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PEDIATRIC TERMINATION OF RESUSCITATION: AN EMS AND ETHICS PERSPECTIVE

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How do we stand by and watch a heart rate drop, respirations slow, and blood pressure fall without doing anything?

What does it mean to disconnect a ventilator that is essentially breathing for a dying child?

Moral distress..

Moral distress (physical or emotional suffering) arises when one knows what the right thing to do is, but constraints (internal or external) make it nearly impossible to pursue the right course of action

Lessons Learned

The Hard Way…..

Phoenix Children's Hospital

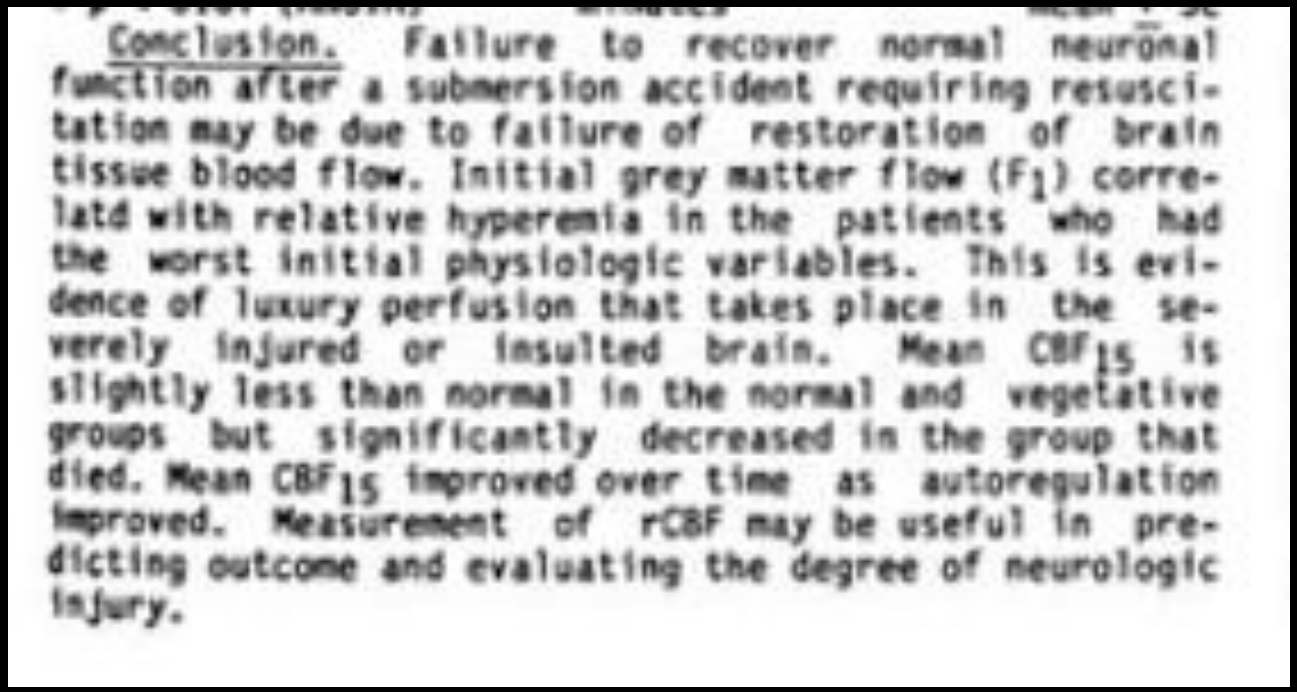
- Research:
  - Cerebral blood flow and metabolism in hypoxic-ischemic patients
  - Outcomes of children's submersion injuries
  - Ethical interventions and therapies for significantly neurologically injured children

MEASUREMENT OF REGIONAL CEREBRAL BLOOD FLOW (rCBF) AS A PREDICTING FACTOR IN THE PEDIATRIC DROWNING VICTIM

Beyda, David H.

Author Information

Critical Care Medicine 14(4):p 363, April 1986.



Conclusion. Failure to recover normal neuronal function after a submersion accident requiring resuscitation may be due to failure of restoration of brain tissue blood flow. Initial grey matter flow (F_1) correlatd with relative hyperemia in the patients who had the worst initial physiologic variables. This is evidence of luxury perfusion that takes place in the severely injured or insulted brain. Mean CBF_{15} is slightly less than normal in the normal and vegetative groups but significantly decreased in the group that died. Mean CBF_{15} improved over time as autoregulation improved. Measurement of rCBF may be useful in predicting outcome and evaluating the degree of neurologic injury.

