JOURNAL SCAN

Journal scan

Edited by Jonathan Wyatt; this scan coordinated by Paul Gaffney and Kieran Cunningham

Short-term prognosis after emergency department diagnosis of TIA

S C Johnston, D R Gress, W S Browner, *et al*
JAMA 2000;**284**:2901–6

Objective—To determine the short-term risk of stroke and other adverse events after emergency department diagnosis of transient ischaemic attack (TIA).

Methods—A 12 month prospective cohort study was performed with patients identified from 16 hospitals in northern California. Patients were followed up for 90 days—the primary outcome measure was stroke during this period. Other events (death, recurrent TIA and other cardiovascular events) were also noted.

Results—Of 1707 patients with TIA, 180 suffered a stroke, 50% of these occurring within the first two days. Five factors were independently associated with stroke: age more than 60 years (odds ratio 1.8; 95% CI 1.1, 2.7), diabetes mellitus (odds ratio 2.0; 95% CI 1.4, 2.9), symptom duration more than 10 minutes (odds ratio 2.3; 95% CI 1.3, 4.2), weakness (odds ratio 1.9; 95% CI 1.4, 2.6) and speech impairment (odds ratio 1.5; 95% CI 1.1, 2.1). Stroke or other adverse event occurred in 25.1%, including 44 admissions for cardiovascular events (2.6%), 45 deaths (2.6%) and 216 recurrent TIAs (12.7%).

Conclusions—The short-term risk of stroke and other adverse events is substantial following the emergency department diagnosis of TIA. The presence of certain risk factors may help to identify patients who would benefit from urgent investigation.

Comments—The diagnosis of TIA can be difficult to make and it is recognised that among neurologists there is low interobserver agreement in making this diagnosis. Of the patients enrolled in this study, the accuracy of diagnosis was estimated to be 94%, based upon independent neurological review. This suggests that other conditions, such as syncope or seizure, may have prompted a number of these patients to attend the emergency department. The independent risk factors will need to be prospectively validated. As the authors themselves recognise, this observational study can provide no reliable data on the benefits of given treatments for TIAs.

Accident and Emergency Department, Royal Cornwall Hospital, Truro, Cornwall TR1 3LJ, UK
J P Wyatt

Accident and Emergency Medicine, St James's University Hospital, Leeds
P Gaffney

Paediatric Department, Whiston Hospital, Prescot, Merseyside
K Cunningham

Correspondence to:
Mr Wyatt, Associate Editor
(jonathan.wyatt@rcht.swest.nhs.uk)

Risk factors for cerebral edema in children with diabetic ketoacidosis

N Glaser, P Barnett, I McCaslin, *et al*
N Engl J Med 2001;**344**:264–9

Background—Cerebral oedema is responsible for up to 60% of diabetes related deaths in childhood.

Objective—The investigators set out to identify risk factors for cerebral oedema in children with diabetic ketoacidosis (DKA).

Methods—A case-control, 10 centre study was performed to evaluate the association between cerebral oedema and demographic characteristics, initial biochemical profile, therapeutic interventions and changes in the biochemical values during treatment. Two comparison groups of children with DKA, but no cerebral oedema were identified—one group was randomly selected, the other was matched.

Results—Of 6977 admissions with DKA over a 15 year period, 61 children (0.9%) were identified in whom cerebral oedema developed (of these 21% died and 21% had permanent neurological sequelae). A total of 181 randomly selected children were in the first comparison group and 174 "matched" children (with respect to age at presentation, onset of diabetes, serum glucose, venous pH at presentation) in the second comparison group. A comparison with the random control group showed that cerebral oedema was significantly associated with lower initial partial pressures of carbon dioxide and higher initial serum urea nitrogen. A comparison with the matched group revealed the same findings. After adjustment for covariates, only treatment with bicarbonate was associated with cerebral oedema.

Conclusions—The authors concluded that children with DKA are at increased risk for cerebral oedema if at diagnosis arterial carbon dioxide pressures are low, serum urea nitrogen is high or if they are treated with bicarbonate.

Comments—Cerebral oedema exists in a subclinical form and therefore some milder cases may have been overlooked in this study. The results confirm that cerebral oedema can become evident even before treatment is started, although it usually develops within hours of starting treatment. This implicates factors in addition to iatrogenic ones as being important in the pathogenesis of cerebral oedema. Interestingly, iatrogenic factors such as high rates of fluid administration, which have previously been implicated in the pathogenesis of DKA associated cerebral oedema, were not associated with an increased risk in this study. Unfortunately, it is not clear exactly why bicarbonate was used, making it difficult

to understand the true significance of their findings in relation to its administration.

Non-invasive pressure support ventilation versus conventional oxygen therapy in acute cardiogenic pulmonary oedema: a randomised trial

J Masip, A J Betbesé, J Páez, *et al*
Lancet 2000;**356**:2126–32

Objective—To assess the efficacy of non-invasive pressure support ventilation (NIPSV) in acute cardiogenic pulmonary oedema, compared with conventional oxygen therapy.

