Out-of-Hospital Termination of Resuscitation

Utility and Implications for Your Practice

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Objectives

• Explain the difference between medical and traumatic arrests
• Summarize evidence supporting out-of-hospital termination of resuscitation (TOR)
• Formulate a plan of action between PCP and ACP medics on the scene of a cardiac arrest
• Relate key information to provide to a base hospital physician when patching for a TOR
• Discuss steps a paramedic can take when giving death notification
Outline

• Case presentation
• Field pronouncement versus TOR
• Traumatic versus medical arrests
• Research for out-of-hospital TOR
• Medical TOR directive
• Scene plan of action/teamwork
• Trauma TOR directive
• Death in a public place
• Death notification
Case Presentation

• Code 4 Notification – PCP crew
• 66 y.o. male – unresponsive
• Became nauseated after dinner and found 30 min later on floor of bathroom
• Son called 911, initiated CPR

• After crew arrival, CPR continued and 3 no-shocks indicated
• Patched for a medical TOR and were successful
Rewind case to last year..

- PCP crew completes fourth analysis and moves to transport patient to the hospital for advanced life support care
Initially a single patient transfer..
Now an MCI..
Traumatic Cardiac Arrest

• Deterioration associated with trauma has several possible causes:
  • Hypoxia
  • Injury to vital structures
  • Severe head injury
  • Hypovolemic

• Studies demonstrate those who do survive have prompt transport, treatable penetrating injuries, and are typically young
Medical Cardiac Arrest

- Long list of causes but most common are:

- Cardiac (up to 60%)
  - Ischemic heart disease
  - Structural heart disease

- Non-cardiac (35–40%)
  - Non-traumatic bleeding (aorta, ICH, GI)
  - Toxicologic
  - Drowning
  - PE
Termination of Resuscitation

• Out-of-hospital cardiac arrest has a very low survival rate to hospital discharge

• Transporting all patients results in inappropriate utilization of valuable resources

• Also exposes paramedics and the public to dangers of high-speed transport
Dangers of Transport..

Deadly Ambulance Crash Could Spur Change

Widow Doesn’t Want Anyone Else

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vehicle crash in Paisley
Field Pronouncement vs. Medical TOR

Field Pronouncement (ACP)
- Patch following 3rd analysis for further direction from BHP

Prior to Medical TOR (PCP)
- Transport to ED

Medical TOR (PCP)
- Patch following 3rd analysis if criteria is met
Clinical Decision Rules

- Tools that quantify individual contributions of various components of history, physical, and lab values to predict likely response to treatment

**Step 1. Derivation**
Identification of factors with predictive power

**Step 2. Validation**
- Narrow Validation: Application of rule in a similar clinical setting and population as in Step 1
- Broad Validation: Application of rule in multiple clinical settings with varying prevalence and outcomes of disease

**Step 3. Impact Analysis**
Evidence that rule changes physician behavior and improves patient outcomes and/or reduces costs

**Level of Evidence**
-窄验证: Step 1
-宽验证: Step 2
-影响分析: Step 3

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REVIEW OF THE EVIDENCE FOR PRE-HOSPITAL BLS–TOR
Validation of a rule for TOR in out–of–hospital cardiac arrest

• NEJM, 2006

Population
• All pts with OHCA receiving exclusively BLS care in Ontario
• 1240 pts enrolled, mean age 69.2, 69% male, 57.4% witnessed, mean response time 8.0min

Design
• Prospective, observational validation study
• BLS–TOR rule applied to all pts but all transported
Validation of a rule for TOR in out-of-hospital cardiac arrest

• NEJM, 2006

Outcomes
• Pronounced in ED, died after admission, discharged home – cerebral performance category 6 months

Exclusion Criteria
• Prior DNR, non-cardiac arrest

Results
• 776/1240 received ‘TOR’
• 3 survived with good neurological outcome
• PPV death 99.5%, 62.6% drop in transport rate
Comparison of TOR guidelines for BLS

Population
- All pts with OHCA receiving exclusively BLS care in Ontario
- 13 684 pts enrolled, mean age 69.1, 67.3% male, 52.2% witnessed, mean response time 8.5 min

Design
- Retrospective validation using a cohort from 1988–2003
- 3 guidelines validated with cohort data

