Audit on evaluation of emergency equipment for cardiopulmonary resuscitation available in clinical areas in Teaching Hospital Anuradhapura

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Abstract

Introduction: Successful cardiopulmonary resuscitation (CPR) is critical in saving lives in critical care management. Both skills and facilities are important to achieve a successful CPR. This study was aimed to determine the currently available facilities for cardiopulmonary resuscitation in various clinical areas at Teaching hospital, Anuradhapura.

Methods: The audit was carried out in all wards, ICUs and operating theatres of Teaching Hospital Anuradhapura during one week period in 2013. This was a questionnaire based, cross-sectional observational study.

Results: Data were collected from 54 clinical areas. Only 80% of clinical areas had ambu bags, face masks, oropharyngeal airways, portable suction apparatus, yankauer sucker and tracheal suction. Almost every clinical area had tracheal tubes of various sizes. More than 95% of sites had a larygoscopy handle. Less than 20% of places had LMA, magil forceps and bougie for use in difficult intubation. Only 40% of the clinical areas had defibrillator in working condition. Most of the sites had equipment for fluid resuscitation. Almost all trolleys had adrenalin 1mg vials and atropin 0.6mg vials. However $CaCl_2$, 10% glucose, naloxone, Saline 10ml vials and GTN spray were available in less than 50% of places we assessed. Only one thirds of the clinical areas did regular checks on the emergency trolley at every shift.

Conclusion: It is important update emergency trolleys according to guidelines and ensure regular check-up to make sure they are up-to-date.

Introduction

Successful cardio pulmonary resuscitation (CPR) is critical in saving lives in critical care management. Both skills and facilities are important to achieve a successful CPR. National reporting and learning system data from Great Britain indicates that ill-stocked resuscitation trolleys directly led to a number of preventable deaths (1). For advanced life support to be effective, the cardiac arrest equipment need to be readily available and in good working order. Equipment failure has been identified as a factor responsible for delays in instituting cardiopulmonary resuscitation in 18% of arrest calls (1).

The National Patient Safety Agency (NPSA) reported 86 incidents involving missing or broken equipment on cardiac arrest trolleys (2) and a separate survey of such trolleys in 2002/2003 found that the equipment available varied considerably from recommended standards (3). Defibrillators were also reported to fail occasionally, while many errors were caused by poor defibrillator care and maintenance (4).

While there is increasing awareness of the fact that the trainee young doctors often lack adequate skills in basic and advanced life support (5), there is a lack of information on the facilities available for successful CPR especially in the Sri Lankan hospital setup.

Resuscitation trolley should contain all the equipment needed for emergency resuscitation. The Intensive Care Society and the Resuscitation Council (UK) (2004) guidelines recommend the minimum required equipment including airway management equipment, circulation equipment, drugs and miscellaneous items (6).

In order to ensure the quality of resuscitation practices, it is essential to maintain required equipment in the resuscitation trolley depending on the anticipated workload and specialized local requirements. The hospital should conduct regular audits in order to improve the resuscitation practices and facilities (7). This study was aimed to determine the current available facilities for Cardiopulmonary Resuscitation in the clinical areas at the Teaching hospital, Anuradhapura.

Methods

The audit was carried out in cross-sectional manner covering all wards, ICUs and theatres of the Teaching Hospital Anuradhapura within one week in 2013. The hospital has 45 wards, seven ICUs and five theatre complexes. Permission for the study was obtained from the Director, Teaching hospital, Anuradhapura and ethical clearance for this study was obtained from the Ethics Committee of Rajarata University.

Two medical officers visited all selected clinical areas and filled up a questionnaire after appropriate observation. The questionnaire assessed the availability of the minimum required equipment as recommended by the Resuscitation Council UK guidelines (2004) (6), storage conditions and the expiry date of each item (if applicable).

Questionnaire had four sections. Section A assessed the airway equipment using 20 questions. Circulatory equipment was assessed by 11 questions included in the section B. Essential drugs which should be in the emergency trolley were assessed in section C. Additional miscellaneous items were assessed in section D.

