Code Blue for Pharmacists: Procedures, Equipment, and RSI

Dale Tucker RPh, MEd, BCPS
Cheryl Cadotte, PharmD
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Objectives

- To elucidate the appropriate procedures/ conduct for the pharmacist to follow during a code blue emergency
- To identify the non-medication components of the crash cart
- To discuss the medications used during rapid sequence intubation (RSI)

Procedures

- Medication tray
- Syringe assembly
- Dispensing medications
- Preparing IVPB medications
- Code etiquette

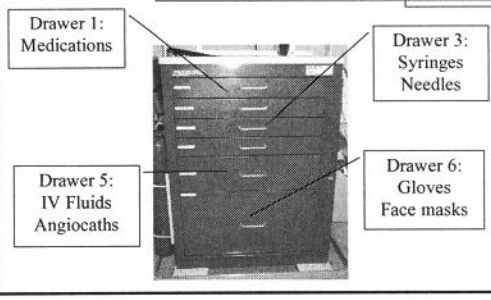
Why Pharmacist Participation

- Use of medications is an inherent part of most code blue emergencies
- Preparation of intravenous medications comes under the purview of pharmacists
- It is a dynamic and interactive process of pharmaceutical care

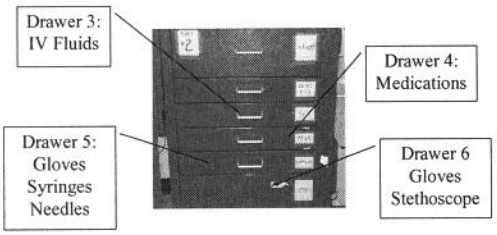
Crash Cart Locations

- Determine location of crash cart on any unit(s) covering
- Replacement medication trays are kept in the central pharmacy manufacturing area
  - Replaced to ICU Pyxis machines
  - Replaced to CPD post-code when cart is cleaned and medications and instruments replaced
  - Replaced to RIM when crash cart in storage is pulled into service

HUH/HWH Crash Cart Components



RIM Crash Cart Components



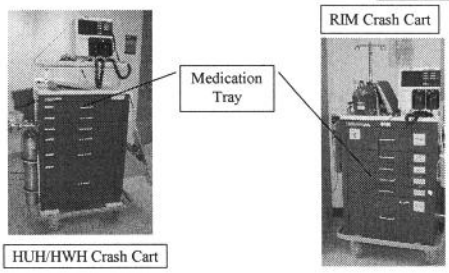
Attending a Code Blue

- Notification
  - Overhead PA system
  - Code blue pager
- Reach site of code
  - Take stairs when possible
  - Enter room/area and identify yourself to staff already in attendance

Pharmacist Procedures

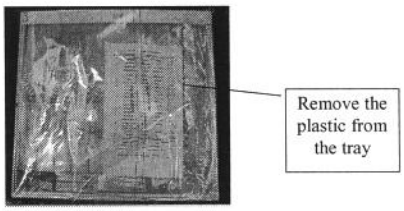
- If the medication tray is still in the cart, remove it at an opportune time when the other drawers are not in use
- If medication tray is already being attended by a physician or nurse, offer to work with them or to handle the medications

Remove the Medication Tray



Place Tray on Solid Surface

Medication Tray

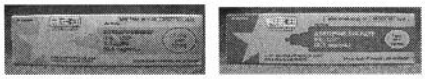


Pharmacist Procedures

- Identify the physician calling the code
- Identify the nurse recording the events
- Locate the nurse or physician administering the medications
- Stand by the medication tray in sight of the physician running the code
- If possible, be in view of the ECG monitor

Syringe Preparation

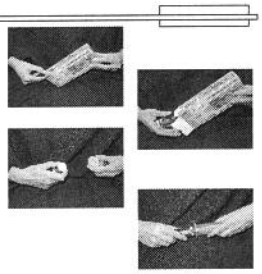
- At the start of the code open and assemble an epinephrine and an atropine syringe



- Replace each assembled syringed in its box to make quick identification easier
- Draw up 2-3 syringes with 20ml NS for flushing between doses of medications

To Assemble a Syringe

1. Open the syringe box from the side indicated
2. So that the two parts fall out into your hand, then
- Flip off the plastic end-caps and
- Attach the medication half to the plunger half with a push and a twist until resistance is met



