

Total Resuscitation Trolley

Lt, Col, Tariq Hayat Khan
MCPS (Anaesthesia)
Graded Anaesthetist AFIIU, Rawalpindi

INTRODUCTION

A design of compact and portable trolley is presented. It is hoped that this sort of trolley will enable an experienced operator with only one assistant to undertake immediate cardiopulmonary resuscitation with ease but without loss of precious time. The idea of this trolley was largely borrowed from the Boyles Anaesthesia Apparatus in common use in operation theatres. Total Resuscitation Trolley' TRT is not intended to replace modern resuscitation trolley's, a variety of which is readily available in international market. Instead it is aimed to complement the existing system at a competitive and affordable price. If a single human life is saved with it's help, all it's target's will be assumed to have been achieved.

HISTORY OF CPR

The history of modern cardiopulmonary resuscitation began in the middle of the eighteenth century. A 'Society for the Recovery of Drowned Persons' was founded in Amsterdam in 1767, A Royal Humane Society was established by William Hawes in 1771 in England. Artificial ventilation of lungs by direct laryngeal intubation started in 1902. And external cardiac compression was made popular following the work of Kouwenhoven and others in 1960.

According to one study, 40 percent of patients who underwent CPR for cardiopulmonary failure, survived in a western hospital, 15 percent left with permanent neural deficit. In our country, no such data is available, but the situation is definitely not very commendable and much remains to be done.

NEED OF A RESUSCITATION TROLLEY

Cardiopulmonary resuscitation (CPR) is now established on firm grounds to save the victim's life in cardiac arrest due to various causes and/or respiratory failure. Operation rooms are comparatively well equipped and have trained staff to undertake CPR, if the need thus arises, but M I Room's, Trauma Centres and even most of the ITC's in our hospitals have yet to acquire a fail-safe system for immediate CPR.

A common problem encountered, besides lack of trained staff, is wastage of precious time in hurrying in

the suction apparatus, oxygen cylinders and intubation apparatus from various corners of the same set-up. Life saving drugs are usually packed in some cabinet in a far-away corner under lock and key. An un-acquainted assistant may fail altogether to locate an ampule of a life-saving drug amongst so many containers. Time factor, is the single-most crucial factor to decide between life and death in patients requiring CPR.

The need to obviate this type of situation, prompted us to design a compact and mobile trolley incorporating suction apparatus, oxygen delivery system, respiratory support equipment and a panel containing life-saving drugs for quick approach and easy recognition all at the same time. Economy and versatility are two other important factors imbued in the design. Commonly available suction apparatus and bull-nosed oxygen cylinders can be used.

COMPONENTS

- a. A drug tray.
- b. A drawer for respiratory support equipment.
- c. A drawer for IV infusions, cannulae and syringes etc.
- d. A shelf for ECG machine/defibrillator.
- e. Oxygen supply system.
- f. Suction apparatus.
- g. Stainless Steel Trolley.

1. DRUG TRAY (TABLE 1)

- a. Consists of an outer PVC or stainless steel tray in which a panel of Thermopore or a thin plastic sheet with ampule pits is fitted. These pits are of specific size for each type of ampule and must hold ampules snugly but not too firmly. This sort of pits can be seen in many gift packs containing cosmetics.
- b. If made with Thermopore, a lining of soft cloth is advisable.
- c. Each set of pits is labeled with the names of specific drugs. Labels are colour-coded, e.g, red

for potentially dangerous drugs, yellow for intermediate and green for relatively 'safe' drugs, which are mainly adjuvants, and have minor systemic effects.

Table 1. List of Drugs

1. Atropine	1. Dormicum	1. Decadron
2. Adrenaline	2. Valium	2. Solu-cortef
3. Aldomet	3. Morphine	3. Phenergon
4. Dopamine	4. Pethidine	4. Largectal
5. Dobutamine	5. Nikethamide	5. Maxolon
6. Propranolol	6. Magnapyrol	6. Vit-K
7. Atenolol	7. Anaroxyl	7. Lasix
8. Tridil	8. Transamine	8. Soda bicarb
9. Suxameth	9. Aminophylline	9. Insulin
10. Adalat	10. Lignocaine	

- d. An outer cover of transparent plastic sheet, to protect the drugs from splash, dust or moisture.
- e. The whole tray with contents and cover should fit firmly on the poles of trolley but be easily removable for independent use.
- f. The tray is not exactly horizontal, but has a slant of 15 degrees for better visibility.



