JOURNAL SCAN

Journal scan

Edited by Jim Wardrope; this scan coordinated by Sean Rothwell

Intra-arterial prourokinase for acute ischemic stroke. The PROACT II study: a randomized controlled trial

A Furlan, R Higashida, L Wechsler, *et al*
JAMA 1999;282:2003–11

Randomised, controlled, multicentre, open label trial with blinded follow up determining the clinical efficacy of intra-arterial prourokinase in patients with acute stroke caused by occlusion of the middle cerebral artery. Only those patients for whom treatment could be initiated within six hours of the onset of symptoms were included. A total of 180 patients were recruited, all of whom passed computed tomography (CT) and cerebral angiography criteria, and were randomised to receive either intra-arterial prourokinase and intravenous heparin or intravenous heparin alone. A second angiogram was performed at two hours and CT scans were performed at baseline, 24 hours and 7 to 10 days after initial treatment. The primary outcome, defined by a modified Rankin score (a score of disability), was the proportion of patients with slight or no neurological disability at 90 days. Secondary outcomes included MCA recanalisation, frequency of intracranial haemorrhage and mortality.

Results showed better neurological outcome in the treatment group with 40% of prourokinase patients and 25% of controls having a modified Rankin score of 2 or less at 90 days. Intracranial haemorrhage with neurological deterioration occurred in 10% of prourokinase patients and 2% of controls, but overall mortality was essentially equal, with 25% and 27% in the respective groups.

Critique—There is a great deal of interest in the role of thrombolysis in acute ischaemic stroke. The evidence so far seems to indicate that neurological outcome can be improved if the treatment is given early but with a real increased risk of intracranial haemorrhage. Intravenous thrombolysis seems to have benefit only if given within three hours of onset of symptoms. The PROACT II trial achieved its goal of demonstrating the possibility of extending the therapeutic window to six hours by the use of intra-arterial injection.

This study screened over 12 000 stroke patients to leave a study population of 180. A total of 4000 were excluded as longer than six hours had elapsed since onset of symptoms. The great exclusion rate does question the utility of this treatment even in the USA where

there is much easier access to cerebral angiography expertise. It would not be practical in the UK. The benefits, even in this trial remain marginal against a background of much increased risk of significant intra-cranial bleeding. This is an area where research will continue but there is not enough present evidence to recommend widespread use of thrombolysis in stroke.

Intramuscular ketamine for pediatric sedation in the emergency department: safety profile in 1,022 cases

S M Green, A G Rothrock, A L Lynch, *et al*
Ann Emerg Med 1998;31:688–97

Consecutive case series of 1022 children aged 15 years or younger who were given intramuscular ketamine (4 mg/kg) in the emergency department of a university medical centre and an associated county hospital. Treating physicians followed a detailed protocol and were asked to complete a data form subsequent to the sedation. The data forms were completed in only 42% of cases. Transient airway complications occurred in 1.4%, emesis in 6.7%, mild recovery agitation in 17.6%, and moderate to severe agitation in 1.6% of cases. Adequate sedation was achieved in 98% of patients and median time to discharge was 110 minutes for a single dose of 4 mg/kg ketamine. No child required hospitalisation for complications caused by ketamine administration.

Comment—This is a huge and very honest study examining the practical implications and risks of one solution to this common problem and should be essential reading for anyone using this technique. This dose of ketamine is obviously effective but higher than used in UK studies. There were significant numbers of side effects, most were minor but some sounded very worrying. On the other hand the use of ketamine allowed some life threatening situations to be effectively managed. It is clear that this technique is probably safe with experienced personnel who are used to dealing with airway problems in children. However, the technique needs good monitoring and resuscitation facilities and a level of experience that is not always available in present UK accident and emergency departments. The paper also includes a number of excellent references to the out of hospital use of ketamine.

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Primary care outcomes in patients treated by nurse practitioners or physicians. A randomized trial

M O Mundinger, R L Kane, E R Lenz, *et al*
JAMA 2000;283:59–68

Aims—This study sought to compare the outcomes of patients randomly assigned to nurse practitioners or physicians for primary care follow up after an initial emergency department visit.