Pharmacist Procedures

- Obtain IV solutions, syringes, and needles from the cart as necessary for requested medications
- Determine if IV medications will be administered by needle or blunt tip system; may need to exchange needles on syringes
- Stay focused on physician calling the code

Dispensing Medications

- Select correct medication requested by the physician calling the code
- Assemble the syringe (if not done in earlier step) or draw up medication requested; change to blunt tip system if required
- Step to bedside and loudly read name of medication and dose from syringe or vial as you hand it to the administering MD or RN

Dispensing Medications

- Reading name of dose of medication from syringe or vial
  - Ensures that the correct medication is being dispensed
  - Is a double check that the correct medication is handed to the administering physician or nurse

Dispensing Medications

- Return to stand by the medication tray
- Check with recording nurse that the correct time and medication were recorded
  - Try and use overhead clock in room to write administration times so everyone can follow the medication timing
- Draw up another syringe/vial/ampule of medication just used

Dispensing Medications

- Helpful hints
  - Back of the medication list found in the medication tray contains dosing basics
  - Keep track of empty boxes/vials/ampules as physician calling the code often asks how much of various medications were already used
    - Line up empty containers next to the medication tray as used
    - Keep track of timing between doses of epinephrine
    - The recording nurse can corroborate counts and timing

Plan Ahead

- If possible, check patient's chart for allergies, age, height, and weight
- Correct patient demographics make for more accurate calculation of doses or infusion rates if needed
- Any history of cocaine use?

Preparing Medications Amiodarone

- Initial dose: 300 mg IVP qs to 20 ml with NS or D_5W; may repeat with 150 mg qs to 20 ml prn
  - Infuse each dose over 10 minutes
- Infusion dose: 150 mg in 150 ml D_5W; stable for 2 hours only
  - Infuse at 1 mg/minute = 60 ml/hour
- Kit with drug, label, and IV fluid in medication tray

Preparing Medications Norepinephrine

- Dilute 4 mg in 250 ml D_5W or D_5NS (16 mcg/min)
- Avoid dilution with plain NS
- Infuse at 0.5-1 mcg/min and titrate up to 30 mcg/min to improve blood pressure
- Avoid giving in same line as alkaline solutions

Preparing Medications Isoproterenol

- Dilute 1 mg in 250 ml D_5W, LR, or NS (4 mcg/ml)
- Infuse at 2-10 mcg/min titrated to an adequate heart rate

Preparing Medications Epinephrine

- For cardiac arrest, dilute 30 mg epinephrine (30 ml of 1:1000 solution) in 250 ml NS or D_5W to infuse at 100 ml/hr and titrate to response
- For bradycardia, dilute 1 mg of 1:1000 epinephrine in 500 ml NS and infuse at 1-5 ml/min (2-10 mcg/min)

Preparing Medications Procainamide

- Dilute 1 grams in 250 ml D_5W or NS (4 mg/ml)
- Maximum concentration 20 mg/ml
- Recurrent VF/VT: 20 mg/min up to 50 mg/min with maximum dose of 17 mg/kg
- Maintenance: 1-4 mg/min

Professional Conduct

- Always remain focused on the physician calling the code
- Watch and be aware of events going on around you
- Never leave a code that is underway without arranging for someone to handle medications and, if possible, letting the physician calling the code know

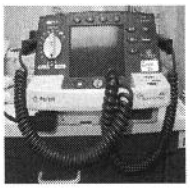
Professional Conduct

- Sometimes additional medications are needed; options to obtain them include:
  - Calling from room to have tubed or delivered to nursing unit, i.e., phenytoin IVPB; send RN, MD, or other pharmacist to pick up from tube
  - Having RN, MD, or other pharmacist go to front desk and call pharmacy
  - Having RN or other pharmacist obtain medication from Pyxis, i.e., flumazenil

Crash Cart Equipment

- Outside of cart
- Inside cart
  - Airway equipment
  - Breathing equipment
  - Circulation equipment
  - Miscellaneous

Monitor and Paddles



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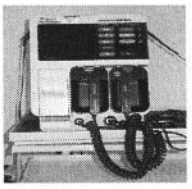
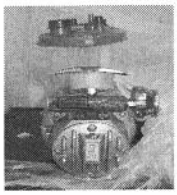
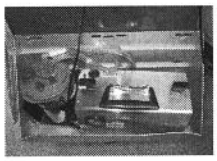