Anterolateral view of TRT



Back view of TRT showing O₂ cylinder

- g. This unique feature is not known to be in existence in any other model.

2. DRAWER FOR RESPIRATORY SUPPORT

It consists of a steel drawer of about 16"x24", opening to one side of trolley.

It contains:

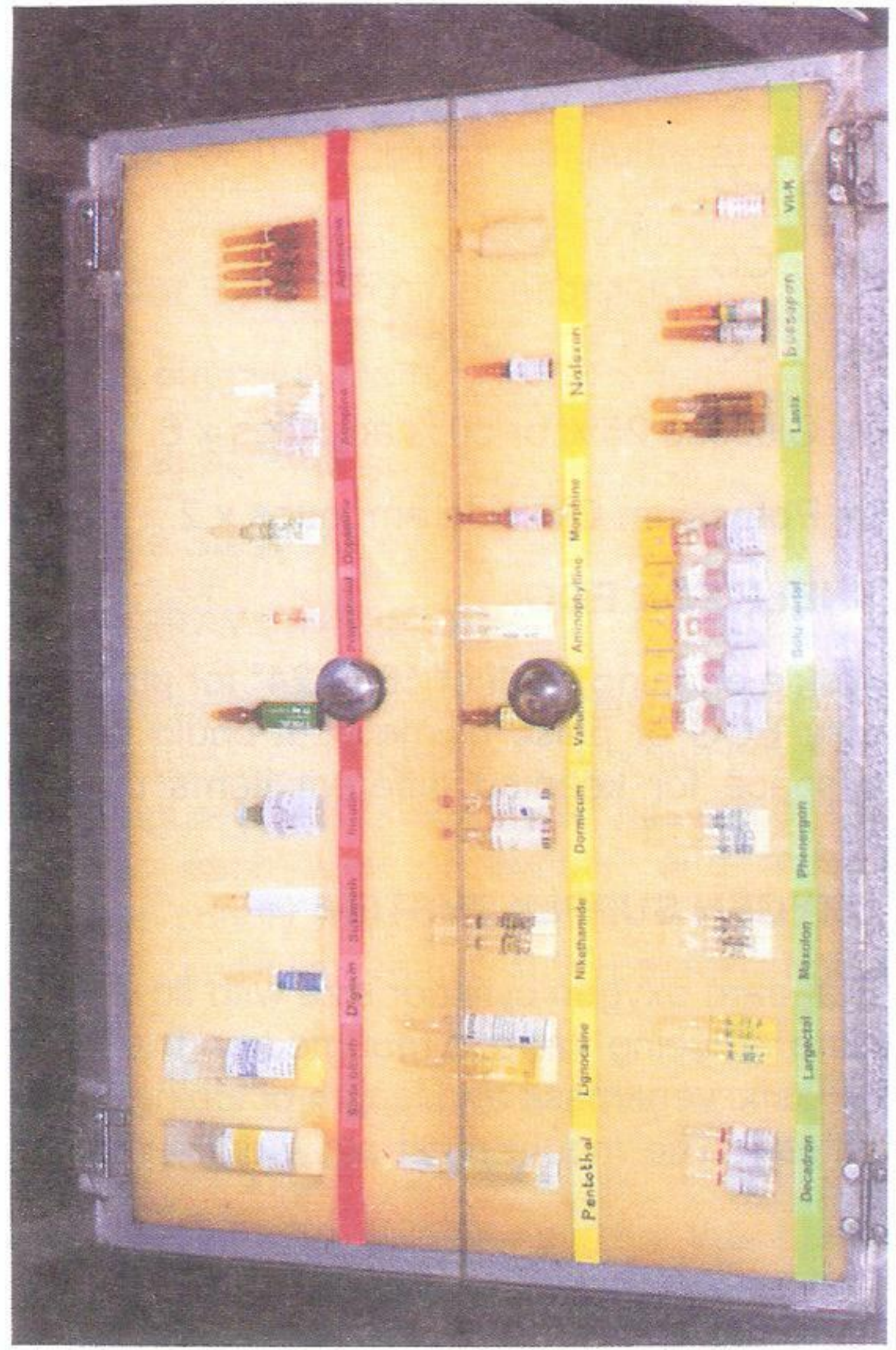
- a. Laryngoscope set complete. (Upper cover of the box having been removed).
- b. Magil's forceps.
- c. Endotracheal tubes, red rubber or disposable, nasal and oral, of assorted sizes, (At least No 8.5, 7.0 and 2.5 must be available).
- d. Suitable connector for ET tubes.
- e. Ambu bag for adults, and babies.
- f. Masks, Adult size 3 and 5. Baby size 0 and 1.
- g. Flash light (torch)
- h. A set of spare batteries for laryngoscope as well as for torch.
- j. A pair of scissors, SS, Blunt Point.
- k. Sticking plaster.



