PostScript

LETTERS

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Emergency management of diabetic ketoacidosis

I read with great interest the paper by Hardern and Quinn.[1] However, it seems that there is some misinterpretation of the quoted papers.

In the introduction, the authors write ''DKA is a potentially fatal metabolic disorder''. It would be useful to point out that it is only life threatening in its most severe stage: coma.[2] They summarise the pathogenesis of coma in DKA on page 212: ''Severe acidosis has adverse effects on many organs, espcially the brain ...''. Indeed, according to Alberti,[3] very low blood pH is the immediate cause of coma: the glycolytic enzyme phosphofructokinase is inactivated by decreasing pH and, thus, the glucose utilisation in brain cells is impaired.

On page 212, the authors write ''It may, therefore, seem appealing to give bicarbonate as treatment for the metabolic acidosis that occurs in DKA. There is no evidence to support this'' with quotations of Lutterman, Lever, Morris and Viallon. Morris and Viallon did not observe comatose patients. Lutterman has given sodium bicarbonate to four comatose patients, all recovered to full alertness. The same result has been observed by Lever in 27 patients with ''deep coma'' and he did not observe adverse reactions to this treatment. Where is there a published report on a similar number of comatose patients with DKA, with zero lethality, without sodium bicarbonate, and without increase of the low blood pH?

On the same page, they quote the paper of Hale: ''no metabolic benefits from bicarbonate administration''. However, in the group with bicarbonate administration, the blood pH increased within 120 minutes to 7.23, whereas in the group without bicarbonate it only increased to 7.12. In a comatose patient, such a difference can be life saving.

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NICE head injury guidelines: cost implication for a district general hospital (''six scans to six figures'')

This observational study aimed to determine the cost implication for a typical size district general hospital (DGH) adopting the recently published NICE head injury (HI) management guidelines.[1] The author reviewed the records of all patients (4688) attending York District Hospital emergency department (60 000 new patients/year) in April 2003 to identify those patients who had suffered a head injury (393). April was chosen because it represented an average month both for attendances and skull radiograph and CT head scan requests. Data were collected from a combination of the triage nurse assessment and the doctor's notes, followed by retrospective application of the NICE HI guidelines.

Adherence to the guidelines would have resulted in requests for 61 adult and 18 child CT head scans compared with the six actually conducted for trauma during this period. This is probably a conservative estimate. That patients were only placed in the ''need CT head'' group if a specific indication for a scan was recorded may account for why 20.1% HI patients would have been scanned compared with the NICE estimate of 29.3%.

NICE estimates that about 58% of HI patients in the UK have skull radiographs taken. The figure was 22.6% in this study. Local guidelines[2] were not followed in every case but it seems that projected savings from a reduction in skull radiographs may be less than NICE predicts. Similarly, only 2.3% of HI patients were admitted for observation compared with the NICE estimate of 14%. Persisting symptoms, intoxication, or lack of supervision would have prohibited discharge of any of the admitted cases after a ''normal'' CT scan. Of the patients meeting NICE CT head criteria, 75% attended out of hours, implying that on-call radiologists would be interpreting scans after midnight on most nights.

The Canadian CT head rule that the guidelines are adopted from excluded children.[3] However, NICE recommends application of guidelines to both adults and children the same, including scanning all patients who vomit more than once. It surprised the author that only 7 of 149 (3.5%) children vomited more than once after HI, most fulfilling CT head criteria on a dangerous mechanism of injury and witnessed loss of consciousness (table 1).

The commonest mode of injury was a fall (47.8%), followed by assault (23.7%), ''accident'' (20.4%), and road traffic accident (5.6%). This is generally representative of previous UK HI studies,[4] except that there were marginally fewer road traffic accidents in this cohort. This subgroup accounts for a greater proportion of moderate to severe HIs and may partly explain the comparatively low number of CT scans requested. It is the aetiological differences between the UK and Canadian populations[2] (11% assault, 43% road traffic accident) that have raised questions about the validity of applying the Canadian CT head rule guidelines to the UK population.

Based on NICE pricing[1] (skull radiograph £26, CT head £160), this study suggests that a typical DGH adopting NICE HI guidelines would have net increased imaging costs alone

Table 1 Criteria on which patients would have had a CT head scan performed if NICE head injury guidelines had been applied

	Adults	Children	Total
GCS<9 at any time	1	0	1
GCS<15 at two hours after injury	6	0	6
Open skull fracture	0	0	0
Depressed skull fracture	0	0	0
Vomiting more than once	15	7	22
Focal neurological deficit	3	0	3
Any sign of base of skull fracture	2	0	2
Seizure	4	0	4
Retrograde amnesia >30 min	3	1	4
Symptomatic HI re-attendees	4	0	4
Coagulopathy (+witnessed LOC or anterograde amnesia)	1	0	1
Age >64 years (+witnessed LOC or anterograde amnesia)	7	0	7
Dangerous mechanism of injury(+witnessed LOC or anterograde amnesia)	24	12	36
Total	70*	20*	90*

*Some patients met more than one criterion, therefore the total number of criteria exceeds the total number of CT scan requests.

of over £9000/month and £110 000/year. Admission costs may not change significantly. Allied to radiology shortages, this will probably prove prohibitive to full implementation of the guidelines in many areas.

