THE TREATMENT OF THE CARDIAC ARREST EMERGENCY

BY

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SUMMARY

A simple routine for the treatment of the cardiac arrest emergency in a general hospital is described, emphasizing the importance of recognizing the experience and training of various grades of staff who must be involved if the treatment is to be successful.

A great deal of publicity has been given to the treatment of the cardiac arrest emergency and much has been written about the organization involved in dealing with these emergencies. The frequency of occurrence is certainly such as to cause considerable administrative consideration to be given to the problem, and as a result a simple routine has been evolved which takes account of the degree of skill to be expected from each grade of staff which is most likely to deal with a particular phase of the emergency.

The treatment has accordingly been arbitrarily divided into three phases, each of which continues smoothly into the succeeding phase until the patient can be removed to the intensive care or progressive patient care ward.

Phase I.

As the patient is nearly always seen first by a nurse it follows that the equipment which is provided must be such that the nurse is able to use it quickly and easily. Our cardiac arrest kit (fig. 1) consists of: (a) resuscitation board; (b) a means of inflating the patient's lungs with oxygen or air; (c) a small cardiac arrest box (38 x 38 x 20 cm) which contains only the basic essentials for the treatment of the immediate emergency.

Cardiac arrest kits are sited in a constant position in each of the wards so that all grades of staff become familiar with the location. Ideally one of these kits should be on each ward, but at present we have only been able to have one for each pair of wards. However, this means that the farthest a nurse has to go to fetch the components of a kit is a few yards.

The first nurse to see the patient immediately starts external cardiac massage whilst her colleague is sent to the telephone to dial a special number, by means of which the switchboard operator finds out where the emergency is and then contacts the duty anaesthetist and other members of the medical and nursing staff who will help to continue treatment of the emergency.

The second nurse, on returning from having dialled the emergency number, should then assist the first nurse to place the resuscitation board under the patient on the bed, so that a firmer...
surface is provided for the continuation of external cardiac massage, and then should administer oxygen or air by means of the apparatus provided, while the first nurse continues her external cardiac massage.

The keynote of this part of the organization is rapid communication, and some difficulties have been encountered with the normal telephone service which exists in hospitals, i.e. the emergency number has to be dialled, the switchboard operator has to answer the telephone, find out where the emergency is and then in turn contact the duty anaesthetist and the other members of the medical and nursing staff. This frequently gives rise to delays, particularly at night when staffing is numerically lowest. As a result the nurses are now instructed that if there is a shortage of nursing help they are to enlist the aid of the nearest "fit" patient until trained staff arrive. It is most important to emphasize that unless this part of the procedure is properly carried out no successful results can be expected.

Lectures are given to all grades of nurses, including auxiliaries, enrolled nurses and pupil nurses, at an early stage of their training so that each nurse is able to: (i) carry out external cardiac massage, (ii) insert correctly a Guedel airway, and (iii) inflate the patient's lungs by means of an anaesthetic face mask, with oxygen or air.

It follows, therefore, and this has been our experience, that the greatest degree of success can be expected by day and the least degree of success by night. We also emphasize that external cardiac massage and the administration of oxygen should go together.

It will be noted that the number of drugs in the box has been reduced to five in order to preserve simplicity and reduce the liability of pilfering from the box.

The meat hook is carried because it has been found expedient to hang the drip over the curtain rail when the more traditional stands are not readily available. Sellotape or 3M tape is used as experience shows that most of these patients sweat profusely, due to vagal stimulation, and the adhesive sometimes does not stick. The tape we use gives the least trouble.

The boxes which are made by our joiners are, in our opinion, of a better pattern than those used in the Sheffield area and described by Beire (1969). In addition, our boxes have proved to be versatile and they have been adapted for use in the obstetric flying squad service and also in the accident and emergency department for major civilian disaster service, simply by the addition of minimal anaesthetic equipment.

Our experience over the past few months is that by day it rarely takes more than two or three minutes from the time the cardiac arrest emergency is notified to the arrival of trained staff at the site of the emergency and at night this time increases to perhaps four or five minutes. When the medical staff arrive they are instructed to inflate the patient's lungs with bag and face mask for five minutes after reaching the site of the emergency, as experience has shown that if a medical officer has had to run to reach the emergency he arrives breathless and with shaking hands. It is therefore wiser to wait five minutes before attempting to intubate the patient. Difficulty may also be encountered if the collapsed patient is in bed when the head end of the bed is not removable and intubation has to be carried out through the bars of the bed.

