

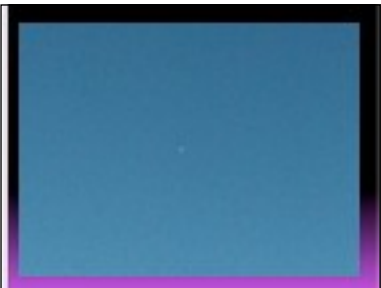


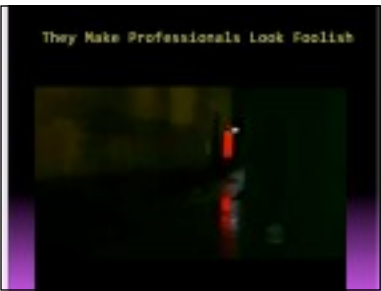
Coping When It Doesn't Work

James R. Whitaker
MD, MPH, FRCPC



• Hollywood take on EMS?





Objectives

- Trauma treatments and outcomes
- Cardiac arrest statistics
- Critical incident stress
- Stages of grief and how to cope

Disclaimer

Some of the material presented may be shocking and may conflict with everything you have been taught. I do not disagree with the protocols and recommendations discussed.



Trauma

Traumatic Arrest?



Case Study 1

- August 1993, 0600
- Received a request for an ambulance to respond for a shooting at a residence located 4 miles north of town.
- Upon arrival, EMS crew is directed to a bedroom in the rear of the residence.
- Find two patients lying in individual beds in the same room.

- Both patients have experienced gunshot wounds to the head.
- Patient 1 is an 8 year old male patient.
- Patient 2 is a 21 year old male patient.
- Both patients are in cardiac arrest.
- CPR is started on both patients and additional ambulances are contacted.

Patient 1

- 8 year old male patient.
- No known allergies, no known medications, no pertinent past medical history.
- Note gunshot wound to right temple area.
- Right pupil is fixed and dilated, left pupil is 3-3 mm, non reactive.
- No other injuries noted on assessment.

Patient 2

- 21 year old male patient.
- No known allergies, no current medications, no pertinent past medical history.
- Note gunshot wound to occipital area of skull.
- Both pupils are fixed, dilated.
- No other injuries are noted on assessment.

- Both patients are transported to local ED within 6 minutes of arrival on scene.
- Air medical was contacted but have a 30 minute response time.
- While enroute, pulses are obtained on both patients. No spontaneous respirations are noted.
- Continue to assist respirations on both patients utilizing OPAs and BVM's.

- Both patients are treated in the ED and eventually airlifted to Trauma Center.
- Both patients expire.

Review of Call

- Paramedics not available
- Crew's treating patients were a mix of EMT-Basics and Intermediates.
- Was the treatment appropriate?
- What were the chances of survival?

Traumatic Brain Injury

- Caused by a blow, jolt, or penetrating injury to the head which results in disruption of the normal function of the brain.
- Some cases may result in mild to severe.
 - 2.4 million cases of TBI in the US each year
 - 1.3 million are treated and released
 - 295,000 are admitted
 - 52,000 die



Centers for Disease Control

Outcomes

- Estimated that 5.3 millions Americans with TBI will require long-term or lifelong need for help with daily living as a result of TBI.
- Wide range of functional changes:
 - Thinking Sensation Language
 - Emotions
 - Epilepsy
 - Diseases associated normally with age

Cranial Gunshot Wounds

- Most lethal of firearm injuries
 - 66% fatality rate
 - 1/3 die before reaching hospital



Cranial Gunshot Wounds

- Predictors of poor neurological outcome or death:
 - Low initial GCS
 - Older age
 - Presence of low blood pressure
 - Inadequate oxygenation early after injury
 - Dilated non-reactive pupils
 - Bullet trajectory

Treatment of TBI

- Airway
- Maintain the airway
 - OPA
 - Combitube
 - Intubation
 - Is it beneficial?



Davis, Daniel P. MD, FACEP, Peay, Jeremy MD, Sise, Michael J. MD, FACS, et. al. The impact of prehospital endotracheal intubation on outcome in moderate to severe traumatic brain injury. *The Journal of Trauma: Injury, Infection, and Critical Care*. May 2005; 58(5): 939-945.

Methods

- Patients identified with moderate to severe TBI in county trauma registry.
- Logistical regression used to explore impact of prehospital intubation on outcome
- Multiple controls utilized
- Neural network analysis performed to identify benefit.