Results

Data were collected from 54 clinical areas. Wards represented 78% of the study sites while ICUs represented 13% and theaters 9%. Of the clinical areas studied, 80% had ambu bags, face masks, oropharyngeal airways, portable suction apparatus, yankauer sucker and tracheal suction. Less than 5% places had nasopharyngeal airways. As shown in figure 1, almost every clinical area had tracheal tubes of various sizes. More than 95% of sites had a larygoscopy handle. Less than 20% of places had LMA, magil forceps and bougie for use in difficult intubation. Most of the sites had several types of syringes. More than 90% sites were equipped with oxygen cylinders and oxygen cylinder keys.

Only 40% of the clinical areas had a defibrilator in working condition. Less than half of the places had ECG electrodes to detect rhythm during cardiac arrest. Approximately 10% areas had defibrilator gel pads.

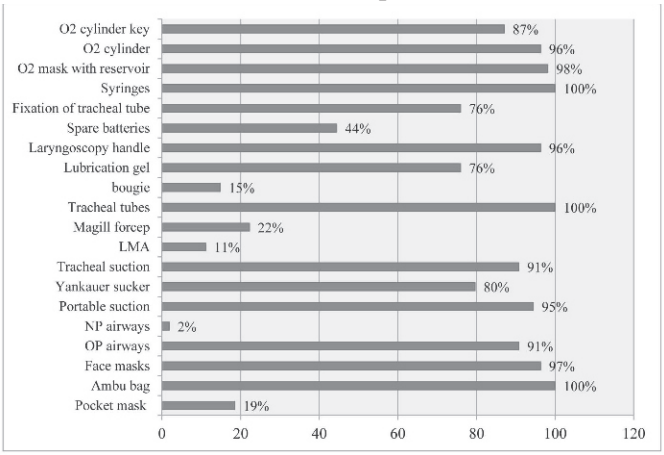

Figure 1: Grapical representation frequency of airway equipment avaiable in the clinical areas

Most of the sites had equipment for fluid resuscitation such as IV cannula, syringes, cannula fixation dressing, IV infusion sets, 500ml, 0.9% saline bags and tourniquets in the emergency trolley. Less than 50% sites had arterial blood gas (ABG) syringes and less than 20% sites had central venous pressure (CVP) monitoring kits in the emergency trolley (Figure 2).

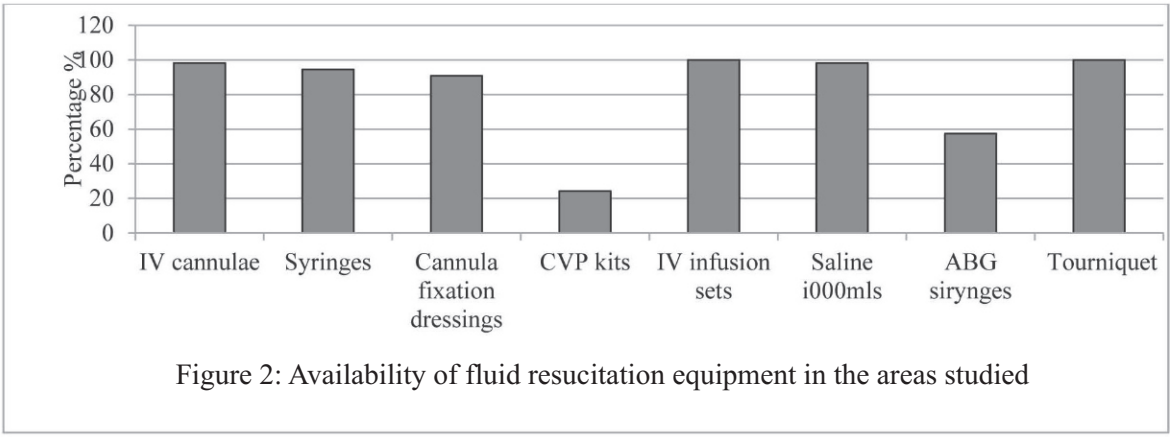

Figure 2: Availability of fluid resucitation equipment in the areas studied

Essential emergency drugs available in all the trolleys were assessed. Of the 22 drugs that were considered, almost all trolleys had adrenalin 1mg vials and atropine 0.6mg vials. Of other essential drugs more than 90% sites had chlopheniramine, hydrocortizone, bicarbonate, salbutamol and aspirin in emergency trollyes.