Plus 20 more research articles and presentations

Michael Munoz

- Battalion Chief – City of Peoria
- Master of Arts in Bioethics and Health Policy and a Doctorate in Bioethics
  - Loyola University Chicago
- Served on the Ethics Committee at PCH
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An Ethical Justification for Termination of Resuscitation Protocols for Pediatric Patients

Michael G. Muñoz, DBe, MA, MAR, MEd and David H. Beyda, MD†‡*

Objective: The aim of this article was to compare specific characteristics and outcomes among adult and pediatric out-of-hospital cardiac arrest (OHCA) patients to show that the existing literature warrants the design and implementation of pediatric studies that would specifically evaluate termination of resuscitation protocols. We also address the emotional and practical concerns associated with ceasing resuscitation efforts on scene when treating pediatric patients.

Methods: Relevant prospective and retrospective studies were used to compare characteristics and outcomes between adult and pediatric OHCA patients. Characteristics analyzed were nonwitnessed arrests, absence of shockable rhythm, no return of spontaneous circulation, and survival to hospital discharge.

Results: Cases of unwitnessed arrests by emergency medical services providers are substantially the same in pediatric patients (41.0%–96.3%) compared with their adult counterparts (47.4%–97.7%). The adult studies revealed 57.6% to 92.2% of patients without an initial shockable rhythm. The pediatric studies showed a range of 64.0% to 98.0%. The range of adult patients without return of spontaneous circulation was 54.8% to 95.4%, and the range in pediatric patients was 68.2% to 95.6%. Survival rates among the adult studies ranged from 0.8% to 9.3% (mean, 5.0%; median, 5.2%), and in the pediatric studies they were 2.0% to 26.2% (mean, 9.2%; median, 7.7%).

Conclusions: The data compared demonstrate that characteristics and outcomes are virtually identical between adult and pediatric OHCA patients. We also found the 3 chief barriers hindering further research to be invalid impediments to moving forward. This review warrants designing pediatric studies that would specifically correlate termination of resuscitation protocols with patient survival and include predictive values.

Key Words: adult, medical futility, out-of-hospital cardiac arrest, survival rate, termination of resuscitation

(*Pediatr Emer Care* 2017;33: 505–515)

for over 2 hours talking with the parents and just being there for them. The crew later received an award for our care of the family. It was not really an award that anyone wanted to receive. I mean, what else could we have done? (e-mail communication with a former RN, now a firefighter paramedic for almost 20 years, September 2, 2015).

Every year in the United States, emergency medical services (EMS) providers respond to approximately 359,400 adult out-of-hospital cardiac arrest (OHCA) incidents. In addition, 11 of every 100,000 children experience an OHCA.[1] There are more than 74 million children younger than 18 years old in the United States[2]; thus, approximately 8140 have an OHCA. Some studies estimate a higher number of OHCAs in pediatric patients, as many as 16,000 per year.[3,4] According to the American Heart Association (AHA), an OHCA is defined as, "A sudden and unexpected pulseless condition attributable to cessation of cardiac mechanical activity."[1(e165)] Although survival rates vary, most OHCA patients do not survive to hospital discharge.[5–7] According to the AHA, "In 2010, after EMS-treated nontraumatic cardiac arrest with any first recorded rhythm," the mean survival rate was 9.5% overall, 9.8% for adults and 7.8% for children.[1(e166)]

In light of such poor outcomes, EMS agencies transporting these patients to emergency departments raise questions of ethics related to futility, optimal patient and family care, the safety of first responders, and preserving scarce medical resources. Because of such ethical considerations and based on empirical research, many EMS agencies have developed termination of resuscitation (TOR) rules for adult OHCA patients.[5–7] Although there is a slight difference between advanced life support (ALS) and basic life support (BLS) criteria, the standard guidelines for suspending resuscitation efforts are as follows: (1) the arrest is not witnessed by EMS personnel, (2) there is no shockable rhythm, and (3) no return of spontaneous circulation (ROSC) (Table 1). These criteria

Objectives

- Describe outcomes in pediatric out-of-hospital cardiac arrest, including the prognostic value of prehospital ROSC and when resuscitation becomes medically futile.
- Apply termination-of-resuscitation criteria to pediatric prehospital arrests, recognizing exclusions and when to involve medical control.
- Evaluate termination decisions using ethical principles of beneficence, nonmaleficence, justice, and respect for patients and families in field care.
- Provide compassionate, family-centered care after termination, including clear communication, scene management, documentation, and attention to provider well-being.

