Code Blue Policy for a Tertiary Care Trauma Hospital in India

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ABSTRACT

"Code Blue" is generally used to indicate a patient requiring resuscitation or in need of immediate medical attention, most often as the result of a respiratory arrest or cardiac arrest. When called overhead, the page takes the form of "Code Blue, (floor), (room)" to alert the resuscitation team where to respond. Every hospital, as a part of its disaster plans, sets a policy to determine which units provide personnel for code coverage. In theory, any emergency medical professional may respond to a code, but in practice the team makeup is limited to those with advanced cardiac life support or other equivalent resuscitation training. Frequently, these teams are staffed by physicians (from anesthesia and internal medicine in larger medical centers or the emergency physician in smaller ones), respiratory therapists, pharmacists, and nurses. A code team leader will be a physician in attendance on any code team; this individual is responsible for directing the resuscitation effort and is said to "run the code". This phrase was coined at Bethany Medical Center in Kansas City, Kansas. The term "code" by itself is commonly used by medical professionals as a slang term for this type of emergency, as in "calling a code" or describing a patient in arrest as "coding".¹

The purpose of this study is to make available policy with regard to Code Blue which can be followed in a tertiary care hospitals. It was a descriptive cross-sectional study carried out between January and June 2015. The study population included doctors, nursing personnel, paramedical staff and quality managers of tertiary care hospital from public and private hospitals. Checklist was made after an exhaustive review of literature which was then improvised. The checklist was discussed in focused group discussion held on 1 June 2015, and suggestions were incorporated. Validation of the checklist was also done by experts in various private and public hospitals. Subsequently, interaction was done with study population against the backdrop of the checklist and Code Blue policy was formulated.

Keywords: Cardiac arrest, Code Blue, Crash cart.

How to cite this article: Singh S, Sharma DK, Bhoi S, Sardana SR, Chauhan S. Code Blue Policy for a Tertiary Care Trauma Hospital in India. *Int J Res Foundation Hosp Healthc Adm* 2015;3(2):114-122.

Source of support: Nil

Conflict of interest: None

REVIEW OF LITERATURE

Hospital emergency codes are used worldwide to alert staff for various emergency situations in hospitals. The use of codes is intended to convey essential information quickly with a minimum of misunderstanding to the hospital staff, while preventing stress or panic among visitors of the hospital.

"Code Blue" is generally used to indicate a patient requiring resuscitation or otherwise in need of immediate medical attention, most often as the result of a respiratory or cardiac arrest. Each hospital, as a part of a disaster plan, sets a policy to determine which units provide personnel for code coverage. In theory, any medical professional may respond to a code, but in practice the team makeup is limited to those who had advanced cardiac life support or other equivalent resuscitation training. Frequently, physicians from anesthesia, emergency medicine and internal medicine are charged in the team. A rapid response team leader or a physician is responsible for directing the resuscitation effort and is said to "run the code".²

General Principles of Code Blue³

After ensuring the safety of the patient, staff and bystanders, the management of the collapsed patient involves as follows:

- Prevention of further injury
- Checking response to verbal and tactile stimuli
- Care of airway, breathing and circulation
- Calling for help
- Control of bleeding
- Protection from the environment
- Maintenance of normal body temperature
- Protection of skin and nerves by protection of bony prominences from hard objects

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- Reassurance and continued observation of the collapsed patient.

Each member of the multidisciplinary team is to know and understand the skills and roles of each person involved in the Code Blue response. During a Code Blue response, the multidisciplinary team recognizes the resuscitation team leader for possessing broad skills of organization and performance related to the Code Blue response.

All active members should be performing as a well-constructed team, polished by practice and experience. This will assist in preventing a disorganized and frantic code scene (Flow Chart 1).³ The incidence of out-of-hospital cardiac arrest is estimated between 36 and 128 per 100,000 subjects per year. In these victims, cardiopulmonary resuscitation efforts are made in as many as 86%, and return of spontaneous circulation (ROSC) can be achieved in 17 to 49%.⁴

Cardiac arrest is a medical emergency that, in certain situations, is potentially reversible if treated early. Unexpected cardiac arrest can lead to death within minutes: this is called sudden cardiac death (SCD). The treatment for cardiac arrest is immediate defibrillation if a "shockable" rhythm is present, while cardiopulmonary resuscitation (CPR) is used to provide circulatory support and/or to induce a "shockable" rhythm.

