LETTERS TO THE EDITOR

Acute myocardial infarction in patients with left bundle branch block

EDITOR,—We read with interest the paper about the electrocardiographic diagnosis of acute myocardial infarction (AMI) in patients with left bundle branch block (LBBB).[1] It emphasises the difficulties many have had with electrocardiogram (ECG) interpretation in this situation and explains clearly how to use the criteria of Sgarbossa *et al*.[2] It concludes that these criteria can be used to identify patients with LBBB and AMI.

It is essential that accident and emergency staff recognise this group of patients so that thrombolysis is delivered promptly. Shlipak *et al* reviewed patients presenting with LBBB and an acute cardiopulmonary history and assessed the usefulness of the Sgarbossa criteria.[3] They found that these criteria had a sensitivity of 10% and a specificity of 100%. Although an ECG that satisfies the criteria is almost certainly indicative of AMI, most (90%) patients with AMI will not meet the criteria. If thrombolytics were to be withheld unless the criteria were met, few patients in this high risk group would receive appropriate treatment.

Rather than relying on the Sgarbossa criteria, we feel it would be more appropriate to thrombolyse all patients (except those with contraindications) who have a history suggestive of AMI and LBBB. This policy is supported by the data of Shlipak *et al*.

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1 Brady WJ, Morris F. Electrocardiographic diagnosis of acute myocardial infarction in the presence of left bundle branch block. *J Accid Emerg Med* 1999;**16**:275–9.
2 Sgarbossa EB, Pinski SL, Barbagelata A, *et al.* Electrocardiographic diagnosis of evolving acute myocardial infarction in the presence of left bundle branch block. *N Engl J Med* 1996;**334**:481–7.
3 Shlipak MG, Lyons WL, Go AS, *et al*. Should the electrocardiogram be used to guide therapy for patients with left bundle branch block and suspected myocardial infarction? *JAMA* 1999; **281**:714–19.

The authors reply

We read with interest the comments of Shepherd and Hardern concerning our article. In large part, we agree with their thoughts. In our report, we stressed several points, including (1) the confounding effect of LBBB pattern on the electrocardiographic diagnosis of AMI; (2) the "normal" or expected findings of LBBB; and (3) additional electrocardiographic strategies to assist in identifying the patient with a potential AMI. Several electrocardiographic strategies are available to the clinician to assist in this endeavour such as comparison with old ECGs, examination of serial ECGs, and a sound understanding of the anticipated ST segment changes resulting from LBBB. These strategies may be supplemented by the clinical decision rule developed by Sgarbossa *et al*.[1]

Since our report was published, recent literature[2 3] has suggested that the Sgarbossa *et al* clinical prediction rule is less useful than reported. The first such investigation,[2] not noted by Shepherd and Hardern, which applied the Sgarbossa *et al* criteria to patients with chest pain and LBBB in the emergency department of a North American hospital, found much less promising results—a very low sensitivity coupled with poor interobserver reliability. And, as noted by Shepherd and Hardern, a second study[3] investigated the diagnostic and therapeutic impact of this criteria—none effectively distinguished the patients who had AMI from those patients with non-coronary diagnoses. The authors concluded that electrocardiographic criteria are poor predictors of AMI in LBBB situations and suggested that all patients suspected of AMI with LBBB should be considered for thrombolysis. As we stated, even if the Sgarbossa *et al* clinical prediction rule is found to be less useful in the objective evaluation of the ECG in the patient with LBBB, the report has merit—it has forced the clinician to review the ECG in detail and cast some degree of doubt on the widely taught belief that the ECG is invalidated in the search for AMI in the LBBB patient.

