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JOURNAL SCAN

Journal scan

Edited by Jim Wardrope; this scan coordinated by Gareth Quin

Usefulness of automated serial 12-lead ECG monitoring during the initial emergency department evaluation of patients with chest pain

FM Fesmire, RF Percy, JB Bardoner, *et al*
Annals of Emergency Medicine 1998;**31**:3–11

Overview—The initial electrocardiogram (ECG) is diagnostic in only 40–65% of patients with acute myocardial infarction and fewer than 10% of those with unstable angina. Given that the conventional ECG represents only 10 seconds of monitoring and ST segment instability is characteristic of acute coronary syndromes, continuous 12 lead ST segment monitoring with frequent automatic serial ECGs (SECGs) is being increasingly evaluated in the assessment of patients with chest pain. The principle aim of this study was to compare the usefulness of the SECG to the initial ECG in diagnosing cardiac ischaemia or injury in the emergency department.

Design—Prospective observational study at a university teaching hospital.

Methods—Patients who were subsequently admitted having had at least one hour of SECG monitoring were enrolled in the study. Initial ECG and SECG data were analysed according to stated criteria and described as diagnostic (for injury or ischaemia) or non-diagnostic.

Discharge diagnosis, in-hospital interventions, and life threatening complications were obtained from hospital records. Discharge diagnosis was defined as acute myocardial infarction, recent myocardial infarction, unstable angina (all three considered acute coronary syndromes), and non-acute coronary syndromes. Sensitivities and specificities for ECGs and SECGs were compared by McNemar's χ^2 test.

Results—1000 patients were enrolled in the study and underwent a mean of 128 minutes SECG monitoring: 204 patients had acute myocardial infarction, 295 had unstable angina, and 18 had recent myocardial infarction; 483 patients had a diagnosis of non-cardiac pain. SECG was diagnostic in 61.8% of patients with acute myocardial infarction compared with 45.6% for the initial ECG. This difference represents patients with new changes on SECG despite a non-diagnostic initial ECG; 61.8% of these patients received thrombolysis. A diagnostic SECG was more sensitive for acute myocardial infarction than a diagnostic initial ECG (68.1% *v* 55.4%) and more sensitive (34.2% *v* 27.5%) and specific (99.4% *v* 97.1%) for an acute coronary syndrome. The SECG showed injury or ischaemia in 11.9% of unstable angina patients. The corresponding figure for the initial ECG was 8.9%.

Conclusions—A diagnostic SECG is more sensitive for acute myocardial infarction and more sensitive and specific for acute coronary syndromes than initial ECG in the A&E evaluation of acute chest pain. A diagnostic SECG identifies high risk patients.

Critique—Given the limitations of single 12 lead ECGs in the A&E assessment of chest pain, this study evaluates a potentially useful diagnostic tool. The results suggest that SECGs are the superior investigation. However, the study has a number of limitations which may limit its applicability. An impressive finding is the greater sensitivity of SECG in detecting acute myocardial infarction—34 extra patients with acute myocardial infarction were detected and 21 of these had subsequent thrombolysis. What would have happened to the myocardial infarction patients in the absence of SECGs? Would they have had delayed or no thrombolysis or would the myocardial infarction have been diagnosed on a repeat ECG? It is a major limitation of this study that it is unable to answer these questions. The design of the study, in which all patients received both initial ECG and SECG, permits comparison of the tests but cannot relate their individual performance independently to patient outcome. Randomisation to one or other test would have provided a more meaningful result. An important aspect in evaluating any diagnostic test is its applicability to the population of interest. This study included only patients who were admitted. Accordingly, the results cannot be applied to the patients that often cause the most problems—those considered for discharge. Despite its performance in the diagnosis of acute myocardial infarction, the overall sensitivity of SECGs for an acute coronary syndrome was still very low (34.2%). SECGs were instituted a mean of 47.7 minutes after arrival in the A&E department and continued for a mean of 128 minutes. The times involved suggest that SECGs may be most useful in the context of a chest pain evaluation unit rather than in the current UK A&E context.