Results

- 13,625 total patients
- Overall mortality was 22.9%
- 25.3% underwent prehospital intubation
- Logistical regression revealed an increase in mortality with prehospital intubation.
- True for all patients with severe TBI

Treatment of TBI

- Breathing/Oxygenation
 - All patients with TBI should receive supplemental oxygen
 - Utilize pulse oximetry
 - Use of PEEP recommended
 - PEEP greater than 15 cm H₂O may increase ICP

- Hypocapnia and hypercapnia can aggravate TBI
 - Control ventilatory rate
 - 10 lpm adults
 - 20 lpm children
 - 25 lpm infants
 - PaCO₂ should be maintained in the range of 35 – 45 mmHg
 - ABGs not available in prehospital setting
 - The difference between ETCO₂ and PaCO₂ vary widely from patient to patient
 - ETCO₂ is not an accurate guide for hyperventilation therapy.

Treatment of TBI

- Circulation
 - No pressure dressings
 - Hypertension can further worsen brain ischemia
 - Combination of hypoxia and hypotension is associated with a mortality rate of 35%.
 - Volume replacement should be started to a SBP of 90 to 100 mmHg
 - Normotensive adult patients: recommend no more than 2x body weight of blood transfusion

Blunt Thoracic Trauma

- Blunt thoracic trauma puts multiple structures at risk.
 - Kill zone
- Multitude of injuries can exist in the presence of this type of injury.



Epidemiology

- MVC's represent the most common cause of major thoracic trauma
- Factors associated with a higher risk of thoracic injury
 - High speed
 - Not restrained
 - Extensive vehicular damage
 - Steering wheel deformity

Injury Types

- Rib fractures
- Scapular fractures
- Sternum fractures

Not too serious in most cases, right?

Injury Types

- Blunt aortic injury
 - 10% of deaths
 - Difficult cause immediate death from aortic transection
- Blunt Cardiac Injury
 - Myocardial rupture
 - Most patients do not reach the ED alive
 - Those who do, hypotension reduces pressure on injured myocardium, but what do we do with trauma patients?

Transport of Trauma Patients

- In a perfect world, all trauma patients go to a Level I Trauma Center
- Every attempt should be made to stabilize the patient and get them there and in surgery ASAP



Sudden Cardiac Arrest

Medical Arrest?

Case Study 2

- August 2009, 1905
- Received a request for an ambulance to respond to an in-town residence for a man not breathing.
- Upon arrival, directed to a bedroom in the residence.
- Patient is found pulseless, with agonal respirations

Case Study 2

- Patient is a 66-year-old male, previous history of diabetes, CVD, neuropathy, morbid obesity.
- CPR was initiated at 15:00 hours.
- Initial cardiac rhythm is VF, 200 J shock delivered and rhythm converts to asystole.
- *N* established and patient intubated without difficulty.
- Epinephrine, atropine, and narsas administered.
- Patient transported to hospital.

Case Study 2

- Upon arrival at ED, resuscitation efforts continued, to include:
 - Additional naloxone, epinephrine, atropine
 - Counter shocks when patient experienced VF.
 - Resuscitated when PCA system with an underlying bradyardia.
 - Continuous CPR
 - Atropine
 - Magnesium
 - Bicar
 - Cardiac catheterization
 - Patient regains pulse at 16:15 hours. Pulse lost 3 minutes later.
- Patient pronounced at 16:15.

Review of Call

- Interruptions in compressions minimal
- Patient treated per AHA guidelines and protocol
- Was the treatment appropriate?
- What were the chances of survival?

- Sudden Cardiac Arrest (SCA)
- Sudden Cardiac Death (SCD)
- The sudden cessation of cardiac activity with hemodynamic collapse, typically due to sustained ventricular tachycardia/fibrillation

Epidemiology

- Second leading cause of death in the US and Canada
- 460,000 people in the US suffer a SCA every year
- 1998 – 1999
 - SCD accounted for over 460,000 deaths
 - 5% of cardiac deaths among adults > 35
 - Six- to ten-fold increase in incidence in the presence of clinically recognized heart disease
 - Increases with age
 - 2 to 3 times more common in men than women

Survival

- Assessments have reached widely disparate conclusions
- Out-of-hospital: 1% - 6%
- Survival to discharge
 - Treated by EMS: 3% - 14%
 - 15% survival rate when underlying rhythm VF
- In-hospital: 17%

Despite medical advances, outcome remains poor

Survival

- Seattle Study
 - 12,000 patients
 - Performed over 14 years
 - Survival to hospital discharge for those treated between 1998 and 2003 was not significantly better than for those treated between 1977 and 1984
 - 15.7% versus 17.3%



Survival

- Reasons for continued poor survival are not certain
- Although some aspects of acute resuscitation have improved over time, the positive trends have been off-set by adverse trends in clinical features of patients.

