

A questionnaire survey of resuscitation equipment carried by general practitioners and their initial management of ventricular fibrillation

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SUMMARY

Background. The early defibrillation of patients having a cardiac arrest and who are in ventricular fibrillation has been shown to increase survival and is recommended by the European Resuscitation Council (ERC) and the American Heart Association. General practitioners (GPs) may expect to encounter a cardiac arrest in 5% of patients they attend who have a suspected acute myocardial infarction.

Aim. To establish whether GPs on call were equipped to treat a patient in ventricular fibrillation, and to investigate their knowledge of the early stages of the current ERC guidelines for this cardiac rhythm.

Method. A postal questionnaire was sent to all the 175 GPs who regularly admit patients to the West Suffolk Hospital. It asked for details of equipment and drugs carried when on call, recognition of a cardiac rhythm strip of ventricular fibrillation, and treatment to be given for this rhythm.

Results. A total of 105 replies were returned (representing a 60% response rate). The distribution of practice size and location reflected primary health care in this area. Fourteen GPs (13%) had attended an advanced cardiac life-support course at some time, and 44 (41.9%) had read the current ERC guidelines. The majority of GPs (60%) carried advanced airway management equipment to allow endotracheal intubation, but only 37 (35%) would have been able to administer additional oxygen. Again, most (82%) would have been able to establish intravenous access, but only 39% carried 2 mg or more of adrenaline, the only recommended drug in the initial stages of resuscitation from ventricular fibrillation. A defibrillator was carried by 37 GPs (35%) when on call, but out of these only 14 had an integral monitor screen and 3 were semi-automatic defibrillators. Ninety-five GPs (91%) successfully identified ventricular fibrillation, but only 32 (31%) were able to state correctly the initial recommended treatment, and only 17 (16%) were able to quote the first two stages of the ERC guidelines of treatment of ventricular fibrillation. However, 78 GPs (74%) would have provided treatment compatible with the guidelines by giving the patient a pre-cordial thump and two subsequent defibrillatory shocks, albeit perhaps at an incorrect energy level and only if a defibrillator was available.

Conclusions. This study shows that the equipment carried by the majority of GPs in this area is inadequate to deal successfully with the victims of cardiac arrest, and that significant reliance is placed on the resources of the ambulance service. It

would also appear that most GPs are not fully conversant with the current ERC guidelines. The ability of GPs to manage cardiac arrests could be enhanced by their attending courses to update their resuscitation skills, one example being the advanced life-support courses endorsed by the United Kingdom Resuscitation Council, and that the Royal College of General Practitioners could stimulate interest in this area by extending their requirement for candidates for the membership examination to include written documentation demonstrating proficiency at advanced life support, in addition to the current requirement for basic life support only.

Keywords: defibrillator; myocardial infarction; cardiac arrest.

Introduction

It has been suggested that if GPs respond rapidly to patients with a suspected acute myocardial infarction they will encounter a cardiac arrest in 5% of cases.¹ The incidence of cardiac arrest in general practice has been estimated to be 1:1260 to 1:4000 patient-years,² and it has been shown in different communities that successful pre-hospital resuscitation of up to 30% of victims of cardiac arrest can be achieved.^{3,4} Moreover, a survival rate exceeding 50% may be achieved in patients whose GP has witnessed their cardiac arrest and who receive prompt defibrillation.⁵ The 'chain of survival' of early access to rescue services, early basic life support, early defibrillation, and early advanced life support has been promoted by the American Heart Association for out-of-hospital cardiac arrest victims.⁶

Guidelines on the early management of acute myocardial infarction had been sent to all GPs in Suffolk in 1994 by the Suffolk Consensus Group of General Practitioners, Physicians and Public Health Consultants (neither author of this article being a member of this group). These guidelines advised that, when faced by a patient sustaining a cardiac arrest following a suspected acute myocardial infarction, the GP should 'treat as ventricular fibrillation and give the first three direct current shocks (200 joules, 200 joules, 360 joules) in quick succession and without interruption, preferably without removing the defibrillator paddles from the chest'. These guidelines were published to accommodate practitioners who carried defibrillators without a monitor screen, or those without access to an electrocardiograph. This advice is compatible with the current recommendations from the European Resuscitation Council,⁷ and the findings that most victims of sudden cardiac death die outside of hospital from ventricular fibrillation.⁸ This survey was carried out six months after the Suffolk Consensus Group issued their guidelines and attempted to see whether our local GPs, when on call, carry the necessary equipment to provide the recommended treatment required by victims of cardiac arrest. In addition, the questionnaire explored the knowledge of the first stages of the algorithm for ventricular fibrillation.⁷

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Method

The West Suffolk Hospital is located in Bury St Edmunds, a market town surrounded by small villages. In 1995, a total of 175 questionnaires were sent to all GPs who admit patients to this hospital. The first part of the questionnaire looked at the practice details. The second part requested information regarding the equipment carried by the GP when on call. The final part asked respondents to identify a cardiac rhythm strip showing ventricular fibrillation, and then to state their initial treatment of a patient in such a rhythm who was receiving competent basic life support. To ensure anonymity respondents were requested not to sign the returns.

