ABC of Resuscitation

BRIAN STEGGLES

ADVANCED LIFE SUPPORT IN GENERAL PRACTICE

The two previous articles have explained the procedures for advanced life support in hospital: these may seem complicated and deter the general practitioner. He should not be deterred because, with some modifications, advanced life support may still be applied effectively before the patient reaches hospital.

The general practitioner may be confronted by an emergency unexpectedly, and it is as well to be prepared and equipped and to be up to date with resuscitation techniques. None of this is difficult, and it is far better to be able to feel confident to attempt resuscitation than to feel helpless. Advanced life support follows on from the basic life support procedures already described and includes advanced airway care, maintenance of circulatory volume, and defibrillation when appropriate.

Defibrillation is not difficult. It does not require an ability to make complicated diagnoses from an electrocardiogram—only the ability to recognise five basic rhythm disturbances or the clinical fact of cardiac arrest—and failure to correct ventricular fibrillation results in death anyway.

Airway care

Advice on basic expired air resuscitation has already been given, and this may be continued or replaced by the use of the bag and mask, and possibly intubation. It is important not to forget the need to keep the airway clear and to have a sucker available.

In skilled hands intubation is a more effective way of ventilating the patient, but do not waste time if you are not skilled, or prolong attempts while forgetting to continue ventilation with a bag and mask.

Upper airway obstruction

Obstruction to the upper part of the airway may be due to the tongue or vomit in an unconscious patient, and the importance of clearing the airway has already been emphasised. Obstruction may also result from trauma, infective or allergic swelling, or obstruction by a foreign body. If it is not possible to deal with any of these causes by other means entry may be made most easily through the cricothyroid membrane, with the neck extended. There are various commercial devices available, but a large bore intravenous cannula will suffice.

Fluid replacement

It is always easier to take a drip down than to struggle to put one up later when the patient has become collapsed. A shocked patient who will need fluid replacement will benefit more from this if it is done early, and continued during the journey to hospital, rather than waiting until arrival at hospital. Putting up an intravenous line is no more difficult than taking blood. Choose a large and obvious vein—for example, in the antecubital fossa; if the vein does not appear easily inflate a blood pressure cuff to a pressure between the systolic and diastolic levels. When blood volume needs to be restored this may be started with normal saline up to 1 litre, followed by a plasma expander such as Haemaccel.

Intravenous infusion requirements

Intravenous cannulae
Drip set
Normal saline 2 × 500 ml
Haemaccel 1 × 500 ml
Fixing tape
Arm splint

Cardiac care

Surgery policy

Receptionists aware of importance of chest pain
Register of patient at risk
Minimal delay in attending the call
If delay is likely consider mobilising ambulance first

Action by doctor

Adequate pain relief lessens risk of rhythm disturbance and possibly ventricular fibrillation
Establish intravenous route—eg, with butterfly flushed with saline intravenous—*not* intramuscular—
Use diamorphine or morphine
Consider admission to coronary care unit
Consider maximum time at risk and accompanying patient to hospital if in this period

Ventricular fibrillation

Defibrillate:
200 J
200 J
400 J
lignocaine bolus 100 mg
400 J
adrenaline 10 ml of 1 in 10 000
defibrillate
After successful defibrillation
continue lignocaine infusion
admit to hospital for electrolytes, blood gases, chest radiograph

Ventricular tachycardia

If circulation stable—lignocaine
If unconscious and collapsed—defibrillate (do not worry about synchronisation)
Bradycardia Rate less than 50 beats/min (reduced cardiac output)—atropine intravenously up to 2 mg
Other rhythm disturbances If unstable and at more risk during transport consider lignocaine 100 mg intravenous bolus and continue infusion 3 mg/min

Every year in Britain 60% (60 000) of deaths from myocardial infarction occur before patients reach hospital. The maximum risk period for cardiac arrest is the first six hours. Because of the delays that occur it is unlikely that much can be done to improve the death toll during the first hour, so the group that needs to be considered for prehospital resuscitation comprises those who die one to six hours after the onset of symptoms. Specialised hospital coronary care units in the United Kingdom have reduced their mortality after cardiac arrest to 50%, and it should be possible to achieve the same success rate outside hospital provided there is no excessive delay before starting the appropriate level of resuscitation, including bystander cardiopulmonary resuscitation. Indeed, in Seattle 70% of patients who suffer a myocardial infarction with arrhythmias and are defibrillated before arrival at hospital by paramedics are subsequently discharged alive from hospital.