Survival

- Without CPR and in VF
 - 10% decline each minute without defibrillation
 - After 12 minutes, rate is only 2% - 5%



Outcomes by Etiology

- Asystole
 - 10% admitted
 - 0% - 2% discharged
- PEA
 - 150 patient study
 - 15% admitted
 - 11% discharged



Outcomes by Etiology

- Ventricular Tachycardia
• 15% - 40% in VF survive until hospital discharge
 - Seattle study cited of those who survived, 90% had witnessed VF
- 65% - 70% survive who present with hemodynamically unstable VT
 - Better prognosis if monomorphic

Outcomes by Etiology

- Non-cardiac causes
• 40% admitted
 - 15% discharged
 - 6% neurologically intact or had mild disability

History of Resuscitation

- Field of resuscitation evolving for more than two centuries
- 1540: Paris Academy of Science - mouth-to-mouth for drowning victims
- 1820: Dr. Friedrich Marcus performed first documented chest compressions on humans
- 1950's and 1960's: CPR developed as we recognize it today
- 1957: Kouwenhoven describes external defibrillation

A Closer Look

- Chest compressions are the most important element
- No matter how brief, interruptions result in unacceptable decline in CPP
- We are now taught hard and fast compressions

Compression Differences

- Two groups of rural patients
 - 2000 AHA Guidelines
 - 30 patients
 - all survived 1g/1g
 - 14 neurologically intact 1g/1g
 - 2005 AHA Guidelines
 - 19 patients
 - 11 survived 1g/1g
 - 11 neurologically intact 1g/1g
- Evidence does suggest that manual compressions become less effective after a few minutes

Automatic Compressions



Automatic Compression Devices

- ASPRE Study
 - Multicenter randomized trial involving patients with out-of-hospital cardiac arrest
 - 55% resuscitated with lead-distributing band device
 - 30% resuscitated by manual compressions
 - No significant difference in outcome in survival to 4 hours (14.7% automated, 16.4% manual)
 - Survival to discharge was lower in the automated group (3.0% vs. 3.9%)

Automatic Compression Devices

- Study of 783 adult out-of-hospital cardiac arrest
 - Automatic lead-distributing band showed improved return of ROSC and survival to discharge (3.7% vs. 3.1%)
 - No significant difference in neurologic outcomes

Transcutaneous Pacing

- 2005 AHA guidelines no longer recommends this therapy for asystolic arrest.
- Multiple studies on TCP performed in late 80's and no significant survival benefit was found for patients in asystole.
- Randomized pre-hospital trials found the same result.

Amiodarone

- Amiodarone is the drug of choice for lethal ventricular arrhythmias
- Used to be lidocaine.
- Most studies performed did show a slight improvement from arrest to hospital admission, as compared to lidocaine

Amiodarone

- One example:
- 347 patients
- Prehospital responses
- 22.8% of 186 patients survived to hospital admission when given amiodarone
- 22.0% of 161 patient survived to hospital admission when given lidocaine

Devere, R MD, Cox, JS MD, Schmitt, R MD et al.
Amiodarone as compared with lidocaine for
resistant ventricular fibrillation. *NEJM*. March
2001; 345: 106-112

stock

Amiodarone

- Another example:
- 55 patient study
- 36 patients received amiodarone
 - 10% resuscitated
 - 26% discharged
- 19 patients received lidocaine
 - 0% resuscitated
 - 21% discharged

Roberts, JG MD, Wertz, RG MD, Hagan, A MD, et al.
Effect of amiodarone versus lidocaine for
prehospital resuscitation of cardiac arrest. *CMAJ*
Canadian Journal of Cardiology. March 2002;
18:18

Intubation

- Time is a factor
- 699 retrospective study
- Quick intubation (<12 sec)
- Slow intubation (>12 sec)
- Quick intubation survival rate: 43%
- Slow intubation survival rate: 25%

Shu S, Ma T, Butler L, et al. "Time to intubation
and survival in prehospital cardiac arrest."
Prehospital Emergency Care. May
2004; 8:105-110