A drawer for resp. Support eqpt



TRT with opened drawers



The Drug Tray



Drawer for IV infusions/Cannulae etc

These items are held in situ by means of anchors, fixtures or partitions.

3. DRAWER FOR IV FLUIDS ETC

It is steel drawer of same size (16"x24"), but opening toward opposite side.

It contains:

- a. Glucose 5%, one bag.
- b. Ringer's Lactate solution, two bags.
- c. Haemaccel/Gelafundin, one bag.
- d. 0.9% Sodium Chloride Sol, one bag.
- e. Sodium Bicarbonate inj, one bag.
- f. Infusion sets, x 6.
- g. Three way stop cock, x 2. For rapid infusion/simultaneous drug injections.
- h. NG tubes x 4, of assorted sizes.
- j. Foley's Catheters of assorted sizes.
- k. IV cannulae, No 16, 18, 20, 24 (one each)
- l. Butterfly needles, No 16, 22, 24 (one each)
- m. Disposable syringes:-

2	CC	:	X	6
5	CC	:	X	6
10	CC	:	X	2
20	CC	:	X	2
50	CC	:	X	1
- n. Inj Glucose 25% or 50% ampoules x 6.
- o. Inj Potassium Chloride ampoues x 2.

4. SHELF FOR ECG:

A side opening shelf of 16" x 24" for placing small, portable ECG or pulse oximeter. It could be used as extra space for keeping different items used during CPR.

5. OXYGEN SUPPLY SYSTEM

Standard oxygen cylinder size with flow meter and pressure reducing valve is mounted on the rear of the TRT. Plastic ventimask and length of tubing is provided for delivery. The mount must allow quick replacement

of empty cylinders. A good arrangement may contain as extra mount for uninterrupted oxygen supply, as considerable time is wasted during replacing empty cylinders and even more so during replacing flow meter assembly on new cylinders.

6. SUCTION APPARATUS

Any standard suction apparatus for resuscitation can be housed in the lower most part of TRT. It could be secured with the trolley permanently or be housed so as to remove it for independent use elsewhere. Castor wheels must be removed from the apparatus before placing it in TRT.

7. TROLLEY

Made of steel, consists of four castor wheels with a wide base to counter-balance the out stretched drawers and heavy oxygen cylinder at the back. Wheels must be fitted with breaks.

Four vertical steel bars hold the drawers, the shelves, and on their top the drug tray is placed. Each bar is fitted with two hooks for suction tubes, or other piping.

8. T-BAR/DRIP STAND

A T-bar can be fixed with one or both of the front vertical bars of the TRT for hanging IV infusions/blood bags.

9. OVER-HEAD SHELF

An additional over-head shelf is provided for defibrillator, cardiac monitors or pulse oximeter etc. It will be fixed over rear vertical bars of the TRT. It could be dispensed with if no such equipment is available.

MANUFACTURE OF THE TROLLEY

TRT can be manufactured very conveniently by combined workshops of Army, firms engaged in manufacture of Anaesthesia systems, or otherwise private manufacturers of hospital furniture may be provided with the blueprints of the trolley and get it custom made.

COST

TRT costs on an average Rs. 8000.00 to Rs. 10000.00 only, as it incorporates all the already existing CPR equipment commonly available in our hospitals. On the other hand foreign assembled trolley's cost at least twenty times as much.