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Cost effective approach for emergency department investigation of deep vein thrombosis

I read with interest the paper by Kilroy *et al*.[1] Wells' criteria of pretest probability (PTP) has recently been validated in a large randomised control trial[2] for excluding pulmonary embolism. Kilroy *et al*[1] admit that using PTP the risk stratification was successful, it was not quite as discriminatory as Wells' original data.

Wells' study[2] has important implications for practice because it shows that combination of a low PTP, and a negative D-diner test safely excluded pulmonary embolism in outpatients, obviating further investigations in 40% of patients.[2] However, the occurrence of deep vein thrombosis in up to 20% of patients with a ''high'' PTP score and negative D-dimer test emphasises the point that the D-dimer test cannot be used in isolation.[2]

SimpliRED D-dimer assay in the study by Kilroy *et al*[1] had a low sensitivity. All D-dimer assays differ and clinicians should know the diagnostic performance of the test used in their own institutions.

Compression ultrasonography is by no means a cheap investigation as the authors perceive.[1] Plethysmography can be used as an alternative investigation for the diagnosis of deep vein thrombosis. Digital photoplethysmography can be used as an useful cheap tool to exclude deep vein thrombosis safely in an emergency department, thus reducing pressure on the radiology department.[3] Table 1 shows the tesults of a study using computed strain gauge plethysmography.

Based on our experience we would like to conclude that we can fulfil our assumption of good practice by achieving a negative predictive value of 100% by combining PTP, a modern D-dimer test, and either digital photoplethysmography or computed strain gauge plethysmography to exclude deep vein thrombosis in an emergency department. However, we believe further randomised control trials are necessary to test this hypothesis.

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3 **Tan YK**, da Silva AF. Digital photoplethysmography in the diagnosis of suspected lower limb DVT; Is it useful? *Eur J Endovasc Surg* 1999;**18**:71–9.

Table 1 Results of ultrasonography (US) and computed strain gauge plethysmography (CSGP) on all 23 D-dimer positive patients with suspected deep vein thrombosis

Results	Number (%)	US	CSGP
True negative	16(69)	−ve	−ve
True positive	1(4)	+ve	+ve
False positive	4(17)	−ve	+ve
False negative	2(8)	−ve	+ve

BOOK REVIEW

Major incident management system

T J Hodgetts, C Porter. (Pp 94; £30.00). BMJ Books, London, 2002. ISBN 0-7279-1614-9

This book will become an essential companion to all those individuals, doctors, and paramedics, who are involved in the immediate management of a major incident at scene. To those not directly involved it provides a valuable insight into its basic theory.

Presented in a high quality loose leaf binder, the pages are laminated and all sections are colour coded, it is the authors' intention that the book is taken to and used at the scene of an incident. As clearly stated on the front cover this is an ''aide memoire'' and therefore there is little in the way of explanation, some prior knowledge of major incident management is therefore required. The book is written in a clear, didactic style with the salient points arranged in ''bullet point'' fashion. The diagrams are colourful, clear, and informative although several of the flow charts appeared a little too busy.

The sections follow in logical order from the actions of the first ambulance crew on scene, the setting up of command centres, modes of communication and terminology, triage and treatment, and finally scene evacuation. Much of the written information is augmented by the clever use of symbols placed in the adjacent margin thus making the information rapidly accessible. The final two sections of the book provide action cards for all ambulance and medical personnel designed to be distributed at scene, again this is given in a clear, succinct fashion with diagrams illustrating the hierarchy of command.

Clearly this book is aimed at the ambulance service and those doctors acting as medical incident officers and although does not have an impact directly on a hospital's major incident procedure, it is useful in understanding what happens before the patient's arrival at hospital.

C J Blakeley

CORRECTION

An authors' error occurred in this article by Dr Jones and others (2003;**20**:453–8)

We wish to clarify the following points in relation to the section on diagnostic sample size calculations.

(1) The method described is used to calculate the sample size required to estimate an expected level of sensitivity or specificity with a predefined degree of precision. If the researcher wishes to ensure that a particular test has a sensitivity or specificity higher than a predetermined level then an alternative method should be used.[1]

(2) The language used in the section on diagnostic tests may be misleading. The method described should use ''expected'' levels of sensitivity or specificity (SN or SP) to calculate the sample size, rather than the ''lowest acceptable'' level.

(3) The method described should not be used if there are fewer than five subjects in any of the cells of the 2×2 table.

We would like to sincerely thank Steve Goodacre for his assistance in recognising the problem and for his assistance in resolving it.

Reference

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