Frusemide, lidocaine, magnesium, midazolam, KCl and ipratropium were available in more than 50% places. Atropine 3mg, amidarone, adinosine, $CaCl_2$, 10% glucose, naloxone, Saline 10ml vials and GTN spray were available in less than 50% of places we assessed (Figure 3).

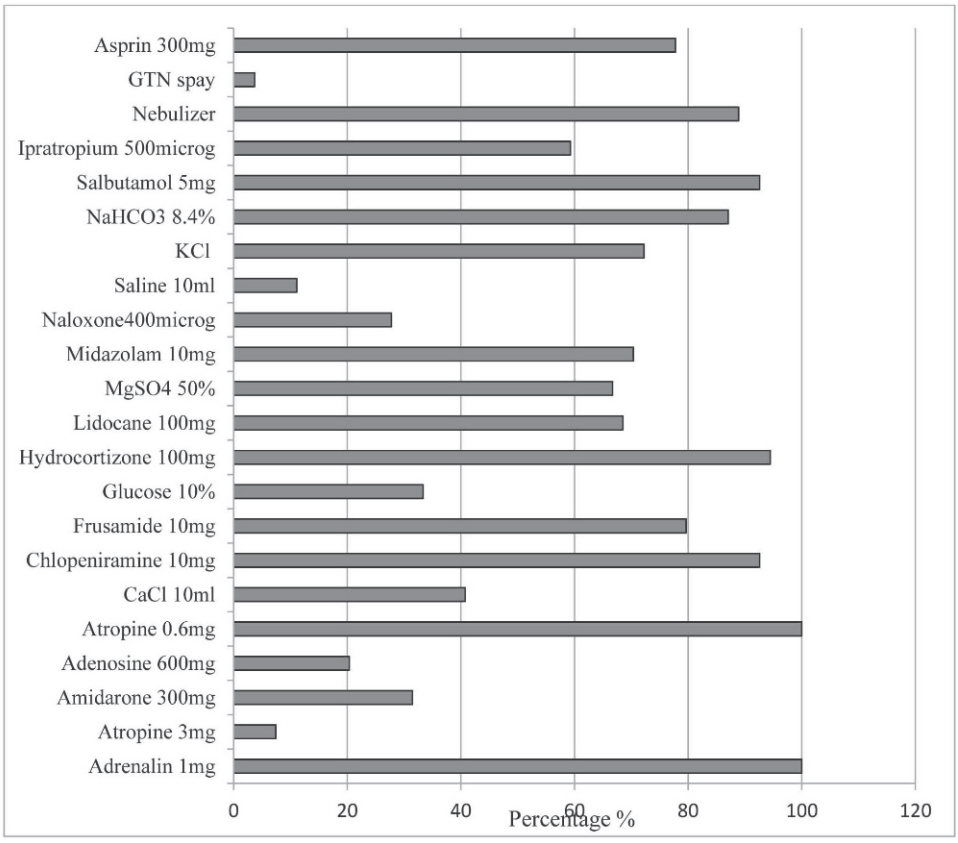

Figure 3: Availability of emergency drugs in the areas studied

More than 90% places had a clock to time CPR, personal protective items such as gloves and aprons and sharp disposal containers. Blood sample bottles and scissors were in the emegency trolley in more than 80% sites. However, none of the trolleys had alcohol wipes required for disinfection (Figure 4).