• Annals of EM, 2006
Comparison of TOR guidelines for BLS

**BLS–TOR**
- No ROSC, no shocks, unwitnessed

**Petrie Rule**
- Initial asystole, EMS response $>8$min

**Marsden Rule**
- Non shockable rhythm, no ROSC, no CPR
  15min, asystole for 10 seconds
Comparison of TOR guidelines for BLS

- Annals of EM, 2006

Outcomes
- Survival to hospital discharge – cerebral performance of survivors

Exclusion Criteria
- Obvious signs of death, non-cardiac arrest
Comparison of TOR guidelines for BLS

Results

• BLS TOR Rule
  • NPV 100%, 50.5% drop in transport

• Petrie Rule
  • NPV 99.9%, 9.4% drop in transport

• Marsden Rule
  • NPV 100%, 18.5% drop in transport

• Annals of EM, 2006
Comparison of TOR guidelines for OHCA in Singapore EMS

- Resuscitation, 2006

**Population**
- Consecutive adults with OHCA who received BLS care
- 2269 pts, mean age 61.1, 68.4% male, 65.3% unwitnessed, EMS response 12.0min

**Design**
- Retrospective validation of cohort study 2001–2004
- Same three rules validated
Comparison of TOR guidelines for OHCA in Singapore EMS

• Resuscitation, 2006

Outcomes
• Survival to hospital discharge or survival to 30 days post arrest

Exclusion Criteria
• Obvious signs of death
Comparison of TOR guidelines for OHCA in Singapore EMS

• Resuscitation, 2006

Results

• BLS TOR Rule
  • NPV 99.6%, 68.7% drop in transport

• Petrie Rule
  • NPV 99.7%, 31.6% drop in transport

• Marsden Rule
  • NPV 99.8%, 63.9% drop in transport
Level of Evidence

• In the setting of exclusively BLS care, the BLS–TOR rule meets ‘level 2’ criteria for clinical decision rules
  • Can be used in various settings with confidence
  • Validated in either one large prospective study or in several smaller studies that differ from one another
REVIEW OF EVIDENCE FOR PRE-HOSPITAL ALS–TOR
Prehospital TOR in cases of refractory OHCA

Population
- Prospectively enrolled OHCA in 19 EMS systems
- 5556 pts, mean age 64.4, 60.0% male, 51.5% unwitnessed

Design
- Retrospective validation of using a registry database 2005–2008
- BLS– and ALS–TOR rules externally validated
- All pts received ALS care

JAMA, 2008
Prehospital TOR in cases of refractory OHCA

BLS–TOR Rule
- No ROSC, no shocks, unwitnessed

ALS–TOR Rule
- No ROSC, no AED/shock before transport, unwitnessed by EMS/bystanders, no bystander CPR

JAMA, 2008
Prehospital TOR in cases of refractory OHCA

Outcomes
• Survival to hospital discharge – cerebral performance at discharge

Exclusion
• Obvious signs of death or traumatic arrest
Prehospital TOR in cases of refractory OHCA

Results

• BLS TOR Rule
  • PPV 99.8%, 47.1% drop in transport

• ALS TOR Rule
  • PPV 100%, 21.7% drop in transport

• JAMA, 2008
Independent Evaluation of an out-of-hospital TOR CDR

Population

- Prospectively enrolled OHCA in Arizona
- 2180 pts, mean age 64, 65% male, EMS response 5.5 min

Design

- Retrospective cohort analysis 2004–2006
- BLS–TOR rule evaluated
- Majority of pts received ALS care
Independent Evaluation of an out-of-hospital TOR CDR

• Academic EM, 2008

Outcomes

• Survival to hospital discharge – cerebral performance of survivors

Exclusion Criteria

• Obvious signs of death or traumatic arrest

Results

• 1160 pts
• PPV 99.9%, 69% drop in transport
Validation of a universal prehospital TOR CDR for ALS and BLS providers

Population
- Prospectively enrolled OHCA in Ontario with ALS or BLS care
- 2415 pts, mean age 69.4, 63% male, 62% unwitnessed

Design
- Retrospective validation using registry data from 2006–2007
- BLS– and ALS–TOR rule evaluated
Validation of a universal prehospital TOR CDR for ALS and BLS providers