HUH/RIM

Suction Apparatus





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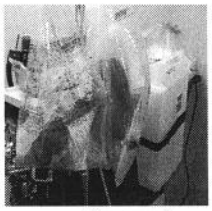
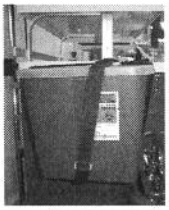
HUH/RIM

Needle Boxes





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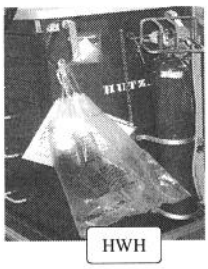
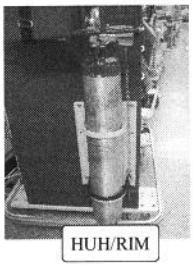
Oxygen Canister





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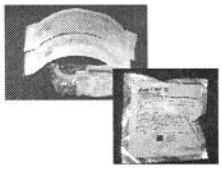
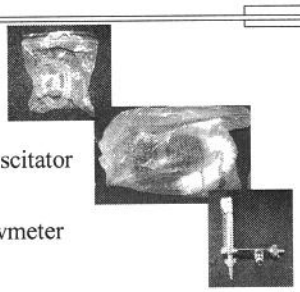
Airway Equipment

- Intubation equipment
- Endotracheal tubes
- CO_2 detector



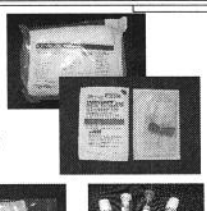
Breathing Equipment

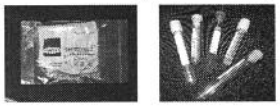
- Face mask
- Manual resuscitator
- Oxygen flowmeter



Circulation Equipment

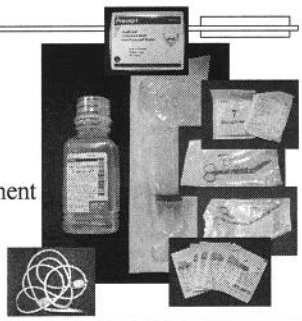
- To insert a central line
- To start peripheral lines
- To test blood





Miscellaneous

- Face mask
- Gloves
- Scissors
- Hemostat
- Irrigation equipment
- Sponges
- Extension cord



Rapid Sequence Intubation (RSI)

- Definition
- Pre-medications
- Sedatives
- Neuromuscular blocking agents (NMBA)

Pre-medications

- L – Lidocaine: 1.5 mg/kg IVP over 30-60 seconds
- O – Opioid: Fentanyl 3 mcg/kg @ 1-2 mcg/kg/min IV analgesia if awake
- A – Atropine: 0.02 mg/kg IVP
  - Glycopyrrolate 0.1mg/kg IVP
- D – Defasciculation: 10% of paralyzing dose

Sedatives: Etomidate (Amidate®)

- 0.2-0.4 mg/kg **IVP**
- Onset = 60 sec DOA = 5 min
- Myoclonus, adrenal suppression
- Lowers ICP → good for head injury patient
- No effect on hemodynamics→ ok if hypotensive
- No effect on ventilation

Sedatives: Midazolam (Versed®)

- 0.1- 0.3 mg/kg
- Onset = 1-2 min DOA = 10-20 min
- Tachycardia, respiratory depression, hypotension
- Amnesia

Sedatives: Propofol (Diprivan®)

- 1 – 2.5 mg/kg IVP
- Onset = 30 sec DOA = 1- 3 min
- Respiratory depression, hypotension, ↓ CO
- ↓ICP, ↓ cerebral oxygen demand, rapid awakening
- Found in ICU pyxis

Sedatives: Ketamine (Ketalar®)

- 1 – 2 mg/kg
- Onset = 30-60 sec DOA = 5-15 min
- HTN, ↑ICP, ↑ myocardial/cerebral oxygen demand, ↑ BP, ↑ HR
- Bronchodilator
- Found in ED pyxis