100-100-100

Vasopressin

- 1996 Study
- Adult patients with in-hospital cardiac arrest
 - ROSC restored in all 8
 - 3 discharged neurologically intact
 - 5 lived between 30 min and 84 hours

London, Prangish, Bostrom, et al

"Vasopressin administration in
adults." *Annals of Internal
Medicine*. 1996;

advantages:
Medication (cost)

Vasopressin

- 2006 Study
- 350 patient study
- No statistical difference between vasopressin and epinephrine groups in failure
 - ROSC
 - Death before length of admission
 - Death within 24 hours
 - Death before discharge
 - Or combination of death and neurologically impaired survivors

Along & Hickey: Vasopressin for cardiac arrest: A systematic review and meta-analysis. *Cochrane Database of Systematic Reviews*, 2006, Issue 4, CD004656.

So What Can You Do?

- Decrease the time to start rescue procedures
- Use of defibrillation
- Accuracy of BLS techniques
- Ventilation efficacy

Prognosis T. J. Brown, T. Brown, S. Brown, S. Brown
Hospital cardiac arrest survival
Resuscitation 1999; 49: 47-54

Anything Else???

- Identify and treat reversible causes



Stress and Coping

How Does It Feel?

- Death affects everyone
 - Family
 - Friends
 - Providers
- Everyone will feel grief
- Time can be your friend or your enemy



Critical Incident Stress

- What is stress?
 - The non-specific response of the body to any demand made upon it.
 - A reaction in your mind and body to an event in the outside world that alarms or arouses you.

Physiological Signs of Stress

- Increased cardiac output
- Increased circulation
- Increased BP and RR
- Diaphoresis
- Piloerection
- Pupil dilation
- Decreased gastric motility
- Hyperalertness
- Increased metabolism

Psychological Signs of Stress

- Denial
- Fear
- Depression
- Grief
- Anger
- Worry
- Uncertainty
- Hopeless
- Helpless
- Feeling lost
- Withdrawn
- Anxiety
- Panic
- Inappropriate emotions

Dealing with Stress

- Its got to be healthy!



Dealing With Stress

- Stay away from the junk food
- Avoid alcohol
- Get plenty of exercise
- For God's sake, find someone to talk to!



Who do I talk to?

- Coworkers
 - No one is that much!
 - Friends
 - Family
 - Religious leaders
-
- Don't talk to your self!

Something Else

- Have you ever said to yourself or a co-worker:

I lost that patient!

Everyone in this room has experienced stress, whether it is caused by day-to-day living or as a result of what we do.



My Journey

- Are we ever really prepared?
- Both of the cases presented today, I was a primary medical provider on the call.
- In both of these cases, I had a personal stake.
- Case one involved a co-worker
- Case two involved my father.

Grieving Process

- Kubler-Ross
 1. Denial and Isolation
 2. Anger
 3. Bargaining
 4. Depression
 5. Acceptance

Everyone goes through this, just at a different pace.

More on Kubler Ross

- Who were the subjects?
- Not everyone goes through these stages in order
- Where do you fit in?

Denial

- A conscious or unconscious refusal to accept the facts.
- It's a natural defense mechanism
- Some people can stay locked in this stage.
- Maybe we are a different breed of human.
 - We may deny its happening, but don't lock up and work the cell.

Anger

- Manifests itself in different ways
- May be angry at:
 - Themselves
 - Family members
 - The patient
 - Co-workers
 - God
- Remember, this is part of the process.
- Don't take the person lashing out personally.

Bargaining

- Negotiating to seek a compromise
 - I will "do" so "it" will not happen.
- Make life changes
 - I will change my life so this won't happen to me.

Depression

- Preparatory grieving
- This stage means different things dependent on who is involved
- Acceptance with emotional attachment
- It shows that the person has begun to accept reality

Acceptance

- This stage varies according to the person's situation
- It is an indication that there is some objectivity with emotional detachment.
- How long does it take to reach this?

Has My Perspective Changed?

- You bet!
- Used to ignore that talk of critical incident stress
- It's hard to understand until you experience it "Live at 5"



- In order to save lives, we must go where death is.
- Death doesn't discriminate
- Maybe we should get to know him better



- Regardless of what the data says, we do make a difference
- We are allowed to have feelings
- Things happen for a reason



*And let us not grow weary while doing good, for
in due season we shall reap if we do not lose
heart*

Galatians 6:9

THANK YOU!

jedliem@speakeMS.com

www.speakeMS.com