A number of heart conditions and non-heart-related events can cause cardiac arrest; the most common cause is coronary artery disease.⁵

Cardiopulmonary resuscitation is an important part of the management of cardiac arrest. It is recommended that it be started as soon as possible and interrupted as little as possible. The component of CPR that seems to make the greatest difference in most cases is the chest compressions. Correctly performed bystander CPR has been shown to increase survival; however, it is performed in less than 30% of out of hospital arrests as of 2007. If high-quality CPR has not resulted in ROSC and the person's heart rhythm is in asystole, discontinuing CPR and pronouncing the person's death is reasonable after 20 minutes.⁵

For decades, conventional wisdom in treating patients with cardiac arrest was that if the heart stopped beating for longer than 6 to 10 minutes, the brain would be dead. Now a new treatment being embraced by a growing number of US hospitals suggests that patients can be brought back to a healthy life even if their heart is stopped for 20 minutes, perhaps longer. In recent months around the US, doctors and nurses say, cardiac-arrest patients who would previously have been given up for dead have been revived and discharged to return to their families

and jobs with all or nearly all of their cognitive abilities intact.⁶ Each year in the US, 400,000–460,000 persons die of unexpected SCD in an emergency department (ED) or before reaching a hospital.⁷

The proportion of SCD that occur out-of-hospital has increased since 1989. Death and disability from a heart attack can be reduced if persons having a heart attack can immediately recognize its symptoms and call for emergency care. Prehospital emergency medical service systems can assist in reducing SCD rates by dispatching appropriately trained and properly equipped response personnel as rapidly as possible in the event of cardiac emergencies. However, national efforts are needed to increase the proportion of the public that can recognize and respond to symptoms and can intervene when someone is having a heart attack, including calling the designated number, attempting cardiac resuscitation, and using automated external defibrillators until emergency personnel arrive.⁷

Survival rates for cardiac arrests that occur in hospitals and outside them continue to be low (17 and 6%, respectively), and fewer than one-third of patients who have an out-of-hospital cardiac arrest receive CPR. Consequently, a number of changes were made to the 2005 American Heart Association Guidelines for CPR and emergency cardiovascular care. The changes were intended to simplify CPR in order to increase its use and effectiveness by both clinicians and nonprofessionals.⁸

In one of the study by Stundek et al, it was found that there were 1,142 cardiac arrests which were included in the analytic data set. Prehospital ROSC occurred in 299 individuals (26.2%). When controlling for initial arrest rhythm and other confounding variables, individuals with no endotracheal intubation (ETI) attempted were 2.33 (95% confidence interval [CI] = 1.63–3.33) times more likely to have ROSC compared to those with one successful ETI attempt. Of the 299 individuals with prehospital ROSC, 118 (39.5%) were subsequently discharged alive from the hospital. Individuals having no ETI were 5.46 (95% CI = 3.36–8.90) times more likely to be discharged from the hospital alive compared to individuals with one successful ETI attempt.⁹

A study was conducted in the year 1996, by Cobbe et al to determine the short and long-term outcome of patients admitted to hospital after initially successful resuscitation from cardiac arrest out of hospital. From the study, it was found that about 40% of initial survivors of resuscitation out of hospital are discharged home without major neurological disability. Patients at high risk of subsequent cardiac death.¹⁰

Flow Chart 1: Process flow during “Code Blue” **Annexure 1:** Responsibilities of Code Blue team**Team Leader**

Doctor from department of anesthesiology will be the team leader

- Designates roles to team members and directs their actions
- Decides appropriate treatment as per ACLS guidelines and gives orders to team members
- Decides appropriate disposition of patient once stabilized
- Brief the patient's attendant after resuscitation and will make sure that information has been passed to patient's family members
- Ensures that one member (nursing) is designated to record events in the Code Blue flow sheet (Annexure-3) and get it verified from the team leader
- Fill Code Blue report (Annexure 2) and submit to the Code Blue committee.