Methods—A controlled prospective randomised study was carried out over 33 months comparing NIPSV with conventional oxygen therapy. Mild cases of acute cardiogenic pulmonary oedema were excluded, as were patients with cardiogenic shock, severe airflow obstruction, severe chronic renal failure, myocardial infarction needing thrombolysis and those requiring immediate intubation. NIPSV was supplied via a facemask with PEEP of 5 cm water. Physiological measurements were taken every five minutes during the first two hours and then at three, four and ten hours. The need for intubation (primary end point) and the time to recovery (defined as clinical improvement with oxygen saturation >96% and respiratory rate <30/min) were specifically looked at. A power calculation was performed, but blinding was not possible. Results were analysed on an intention to treat basis.

Results—40 patients were randomised, 20 being assigned to each group. Three patients were withdrawn on the basis of clinical findings or chest radiography results. Endotracheal intubation was necessary in one (5%) of 19 patients assigned NIPSV and in six (33%) of 18 controls (p=0.037). Resolution time was significantly shorter in the NIPSV group (p=0.002). NIPSV led to a rapid improvement in oxygenation in the first two hours. There were no differences in hospital length of stay or mortality.

Conclusions—The authors concluded that NIPSV is superior to conventional oxygen therapy in the management of acute severe cardiogenic pulmonary oedema.

Comments—The study was too small to detect any significant effect on length of stay and mortality. The design did not compare NIPSV with CPAP, which has documented benefits in the management of acute cardiogenic pulmonary oedema—the direction of future studies is clear. The short duration of NIPSV probably explains why previously reported side effects (eye irritation and facial skin necrosis) did not feature in this study. The role of NIPSV may be limited by its intrusive nature.

Diagnostic accuracy of a bedside D-dimer assay and alveolar dead-space measurement for rapid exclusion of pulmonary embolism

J A Kline, E G Israel, E A Michelson, *et al*
JAMA 2001;**285**:761–8

Objective—To determine if the combination of a normal D-dimer assay and a normal alveolar dead space fraction (alveolar dead space volume/tidal volume <20%) can exclude pulmonary embolism (PE) in emergency department patients.

Methods—A prospective non-interventional multicentre study involved six US emergency departments. Study data were obtained prior to standard testing for PE. Blinded observers interpreted imaging studies. The main outcome measures were sensitivity and specificity for PE with a positive test defined as having either alveolar dead space fraction or D-dimer assay results abnormal.

Results—A total of 380 patients aged more than 18 years who were haemodynamically stable were enrolled (representing 43% of eligible patients). In total, 64 patients were diagnosed as having a PE, giving a sensitivity of 98.4% (95% CI 91.6%, 100%). PE was excluded in 316 patients giving a specificity of 51.6% (95% CI 46.1%, 57.1%). The posterior probability of PE with normal results on both test was 0.75% (95% CI 0%, 3.4%).

Conclusions—The authors concluded that the combination of a normal D-dimer assay plus a normal alveolar dead space fraction was associated with a probability of PE less than 1%.

Comments—Bedside D-dimer assays have considerable potential, albeit as yet unrealised, in the investigation of suspected deep venous thrombosis and PE.[1] This study attempts to realise some of this potential. However, only 28.9% of potentially eligible patients were enrolled in this study, raising concerns about selection bias. The authors attempt to "play down" the effect of this by detailing characteristics of a random sample of the patients who were not enrolled. While the two groups seemed broadly similar, there was a higher prevalence of PE in the enrolled group. Also, the follow up criteria may have led to over-diagnosis of PE because, for example, patients were classified as having PE if they were diagnosed with deep venous thrombosis during this period even if PE was not diagnosed. Arguments regarding rapid exclusion of PE seem set to continue.

1 Jones S, Harrison M. SimpliRed and diagnosis of deep venous thrombosis. *Emerg Med J* 2001;**18**:120–2.

Determining the minimum clinically significant difference in Visual Analogue Pain Scores for children

C V Powell, A M Kelly, A Williams
Ann Emerg Med 2001;**37**:28–31

Background—Good pain management is one of the most important benchmarks of a good emergency service. The use of a horizontal 100 mm visual analogue scale (VAS) is well validated in the assessment of pain severity and pain relief. There is a large body of literature on pain management where studies classically show a difference between VAS pain scores for various clinical interventions. However, very few of these have addressed the issue of the clinical significance of the particular score differences they have demonstrated.

Objectives—To determine the amount of change in pain severity, as measured by a VAS,

that constitutes the minimum clinically significant difference in older children.

Methods—Prospective observational study conducted in a single urban paediatric emergency department. A convenience sample of children aged between 8 and 15 years who presented with acute pain was enrolled. Patients were asked on presentation to indicate their current pain severity with a single mark through a standard 100 mm VAS. At 20 minute intervals thereafter, they were asked to repeat this procedure on another VAS of the same type (without reference to the previous measurement). Simultaneously, they were also asked to give a verbal categoric rating of their pain as "heaps better", "a bit better", "much the same", "a bit worse", or "heaps worse". The maximum number of comparisons recorded per patient was three. The minimum clinically significant change in VAS pain score was defined as the mean difference between current and preceding scores when the patient noted "a bit worse" or "a bit better" pain.