Outcomes
• Survival to hospital discharge but had met either BLS– or ALS–TOR criteria

Exclusion Criteria
• DNR, non–cardiac etiology, obvious signs death, under 18 y.o.
Validation of a universal prehospital TOR CDR for ALS and BLS providers

Results

• BLS TOR Rule
  • PPV 100%, 54.4% drop in transport

• ALS TOR Rule
  • PPV 100%, 31% drop in transport

Resuscitation, 2008
Conclusions

• In OHCA receiving only BLS care, only BLS–TOR rule has been prospectively validated in a rigorous fashion to warrant widespread use

• In OHCA receiving mixed/ALS care, neither TOR rules have been appropriately validated to warrant widespread use
  • Robust preliminary findings of ALS–TOR rule holds promise in these settings
Medical TOR

Applies to all medical VSA

- Of cardiac & asphyxial origin
- Includes hanging, drowning, electrocution

Patient Indications

- ≥ 18 years
- No ROSC
- No Shock
- Unwitnessed Arrest

Mandatory Patch Point Following 3rd analysis

(Advanced Life Support Patient Care Standards., 2011)
Medical TOR in a Public Place

**Unusual circumstance

• 2 Options:
  • Call for TOR and discuss the situation with the BHP
  • Move pt to the truck and call for TOR
PCP: ACP MedTOR Teamwork

- PCP Crew First on Scene
  - ACP crew to take over pt care IF patch for MedTOR has not yet occurred
  - PCP to continue with patch for MedTOR if ACP crew arrives during patch
  - ACP crew may begin treatment while PCP crew attempts to obtain MedTOR via patch
  - ACP crew to respect PCP MedTOR if granted
Trauma TOR

VSA due to severe blunt OR penetrating trauma (Age ≥ 16)

- CPR until pads applied
- Apply defib pads

Analyze/Interpret Rhythm

Shock Advised/VT/VF
- Transport

No Shock Indicated/Asystole/PEA

- Asystole
  - Transport
  - Patch for TOR

- PEA (HR>0)
  - Transport > 30min
  - Transport < 30min
  - Patch for TOR
  - Transport

(Advanced Life Support Patient Care Standards, 2011)
THE PATCH REQUEST
I AM CALLING FOR A TERMINATION OF RESUSCITATION ORDER FOR A MEDICAL/TRAUMA PATIENT

Incident Hx/Mechanism of Injury: Physical Assessment:

Medical TOR
- Pt > 18 with no palpable pulses
- Arrest unwitnessed, No ROSC, No Shocks delivered

Trauma TOR
- Pt > 16 with no palpable pulses
- No defibrillation delivered
- Pt asystolic, OR HR>0 & Transport >30min

(BH Physician Name: Time of Death: Patch Sheet #)

(Advanced Life Support Patient Care Standards., 2011)
LET’S TALK ABOUT DEATH
Previous Training and Knowledge

• Level of difficulty increases as your level of training does not match a situation

• There is some research but definitely not hard science – *art* of medicine

• We all do it a little differently

• Certain core elements we all share
The Setup

• You enter a room of people you have never met... and have to deliver the worst possible news

• You have no idea the family dynamics, or even who you should address

• Rapport must be established quickly however you cannot delay delivering the message
The Delivery

• Focus on closest family members

• Within 1 minute of talking, deliver news
  • “I have horrible news, I’m sorry to tell you that your loved one has died. . .”

• Nothing they could have done would have made a difference (even if not entirely true)

• Recap method
Words to Use

• Be direct, no ambiguity

• DIED, DEAD, DEATH, PASSED AWAY

• No cliché terminology

• ‘Sorry’ is okay
Post Delivery

• Be quiet.. just be there

• Family will break silence

• Offer to answer questions, further condolences

• Leaving can be awkward
Common Errors

• Talking too much

• Over-explaining or using medical jargon

• Being impatient to leave
Concluding Remarks

• The BLS–TOR and combined traumaTOR are there for your and your patient’s best interest

• Patients who fit these criteria have an incredibly small chance at meaningful survival

• Patch if you are ever in an uncertain situation

• Take the time to speak with family members in an appropriate fashion
References


References