Quantitative systematic review of topically applied non-steroidal anti-inflammatory drugs

RA Moore, MR Tramer, D Carroll, *et al*
BMJ 1998;**316**:333–8

Overview—Despite their wide availability and reduced potential for systemic side effects than

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oral preparations, there is scepticism that topical non-steroidal preparations actually work. This systematic review was carried out to assess the efficacy and safety of topical non-steroidal drugs and to establish if some agents were superior to others.

Design—Quantitative systematic review of randomised controlled trials.

Inclusion criteria—The authors included randomised controlled trials comparing topical non-steroidal drugs with either placebo or active preparations in the management of acute or chronic conditions, where pain was an outcome.

Methods—Relevant trials were identified by searching three computerised databases, reviewing reference lists of articles and contacting pharmaceutical companies for published and unpublished work. Two authors screened the trials for inclusion. Each author independently scored each trial from 1 to 5 for quality of randomisation, blinding, and description of withdrawals. Numbers randomised and analysed, outcome (according to a defined standard), and local and systemic side effects were recorded for each trial. Efficacy data were analysed for homogeneity. For placebo controlled trials, data were pooled and relative risk or benefit and number needed to treat (NNT) calculated. Data were pooled for all trials and for studies of an individual drug for which there were at least three trials. Trials were also pooled on the basis of quality score and size of treatment group.

Results—86 reports were included (10 160 patients); 75% of placebo controlled trials had quality scores of 3 or more. In acute conditions, the pooled relative benefit over placebo was 1.7 (1.5 to 1.9) and the NNT was 3.9 (3.4 to 4.4)—that is you need to treat four patients for one to have a beneficial outcome. Analysis confined to trials with a quality score of three or more showed similar results. Smaller studies (fewer than 40 treated patients) produced a smaller (better) NNT of 2.6 (2.3 to 3.1). Ketoprofen, felbinac, ibuprofen, and piroxicam were superior to placebo. Indomethacin and benzydamine were no better than placebo. In chronic conditions, the pooled relative benefit over placebo was 2.0 (1.5 to 2.7) and the NNT was 3.1 (2.7 to 3.8). Side effects in acute and chronic conditions were rare and showed no difference between treatment and placebo groups. In the five studies comparing oral and topical non-steroidal anti-inflammatory drugs no statistically significant differences were demonstrated but the statistical power of the relevant studies was in question..

Conclusions—Topical non-steroidal agents are more effective than placebo for pain relief in acute and chronic conditions. Local and systemic side effects are rare. While there is no evidence for the superiority of one agent over the other, ketoprofen, felbinac, ibuprofen, and piroxicam are significantly better than placebo, while indomethacin and benzydamine are not.

Critique—When judged by published criteria for evaluating systematic reviews,[1 2] this study emerges as a well designed piece of work. The authors' clearly described search strategy was designed to reduce the likelihood that a relevant study was missed. Publication bias (only positive studies published) was addressed by contacting pharmaceutical companies, although only one of 12 companies made unpublished data available, a surprising reluctance that may lead to the study still being subject to publication bias. The researchers did not contact authors—another potential source of unpublished data. Inclusion criteria were clearly stated and randomisation of subjects was a minimum requirement. Selection and quality assessment of trials was undertaken by more than one author, although levels of agreement are not specified. Included trials were tested for, and displayed, homogeneity—that is, the treatment effect was in the same direction across all the trials. Studies showing discordant treatment effects may differ in some crucial aspect and pooling their results may be meaningless or misleading. The size of the treatment effect (NNT ranging from 3 to 5) is at the upper limit of what is usually considered an effective treatment (NNT 2 to 4).[3] The final appraisal hurdle for a systematic review is its applicability to individual patients. Relevant accident and emergency patients are likely to have acute conditions and contraindications to oral non-steroidal anti-inflammatory drugs. We may now prescribe topical preparations confident that we are offering more than an expensive massage cream. However, this review does not tell us how these agents compare with either their oral counterparts or conventional alternatives (for example compound paracetamol preparations) nor does it examine the cost-benefits of these agents. The results of this review may be more relevant to those with chronic disease in whom the avoidance of long term oral treatment may be desirable.