Design and methods—Adult patients were recruited from one urgent care centre and two emergency departments. The population served by these medical centres comprised mainly of families from the Dominican Republic who were eligible for Medicaid. Those patients with previous diagnoses of asthma, diabetes, or hypertension, or all three, were oversampled to create a cohort more suitable for primary care impact. Patients were then randomised to either an exclusively nurse practitioner practice or physician practice. The patients subsequently became part of those practices' panel, and all further management was arranged through that site. At the time of recruitment, patients completed a Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) and provided demographic information. After the initial primary care attendance they were contacted to complete a satisfaction questionnaire. Six months later the cohort was contacted again. On this occasion the SF-36 and satisfaction questionnaires were repeated and additional questions were asked about health care utilisation. For those patients with asthma, diabetes or hypertension, physiological data were also collected. These consisted of blood pressure, peak flow and glycosylated haemoglobin measurements. Health service utilisation of the assigned practice and all other medical centre sites was obtained for the period from six months before recruitment to one year afterwards.

Results and analysis—A total of 1981 patients were randomised, 1181 to the nurse practitioner and 800 to the physician practice. A total of 1316 kept their initial primary care appointment and were thus considered enrolled in the study. Analysis of health care utilisation, baseline patient details and SF-36 scores of the patients who did not keep their appointment showed no statistical difference between those assigned to the nurse practitioners and the physician group. There was a difference in retention rates, with 68.2% for the nurse practitioner patients and 63.8% for the physician patients. Initial satisfaction questionnaires were completed in 90.3% of the enrolled cohort, and six month interviews in 79% of the group. There were no significant differences at six months and one year in the frequency of primary care visits, need for specialist referral, emergency room visits or emergency admission to hospital. "Hard" markers of chronic disease control in asthma, diabetes and hypertension showed no significant difference between the groups except for a slightly lower diastolic blood pressure in the nurse practitioner patients (82 mm Hg *v* 85 mm Hg). There was no difference in "satisfac-

tion" scores between the groups after the initial primary care visit, and at six months the scores were again similar, except in the "provider attributes" score, in which the physician group scored slightly higher (4.22 *v* 4.12 out of 5). The health status of the total cohort improved from baseline to six month follow up, with no significant difference between nurse practitioner and physician patients in scale scores. **Critique**—This was an original study comparing the primary care outcomes of patients treated by either nurse practitioners or physicians. The trial was randomised and recruited a large number of patients. The nurse practitioners and the physicians had similar roles and responsibilities. The assessment of primary care outcome is a difficult task but the authors used a number of outcomes including number of primary care, specialist care, emergency room visits and hospital admissions along with "hard markers" of the control of chronic disease such as peak expiratory flow rate, glycosylated haemoglobin and blood pressure. They also used a battery of questionnaires to assess health status and patient satisfaction.

There were several potential sources of error in the trial design. The most important was in the population sample. The cohort consisted of a specific group of people, namely those from the Dominican Republic, who spoke predominantly Spanish. The authors pointed out that these people had frequently changing addresses, changing eligibility for Medicaid and frequent extended trips out of the country. There are two issues with the use of this population as the study sample that need to be discussed. Firstly, the language spoken in the primary care consultations was said to be Spanish in approximately 80% of interviews. The practitioners and physicians apparently had at least limited knowledge of Spanish, with some being fluent or bilingual. The differences in the grasp of Spanish between different nurse practitioners and physicians cannot be dismissed. In a study whose outcomes included satisfaction and self reported health status, a language barrier during interviews with the patient would certainly be a confounding element. Secondly, choosing a sample of patients who may have recently moved to the country is likely to affect patients' expectations of medical care. A patient from the Dominican Republic may not share the same ideas of satisfaction regarding health care as a patient from New York City, for example. It is difficult to extrapolate the results of this study to the general population of the United States or United Kingdom.

Another confounding issue lies in the different assignment ratios. Initially the ratio was 2:1, with more patients assigned to the nurse practitioner clinic because it had only recently opened, and then later the ratio was 1:1. The authors discuss the statistical correction of this problem, but the possibility of skewed results must still remain. Additionally, the screening criteria were not explained in detail. The study stated that those patients with a diagnosis of asthma, diabetes and/or hypertension were oversampled. It also claims to have recruited patients consecutively from the medical centre

and there is no description of how this "oversampling" was achieved.