This can be achieved by:

- improving the awareness and skills in cardiopulmonary resuscitation of the general public;
- introducing a chest pain policy for the surgery to reduce delays;
- prompt action by doctor, including adequate pain relief;
- providing facilities for prehospital resuscitation, including defibrillation.

Training of the general public in basic life support is being undertaken in many areas, and a national campaign is being planned.

A general practitioners' study published in 1981 showed that of those patients who died, 44% did so before the doctor arrived, 21% while the doctor was present, and a further 5% en route to hospital. A recent report showed that the most important factor in reducing the number of deaths after myocardial infarction had been the improvement in prehospital resuscitation. The lifesaving potential is therefore considerable.

Adequate pain relief reduces the risk of rhythm disturbances and so possibly of ventricular fibrillation. Morphine or diamorphine should be used and given intravenously; only if the intravenous route proves impossible should intramuscular injection be given, and then into the deltoid muscles for most rapid absorption.

Since it is not impossible to predict which patients will develop ventricular fibrillation, defibrillators need to be available for all patients in the high risk period and from the time that the doctor or ambulance arrives until the patient reaches hospital. The Ambulance National Staff Committee Training recommendations now include cardiac care, but the number of ambulance personnel trained is as yet small. It may be more appropriate at present for the ambulance to carry the defibrillator and the general practitioner to be skilled in using it.

Defibrillators

In 1985 the British Heart Foundation sent a questionnaire to all general practitioners in the United Kingdom. Of those who replied, 5% already had a defibrillator and 46% said they would like one, though half of them made comments that indicated they would not be committed to using it, had no idea of the available models, and thought that they would need extensive training.

The use of a defibrillator is essentially simple, and the basic rhythms that need to be recognised are bradycardia, ventricular tachycardia, electromechanical dissociation, ventricular fibrillation, and asystole.

The defibrillators available at present are operator activated. There should soon be available an automatic defibrillator with good sensitivity and specificity: training in the use of defibrillators is not difficult but this type may reduce some of the anxieties implied in the response to the questionnaire. Another unit being developed is one which is used once only, after which it is returned to the manufacturers for recharging. This will overcome some of the maintenance problems associated with infrequent use of equipment by general practitioners, and it will probably be much cheaper than existing models.

Drugs and dosages

Diamorphine 10 mg×2 or morphine 20 mg*×2
(given slowly intravenously diluted with water to 10 ml and with antiemetic—titrate dose for pain relief)

Water for injection 10 ml×2

Cyclizine 50 mg or metoclopramide 10 mg or prochlorperazine 12.5 mg

(all may be mixed with diamorphine)

Naloxone 0.4 mg/ml ampoule×2

Atropine sulphate 1 mg*×2 or 600 µg×3

Lignocaine 100 mg* in 5 ml (bolus)
1000 mg* in 5 ml (infusion in 500 ml of normal saline)

Adrenaline 1 in 10 000—10 ml*×2

* Available in IMS prefilled syringes

I thank the British Heart Foundation for allowing me to use information from their general practice questionnaire on defibrillators; and Cardiac Records, Simonsen and Weel, and Physio Control for information on defibrillators.

Useful addresses

BASICS, 31c Lower Brook Street, Ipswich, Suffolk, IP4 1AQ.

IMS—International Medication Systems (UK) Ltd, 11 Royal Oak Way South, Daventry, Northamptonshire, NN1 5PJ.

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Cardiac arrest

Ventricular fibrillation is a potentially correctable rhythm disturbance and the one most likely to be treated successfully; treatment is much less likely to be successful with either asystole or electromechanical dissociation outside hospital, and even if initial attempts are successful there is still the problem of maintaining cardiac output while transporting the patient to hospital. The full procedure set out in the articles relating to hospital practice may not be appropriate to general practice. With ventricular fibrillation it is reasonable to defibrillate and to use lignocaine and adrenaline but probably not to proceed to the use of bicarbonate or the other antiarrhythmic drugs; similarly, with asystole try atropine and adrenaline, and with electromechanical dissociation adrenaline.