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The United Kingdom pre-hospital study of active compression-decompression resuscitation

J Nolan, G Smith, R Evans, *et al* and members of the UK ACD Study group
Resuscitation 1998;**37**:119–25

This paper suggests that the apparent haemodynamic advantages of active compression-decompression cardiopulmonary resuscitation (CPR) over conventional CPR do not translate into improved patient outcome. In a prospective, controlled trial comparing the two methods of CPR there was no difference in survival to intensive care unit admission, survival to hospital discharge, or neurological outcome in survivors between the two groups.

A comparison of noninvasive positive-pressure ventilation and conventional mechanical ventilation in patients with acute respiratory failure

M Antonelli, G Conti, M Rocco, *et al*
New England Journal of Medicine 1998; **339**:429–35

This prospective, randomised trial compared non-invasive positive pressure ventilation with

endotracheal intubation in the management of 64 patients who required mechanical ventilation for hypoxaemic acute respiratory failure. Non-invasive ventilation was as effective in improving gas exchange as conventional ventilation and resulted in fewer complications and shorter intensive care unit stays.

Intranasal midazolam for childhood seizures

E Lahat, M Goldman, J Barr, *et al*
Lancet 1998;**352**:620

This small observational study, published as a research letter, describes another possible route of drug administration in the control of childhood seizures. Midazolam solution 0.2 mg/kg dropped into both nostrils, controlled all but one seizure in 20 children aged 6 months to 16 years. The recalcitrant seizure failed to respond to intravenous diazepam, necessitating the use of intravenous phenytoin. No seizure recurred within 60 minutes. While the results appear impressive, a larger, randomised trial comparing intranasal midazolam with the conventional treatments would need to inform any change in practice.

The effect of rescuer fatigue on the quality of chest compressions

F Javier Ochoa, E Ramalle-Gomara, V Lisa, *et al*
Resuscitation 1998;**37**:149–52

This paper reports a large discrepancy between rescuers' subjective impression of the time at which fatigue affects the quality of their chest compressions and time at which that deterioration actually occurs. Despite a median interval of 186 seconds before rescuers reported an appreciable decrease in the quality of compressions, objective measurement using a skillmeter mannikin showed that the largest reduction in proportion of correct compressions occurred much sooner, falling from 79.7% in the first minute to 24.9% in the second.

"Clearance" of cervical spine injury in the obtunded patient

AS Lockey, R Handley, K Willet
Injury 1998;**29**:493–7

The authors surveyed 147 UK intensive care units and found considerable differences in their approaches to clearing the cervical spine obtunded patients. The authors identify the need for national guidelines and present a suggested protocol.

A comparison of nebulised budesonide, intramuscular dexamethasone, and placebo for moderately severe croup

DW Johnson, S Jacobson, PC Edney, *et al*
New England Journal of Medicine 1998;**339**:498–503

This double blind randomised controlled trial assessed the benefits of nebulised budesonide, intramuscular dexamethasone, or placebo in children with moderately severe croup. Post-treatment croup scores and rates of hospitalisation were significantly lower in the children treated with glucocorticoids. These results support the findings of previously reported smaller trials.

Calcium antagonists in patients with aneursymal subarachnoid haemorrhage. A systematic review

VL Feigin, GJE Rinkel, A Algra, *et al*
Neurology 1998;**50**:876–83

This systematic review of 10 randomised trials studying the effect of calcium antagonists within 10 days of aneurysmal subarachnoid haemorrhage found that nimodipine improved outcome at three months whereas nicardipine and AT877 (an intracellular calcium antagonist) did not. Overall, calcium antagonists reduced the proportion of ischaemic neurological deficit but no analysis is described for individual drugs. The study does not address the effect of time after haemorrhage on the efficacy of the drugs.

Spiral computed tomographic scanning and magnetic resonance angiography for the diagnosis of pulmonary embolism

PA Grenier, C Biegelman
Thorax 1998;**53**(suppl 2):S25–S31

This article reviews the emerging role of spiral computed tomographic angiography and magnetic resonance (MR) angiography in the diagnosis of pulmonary embolism. Spiral computed tomographic angiography is described as being as specific and more sensitive for pulmonary embolism as ventilation-perfusion scanning, while facilitating the diagnosis of other pathologies. The diagnostic performance of MR angiography is similar to conventional pulmonary angiography. MR is non-invasive and without radiation hazard.