

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.

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

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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

Exercise testing and angiography in 10 hospital catchment areas in two Danish counties, one rural and one urban

Hospital catchment area	No of exercise tests per million inhabitants	Angiography per million inhabitants	Percentage of exercise tests suggesting disease	Percentage of exercise tests suggesting disease that led to referral for angiography	Distance (km) from hospital to angiography centre
Rural (Ringkøbing):					
1	2213	940	28	33	154
2	2978	1645	31	33	128
3	4044	1451	27	41	127
4	3649	1090	30	40	116
5	2931	1326	28	58	82
Urban (Aarhus):					
1	3965	2441	28	69	62
2	2000	1576	27	53	42
3	3835	2292	25	61	36
4	4278	1519	23	79	21
5*	3634	2683	26	63	2

*Two different units with bicycle exercise testing in Aarhus University Hospital, but serving the same hospital area population.

medical consultant at the local hospital or by a cardiology specialist (three in each county). Stratified for age, the relative risk of referral (urban versus rural) for angiography (if an exercise test result suggested disease) was 2.06 (1.39 to 3.05) for women and 1.27 (1.09 to 1.50) for men. Adjustment for history of myocardial infarction did not affect the relative risk. The highest proportion of patients (per million inhabitants) with a test result that suggested disease who were referred for angiography was 79%—in the hospital catchment area 21 km from the angiography centre. The lowest proportion was 33%—in two areas 128 km and 154 km away. A linear regression was significant ($P < 0.01$) with a slope of -0.78 .

Comments

Referral for coronary angiography in patients with a bicycle exercise test suggesting disease varied strongly with the distance from the angiography centre, showing that triage by medical consultants may constitute a barrier to referral for coronary angiography.

The two Danish counties in this study did not differ in their rates of exercise testing, and the doctors gave similar interpretations of the test results. No economic restrictions affected referral of patients from any of the local hospitals to the angiography centre, and both counties had similar policies on the management of healthcare problems.

The clear association between the distance to the coronary angiography service and the doctor's decision to refer the patient for coronary angiography presumably reflects different local medical cultures rather than problems with the transport of patients. Our data show that the medical specialist is a major barrier to referral for coronary angiography. The observed differences in practice between centres have implications for the organisation of the coronary angiography service, the diffusion of new technology, the use of guidelines, and continuing performance development. It is not known whether the observed differences in 1996 reflect appropriate or inappropriate use of medical resources; this issue deserves further investigation.

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Corrections and clarifications

Adverse events in British hospitals: preliminary retrospective record review

Two errors persisted to publication in this article by Charles Vincent and colleagues (3 March, pp 517-8). The first column heading in table 2 should read "No of adverse events" [not "No of patients with adverse events"], and the penultimate sentence in the second paragraph of the results section should read: "Overall, 57 [not 53] (48%) adverse events were judged preventable." It should also have been made clear that some of the authors' results had already been published earlier in the *BMJ* (1999;319:1091); in *Organisation With a Memory* (a report by an expert group, chaired by the chief medical officer for England, Liam Donaldson, on learning from adverse events in the NHS); and in *Clinical Governance Bulletin*.

Mimerva

The caption to the photograph submitted by I Grant and colleagues (28 April, p 1072) correctly referred to the left side of the man's face being affected, but unfortunately we published the photograph the wrong way round.

Two more medical schools to open

In the final paragraph of the website version of this news article by Lynn Eaton (7 April, p 816) Newcastle University was inadvertently omitted from the list of new medical schools and places. Newcastle University has been in collaboration with Durham University—the venture has therefore been a joint one.

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