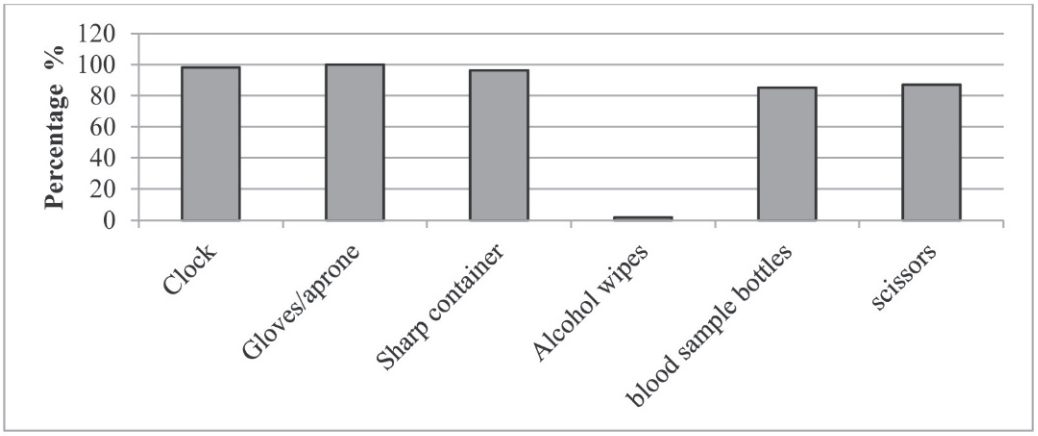

Figure 4: Availability of miscellaneous instruments in clinical areas

Of the clinical areas we assessed only 31% of the emergency trolleys were checked at every shift as recommended. Daily checks were carried out in 24% of areas, while weekly checks were carried out in 16%. Twenty eight percent of the emergency trolleys were checked even less frequently every month. Approximately 90% of the deficiencies in the emergency trolley had been identified by regular checks according to the survey and 85% of them were informed to the relevant authorities. Nine percent deficiencies were not identified by regular checks and not communicated or addressed by the relevant authorities in the ward.

Discussion

Emergency trolleys are essential to save lives in a critical situation. Well equiped emergency trolleys and properly functioning equipment can reduce the in-hospital mortality, considerably. It is important to carry out regular check, maintain and restock emergency trolleys in order to maximize the efficiency and avoid delays in critical care management. A study by Kolkailah *et al.* (2014) showed that the anaesthetists knowledge regarding the location of emergency trolleys were unsatisfactory (8) which suggests the importance of all medical staff to be made aware of the location of the resuscitation trolleys in the ward, ICU or operation theatre. Our study was conducted in 54 clinical areas which included wards, ICUs and operation theaters. In most of the sites there was an organized emergency trolley which is helpful in the management of patients in emergency situations.

Commonly used airway devices were present in most of the places except for the nasopharyngeal airway. All sites had equipment for tracheal intubation. This is very useful in emergency tracheal intubations. But only one fifth of the places had equipment for difficult intubation and these sites were obviously the theaters. Only 90% of the sites had oxygen available which is a basic drug which saves life in emergencies. It is therefore recommended to upgrade availability to all sites.

Almost all the places had equipment for fluid resuscitation including various types of fluid. This will enable rapid fluid resuscitation specially in hypotensive and shock patients. Both adrenalin and atropine were available in almost all sites which is very helpful during management of cardiac arrest patients. Hydrocortizone and chlorpheniramine were available in most of the places. These are useful medications for the management of anaphylaxis which can occur at anytime. Amiodarone, $CaCl_2$ and 10% glucose were not readily available which needs to be addressed as these are essential for the cardiac arrest management. Salbutamol, ipratropium and magnesium were available in most of the sites as these were used in management of acute severe asthma.

Personal protective equipment were available in most of the sites. Sharps disposal container was available in most of the sites for safe disposal of sharps. But we need to upgrade the availability to 100% for the prevention of cross infections even in an emergency situation. Unfortunately none of the places had alcohol wipes.

Checking of the emergency trolley was not satisfactory as only 50% of the sites checked it at least daily. Ideally this has to be done during every shift and after use. We suggest this to be done at the beginning of every shift so that deficiencies can be identified and corrected. These steps are useful for efficient resuscitation of critically ill patients and has a effect on the outcome of the patients**.**

Recommendations

We recommend to keep a log book to assess regular checkups and random checks by the outreach team to determine whether these are done regularly. Resuscitation trolleys should be checked at the beginning of every shift and required items should be restocked. Further we recommend to carry out regular audits and health care personnel awareness programmes to improve checking, maintaining, restocking and repairing the equipment in the emergency trolley. A standardized checklist of the equipment in the emergency trolley and a standard layout is recommended for all hospitals for more efficient use.

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