Physician or Anesthesiologist

Manages the airway and circulation.

One Nurse

- Assists doctor in managing the airway
- Assists in obtaining intravenous access and drug administration as per team leader's instructions
- Assists in managing code as requested
- Will remain with the patient until the transfer occurs?

Other Nurse

- Automated external defibrillator (AED)/defibrillator switched on
- Monitor rhythms through AED pads /ECG leads/paddles
- Rhythm analysis and shock delivery as advised by Code Blue team leader
- Fill Code Blue flowsheet and attach to the patient's medical record after showing the same to team leader.

Security Personnel

- Directs team members toward code location
- He must ensure the area/scene is safe before proceeding with their response
- Ensures that no crowding of Code Blue site takes place.

Hospital Attendant

- Help nursing staff in pushing crash card near the patient
- Assists in various other activities.

Need of the Study

Cardiac arrest is a medical emergency that, in certain situations, is potentially reversible if treated early. Unexpected cardiac arrest can lead to death within minutes: this is called SCD.⁵

Despite advances in the prevention and treatment of heart disease and improvements in emergency transport, the proportion of cardiac deaths classified as "sudden" remains high, probably because of the unexpected nature of SCD and the failure to recognize early warning symptoms and signs of heart disease. The age-adjusted SCD rates and the state-specific variation in the proportion of SCDs suggest a need for increased public awareness of heart attack symptoms and signs.⁷

Death and disability from a heart attack can be reduced if persons having a heart attack can immediately recognize its symptoms and call for emergency care. Prehospital emergency medical service systems can assist in reducing SCD rates by dispatching appropriately trained and properly equipped response personnel as rapidly as possible in the event of cardiac emergencies. However, national efforts are needed to increase the proportion of the public that can recognize and respond to symptoms and can intervene when someone is having a heart attack, including calling a designated number, attempting cardiac resuscitation, and using automated external defibrillators until emergency personnel arrive.⁷

METHODOLOGY

It was a descriptive cross-sectional study carried out between January to June 2015. The study population included doctors, nursing personnel, paramedical staff and quality managers of tertiary care trauma hospital from public and private hospitals. Checklist was made after an exhaustive review of literature which was then improvised. The checklist was discussed in focused group discussion held on 1 June 2015, and suggestions were incorporated. Validation of the checklist was also done by experts from various private and public hospitals. Subsequently, interaction was done with study population against the backdrop of the checklist and Code Blue policy was formulated.

ANALYSIS AND RESULTS

A total of 200 people which included doctors, nurses, paramedical staff, and quality managers of tertiary care public and private hospitals were approached for interaction against the backdrop of the checklist. Total response rate was 62%. Forty-one doctors responded out

of 50 doctors approached, 34 nurses responded out of 50, 20 quality managers interacted out of 50 and 16 doctors, expertise in handling Code Blue responded out of 25 approached and 14 nurses, expertise in infection control practices out of 25 approached. Policy was framed after incorporating inputs from responses received against the backdrop of the checklist.

CODE BLUE POLICY FOR A TERTIARY CARE TRAUMA HOSPITAL IN INDIA

Aim of the Policy

To make clear to all the staff about Code Blue and to inform and guidance regarding the same. This document summarizes the information to patients and the staff about Code Blue policy. It put in the picture how the institute will meet its training requisites to ensure that staffs receives adequate training in relation to Code Blue policy.

Goals and Purpose

The goals and purpose of this policy is to ensure that skilled medical team response for emergency resuscitation is provided.

Scope

Provide skilled medical team response for emergency resuscitation.

Responsibility

All employees of the hospital, Cardiac Arrest Review Committee for monitoring.

What is Code Blue?¹

Code Blue is one of the emergency procedure codes for cardiopulmonary arrests and life-threatening emergencies in areas of the hospital. A Code Blue is the term used to alert the Code Blue team (resuscitation team) to an area where a person has had a cardiac/respiratory arrest.

Any attempt at resuscitation is better than no attempt.

