FOR SHORT ANSWERS
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FOR LONG ANSWERS
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ENDGAMES

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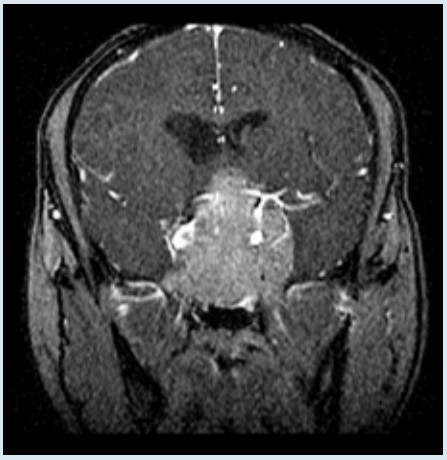
PICTURE QUIZ A persistent headache



A 34 year old man was admitted to the medical admissions unit with a history of headache and vomiting. He had been experiencing neck pain for the preceding four months; his headache had developed gradually over this time but had worsened over the past two weeks. The headache was described as a "throbbing" sensation over the frontal area of the skull radiating to the neck, and the patient felt as if his scalp "was being ripped on and off." The headache was not related to the time of day. He also described some pain over his left eye. He had a two week history of vomiting associated with the headache, but no photophobia. On further questioning, he had not noticed any change in his libido.

On examination the patient did not have a fever (temperature 36.8°C) and was haemodynamically stable (respiratory rate 15 breaths a minute, heart rate 85 beats a minute, blood pressure 125/65 mm Hg). Clinical examination of the neurological system determined papilloedema, and visual fields were noted to show a bitemporal hemianopia. Endocrine examination revealed reduced body hair; testes were not examined. All other system examinations were unremarkable.

Blood tests initially showed a haemoglobin concentration of 155 g/l, a white cell count of 12.0×10^9/l (neutrophils 10.1×10^9/l), a platelet count of 225×10^9/l, a urea concentration of 5.3 mmol/l, and a serum sodium concentration of 136 mmol/l, potassium concentration of 3.7 mmol/l, and bicarbonate concentration of 27 mmol/l.

Computed tomography of the head was performed, followed by magnetic resonance imaging.

A subsequent blood test showed a prolactin level of greater than 1 035 190 pmol/l (reference range 207-725), an 8 am cortisol concentration of 75 nmol/l, a thyroid stimulating hormone concentration of 0.6 mIU/l (0.5-4.7), a free thyroxine level of 11 pmol/l (9-24), a follicle stimulating hormone concentration of 3.3 IU/l (1-7), a luteinising hormone level of 1.4 IU/l (1-8), a testosterone concentration of 1.9 nmol/l (8-27), and an insulin-like growth factor 1 concentration of 124.0 µg/l (110-280).

1 What does the MRI scan show and what are the differential diagnoses on the basis of the scan and the clinical findings?
2 What is the significance of the prolactin and cortisol concentrations, and the results of the thyroid function tests?
3 What ophthalmological investigation is necessary to guide further management?
4 What medical treatment should be started and what are the potential complications of this treatment?
5 What are the complications of the underlying condition and how would you treat these?

Submitted by A J Dawson, C Rowland-Hill, and S L Atkin
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STATISTICAL QUESTION
Sample size calculations I

A randomised, double blind, placebo controlled trial investigated whether fluvastatin reduced major adverse cardiac events in patients who had undergone successful percutaneous coronary intervention (with or without stenting). The primary outcome was the occurrence of major adverse cardiac events—defined as cardiac death, non-fatal myocardial infarction, or a reintervention procedure—within three years.

To calculate the sample size needed to compare fluvastatin with placebo, it was assumed that the proportion of patients having major adverse cardiac events at three years without treatment would be 25%. For fluvastatin to be considered clinically superior to placebo, it would be necessary to demonstrate a relative improvement of 25%, with only 18.75% of patients having major adverse cardiac events at three years. To do so, a total sample size of 1828 patients (914 in each treatment arm) would be required to achieve 90% power using a two sided hypothesis test and critical level of significance of 0.05. A total of 1677 patients were subsequently recruited to the trial.

Which of the following, if any, are true?

a) The specified difference in major adverse cardiac events between fluvastatin and placebo is called the smallest effect of clinical interest
b) Power is the probability of detecting the specified difference in major adverse cardiac events, if it exists in the population
c) If power was increased to 95%, the sample size would decrease
d) The maximum probability of a type I error was 0.05

Submitted by Philip Sedgwick
Cite this as: *BMJ* 2010;340:c3104

ON EXAMINATION QUIZ
Fractures

This week's quiz is on fractures and is taken from the OnExamination revision questions for the MRCS part 1 exam.

A 33 year old man is injured while riding a motorbike. He sustains a fracture of his tibial plafond. The orthopaedic registrar decides to provide initial stability by placing his ankle in a quadrilateral frame (external fixator frame). This consists of two pins being placed and then linked by rods. The first pin is placed in the proximal tibia and the second through the calcaneum in a medial to lateral direction. The site of entry of the calcenal pin is 2.5 cm superior and towards the toes away from the heel.

What nerve in this area could be damaged if the pin is incorrectly placed?

A Deep peroneal nerve
B Lateral plantar nerve
C Medial plantar nerve
D Superficial peroneal nerve
E Sural nerve

More questions on this topic are available from www.onexamination.com/endgames until midnight on Wednesday.