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

CASE REVIEW

Skin lesion in a critically ill man

A 45 year old man was referred to the emergency department with a seven day history of high fever and chills. His condition suddenly deteriorated and he presented with dark yellow urine of decreased volume, tachypnoea, and drowsiness. His medical history included hypertension, type 2 diabetes, and heavy consumption of alcohol (>6.8 units, or >50 g alcohol/day for 12 years). He had travelled to a mountainous region in the Fujian province of China 12 days earlier.

On admission to intensive care, he was found to have a round ulcer near the navel, 3 mm in diameter, with marginal swelling and peripheral blushing (figure). The rest of his physical examination, including the cranial nerve, was normal. The table shows the results of his blood tests. No obvious abnormality was visible on routine computed tomography of the brain and lung; however, hepatomegaly and a slight splenomegaly were seen on a computed tomogram of his abdomen.

1 What is the differential diagnosis?
2 What further tests are needed?
3 Given the most likely diagnosis how should the condition be treated?
4 What risk factors affect prognosis?
5 How can primary care practitioners make a straightforward diagnosis?

Submitted by Ming-Hua Zheng, Ke-Qing Shi, and Yong-Ping Chen
Patient consent obtained.
Cite this as: *BMJ* 2015;351:h4570

The patient's laboratory test results in the intensive care unit

Laboratory test	At admission	At discharge	Reference range
White blood cells (×10⁹/L)	16.33	6.5	4.0-10.0
Neutrophils (×10⁹/L)	12.08	4.3	2.0-7.0
Lymphocytes (×10⁹/L)	3.43	1.3	1.0-3.0
Red blood cells (×10¹²/L)	2.58	3.12	4.30-5.80
Platelets (×10⁹/L)	5	182	125-350
Haemoglobin (g/L)	80	98	130-175
Alanine aminotransferase (U/L)	121	45	9-50
Total bilirubin (µmol/L)	95	32	0-20
Albumin (g/L)	33.5	33	35.0-55.0
Alkaline phosphatase	124	120	40-150
γ-Glutamyl transpeptidase	890	859	10-15
Fasting plasma glucose (mmol/L)	8.44	7.56	3.9-6.1
Creatinine (µmol/L)	265	95	58-110
Uric acid (µmol/L)	220	235	90-420
Myoglobin	346.4	125.5	0-154.9
Lactate dehydrogenase	9.0	0.8	0.7-2.1
D-dimer	32.86	0.55	0.0-2.74
International normalised ratio	1.87	0.94	0.85-1.15

SPOT DIAGNOSIS

An uncomfortable hip exacerbated by exercise

A 41 year old woman presented to the hospital with gait disturbance. She had felt discomfort around her groin for several years, which was exacerbated recently after taking part in a square dance. On examination she had slight leg length discrepancy. A plain anteroposterior radiograph was taken of her pelvis. What is the diagnosis?

Submitted by Hao Chen

Patient consent obtained.
Cite this as: *BMJ* 2015;351:h4750

STATISTICAL QUESTION Understanding the ecological fallacy

Researchers investigated whether an association existed between antibiotic prescribing by general practices and antibiotic resistance. A cross-sectional study design was used. The setting was 28 general practices in Scotland. The participants were patients registered with a general practitioner between January 1995 and December 1996 who provided a urine sample for analysis during this period. In total, 8833 patients were included in the sample. For each patient in each of the practices the number of dispensed prescriptions for trimethoprim was obtained from databases of health records.

Data were aggregated at the general practice level. For each general practice, antibiotic prescribing was measured as the number of dispensed trimethoprim prescriptions per 100 practice patients. Antibiotic resistance was defined as the proportion of patients in the practice with a urine sample that contained trimethoprim resistant Gram negative bacteria. Rates of trimethoprim prescription varied from 67 to 357 prescriptions per 100 patients between practices. The prevalence of trimethoprim resistance in Gram negative bacteria isolated from urine specimens varied between 26% and 50%. A weak negative association was seen between trimethoprim prescription and antibiotic resistance across the 28 general practices (Spearman rank correlation r_s=−0.039). The researchers commented that although there was no evidence of an association between trimethoprim prescription and resistance at the practice level, the results may have been prone to the ecological fallacy.

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

a) The unit of observation was the patient
b) The unit of analysis was the general practice
c) Spearman's rank correlation coefficient measured the strength of a linear association between trimethoprim prescription and antibiotic resistance across practices
d) The ecological fallacy is the assumption that inferences made at the general practice level would apply to individual patients

Submitted by Philip Sedgwick
Cite this as: *BMJ* 2015;351:h4773

ANSWERS TO ENDGAMES, p XX For long answers go to the Education channel on thebmj.com

CASE REVIEW
Skin lesion in a critically ill man

1 Tsutsugamushi disease (severe type), typhoid fever, relapsing fever, and epidemic haemorrhagic fever.

2 Weil-Felix test, immunofluorescent antibody test, polymerase chain reaction (PCR).

3 Once confirmed as tsutsugamushi disease, treatment with tetracycline and doxycycline is highly effective.

4 Older age; absence of an eschar; shock; multiple organ dysfunction; underlying chronic disease; decreased albumin and haemoglobin; leucocytosis; increased concentrations of aspartate aminotransferase, serum creatinine, urine albumin, and C reactive protein; and an APACHE II score of 50 or more all contribute to a poor prognosis.

5 Take a detailed medical history (especially travel history), repeat the physical examination, and characterise the eschar.

STATISTICAL QUESTION
Understanding the ecological fallacy
Statements *a*, *b*, *c*, and *d* are all true.

SPOT DIAGNOSIS
An uncomfortable hip exacerbated by exercise
This plain radiograph shows several radiographic signs that are characteristic of developmental dysplasia of the left hip.