Traditional criteria for administration of thrombolytic agents in the AMI patient most often involves electrocardiographic ST segment elevation situated in an anatomic distribution; the presence of a new LBBB pattern represents another electrocardiographic criterion for such treatment. Shepherd and Hardern suggest that all appropriate patients with LBBB pattern—presumably regardless of its chronicity—and a history suggestive of AMI receive a thrombolytic agent. Such an approach is perhaps reasonable if the physician has a high suspicion of AMI and is comfortable initiating thrombolysis based solely on clinical information—in other words, an analysis of the patient's history and physical examination. Physicians, however, may be uncomfortable administering a thrombolytic agent under such circumstances; in fact, patients with electrocardiographic LBBB and AMI less often receive thrombolysis despite an increased risk of poor outcome[1 4] and the potential for significant benefit.[5] The clinician must realise that of all patients with chest pain, electrocardiographic LBBB pattern without obvious infarction, and clinically presumed AMI, only a minority will actually be experiencing acute myocardial infarction.[1] Treating all such patients with LBBB and presumed AMI will subject a number of non-infarction patients to the not insignificant risks and expense of thrombolysis. The chest pain patient with LBBB represents a significant challenge to the emergency practitioner. Currently, no single or combination diagnostic approach exists which will reliably reveal AMI in timely fashion. Our article was intended to review the appropriate principles of electrocardiography in the LBBB pattern in the hopes that the emergency practitioner would be better versed in interpretation of these complicated ECGs and therefore offer the AMI patient the correct treatment in rapid order.

1 Sgarbossa EB, Pinski SL, Barbagelata A, *et al.* Electrocardiographic diagnosis of evolving acute myocardial infarction in the presence of left bundle branch block. *N Engl J Med* 1996;**334**:481–7.
2 Shapiro NI, Fisher J, Zimmer GD, *et al.* Validation of electrocardiographic criteria for diagnosing acute myocardial infarction in the presence of left bundle branch block. *Acad Emerg Med* 1998;**5**:508(abstract).
3 Shlipak MG, Lyons WL, Go AS, *et al.* Should the electrocardiogram be used to guide therapy for patients with left bundle branch block and suspected acute myocardial infraction? *JAMA* 1999;**281**:714–19.
4 Rogers WJ, Bowlby LI, Chandra NC, *et al.* Treatment of myocardial infarction in the United States (1990 to 1993): observations from the National Registry of Myocardial Infarction. *Circulation* 1994;**90**:2103–14.
5 ISIS-2 (Second International Study of Infarct Survival) Collaborative Group. Randomized trial of intravenous streptokinase, oral aspirin, both, or neither among 17 187 cases of suspected acute myocardial infarction: ISIS-2. *Lancet* 1988;**ii**:349–60.

Confirmation of correct endotracheal tube placement

EDITOR,—We were disturbed to note from the survey of Florance *et al* that fewer than 50% of "major" accident and emergency departments in East Anglia report having any facilities for end tidal carbon dioxide ($ETCO_2$) monitoring available for trauma patients.[1]

All emergency departments in North America that manage trauma patients routinely keep in their trauma rooms at least a calorimetric device for $ETCO_2$ detection—not to do so would be considered indefensible in the event of an adverse airway event (R N Walls, personal communication).

Relying on having *seen* the endotracheal tube "pass through the cords" and depending on clinical signs is hazardous in the multiply injured patient. Capnography should be considered mandatory in any patient requiring intubation, especially as an emergency. The endotracheal tube must be replaced immediately in any patient not in cardiac arrest in whom $ETCO_2$ is not detected.[2]

Endotracheal intubation continues to remain the "gold standard" for airway management for patients in cardiac arrest. The standard clinical signs widely used to confirm endotracheal intubation are again potentially unreliable and capnography is unhelpful. The use of a lit tracheal stylet (for example Trachlight Stylet and Tracheal Lightwand, Rusch Inc, Duluth, GA, USA), inserted through the endotracheal tube after intubation, can very simply provide indirect and rapid confirmation of correct tracheal placement by transillumination of the soft tissues of the neck. This simple technique may help to reduce the tragedy of failure to recognise oesophageal intubation in critically ill patients.