Neuromuscular Blocking Agents

NMB	Dose (/kg)	Onset	Duration	Side Effects	Notes
Succinylcholine (Anectine®)	1-1.5 mg/kg (70-100 mg)	<1 min	6-10 min	↑ ICP, IOP, ↓ HTN, myalgia, fasciculations, malignant hyperthermia, tachy/bradyrhythmias	Quickest onset
Pancuronium (Pavulon®)	0.1-0.15 mg/kg (7-10 mg)	2-3 min	60-90min	Hepatic elimination	↑ HR, BP, histamine release
Vecuronium (Norcuron®)	0.1 – 0.15 mg/kg (7-10 mg)	2-3 min	30-45 min	Renal/Bile elimination	No hemodynamic effect
Rocuronium (Zemuron®)	1 mg/kg (70 mg)	1-2 min	60-80 min		Used in renal and hepatic failure
Cisatracurium (Nimbex®)	0.15-0.2 mg/kg (10.5 – 14 mg)	~2 min	30 – 90 min		Reserved for use in renal failure (Cr Cl < 30 ml/min)

NMBA

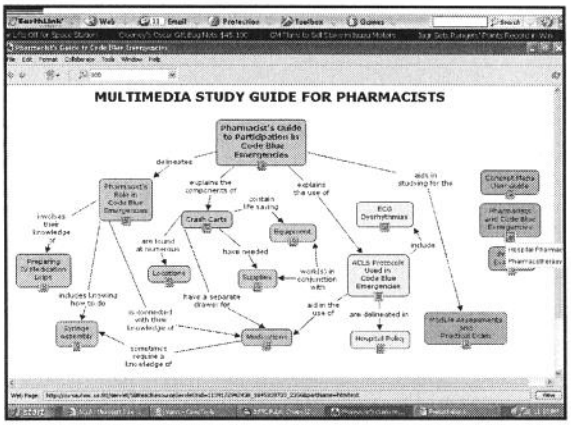
- Used to manage ventilation, ICP, spasms and decreased oxygen consumption
- Not first line
- Before NMBA, medicate with sedation and analgesia

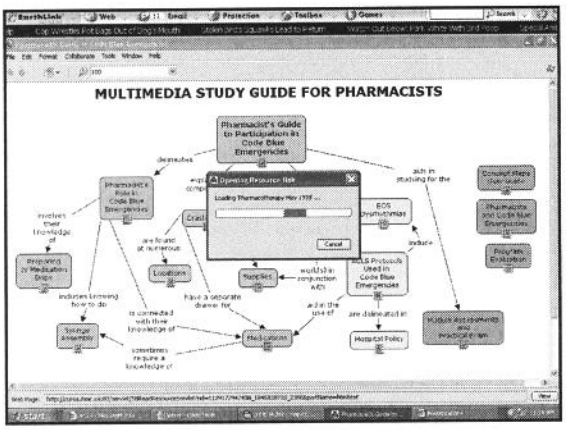
Summary

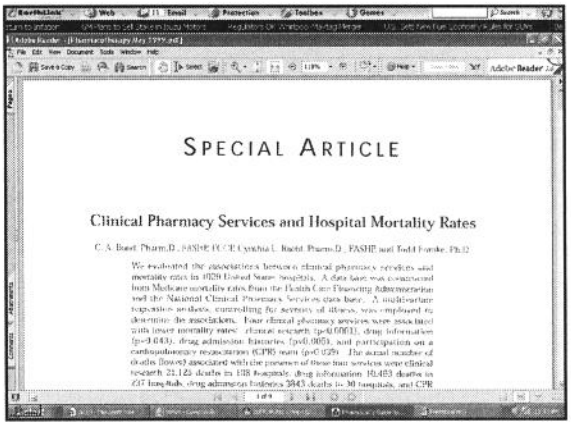
- RSI can involve pretreatment ("LOAD"), sedation and paralyzing the patient
- Sedate before paralyze
- NMBAs are used for muscle relaxation
- NMBAs should be selected based on PMH, DOA, renal & liver function

Concept Maps

- A method of organizing information
- Code blue concept map found on Harper Hospital webpage: Click on Code Blue







Summary

- Always remain calm and in control
- Note that each code you attend will be a different scenario; be alert and pay attention
- Remember that participation in code blue emergencies becomes more comfortable with each time you do it

Supplemental Reading

- Evaluating a training program for pharmacist code blue response. *Hospital Pharmacy* 2005; 40(1): 49-53, 60
- Rapid sequence intubation in the emergency department. *J Emerg Med* 1995; 13: 705–10