All the authors contributed to the review and writing of the paper. NAR and VMC will act as guarantors of the paper.

Funding: The original cohort tagging was funded by a grant from Diabetes UK, formerly the British Diabetic Association. NAR is funded by the NHS Executive, Northern and Yorkshire Region.

Competing interests: None declared.

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(Accepted 8 March 2001)

Do doctors position defibrillation paddles correctly? Observational study

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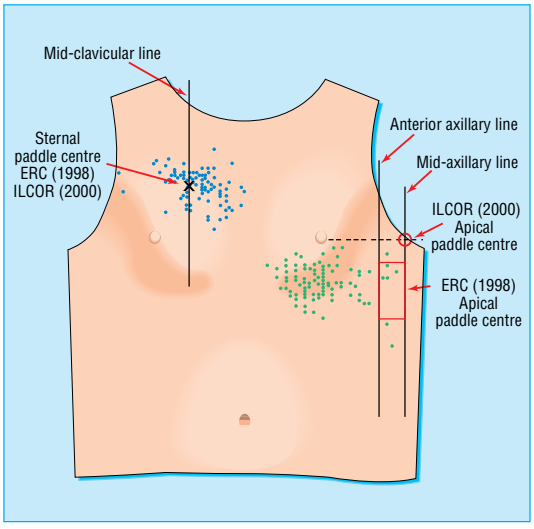
BMJ 2001;322:1393–4

Defibrillation is necessary to restore normal sinus rhythm in a patient having a ventricular fibrillation arrest. Each minute of delay in restoring sinus rhythm increases mortality by 7-10%.[1] Successful defibrillation requires depolarisation of a critical mass of myocardium, which is most likely to be achieved if the defibrillation paddles are correctly placed. Recent guidelines from the European Resuscitation Council state that the sternal paddle should be placed "below the right clavicle in the mid-clavicular line" and that the apical paddle should be placed "over the left lower ribs in the mid/anterior axillary line."[2] The limited literature available and our own observations suggest that these anatomical positions are not adhered to during defibrillation.[3] We undertook an observational study to assess paddle positioning during defibrillation.

Methods and results

We recruited 101 doctors of all grades and acute specialties at Southampton General Hospital over a period of two weeks, who were unprepared and unaware of the nature of the study. They were shown an anatomically accurate male resuscitation manikin that they were told was in ventricular fibrillation. They were asked to defibrillate the manikin, which required the initial placement of sternal and apical defibrillation pads on the chest wall, on to which were placed the defibrillation paddles. The position of the centre of the defibrillation pads was recorded by using a grid placed over the chest wall. It was assumed that positions of the pad centre and the paddle centre were anatomically



Anatomical position of the centre of apical and sternal defibrillation paddles placed by 101 doctors. Positions recommended by the European Resuscitation Council (ERC) and the International Liaison Committee on Resuscitation (ILCOR) are also shown.

identical. Details of doctors' grade and specialty and the date of any previous instruction on defibrillation technique were also recorded.

Data were collected from 20 consultants, 2 staff grades, 38 registrars, 31 senior house officers, and 10 preregistration house officers. There was no significant difference (determined by analysis of variance) in paddle positioning between different grades or specialties or between those who had received defibrillation instruction within the past three years and those who had not.

Results are shown in the figure. The positions for the sternal and apical paddles specified by the European Resuscitation Council are shown. Sixty five per cent of sternal paddles were placed within 5 cm (approximate radius of a defibrillation paddle) of the position recommended in the guidelines.[2] Most apical paddles were placed too medially and too cranially, only 22% being placed within 5 cm of the position recommended by the guidelines.[2]

Comment

Adherence to European Resuscitation Council guidelines for defibrillation paddle position is poor, resulting in incorrect paddle placement, particularly of the apical paddle, by most doctors, irrespective of grade, specialty, or how recently they had been instructed on technique. Apical paddle placement is usually too medial, reducing the separation of the paddles.

Since this study was performed, the International Liaison Committee on Resuscitation (ILCOR) has published guidelines which supersede those of the European Resuscitation Council and which specify even more lateral placement of the apical defibrillation paddle, "to the left of the nipple with the center of the electrode in the mid-axillary line."[4] This is the position previously advocated by the American Heart Association.[5]

Incorrect paddle placement will result in a greater percentage of current passing through non-cardiac tissue and will reduce the chances of successful defibrillation through failure to depolarise a critical mass of myocardium. Teaching of advanced life support must place greater emphasis on paddle position if success of defibrillation is to be optimised.

Contributors: CD had the original idea and assisted RH and DS in designing the study, analysing the results, and drafting the paper. RH and DS collected and interpreted the data. CD is guarantor for the paper.

Funding: None.

Competing interests: None declared.

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(Accepted 17 January 2001)

Differences in therapeutic consequences of exercise testing between a rural and an urban Danish county: population based study

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BMJ 2001;322:1394–5

bmj.com

This article is part of the BMJ's randomised controlled trial of open peer review. Documentation relating to the editorial decision making process is available on the BMJ's website

Coronary angiography is the main diagnostic test for deciding whether to refer a patient for coronary revascularisation, but referral for coronary angiography may vary significantly among regions.[1 2] Regional differences have been explained by the fact that access to cardiac catheterisation facilities is associated with a higher likelihood of undergoing angiography.[3 4] We investigated the impact of exercise stress testing on decisions taken about patients suspected of having angina pectoris and the barriers to referral for coronary angiography.

Subjects, methods, and results

We identified all exercise tests and coronary angiography performed during 1996 in two Danish counties, Aarhus (urban) and Ringkøbing (rural), with five hospitals in each county. The total study population was about 900 000 inhabitants. Invasive cardiac facilities were available only in Aarhus but were for use of both counties. Data from the County Public Health Authorities on the number of admissions resulting from acute myocardial infarction and from the Danish National Board of Health on mortality from suspected ischaemic heart disease showed a similar or slightly higher prevalence of ischaemic heart disease in Ringkøbing in 1996.

A total of 2934 patients underwent bicycle exercise testing and 1691 patients underwent coronary angiography. Age adjusted rates of exercise testing were 3315 (urban) and 3183 (rural) per million inhabitants (rate ratio 1.04 (95% confidence interval 0.96 to 1.11)). Age adjusted angiography rates were 2162 (urban) and 1244 (rural) per one million inhabitants (1.74 (1.66 to 1.83)). Proportions of patients with an exercise test result that suggested disease (angina pectoris, severe ischaemia on electrocardiography, or decreased blood pressure) were similar among the 10 hospital catchment areas (table). The decision to refer for coronary angiography a patient who had a test result that suggested disease was taken either by a