Two more factors need to be considered when interpreting the results. The researchers conducting the follow up interviews were not blinded to each patient's primary care modality and neither were the providers of that care. There was also a large proportion of patients lost to follow up when it is considered that 1981 patients were initially randomised and only 1040 completed the six month interview.

In conclusion, the findings of this trial support previous studies in the outcomes of nurse practitioner care compared with care by doctors. However, there are several serious failures in the experimental design and execution that limit the generalisability of the results. The results are also difficult to extrapolate to the current use of nurse practitioners in the emergency department setting.

Avoiding pitfalls in the diagnosis of subarachnoid hemorrhage

J A Edlow, L R Caplan

N Engl J Med 2000;342:29–36

Excellent, concise review of the problems associated with subarachnoid haemorrhage diagnosis. The article is focused on the broad spectrum of clinical presentation, including the importance of warning headaches, and the limitations of computed tomography and lumbar puncture results.

This article should be read by everyone assessing headache in your department.

Clinical decision making based on venous versus capillary blood gas values in the well-perfused child

D McGillivray, F M Ducharme, Y Charron, *et al*
Ann Emerg Med 1999;34:58–63

This study aimed to compare venous and capillary blood gas values in acutely ill patients aged 1 month to 18 years. It also examined whether the source of the sample influenced interpretation and subsequent management decisions.

Venous and capillary gas values showed a strong linear relation for pH and Pco_2 but not for Po_2 . Two paediatric intensivists were asked to interpret the results and make management decisions regarding the need for intubation, NaHCO_3 administration or changing the minute ventilation. Their opinions revealed good intraobserver concordance. It did highlight the correlation between venous and capillary gas values and the utility of the venous gas sample in the management of well perfused acutely ill paediatric patients.

An economic analysis of an aggressive diagnostic strategy with single photon emission computed tomography myocardial perfusion imaging and early exercise stress testing in emergency department patients who present with chest pain but nondiagnostic electrocardiograms: results from a randomized trial

S A Stowers, E L Eisenstein, F J Whackers, *et al*
Ann Emerg Med 2000;35:17–25

This was a randomised trial of 46 patients assessing the overall clinical outcomes and cost of care when SPECT imaging and early exercise stress testing are routinely used for intermediate risk patients with chest pain. Inclusion criteria consisted of ongoing chest pain for less than 12 hours, no acute ST segment increase or depression, and two or more designated risk factors. In the conventional care group the treating physician was blinded to the SPECT result while in the perfusion study-guided arm the managing physician was given the results of the SPECT study. The results demonstrated the patients whose physician was given the results of the screening tests spent less time in hospital and underwent fewer cardiac catheterisations but having similar outcomes to the blinded group. The limitations of the trial included the fact that there were only two hospitals participating and the inclusion criteria of ongoing chest pain, which contributed to having only a small number of patients in the study. Although many emergency departments do not have access to these investigations, it examined other strategies in assessing intermediate risk chest pain patients.

The limping child: epidemiology, assessment and outcome

S U Fischer, T F Beattie

J Bone Joint Surg Br 1999;81-B:1029–34

Prospective study of 244 children presenting to the emergency department with a history of atraumatic limp. The children satisfying the inclusion criteria were assigned to a specific management protocol and treated accordingly. The medical notes of those enrolled in the study were then reviewed at 18 to 21 months after initial presentation. The protocol consisted initially of axillary temperature, FBC and erythrocyte sedimentation rate. If a hip problem was suspected clinically, ultrasonography was performed. Plain radiographs of the suspected anatomical site were obtained if an orthopaedic problem was suspected or if the ultrasound was negative. The child was then assigned a working diagnosis and treated accordingly. Using this protocol, there were no major diagnostic difficulties and more than 75% of patients were treated entirely in the emergency department. This was an informative assessment of a simple approach to a common paediatric problem seen in the emergency department.

A stab in the dark! Are you ready to perform needle cricothyroidotomy?

P Davies

Injury 1999;30:659–62

Telephone survey of 184 accident and emergency departments in Great Britain assessing medical staff knowledge and accessibility of equipment for needle cricothyroidotomy. Only 45% of doctors correctly identified the essential steps in the procedure and 47% of departments had made provision for immediate use of needle cricothyroidotomy. Does everyone in your department know where to get the equipment and how to do this procedure?

