EQUIPMENT REVIEW

A user-designed resuscitation unit

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SUMMARY

Prior to the commissioning of the Phase I redevelopment of Glasgow Royal Infirmary, the need for the development of a new type of resuscitation trolley had been identified by a liaison group consisting of medical, nursing and scientific staff which had been set up to collaborate on the selection and specification of clinical equipment. A design study involving the liaison group and the Product Design Section of the Glasgow School of Art was, therefore, undertaken. This resulted in a basic design which was built in prototype form by the Department of Clinical Physics and Bioengineering for hospital trials. The unit was later taken over commercially.

DESCRIPTION OF RESUSCITATION UNIT

The complete resuscitation unit consists of two separate trolleys (Fig. 1) the smaller of which is mounted inside the larger when on standby and during transportation. Both trolleys are constructed of steel and the complete unit has a height of 108 cm (excluding the defibrillator), a width of 57 cm and a maximum depth of 80 cm.

The base of the large trolley is designed in such a way that when the smaller trolley is mounted inside it, its wheels are locked in position and no movement between the two trolleys can occur during transportation. At the scene of the emergency, the smaller trolley is separated from the larger one by a simple manual lift and tilt operation. The trolleys can then be positioned where required thus making the appropriate equipment readily accessible to the various members of a resuscitation team.

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Fig. 1 Front view of large and small trolleys.

CONTENTS OF RESUSCITATION UNIT

Large trolley

The large trolley (Fig. 2a) houses the defibrillator/monitor/recorder unit, oxygen and suction apparatus, and all the other equipment necessary for respiratory resuscitation.

Defibrillator/Monitor/Recorder. It was decided that a combined defibrillator-monitor-ECG recorder was required which was mains-powered, with battery backup, and also sufficiently lightweight to remove from the trolley, if necessary. With these basic requirements in mind, the Cardiac Recorders 2006 Defibrillator/Monitor/Recorder Unit was chosen. The defibrillator charger unit is mounted on a turntable arrangement which can turn through 360° at the top of the larger trolley. The charger itself is secured to the turntable by two '3 M' Hedlok fasteners which keep it firmly retained on the trolley whilst allowing quick and easy release for maintenance purposes. The turntable accepts the Cardiac Recorders 2006 charger unit at present, but can be modified 'in house' to accept most defibrillators of similar geometry.

Oxygen and suction apparatus. Oxygen is supplied from two 340-l oxygen cylinders

Fig. 2 (a) Front view of large trolley, and (b) front view and (c) rear view of small trolley.

mounted on the trolley, or from a pipeline source via a Mark IV Remote Probe (B.O.C.) and 3 m of high-pressure oxygen hose. The cylinders are fitted horizontally via metal straps to the base of the large trolley. Each cylinder is fitted to an oxygen regulator (Oxylitre Ltd) with 60 p.s.i. fir-tree-type outlet, which in turn is connected to a Mark IV Boom Outlet Valve (B.O.C.). Three such valves are mounted on a panel which is built into the front support frame of the large trolley, the third being connected to the high-pressure oxygen hose. Oxygen is taken from the appropriate boom outlet valve via a probe which is connected to an oxygen flowmeter and high-suction injector with 500 ml jar (B.O.C.) sited on a bar which is fitted to the large trolley frame.

Respiratory resuscitation equipment. All of the respiratory resuscitation equipment is stored in four separate trays which are attached to the Linvar louvred sloping front panel of the large trolley.

At all times an Ambu Mark IV Resuscitator is attached to the oxygen flowmeter. The suction apparatus is, likewise, set up for use with a wide-bore suction catheter. A full list of the equipment in each tray is shown in Table 1.

Table 1 Respiratory resuscitation equipment

Tray 1	Tray 2
2 Laryngoscopes	5 Endotracheal tubes (Clearway)
3 Face masks	2 Catheter mounts
3 Guedel Airways	(Medishield) with swivel connectors (Portex)
20 ml Syringe	2 Pairs of pressure forceps
Linen tape	1 Non-disposable introducer
Lubricating jelly	
Swabs	
Tray 3	Tray 4
Ambu bag	6 Suction catheters (Aeroflo Argyle)
Hudson oxygen mask	2 Suction catheters (Yankauer Argyle)
Brook airway	
Spare laryngoscope blade	
Spare bulbs and batteries for laryngoscope	

Small trolley

The small trolley (Fig. 2b & c) is used to transport the tray of emergency drugs and accessory equipment.

The emergency drug tray. The drug tray is sealed and kept in a closed compartment at the top of the unit. This tray contains standard resuscitation drugs and is returned to the pharmacy department for renewal if the seal is broken.

Accessory equipment. The accessory equipment is stored in a number of plastic boxes attached to the Linvar louvred sloping panel of the small trolley. Included in this equipment are accessory items required for defibrillation and ECG monitoring: intravenous cannulae, a comprehensive supply of intravenous fluids, needles and syringes for drug administrations, and many other items such as swabs, scissors and strapping which may be required.

Cost. The basic unit is £1430. The defibrillator was £3595 and the accessories £7300.

CLINICAL USE OF RESUSCITATION UNIT

At present, 23 such units are in use in the hospital. Prior to their introduction, tutorials covering the use of the equipment were given to all junior medical and nursing staff. Despite this, minor operator problems with the equipment were frequent in the first few months. However, these have since decreased as the staff have become more familiar

with the trolley. It is expected that the remaining operator problems will be overcome by the continuing training of user staff, which is implemented by the hospital's Resuscitation Group.

CONCLUSIONS

The unit described offers the following advantages over hitherto available resuscitation trolleys:

- (1) it takes up significantly less floor space, whilst allowing the equipment to be conveniently sited during use because of the 'two-trolley' design;
- (2) all the equipment can be easily seen and is readily accessible without the necessity of opening drawers;
- (3) the contents of all trays and boxes can be easily altered to suit individual hospital requirements;
- (4) facilities for oxygen therapy from cylinders on the trolley and from wall supply are provided.

ACKNOWLEDGEMENTS

The authors are indebted to all staff who have assisted in the evaluation and commissioning of the resuscitation equipment, and also to the mechanical engineering staff of the Department of Clinical Physics and Bioengineering. Thanks are also due to Cardiac Recorders Limited for their assistance throughout the development of the resuscitation unit.

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Erratum

‘Equipment Review: A user-designed resuscitation unit’ by S. M. MacVicar, M. P. Watts & C. S. Watt (*Archives of Emergency Medicine*, 1986, **3**, 203–207) contained an error. This occurred on page 206, line 16, where ‘£7300’ should correctly read ‘£730’.

It should be noted that the defibrillator/monitor/recorder chosen for this piece of equipment was a Cardiac Recorders 2006 Defibrillator/Monitor/Recorder Unit. This machine does not fully meet Part 1 of the BS5724 and neither does it meet the Part 2 requirements which will come into operation in April 1987. Cardiac Recorders have advised that they have no intention of upgrading this model to comply with Part 2 and that they now consider this to be an old and out-of-date model themselves. It is to be discontinued in favour of subsequent models.