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1 Florance R, Griffiths R, Cope A. Capnography and "major" accident and emergency departments in East Anglia. *J Accid Emerg Med* 1999;**16**:159.
2 Walls RN, Luten RC, Murphy MF, *et al*, eds. *Manual of emergency airway management. The airway course.* 3rd Ed. Wellesley, MA: Airway Management Education Center, 1999.

The authors reply

We would like to thank Black and Skinner for their interest in our survey. Since then, one more department has acquired a capnograph, with more contemplating purchase. We hope this trend will continue.

We agree that capnography is essential in patients who require endotracheal intubation

and is a minimal monitor for anaesthesia in the UK and the USA. We have no experience of the "lit tracheal stylet" and so cannot comment on its usefulness.

However we question whether capnography is unhelpful in cardiac arrest. The level of carbon dioxide has been correlated with survival in cardiac arrest and the ability to resuscitate.[1] After cardiac arrest in patients already intubated, for example during surgery, $ETCO_2$ levels are invaluable in guiding resuscitation (personal experience RG).

In summary, capnography provides useful information about the correct placement of an endotracheal tube ("A"), the adequacy of ventilation ("B"), and the perfusion of the lungs ("C").

1 Sanders AB, Kern KB, Otto CW, *et al*. End-tidal carbon dioxide monitoring during cardiopulmonary resuscitation. *JAMA* 1989;**262**:1347–51.

Anaesthetic training for specialist registrars in accident and emergency

EDITOR,—Accident and emergency (A&E) trainees are required to spend a minimum of three months on secondment to anaesthetics and the intensive care unit (ICU) if they have not already obtained adequate anaesthetic/ICU experience before entering the specialty. The depth and breadth of experience varies widely. Sometimes, the trainee is purely supernumerary and gains little experience other than placing laryngeal masks and endotracheal tubes. We have each been fortunate enough to spend six months as trainee senior house officer (SHO) anaesthetists as part of our rotations. We feel that this offers considerable benefit to our training as A&E specialists and recommend it to other A&E trainees.

Anaesthetics is unlike any other clinical specialty. It is impossible to start as the sole "on call" anaesthetic SHO on the first day. Hospitals vary, but most train their new SHOs over three months before allowing them onto the on call rota. In our six month secondments we participated in the on call rota and have benefited from the responsibility of acute decision making. We have become increasingly competent in preanaesthetic assessment, sedation, pain management (including regional anaesthesia), and the induction, maintenance, and recovery phases of a general anaesthetic. We have performed rapid sequence induction independently. Our improved confidence in the management of the airway has to be good for patient care, especially as we often provide initial airway control before the anaesthetist arrives in the A&E department.

A greater understanding of anaesthetic problems and equipment will be increasingly important for A&E consultants as anaesthetics and A&E have a common role in airway management and ventilatory and circulatory support in critically ill patients. We propose that every A&E trainee requiring an anaesthetic secondment undergo six months of anaesthetics/ICU experience with the same commitment and training as a career anaesthetics SHO.

To achieve this, A&E training programmes should routinely allow the trainee to be released to SHO posts in anaesthetics and intensive care for six months. This could be at another hospital, although salary issues would need to be addressed in advance. These include salary protection at the specialist registrar grade, and how much each trust and postgraduate deanery pay.

We accept that both the quality and quantity of dedicated anaesthetic SHOs must be maintained. However, six month slots could still be allocated on a competitive basis, and an anaesthetic specialist registrar or SHO could undertake a similar secondment in A&E on an exchange. A&E medicine has a lot to offer, particularly in those departments that perform regional anaesthesia, rapid sequence induction, advanced life support, and advanced trauma life support without initially involving the on call anaesthetist.