### Contents of cardiac arrest box.

- **Laryngoscope**—check working
- **Spare battery**
- **Spare bulb**
- **Endotracheal tubes, sizes 7 mm, 8 mm, 9 mm (each with Nosworthy connection)**
- **Guedel airways, Nos. 2 and 3 (disposable)**
- **1 Spencer Wells**
- **1 Syringe, 20 ml**
- **Connection to Waters circuit**
- **1-inch roll Sellotape**
- **Ambo Mini foot sucker and suction catheter (size 18 or 16) × 2**

### IV needles

- **Medicut cannulae**: 16 gauge × 1; 18 gauge × 1
- **Braunula × 1**
- **Grahams Viggo × 1**
- **1 Baxter IV set and meat hook**
- **Syringes**: 50 ml × 1; 20 ml × 1; 10 ml × 3; 3 ml × 2; 2 ml × 3
- **Needles**: 21 gauge × 8; 23 gauge × 8

### Drugs

- **Sodium Bicarb. 8.4%, 100 ml × 2 bottles**
- **Calcium Gluconate 20%, 5 ml × 4 ampoules**
- **Water, 10 ml × 3 ampoules**
- **Adrenaline 1:1000 × 2 ampoules**
- **Lignocaine 0.5%, 20 ml × 2 ampoules**
- **Methoxamine, 20 mg, 1 ml × 2 ampoules**
- **Saline 0.9%, 500 ml × 1 bottle and cage**
- **Dextrose 5%, 500 ml × 1 bottle and cage**
After the initial collapse has been treated there is, because of the period of hypotension, invariably a tendency for the patient to vomit or regurgitate the stomach contents. This has to be watched for very carefully and pre-monitory signs are pallor, cold and clammy skin once the circulation has been restored. If vomiting does occur the usual steps are taken to clear the airway.

The cardiac arrest kits are maintained by the operating theatre technicians who inspect the oxygen cylinders daily and the boxes each time they are used to check they are complete, and at least once a month, if they have not been used, to check that the laryngoscope is with the spare battery and bulb, in working order, and that the drugs have not exceeded the expiry date. When the cardiac arrest box is ready for use a thread is tied across from lid to base (fig. 2) so that all grades of staff know that if the thread is not intact they must contact the nearest theatre to have the box examined and re-sealed.

Phase II.

The Cardiac Arrest Trolley (figure 3), is a converted dressings trolley (Top: 89 cm x 23 cm. Base: 89 cm x 53 cm x 41 cm). It contains more sophisticated equipment and drugs including a bronchoscope and foreign body forceps, a complete tracheostomy kit, an electrocardiograph and a defibrillator.

These serve as transitional apparatus between the immediate arrest and the transference of the resuscitated patient to either the intensive care or progressive patient care ward. They are also made by the hospital joiners and have been placed at strategic points throughout the hospital. They are brought to the site of the emergency as a result of a telephone call from the operator to the porter on duty.

Phase III.

As soon as the patient’s general condition has been improved and normal sinus rhythm has been restored he is then transferred to the progressive patient care ward which houses the monitoring devices which ensure that progress is maintained.
until such time as the patient is ready to be discharged.

Once the organization has been established and staff are familiar with the routine for the treatment of the emergency success can be achieved under the most remarkable circumstances.

One of the hospital porters, a man aged 57, was pushing a heavy trolley outside the gynaecological ward towards the incinerator. He was seen, through the open window of the ward, to fall flat on his face, by a nurse who immediately gave the alarm and ran out. External cardiac massage was carried out on the porter, who showed all signs of cessation of respiration and circulation, by the nurse and later by the medical staff, on the open road, where he was intubated by the duty anaesthetist as soon as the cardiac arrest box arrived. An electrocardiograph was connected by a flex leading through the open window and he was defibrillated in situ and later transferred to the progressive patient care ward, from which he was later discharged and is now back on duty.

In a three-month period we have dealt with 26 cardiac arrest emergencies in this 600 bedded hospital, of which the outcome was successful in four.

It is thought that, with increased familiarity with the organization and equipment, the proportion of successful results can be increased. It will be clearly appreciated that the organization outlined above involves many grades of personnel, including telephonists, porters and technicians as well as medical and nursing staff and requires the co-operation of all in order to work successfully.

ACKNOWLEDGEMENTS

I wish to thank the joiners of Newsham General Hospital for making the boxes, Mr W. J. Keboe, M.I.O.T.T., Senior Theatre Technician at Walton Hospital, Liverpool 9, who originally conceived the idea of the boxes and Mrs H. E. Brownbill for secretarial help.

REFERENCES


Correspondence

**APPARATUS FOR PULMONARY VENTILATION DURING BRONCHOSCOPY**

Sir,—The same flexible pressure tubing used in the small apparatus (Hart, 1970), for pulmonary ventilation during bronchoscopy (Sanders, 1967), is available in another convenient form. The alternative comes in 8 ft. lengths, has a Luer Lok connection at one end and is used normally for gas endarterectomy. The catalogue number is 42-0187 (Becton Dickinson).

S. M. Hart,

Liverpool

**REFERENCES**


**ABNORMAL RESPONSES IN VON RECKLINGHAUSEN'S DISEASE**

Sir,—May I draw the attention of your readers to the article on Von Recklinghausen's disease published in the February number of the *British Journal of Anaesthesia*. The condition referred to was that of multiple neurofibromata in which an abnormal response to muscle relaxants had been noted in two patients. I should like to thank Dr J. Alfred Lee for kindly drawing my attention to the ambiguity in the original article.

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**REFERENCE**