Mean (standard error) number of penalty points accrued by subjects during resuscitation attempts immediately before and after initial instruction and then at regular intervals of three (group A), six (group B), or twelve months (group C)

found between the participants' scores or pattern of scores over time and their gender, age, working experience, number of actual resuscitation attempts attended, or number of instruction courses on resuscitation received (Spearman's test).

Comment

After the first instruction course our subjects obtained results similar to those of other studies.⁴ Reinstruction of groups A and B led to an improvement in performance which did not decline thereafter. This suggests that resuscitation skills are maintained at a stable level by three or six monthly refresher courses. Our results suggest that an interval of 12 months is probably too long since, for most of that time, a person's skill would be insufficient. We did not, however, measure subjects' skills after the first year of the study.

It has been suggested that poor retention of skills may depend on the instructor.⁵ We eliminated this factor by rotating the instructors and reinstructing them regularly. We can therefore conclude that

reinstruction at six monthly intervals is sufficient to maintain adequate skills in cardiopulmonary resuscitation. These results should be relevant to all members of the public interested in maintaining resuscitation skills as well as the medical profession.

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Nurses' knowledge of the resuscitation status of patients and action in the event of cardiorespiratory arrest

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Cardiopulmonary resuscitation has become an integral part of hospital practice. The outcome varies with setting, type of arrest, and underlying disease but only about 10% of patients who have cardiac arrests in hospital survive to be discharged.¹

Since cardiopulmonary resuscitation is a traumatic procedure for both patient and doctor patients with little to gain from it often have "Do not resuscitate" written in their notes. At the time of a cardiac arrest, however, there is often confusion over an individual patient's resuscitation status. This can result in resuscitation being started and then stopped, sometimes after a considerable time, when someone finds a do not resuscitate order in the notes. This study set out to determine how nurses' knowledge of resuscitation status and proposed action in the event of a patient suffering a cardiac arrest agreed with the documented resuscitation status.

Subjects, methods, and results

The study was conducted on all five acute medical wards at two linked district general hospitals. At the end of nursing handover without warning all the nurses on the ward were given a questionnaire with two questions. All the nurses were taken in a group around all the patients (or appropriate half of ward in sectioned wards) and were allowed 10 seconds to answer both questions before the group moved on to the next patient. The questionnaire asked, firstly, whether in the event of a cardiac arrest the nurse knew the resuscitation status of this patient to be: (a) for resuscitation, (b) not for resuscitation, or (c) "unknown to me." Secondly, it asked whether in reality if the nurse saw the patient arrest she would (a) initiate basic life support and put out a crash call, (b) not initiate basic

life support and not put out a crash call, or (c) try to ascertain the resuscitation status by asking someone or looking in the notes before initiating life support and putting out a crash call. The response of one nurse on one patient was deemed to be one resuscitation decision. The medical and nursing notes were then examined for evidence of do not resuscitate orders. The exact wording of such orders and the time since last written were recorded. If no orders were found in either the medical or nursing notes we assumed that the patient should be resuscitated. In the results the percentage agreement indicates the proportion of nurses' responses that agreed with documented evidence.

This study questioned 41 nurses (17 qualified, 24 unqualified) about 113 patients (mean age 72 years, 59 women, mean duration of stay 21 days (range 1-92)). Do not resuscitate orders were found in both the medical and nursing notes of 23 patients. Four patients had such orders only in the medical notes and seven only in the nursing notes. All 27 of the medical orders were written as "Not for resuscitation" or "not for 3333" (the local cardiac arrest emergency number), or both. The mean time since the last do not resuscitate order was written was 18 days. Do not resuscitate orders were recorded in the same way on the first page of the nursing notes with the addition of a red dot. Only six nursing orders were dated.

Knowledge of and response to patients' resuscitation status among qualified and unqualified nurses: results are percentage agreement between nurses' judgments and presence or absence of do not resuscitate (DNR) orders in medical notes

	Patients with no DNR orders		Patients with DNR orders	
	Knowledge of status	Action in arrest	Knowledge of status	Action in arrest
No of patients	86		27	
No of nurse/patient decisions	443		141	
Qualified	191		60	
Unqualified	252		81	
<i>Nurses' answers (% agreement)</i>				
Resuscitate	76.7	74.5	14.2	14.9
Qualified	82.2	79.6	11.5	11.5
Unqualified	72.6	70.6	16.3	17.5
Do not resuscitate	14.2	17.6	75.2	68.8
Qualified	13.6	15.7	78.8	77.0
Unqualified	14.7	19.0	72.5	62.5
Don't know	9.1	7.9	10.6	16.3
Qualified	4.2	4.7	9.8	11.5
Unqualified	12.7	10.3	11.3	20.0

Nurses' responses agreed poorly with the notes for both patients intended to be resuscitated and those not intended for resuscitation. The table shows the agreement with orders in medical notes, but the findings were similar when the nursing notes were taken as the authority.

