normal ranges for left ventricular end diastolic volume were 62.3-119.5 mL/m<sup>2</sup> for men and 58.3-103.1 mL/m<sup>2</sup> for women.

Which of the following statements, if any, are true?

- Any person with a left ventricular volume outside the sex specific normal range has an abnormal measurement
- About 95% of the sample measurements are contained within the sex specific normal ranges
- To calculate the normal ranges, it was assumed that the distribution of measurements of left ventricular volume was normally distributed

Submitted by Philip Sedgwick

Cite this as: *BMJ* 2013;346:f1343

## PICTURE QUIZ Peri-oral papules

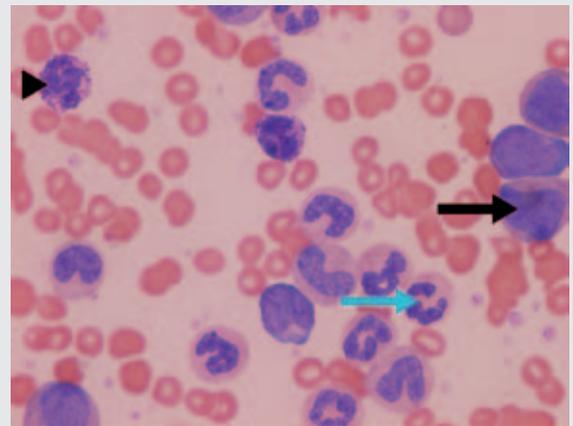


A 40 year old woman, originally from sub-Saharan Africa, was referred to dermatology by her general practitioner. She had noticed the appearance of several itchy papules around her mouth five months ago (figure). She was otherwise well and had no relevant medical history. She was taking no drugs.

- What is the diagnosis?
- What investigations would you do?
- How would you treat this condition?
- What other skin diseases are associated with the underlying disease?

Submitted by Catriona Maybury and Emma Craythorne

Cite this as: *BMJ* 2013;346:f750



## CASE REPORT

### An unexpected finding after a fall from a horse

A 37 year old jockey was admitted with left sided abdominal pain and fullness one week after a fall from a horse. Before this he had been fit and well. On examination, he was tender in the left upper outer quadrant of his abdomen and his blood pressure was 90/55 mm Hg. A computed tomography scan showed an area of active bleeding in the parenchyma of the spleen and a large subcapsular haematoma.

Blood tests showed a white blood cell count of  $259 \times 10^9/L$  (reference range 4-11) with the following differential: blasts 3%, promyelocytes 11%, myelocytes 28%, metamyelocytes 19%, neutrophils 21%, basophils 10%, lymphocytes 4%, and eosinophils 4%. His haemoglobin was 109 g/L (130-180), mean cell volume was 80 fL (76-96), and platelets were  $201 \times 10^9/L$  (150-400). Lactate dehydrogenase was 563 IU/L (70-250; 1 mmol/L=9.01 mg/dL) and uric acid was 600  $\mu\text{mol/L}$  (300-470; 1  $\mu\text{mol/L}$ =0.03 mg/dL).

He underwent emergency splenectomy. Macroscopically, the spleen was greatly enlarged, at  $22 \times 13 \times 10$  cm, and microscopically it showed a dense infiltrate of left shifted immature myeloid cells.

- What are the possible causes of a raised white blood cell count?
- Given the clinical findings, what is the likely diagnosis?
- What further investigations should be considered?
- What are the treatment options?
- Why might allopurinol be started in this patient?

Submitted by Sophie Raby, Daniel Greaves, Joseph Padayatty, and Brian Huntly

Cite this as: *BMJ* 2013;346:f724