Troponin-I, myoglobin, and mass concentration of creatine kinase-MB in acute myocardial infarction

A Chiu, W K Chan, S H Cheng, *et al*

Q J Med 1999;92:711–18

Prospective study of less than 100 patients measuring creatine kinase-MB (CKMB) (mass), myoglobin and troponin-I at various intervals after onset of chest pain in those patients with suspected acute myocardial infarction (AMI). Only the results of patients with a diagnosis of AMI by WHO criteria were included in the study, a total of 104 in all. This meant that the specificities of the various investigations could not be assessed. The results confirmed those of previous studies, with poor diagnostic sensitivities of all three modalities in the first four hours, CKMB mass slightly more sensitive than troponin-I at 4–8 hours. Both CKMB mass and troponin-I were 100% sensitive at 16–24 hours.

Diagnostic value of tachypnoea in pneumonia defined radiologically

M Palafox, H Guiscafre, H Reyes, *et al*

Arch Dis Child 2000;82:41–5

Study of 110 children less than 5 years old designed to evaluate the presence of tachypnoea as a diagnostic test for pneumonia. The changes in sensitivity and specificity with differing age, nutritional status and duration of disease were also analysed. Using a chest radiograph as the gold standard, tachypnoea was found to have a sensitivity of 74% and specificity of 67%.

Tachypnoea is a good predictor of hypoxia in acutely ill infants under 2 months

V T Rajesh, S Singhi, S Kataria

Arch Dis Child 2000;82:46–9

Study of 200 infants less than 2 months old evaluating the respiratory rate as an indicator of hypoxia. Hypoxia was defined as $\text{Sao}_2 < 90\%$ using a pulse oximeter. A respiratory rate $> 60/\text{min}$ was found to be a good predictor of hypoxia in infants less than 2 months old.

Midtarsal dislocations in children

K V Hosking, E B Hoffman

J Pediatr Orthop 1999;19:592–5

Review of four case reports of children withmidtarsal dislocations. This paper demonstrates that, although rare in children,midtarsal joint disruption needs to be considered if there aremidtarsal bone fractures.

Ultrasound therapy for calcific tendinitis of the shoulder

G R Ebenbichler, C B Erdogmus, K L Resch, *et al*

N Engl J Med 1999;340:1533–8

Randomised, double blind, placebo controlled trial examining the clinical effectiveness of pulsed ultrasound therapy for radiographically

dense calcific tendinitis of the shoulder. Ultrasound was shown to be clinically effective at the end of treatment but not at nine months.

Hidden threats: lead poisoning from unusual sources

T F Jones, W L Moore, A S Craig, *et al*

Paediatrics 1999;104:1223–5

Case reports of two unusual sources of lead exposure in children. One source was a bead from a necklace that was frequently in the mouth of its 2 year old owner. The other was an Asian powder called “surma” that had been applied daily to the eyelids of an 11 month old child. These cases underlined the importance of thorough investigation of any episodes of lead poisoning.

Current issues in managing sports-related concussion

M W Collins, M R Lovell, D B McKeag

JAMA 1999;282:964–70

The article highlights the lack of any good evidence on when sportsmen/women should return to play after an episode of concussion. It cites some evidence for a poorer outcome of athletes having a second concussive injury soon after the first. There are a number of different guidelines on the length of any compulsory period of rest after an episode of concussion. Recommendations were made for more formal neuropsychological evaluations of all those concussed in to improve assessment of cognitive function and further research and refine this area.

Risk factors for injury to women from domestic violence

D N Kyriacou, D Anglin, E Taliaferro, *et al*

N Engl J Med 1999;341:1892–8

Multicentre, case controlled study of socioeconomic and behavioural characteristics of women injured from domestic violence. Risk factors identified included those women who had less permanent relationships, abused alcohol with male partners who abuse alcohol or drugs, are unemployed and are former husbands or boyfriends of the women.

Predictive value of history and physical examination in patients with suspected ectopic pregnancy

R G Dart, B Kaplan, K Varaklis

Ann Emerg Med 1999;33:283–90

A prospective study of women presenting to an urban academic emergency department with a positive beta-HCG level and, either abdominal pain, or vaginal bleeding. The historical and examination findings were assessed for those factors predictive of the diagnosis of ectopic pregnancy. A classification and regression tree analysis revealed a number of findings that altered the risk of ectopic pregnancy, although none could exclude or confirm the diagnosis with a high degree of certainty.