Purpose

To provide immediate life saving measures in cases of life threatening emergencies.

When to Activate Code Blue?

A Code Blue will be initiated on all patients, visitors and staff suffering a cardiac/respiratory arrest showing following symptoms:

- Not responsive
- No breathing

- No neck pulse (to be witnessed by healthcare provider).

Who can Activate Code Blue?

Any individual may call a Code Blue and certified staff will initiate basic life support (BLS) and automated external defibrillator (AED) if available, until relieved by the Code Blue team.

How to Activate Code Blue?¹¹

- The Code Blue team has to be notified by the control room (room designated to notify the message to the response team).

Affix patient label

- The individual calling the Code Blue must dial the designated number to call a Code Blue.
- Identify yourself to the call center staff who responds to the call.
- Give the exact location (i.e., unit, floor, wing, building)
- Tell him/her that there is a adult/pediatric Code Blue
- Code Blue team will be notified using public address system.

What Happens when Code Blue is Announced? (Flow Chart 1)¹²

- When Code Blue is announced the message is sent to the Code Blue team (Annexure 1), who are expected to arrive at the scene as soon as they get the message

Annexure 2: Code Blue report

This form has to be filled by the team leader of the Code Blue team who is the in-charge of the patient after evaluating the event.

This is to be submitted to the **Code Blue review committee** within 24 hours of occurrence of the event.

This form is for quality assurance purpose.

Date and time of Code Blue _____

Location of the Code Blue _____

Patient's description in brief

Conditions which led to Code Blue

Was the Code Blue managed appropriately?

Gaps in following the Code Blue protocol

Anything important needs to be mentioned

Name and sign of the doctor

Date

Annexure 3: Code Blue flowsheet (adult and pediatric)

Name _____, Age _____ Sex _____ UHID of the Patient _____ Date _____ Time of Code Blue announcement _____, Time of arrest _____, Witnessed _____, Unwitnessed _____ Cardiac arrest ☐ Respiratory arrest ☐							Circumstances prior to arrest Diagnosis		Treatment given to the patient prior to code team arrival Time of starting CPR _____ CPR given by _____					
Airway/Ventilation Breathing at onset ☐ Spontaneous: Aponic: Agonal: Assisted Time of first assisted ventilation: Ventilation: BVM ET Tracheotomy others Intubation: Time _____ Size: _____ By whom _____														
Defibrillation (Joules)			Epinephrine		Atropine		Amiodranone		Lidocaine		Magnesium		Code Blue team members	
T I M E	B P	P R	R R	S A O 2	R H Y	Comments:								

Monitor strips to be pasted here	Nursing notes

Monitor strips to be pasted here	Outcome Time resuscitation ended _____ Status: Alive ☐ Dead ☐ Reason of ending resuscitation _____ Return of circulation _____ Medical futility _____ Time deathdeclared _____ Death declared by whom _____ Family present at that time _____ Name of the family member contacted _____ Recorder's signature _____
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Cause	
Other remarks if any Auditor's report Signature of the staff	
Signature of the team leader	

(Code Blue response time is expected to be < 3 minutes).

- The members of the Code Blue team must ensure that the area/scene is safe before proceeding with their response. This requires rapid assessment of the location and circumstances associated with the Code Blue call.
- The members of the Code Blue team will not respond to areas where unpredictable and variable environmental conditions exist. When a Code Blue is called, all members of the Code team will respond immediately.
- Refer to appendices for site-specific information regarding members of the Code Blue team (Annexure 1).
- Code team members function collaboratively during the code with one person identified as the code team leader.
- The Code Blue will follow the advanced cardiovascular life support (ACLS) guidelines. It is recommended all members have current ACLS training and certification.
- The individual assigned as recorder will document all treatments, medications, electrocardiogram

(ECG) data etc., on the Code Blue record (Annexure 3). The Code record remains in the patient's medical record after designated individual show it to the team leader.