Comment

Do not resuscitate orders were written in a limited number of formats. This compares well with the multitude of different symbols and code words found in a recent Swedish report.² However, the time since the order was last written was long and may have accounted for some confusion. In 15% of decisions where there was a do not resuscitate order the nurses thought that the patient was to be resuscitated. More worryingly, nearly 18% of nursing decisions were not to resuscitate when there was no documented evidence to support this action. This puts nurses in a serious medicolegal position.³ Some of this difference was due to poor knowledge of the patients' status, but some may reflect poor documentation by doctors in the notes and poor doctor to nurse communication rather than a medical intention actively to resuscitate those patients. Aarons and Beeching showed that only a few patients actually perceived as unsuitable for resuscitation had do not resuscitate orders.⁴ Likewise, following legislation in New York State on withholding cardiopulmonary

resuscitation the percentage of patients dying without resuscitation but with written do not resuscitate orders increased dramatically (from 22% to 93%) without altering the incidence of resuscitation attempts at the time of death.⁵

This study highlights the problems of documenting resuscitation status and communicating these orders between doctors and nurses. Doctors need to communicate and document their views about resuscitation status more clearly and more often. Raising the priority of resuscitation status at nursing handover would encourage doctors to do that.

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Resuscitation skills of MRCP candidates

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Research has shown that survival to hospital discharge may be directly linked to the attending doctor's knowledge of correct treatment of a lethal arrhythmia coupled with availability of equipment and coordination.¹ We assessed the resuscitation skills of 30 senior house officers and registrars in medicine who were taking the second part of the membership of the Royal College of Physicians (MRCP) examination.

Methods and results

Thirty British doctors took the Oxford University and Region postgraduate medical education MRCP (II) clinical course at Reading. They were selected from 120 applicants, chosen on academic merit and having been successful in passing part I of the MRCP examination on their first or second attempt. They had no or only one previous attempt at part II of the examination. All were active members of cardiac arrest teams in their hospitals.

Management of cardiac arrest was evaluated for 10 minutes by providing the candidate with a scenario of a hospital patient in cardiac arrest. The situation was simulated using a Laerdal Arrhythmia Annie. A Physio Control Lifepak 6s defibrillator was available and was connected to a Heartsim rhythm simulator. Stand ins for nurse and anaesthetist performed tasks as directed by the candidate. The "patient" presented in cardiac arrest with ventricular fibrillation and one further rhythm of cardiac arrest—for example, pulseless ventricular tachycardia, asystole, or electromechanical dissociation.

Twenty nine candidates neglected fundamental rules for the management of cardiac arrest. Six out of 30 candidates correctly followed the resuscitation procedure according to the 1989 guidelines of the

Resuscitation Council.¹ Basic life support skills of the other 24 candidates were inadequate (wrong hand position, gastric massage, lack of knowledge of the basic ABC, and failure to check the pulse correctly). Twenty nine candidates did not remove the glycerotrinitrate patch from the manikin's chest before defibrillation. Such a patch should be removed if the patient is defibrillated as there is a risk that it will cause burns.

Drug treatment given by the candidates deviated from the Resuscitation Council's guidelines, with incorrect use of adrenaline, calcium chloride, and lignocaine infusions in 19 out of the 30 candidates. Poor knowledge of the order of events in the ventricular fibrillation algorithm was seen in 24 candidates. Twenty candidates used an incorrect frequency and energy of shock, and eight did not handle the defibrillator safely. Six used an incorrect basic life support ratio, and the knowledge of the treatment of the other rhythms of cardiac arrest was inadequate in 22 candidates.

Nineteen of the 30 MRCP candidates subsequently went on to pass the actual MRCP (II) examination.

Comment

Several studies have looked at the resuscitation skills of the general public, nurses, medical students, house officers, and hospital consultants.² These studies draw the same conclusion: basic life support skills are of poor quality. Our study highlights the lack of knowledge of not only basic life support skills in 29 out of 30 hospital doctors taking the MRCP examination but also a lack of knowledge of the Resuscitation Council's guidelines for arrest management, drug treatment, and electrical treatment. These doctors were at a level of seniority where they conduct resuscitation procedures, and might be assumed to be the most skilled at resuscitation of the groups listed above.

The poor performance of the candidates may be attributed to inadequate teaching during their undergraduate and postgraduate years. The Royal College of Physicians working party proposed that medical staff