Deacon's Challenge

No 180 - Answer

It has been suggested that measurement of Calprotectin in faeces can be used to distinguish between Inflammatory Bowel Disease (IBD) and Irritable Bowel Syndrome (IBS). Diagnosis of IBD requires colonoscopy, diagnosis of IBS does not.

At present, all patients referred to your local Gastroenterologists' clinic with either IBS or IBD undergo colonoscopy. They wish to restrict colonoscopy to patients with a faecal calprotectin >50 µg/g. Calculate the anticipated cost saving/patient of this strategy.

NB: At present, 48% of patients referred to the clinic are found to have IBD at colonoscopy.

Studies indicate a cut-off value of 50 µg/g faeces has a sensitivity of 99% and specificity of 74% for distinguishing between IBS and IBD in the out-patient setting.

The total cost of a faecal calprotectin assay has been estimated at £22.79. The cost of a colonoscopy is £750 (for the purposes of this question, you should ignore the possible costs of any complications arising from colonoscopy).

(Broadly based on NICE DG11; October 2013)

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Using the new strategy colonoscopy will only be performed on patients with a raised calprotectin which will comprise both true positives (TP) and false positives (FP).

Consider 100 patients. 48 of these will have IBD, 52 will not.

If the sensitivity of calprotectin is 99%:

$$TP = \frac{48 \times 99}{100} = 47.52$$

$$FN = 48 - 47.52 = 0.48$$

If the specificity of calprotectin is 74%:

$$TN = \frac{52 \times 74}{100} = 38.48$$

$$FP = 52 - 38.48 = 13.52$$

Number of patients requiring colonoscopy = TP + FP = 47.52 + 13.52 = 61.04

Therefore cost of colonoscopy = 61.04 x £750 = £45,780

Cost of calprotectin assay = 100 x £22.79 = £2,279

Therefore total cost of new strategy = £45,780 + £2,279 = £48,059

Cost if all patients have colonoscopy = 100 x £750 = £75,000

The cost saving is the difference between the two strategies:

Cost saving = £75,000 - £48,059 = £26,941 per 100 patients

Cost saving per patient = £26,941/100 = **£269** (3 sig figs)

However, this strategy is at the expense of missing 0.48 x100/48 = 1% of patients with IBD which will probably require colonoscopy at a later stage.

Question 181

An 8-day old baby was born at 39 weeks gestation weighing 3085 g. He developed an ischaemic encephalopathy and required ventilation. He subsequently became hyponatraemic.

You are provided with his plasma sodium concentrations. The paediatricians decide he requires intravenous sodium supplementation. Estimate his sodium deficit, and the infusion rate of 0.9% saline required to return his plasma sodium concentration to 140 mmol/L over 72 hours.

You should assume that the average healthy term infant has a total body water of approximately 80% body weight, divided equally between intra- and extra-cellular compartments, and a sodium requirement of 4 mmol/kg/day.

	16/3/15	22/3/15	23/3/15	23/3/15	24/3/15
	15:00	00:00	07:00	21:00	21.00
Sodium	136	139	133	121	115

His sodium intake between 22/3/15 and 24/3/15 was 8.5 mmol/24 hours (6.6 via IVI and 1.9 via milk).

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