- The Code Blue report (Annexure 2) is filled by the team leader at the end of the Code Blue and submit to Code Blue Committee completes the monthly statistics for Code Committee.
- Resuscitation equipment will be immediately available for all Code Blue calls.
- Following a successful resuscitation of in-patient, and planned transfer to a critical care unit, a Code Blue team nurse will remain with the patient until the transfer occurs.
- Following successful codes on other than registered in-patients (admitted patients) the patient should be transferred to ED for further assessment and treatment. Exceptions to the above may occur.

Means of announcing Code Blue differs from hospital to hospital depending on the resources available.

Number of Code Blue teams is not fixed and vary from hospital to hospital.

Annexure 4: Code Blue mock drill audit sheet (adult and pediatric)¹⁵⁻¹⁹

Assessment and activating help	Yes	No	Comments
Did the first responder assessed the patient appropriately?			
Did the first responder verbally summoned the help?			
Did he/she instructed someone to call on the designated number?			
Was there proper delegation of tasks to 2nd and 3rd responder by first responder?			
The victim was moved from the site of code only if absolutely essential to perform CPR effectively or safely			
Did the 1st responder performed appropriate ABC assessment and intervention?			
Alerting Code Blue			
Was there any delay in alerting Code Blue?			
Was Code Blue announced thrice (loud and distinct)?			
"Adult" of pediatric code announced			
Exact location specified when announced			
Any Pager/phone issue(s)/or any other means of communication			
Any other issue related			
Did Code Blue team responded in time (<3 minutes)			
Role of 2nd and 3rd responders			
Did the crash cart arrive/Kit Bag within 2 minutes?			
Did the 2nd responder did the assigned job appropriately? (opened the crash cart, provided ambu, attached defibrillator, attached oxygen, helped with CPR)			
Did the 3rd responder did the job as assigned (ensure/secure IV access)			
CPR quality			
Delivered compressions × 2 minutes, per AHA guidelines, then commenced with usual CPR methodology as follows:			
Opened airway/checked breathing			
Delivered two breaths			
Checked pulse (location appropriate to age of victim)			
Positioned proper hand position for compressions			

Contd...

Contd...

Performed correct depth for compressions			
Used correct rate/ratio for one-man CPR			
Applied and/or used ambu bag correctly			
Reported events information to second responders clearly			
Vascular access			
Delay			
Inadvertent arterial cannulation			
Infiltration/disconnection			
Other (specify in comments section)			
Defibrillation(s):			
Once AED available, turn on machine, applied pads and activated AED			
Followed directives per AED			
Crash cart			
Located drugs and equipment easily			
Located/assembled laryngoscope correctly and identified correct endotracheal (ET) tube			
Prepared IV equipment			
Correctly assembled suction			
Universal precautions			
Followed by all team members (gloves, face mask)			
Documentation			
Signature of Code team leader on code sheet			
Incomplete record			
Other			
Team behavior			
Was handover proper from 1st responder?			
Were team members aware of their roles and responsibilities?			
Was there any delay in identifying leader?			
Was knowledge of equipment appropriate?			
Was knowledge of medications/protocols appropriate?			
Was communication among team members appropriate?			
Any other issue			
Any protocol deviation			
With regard basic life support (BLS)			
With regard to ACLS			
Others			
Equipment			
Were equipment available?			
Was there any problem in the functionality of the equipment?			
Any other issue			
Miscellaneous points			
Did security personnel respond as per role?			
Did hospital attendants respond as per role?			

*Code Blue mock drill assessment team will assess any deviation from the protocol and report to Code Blue committee

Training

Continuous training is required for all the staff of the hospital (doctor, nurses, paramedics, grade IV, security) for the implementation of Code Blue policy for all.

Training would be conducted through regular classes and Mock Drills (Annexure 4).

Awareness will be created by displaying poster both in Hindi, English and a local language showing the number clearly all around.

How Code Blue Teams may be Required for a Hospital?

There is no fixed number. Availability and accessibility of resources (manpower, equipment), size of the hospital, design of the hospital and many other factors specific to the hospital should be taken into account while deciding upon the number of Code Blue teams.

Limitation of the Policy

This policy is specially designed for a trauma care hospital.

Means of announcing Code Blue differs from hospital to hospital depending on the resources available.

Number of Code Blue teams is not fixed and vary from hospital to hospital.

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