“When we arrived on scene, the baby was obviously deceased—dilated, fixed pupils; nonresponsive; no respiration or pulse; blue in color with lividity. Yet, my partner still asked, ‘Do you want to work this code?’ I quickly said, ‘No, we are not going to work this child.’ The baby coded while at an in-home daycare, and the babysitter was hysterical. We quickly removed the babysitter from the child's presence and just started talking to her. I called both the parents and told them that something had happened at the daycare, and they needed come as soon as possible. The father arrived first and after speaking with him, he broke down crying. The mother arrived next with the same outcome. The critical response team arrived, and one of their members was soon in tears. It was a chaotic scene. We stayed for over 2 hours talking with the parents and just being there for them. The crew later received an award for our care of the family. It was not really an award that anyone wanted to receive. I mean, what else could we have done?

(e-mail communication with a former RN, now a firefighter paramedic for almost 20 years, September 2, 2015).

Study Objective

- Compare adult and pediatric OHCA outcomes
- Assess need for pediatric TOR research
- Evaluate ethical and clinical justification
- Address emotional and ethical barriers.

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Key Question

- Are pediatric arrests fundamentally different enough to justify different rules?

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ROSC & Outcomes

- Survival rare without ROSC
- ROSC strongly predicts survival
- Good neurological outcomes uncommon
- Applies to adults and children

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Key Findings: Arrest Features

- Most arrests not EMS witnessed
- Shockable rhythms uncommon
- ROSC rarely achieved prehospital
- Patterns similar in adults and children

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Key Findings: Survival

- With ROSC
  - Adult survival: 0.8–9.3% (mean ~5%).
  - Pediatric survival: 2.0–26.2% (mean ~7%).

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Neurologic Outcomes Matter

- Good neurologic survival is uncommon without ROSC.
- Adult TOR rules predict poor neurologic outcome with ≥99% accuracy.
- No evidence suggests children fare better under identical conditions.

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Out of hospital arrests

- Adult resuscitation can be halted if pre-hospital responders deem CPR is futile
- Pediatrics
  - Leads to often
    - “Keeping the patient alive” rather than ”ensuring a meaningful life when discharged.”

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Being alive
Having a meaningful life
How can he die even if he wanted to?

The Hard Question

- CPR is a life-saving intervention, but there are times when continued efforts become futile.
- How do we determine when to stop?

Core Ethical Principles

- Beneficence: act in the patient's best interest.
- Nonmaleficence: avoid causing harm.
- Justice: steward limited EMS and hospital resources.
- Respect: care for the child and the family.

The Hard Facts

- Knowing why we should decide when “enough is enough.”
- Knowing how we make the decision that “enough is enough.”
- Knowing when to make the decision that “enough is enough.”

Why This Matters in the Field

- Most pediatric OHCAs do not survive to hospital discharge.
- EMS professionals carry emotional, ethical, and operational burdens.
- Protocols guide care when outcomes are predictably futile.

It all comes down to…

The knowledge that we should only do something **FOR** our patients and not just **TO** them for the sake of doing something

When there is nothing left to be done that will be of therapeutic benefit

When there is no chance of a meaningful outcome

FUTILITY: NOW WHAT?

Definition: Medical Futility

When treatment is unable to achieve its desired goal or to improve the patient's health or well-being or treatment will do no more than temporarily prolong dying when death is imminent, the treatment is considered medically futile.

"Defining Medical Futility and Improving Medical Care"
Lawrence J. Schneiderman. Bioethical Inquiry (2011) 8:123–131

Signs of Futility

- • No return of spontaneous circulation (ROSC) after 30+ minutes
- • Asystole with no reversible causes
- • Severe trauma incompatible with life
- • Terminal illness with no chance of recovery

Medical Futility: Definition

Quantitative Futility, where the likelihood that an intervention will benefit the patient is exceedingly poor

Qualitative Futility, where the quality of benefit an intervention will produce is exceedingly poor

Each criterion is sufficient by itself to confer medical futility

Schneiderman LJ, Jecker NAS. *Wrong medicine : doctors, patients, and futile treatment*. Baltimore: Johns Hopkins University Press; 1995.

Futility Defined

- Unnecessary – The desired end, or goal, can be achieved by simpler means.
- Unsuccessful – The patient has a condition too advanced to respond to treatment.
- Unsafe – The risks of particular complications outweigh any probable benefits.
- Unkind – The quality of life after the intervention will not be good enough, or long enough in duration, to justify it.
- Unwise – The intervention diverts resources that would yield greater benefits to other patients.

Jennett, Bryan. (1984). Inappropriate Use of Medical Technology. British Medical Journal, 289(6460), 1709-1711.