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Casemix Healthcare Resource Group update

EDITOR,—The accident and emergency (A&E) medicine clinical working group of the Casemix Office (part of the NHS Information Authority) has selected six pilot sites to take part in a study leading to refinement of the A&E medicine Healthcare Resource Group (HRG). The chosen sites are as follows (attendances in previous year in thousands):

- Leeds General Infirmary (96)
- Derbyshire Royal Infirmary (78)
- Sandwell District General Hospital (72)
- Princess Alexandra Hospital, Harlow (60)
- Stoke Mandeville Hospital (39)
- Harrogate District Hospital (35)

Other departments are thanked for submitting high quality bids but it was essential to represent a broad cross section of emergency departments.

The current HRG A&E casemix measure version 1.0 uses disposal data that are already collected and are generally comprehensible. The A&E HRGs also have a specificity or reduction in variance for allocating appropriate grouping around costings and complexity of activity, which is currently better than that of any other specialty.[1]

Korner returns to the NHS of departmental activity using the A&E HRG are expected from hospital information departments June 1999 where possible, but are compulsory from June 2000.

The refinement projects will look at the potential of the national triage scale (NTS) and details of how long a patient stays in the department, to see if they provide a further reduction in variance and can be easily collected to drive our HRG.[2]

Work to date on this refinement project anticipates making recommendations to seek changes in the minimum dataset to include the NTS triage groupings, a separate investigation code for more expensive radiological investigations, such as intravenous urography, and a treatment code to identify patients receiving thrombolytic treatment.

The change from "finished consultant episodes" to so-called "spells" could lose our departments funding for the care of patients awaiting admission in A&E departments and not formally under our care. The pilot sites are therefore being asked to develop ways of identifying patients who are cared for within the A&E department but do not form part of the medical responsibility of A&E staff so that the burden that these patients place on our departments can be better evaluated. All general practitioner admissions activity should be triaged and flagged as A&E activity so that data analysis around this group can be undertaken.

The activity undertaken as outpatient work by consultants at scheduled review clinics is specifically excluded from this project, but will be covered in turn by the Outpatient HRG Development Project.

Observation ward activity (or spells) can be counted using the relevant existing inpatient HRGs.[3]

The whole project is due to report initial findings within the financial year. The current baseline project plan identifies a completion date of June 2000. We do not underestimate the hard work that will be necessary by the selected sites and the Casemix Office to deliver this refinement of our casemix measure. We owe them a debt of gratitude, especially when several of the sites will also be modernising their departments at the same time.

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1 Brayley N, Marrow J. Healthcare resource groups in accident and emergency medicine. *J Accid Emerg Med* 1996;**13**:143–4.
2 Marrow J. Triage and casemix in accident and emergency medicine. *European Journal of Emergency Medicine* 1998;**5**:153–8.
3 Brayley N, Bray P, Anthony P, *et al*. Towards a UK national casemix measure: how can we price activity in an observation ward? *Proceedings of the 6th International Conference on Emergency Medicine*. Sydney 1996: abstract O282.

Prospective survey to verify the Ottawa ankle rules

EDITOR,—In their study to verify the Ottawa ankle rules Perry *et al* point out "the potential dangers of rigidly adhering to decision rules".[1] The study discovered that four malleolar fractures would have been missed had the guidelines (per the Ottawa ankle rules[2]) been applied—that is, these patients would not have had radiography.

The data from the study were derived from the emergency department ankle "stamper", which comprises 12 parameters. Of these they selected four: age, posterior malleolar tenderness (which malleolus was not specified), inability to weight bear immediately, and inability to weight bear in the emergency department. This information was deemed adequate to meet the study's requirements.

However, age is relevant only as an eligibility criterion for application of the rules—it does not impact on decision making regarding radiography thereafter. Secondly, the failure to specify which malleolus was tender detracts from attempts at verification—the rules specify both malleoli must be assessed. Moreover, the study (and the stamper!) ignores the second part of the ankle rules entirely—that is, navicular zone and fifth metatarsal zone tenderness.