Results

The overall questionnaire return rate was 60% (105/175). Practice details are shown in Table 1; all other data are shown in Table 2. Of the practices, 29 (27.9%) were urban, 44 (42.3%) were rural and 31 (29.8%) were mixed. The distribution of practice size and location, year of qualification and number of training practices suggests that our sample is representative of the primary care practitioners of this area. The practice sizes varied from single-handed to eight-partner practices. Approximately half (50.4%) of the practices in our sample were training practices. At the time of the survey the GPs covered their own on-call duties mainly in small rotas as there were no deputizing services or co-operatives. Of the respondents, 43 (41.0%) were members of the Royal College of General Practitioners, and nine (8.6%) were members of the Royal College of Physicians.

Only 14 GPs (13.3%) had ever attended an advanced life-support course; overall, 44 (41.9%) had read the latest European Resuscitation Council (ERC) guidelines. Although 75 (71.4%) carried an adult resuscitator and 63 (60.0%) intubation and ventilation equipment, only 37 (35.2%) would have been able to administer oxygen before the arrival of an ambulance. The majority carried atropine, but only one would have been able to comply with the ERC algorithm for asystole with a dose of 3 mg. Again, 100 (95.2%) carried adrenaline, but only 41 (39.0%) had 2 mg or more. Eighty-six (81.9%) of respondents carried cannulae for intravenous drug administration and nine (8.6%) carried sodium bicarbonate — a drug no longer recommended in the initial management of cardiac arrests.

It was reassuring to find that 95 respondents (90.5%) recognized the rhythm strip of ventricular fibrillation correctly (Figure 1). However, when faced with this rhythm in a patient

receiving proficient basic life support, only 32 (30.5%) correctly stated the appropriate initial action according to the published ERC guidelines (allowing both precordial thump and 200-joule shock as correct for the first action). A further 54 GPs (51.4%) would have defibrillated the patient but were unable to offer any figure for the number of joules to be used, and five (4.8%) gave an incorrect value (range 60–400 joules). More disturbingly, two (1.9%) would have administered lignocaine. It is interesting to note from this audit that those in possession of the MRCGP or MRCP performed no differently from those without these qualifications.

The respondents were more uncertain of their next treatment if the patient remained in ventricular fibrillation. Quoted actions are shown in Table 2. Overall, 75 (71.5%) doctors would have provided treatment consistent with the first two stages of the algorithm for ventricular fibrillation⁷ (giving two defibrillatory shocks), provided a defibrillator was present. However, only 17 (16.2%) correctly stated the first two stages of this algorithm.

A total of 37 GPs (34.7%) carried a defibrillator when on call. The majority of these defibrillators (20) were manually operated without an integral monitor screen. Of the remainder, 14 were manually operated with a monitor screen and three were semi-automatic defibrillators.

Discussion

This survey shows that a significant proportion of GPs do not carry the necessary equipment to deal with a patient suffering from ventricular fibrillation in the community. In particular, they lack a defibrillator. Although only 17 (16.2%) recognized the rhythm strip and stated the first two stages of the ventricular fibrillation algorithm correctly, 75 (71.5%) would have provided treatment compatible with the guidelines. This begs the question whether we should expect GPs to be able to manage out-of-hospital resuscitation, or whether this should be the responsibility of the paramedics in the ambulance service. It has been suggested that all GPs who attend patients suspected of having a myocardial infarction should carry defibrillation equipment.⁹ Furthermore, in many cases the GP is helped by ambulance colleagues, which highlights the benefits of both groups attending patients with chest pain.⁹ We feel that it is desirable for GPs to attend patients with chest pain as soon as possible; however, this obviously depends on doctor availability and creates a significant demand on what is already a heavy workload. Macdonald² concluded that all GPs should be prepared to attend patients with chest pain as a priority, and that they should respond immediately and carry a defibrillator.

It has been shown in community hospitals in the United States that practitioner attendance at advanced life-support courses favourably affects the overall practice of resuscitation and increases the survival rate of patients with ischaemic heart disease.¹⁰ Yet only 13% of the respondents in our survey reported having attended such a course at any time in their careers. It may be that this figure is falsely low as some may have had instruction in advanced life-support techniques from other courses. It would be beneficial to the population if GPs were to attend such courses on a regular basis.