The adrenaline and atropine may be given either intravenously or at double the dose via an endotracheal tube. Several of the drugs suggested are available in prefilled syringes (International Medical Systems), which are much easier to use in an emergency: those available are supplied in a complete pack.

Other rhythm disturbances

The only other rhythm disturbances that need prompt prehospital correction are those producing low cardiac output: if the circulation is adequate consider lignocaine and monitor.

Ventricular tachycardia and bradycardia may therefore need to be corrected. If the patient is unconscious and collapsed with ventricular tachycardia defibrillate—failure to do so will result in death anyway—synchronisation is not essential. Bradycardia responds to a reasonable dose of atropine, not less than 0.6 mg intravenously.

Training

Training in advanced life support for general practitioners is limited, but in future we hope that postgraduate centres will be able to provide more. BASICS (British Association for Immediate Care) is introducing a system of regionalisation and through this it is hoped that training may become locally available.

Do hormones in meat, both intrinsic and added, survive cooking, and if so how might they affect people?

The anabolic agents currently permitted by the European Community for general use in fattening farm animals are based on the naturally occurring hormones and two xenobiotics (trenbolone acetate and zeranol). The EC intends to impose a ban on these synthetic compounds in the near future. Thyrostatics and the purely synthetic stilbene based agents (hexoestrol, diethylstilboestrol (DES)) are banned for this purpose in the Common Market. The natural steroid oestrogens have been shown to exhibit carcinogenic activity in several animal studies, but whether they are carcinogenic to man is at present a matter of debate. There is some evidence to suggest that some hormones can survive the cooking process, but in the case of natural steroids the residual concentrations are much smaller than those that occur naturally in the meat of bulls and pregnant animals. A report by the World Health Organisation stated that residues of natural steroidal hormones derived from treated animals are of negligible concern to human health because (a) they are readily degraded by the liver, (b) the consumer is producing far higher daily quantities of these hormones, and (c) the consumer is exposed to higher and widely variable levels from the meat and milk of untreated animals. The only cause for concern associated with the treatment of animals with natural steroids is that a depot of the administered agent might be consumed by people. This would happen after incorrect administration by injection or implantation of the agent into edible tissues. For this reason permitted procedures have to be clearly defined. Residues of xenobiotic anabolic agents may pose questions of safety, firstly, because of the potency of the hormonal activity and, secondly, because they or their metabolites may exhibit toxic effects essentially unrelated to their hormonal

activity. All the evidence in respect of the two compounds currently permitted is that the residual concentrations are negligible and unlikely to be associated with adverse effects.—D CONNING, toxicologist, London.

Estergreen VL, Lin MT, Martin EL, *et al.* Distribution of progesterone and its metabolites in cattle tissue following administration of progesterone— $4^{14}C$. *Journal of Animal Science* 1977;45:642-51.

Patterson RLS, Salter LJ. Anabolic agents and meat quality: a review. *Meat Science* 1985;14:191-220. Working Group on Health. *Aspects of residues of anabolics in meat*. Bilthoven, the Netherlands: World Health Organisation, 1981. (ICP FSP 002(1);S) 8467B.)

Does chlorination or fluoridation of water reduce its iodine content? Is there any evidence that water with a low iodine content predisposes a woman to breast cancer?

Fluoridation is unlikely to have any effect on iodine levels in water as the fluoride is added as the salt. Chlorination, with chlorine usually added as free chlorine, may displace iodine. We do not know to what extent this may happen. To put the issue into context, even if all water iodine were not available, it would make little difference to the overall daily iodine intake, except where water supplies were affected by saline intrusion. Assuming a usual daily fluid consumption of around 1.5 litres a day, the average daily contribution of water iodine to total iodine intake would be about 2%. There is some suggestive evidence (reviewed by Kelsay¹) that thyroid function is related to breast cancer. It is, however, most unlikely that small changes in water iodine levels will affect thyroid function and risk of breast cancer.—B MARGETTS, nutritionist, Southampton.

1 Kelsay JL. A review of the epidemiology of human breast cancer. *Epidemiol Rev* 1979;1:74-109.