Results—In total, 73 children were enrolled. There were 103 VAS pain score comparisons where the pain was categorised as "a bit worse" or "a bit better". The mean difference between VAS pain scores in these 103 contrasts was 10 mm (95% CI 7 mm, 12 mm).

Conclusions—The authors concluded that for children aged 8 to 15 years, the minimum clinically significant change in patient pain severity as measured on a 100 mm VAS is 10 mm (95% CI 7 mm, 12mm). Studies of pain perception that report less than a 10 mm change in pain severity, although statistically significant, are unlikely to be of any clinical importance.

Comments—This paper investigates an important aspect of emergency medicine pain research that is often neglected. Too often the results of VAS pain score differences have been presented without being put into a clinical perspective. The methodology seems sound and the results valid. It is the first study of its kind in a paediatric age group, and replicates the findings in adults—namely that the minimum clinically significant difference in VAS pain scores is of the order of 10 mm. Although this magnitude of VAS pain score change has been consistent in the few emergency department studies done so far, it will be important to confirm this in other populations and settings. As only acute pain was studied, the results cannot be extrapolated to the patient with chronic pain. Another side issue to be clarified is the relevance of the direction of pain change, as increases in pain have smaller corresponding changes in VAS pain score differences than reductions in pain.

Hypocalcemia in severe meningococcal infections

P B Baines, A P J Thomson, W D Fraser, *et al*
Arch Dis Child 2000;**83**:510–13

This prospective study investigated the incidence of hypocalcaemia in a cohort of critically ill children with meningococcal disease. A total of 70 of 80 such patients in an intensive care setting had assays performed for total and ionised calcium, parathormone and calcitonin. Total and ionised calcium concentrations were found to be low in 70%. Parathormone levels were raised in some, but not all children with low ionised calcium levels. There seemed to be a strong relation between low calcium concentrations (ionised and total) and disease severity. The effect of attempting to correct the hypocalcaemia was not investigated.

Misplaced endotracheal tubes by paramedics in an urban Emergency Medical Services System

S H Katz, J L Falk
Ann Emerg Med 2001;**37**:32–7

This prospective observational study from Florida aimed to assess the position of tracheal tubes in patients who were intubated by paramedics in a prehospital setting. Emergency physicians used a combination of auscultation, capnography and direct laryngoscopy to assess tube position on arrival at hospital. The results were startling and worrying. Of 108 consecutive intubated patients, 27 (25%) had improperly placed tubes. The majority (66%) of these misplaced tubes lay in the oesophagus.

Interestingly, five of the nine patients whose tubes were misplaced in the hypopharynx had evidence of end tidal CO_2 on arrival at the emergency department. In the prehospital setting, such monitoring may provide false reassurance regarding tube placement.

2576 ultrasounds for blunt abdominal trauma

M O Dolich, M G McKenney, J E Varela, *et al*
J Trauma 2001;**50**:108–12

The authors used the results from a 30 month retrospective analysis of their US level 1 trauma centre to promote the more widespread use of ultrasound as a means of evaluating emergency department patients with blunt abdominal trauma. Ultrasound was performed on an impressively large number of patients (2576, including children), of whom 311 had positive scans (including 39 false positives). Forty three patients (1.7%) were considered to have had false negative ultrasound scans, 10 subsequently requiring laparotomy. The considerable experience of the hospital studied, combined with its immediate availability of ultrasound trained radiologists, do limit the extent to which the findings of this study may be generally applied.

Early administration of vapreotide for variceal bleeding in patients with cirrhosis

P Calès, C Masliah, B Bernard, *et al*
N Engl J Med 2001;**344**:23–8

The effects of a somatostatin analogue (vapreotide) were studied in patients with cirrhosis before endoscopic treatment for variceal associated upper gastrointestinal bleeding. Altogether 227 adult patients were randomised throughout 22 centres to receive early intravenous vapreotide or placebo, together with subsequent endoscopic treatment. After exclusions, there were 98 patients in each group. At endoscopy, active bleeding was significantly less in the

treatment group (p=0.03). During the five day infusion, control of bleeding was achieved in significantly more of the treatment group (66% versus 50%, p=0.02). The treatment group needed significantly fewer blood transfusions and the infusion was well tolerated. However, the mortality rate at 42 days was similar. The authors advocate the combination of early vapreotide followed by endoscopic treatment as being more effective than endoscopic treatment alone in controlling acute variceal bleeding.

Fomepizole for the treatment of methanol poisoning
J Brent, K McMartin, S Phillips, *et al*
N Engl J Med 200;**344**:424–9

A way of tackling the difficulty of introducing new treatments for relatively rare conditions is neatly demonstrated by this multicentre prospective trial of consecutive patients presenting with methanol poisoning. The administration of a potent inhibitor of alcohol dehydrogenase in the form of intravenous fomepizole (4-methylpyrazole) to 11 patients with methanol poisoning produced encouraging results. The authors acknowledge that the rarity of methanol poisoning is likely to prevent any large meaningful trials comparing fomepizole with standard current treatment (ethanol). However, based upon the data presented in this study, fomepizole seems to be the way ahead.