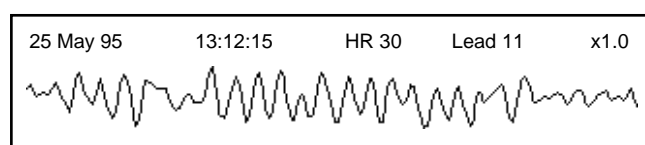
Cobbe *et al*¹¹ showed that 33% of patients who were in ventricular fibrillation after the arrival of paramedics trained to defibrillate survived to hospital discharge. Our study found a higher percentage (35%) of GPs carrying a defibrillator than previous publications,¹² although more than half of these machines were manually operated with no monitor screen. However, our own view agrees with others¹³ in that it is unacceptable for a doctor to be dependent on others to provide basic life-saving equipment. It has been shown that GPs who carry and use defibrilla-

Table 1. Practice details.

Practice size	Number	Year qualified	Number
Single-handed	3 (3.0%)	1960-1969	19 (18.1%)
2	3 (3.0%)	1970-1979	37 (35.2%)
2.5	1 (1.0%)	1980-1989	46 (43.8%)
3	10 (10.1%)	1990-1995	1 (0.9%)
4	13 (13.1%)		
4.5	1 (1.0%)	Type of Practice	
5	33 (33.34%)		
6	14 (14.2%)	Town	29 (27.9%)
7	7 (7.1%)	Rural	44 (42.3%)
8	14 (14.2%)	Semi-rural	31 (29.8%)
Possesses MRCGP:	43 (41.0%)	Training Practice? Yes	50.4%
Possesses MRCP:	9 (8.6%)	No	49.6%

Table 2. Resuscitation equipment carried by GPs when on call, and their initial management of ventricular fibrillation.

General responses	Yes	No
Had read ERC Guidelines 1994	44 (41.9%)	61 (58.1%)
Had attended advanced life-support course	14 (13.3%)	91 (86.7%)
Possessed MRCP	9 (8.6%)	96 (91.4%)
Possessed MRCGP	43 (41%)	62 (59%)
Equipment carried when on call	Number	
Defibrillation equipment	Defibrillator (no screen)	20 (19.2%)
	Defibrillator with monitor	14 (13.4%)
	Semi-automatic defibrillator	3 (2.1%)
Airway equipment	Adult resuscitator	75 (71.4%)
	Intubation equipment	63 (60%)
	Oxygen	37 (35.2%)
Intravenous access	Cannulae	86 (81.9%)
Drugs	Adrenaline	100 (95.2%)
	Atropine	99 (94.3%)
	Lignocaine	42 (40%)
	Sodium bicarbonate	9 (8.6%)
Initial management of ventricular fibrillation (VF)	Number	
Correct identification of VF	95 (90.4%)	
Initial action	Precordial thump	7 (6.7%)
	200-joule shock	25 (23.8%)
	'defibrillate'	54 (51.4%)
	'defibrillate': wrong no. joules	5 (4.8%)
	Lignocaine	2 (1.9%)
	Dial 999	1 (1.0%)
	No idea	11 (10.5%)
Second action	200-joule shock	17 (16.2%)
	'defibrillate'	26 (24.8%)
	'defibrillate higher'	32 (30.5%)
	Lignocaine	10 (9.5%)
	Adrenaline	1 (0.9%)
	Bicarbonate	1 (0.9%)
	Continue cardiopulmonary resuscitation	2 (1.8%)
No idea	14 (13.3%)	

**Figure 1.** Rhythm strip of ventricular fibrillation.

tors do save lives,^{2,12,14} and that the GP is often the first member of the emergency services to arrive at the scene of a cardiac arrest.² It is not known whether this currently applies in Suffolk, but, for '999' calls in 1994, 56% of ambulances called out arrived within eight minutes, and 95% within 19 minutes (personal communication). It appears that a significant proportion of GPs rely on the ambulance service to bring essential life-saving equipment to the scene of an incident.

With the number of cooperatives being formed, is it not time for a reassessment of the essential equipment to be carried when on call, especially as the cost of such equipment can be the focus of a health education drive and the full cost of the defibrillator need not be met by the practice.¹⁴ Indeed, at a time when the call for GPs to administer thrombolysis to victims of acute myocardial infarction in the community is being raised,^{5,15} should not a dual approach to increasing patient survival be encouraged,

namely the ability for prompt administration of thrombolytic agents along with the ability to deal effectively with cardiac arrests?

While some royal colleges expect candidates presenting for their membership or fellowship examinations to be competent in basic and advanced life support, to its credit the Royal College of General Practitioners (RCGP) is alone in expecting candidates to present documented evidence of proficiency in basic life support. Since this is an examination of excellence, perhaps it is now time that the RCGP extends this requirement to proficiency in basic and advanced life support, and encourages the other royal colleges to follow its lead.

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