EMS Example Scenario 1

- Unwitnessed infant arrest at daycare
- No pulse, prolonged downtime
- No shockable rhythm, no ROSC after CPR
- Transport unlikely to change outcome

EMS Example Scenario 2

- Teen collapse at home, long EMS response time
- CPR started late by bystanders
- No shockable rhythm, no ROSC
- Prolonged transport adds risk without benefit

Ethics at the Scene

- Futility is not abandonment.
- Continuing ineffective CPR may cause harm.
- Ethical care includes knowing when further intervention offers no benefit.

Ethical Considerations

- Futile resuscitation risks health care professionals
- Uses scarce resources
- Delays care for viable patients
- Transport CPR often unsafe

Moral Distress

- If care is futile, we are under no moral obligation to continue care or even engage in heroics
- That does not mean that we “hide” the fact
- We should engage in conversations trying to learn families at times are adamant about wanting continued CPR

Current State of Practice

- Adult TOR protocols are widely implemented.
- Pediatric TOR are just becoming more common place
  - Default practice: transport despite poor prognostic indicators.

What TOR Means Operationally

- Recognition of medical futility.
- Cessation of resuscitation on scene.
- Transition from rescue to care of the family.
- Medical control involvement as required.

EMS Reality: Pediatric Arrest Scene

- Typical EMS challenges at pediatric arrests
  - High emotional stress for crews
  - Family and bystanders often present
  - Pressure to 'do everything' despite futility

Crew Emotional Impact

- Pediatric deaths strongly affect EMS professionals
  - Moral distress common after futile resuscitations
  - Emotional fatigue contributes to burnout
- Support systems reduce long-term impact

Post-Event Crew Support

- Structured debrief after difficult cases
- Watch for delayed stress reactions
- Encourage time off if needed
- Leadership should check in with crews

EMS Discussion Questions

- When have you felt pressure to transport despite futility?
- How should crews balance emotion with evidence?
- What support do crews need after pediatric deaths?
- How can communication with families improve?

EMS Training Needs

- Clear medical control guidance
- Training in death notification
- Family support communication skills
- Crew emotional support after events

Scene Management with TOR

- Shift focus from resuscitation to family care
- Explain efforts clearly and compassionately
- Allow family presence when appropriate
- Use chaplain or crisis teams when available

Communication with Families

- • Be honest yet compassionate
- • Explain medical reasoning behind stopping CPR
- • Offer emotional support and discuss end-of-life care options

Building Crew Resilience

- Normalize discussion after difficult calls
- Encourage peer support and debriefings
- Use critical incident stress resources
- Promote mental health support access

Quality Improvement & Review

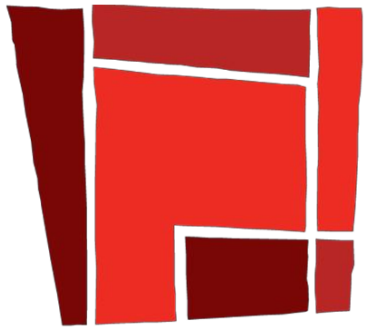
- Review TOR cases regularly
- Track outcomes and protocol adherence
- Provide feedback to crews
- Update protocols based on evidence

Practical Next Steps for EMS Systems

- Education on pediatric futility and ethics.
- Pilot retrospective data review.
- Develop medical director–supported protocols.
- Integrate grief and death-notification training.

Triage, Treatment and Transport Guidelines (T3G)

As Recommended by the Bureau of EMS and Trauma System



ADHS

PREPAREDNESS

Literature

- There **are pediatric-specific TOR derivation and early validation studies**, but they're limited in number and quality.
- Strong prospective validation or impact studies in different EMS systems aren't yet available.
- Most guideline groups still treat TOR in children with caution because of this evidence gap.

Resuscitation Plus
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Clinical paper

Verification of the termination of resuscitation rules in pediatric out-of-hospital cardiac arrest cases

Sakura Minami [a], Chiaki Toida [a b], Mafumi Shinohara [a], Takeru Abe [a c], Ichiro Takeuchi [a]

Show more

Resuscitation. 2024 Nov:204:110400. doi: 10.1016/j.resuscitation.2024.110400. Epub 2024 Sep 18.

Derivation of a clinical decision rule for termination of resuscitation in non-traumatic pediatric out-of-hospital cardiac arrest

Pranav Shetty [1], Yunyi Ren [2], David Dillon [3], Alec Mcleod [4], Daniel Nishijima [3], Sandra L Taylor [2]; CARES Surveillance Group

Ethical Framing for Field TOR

- Why TOR is Ethical Care
  - Futility is not abandonment.
    - Continuing CPR without ROSC rarely changes outcome.
  - Beneficence & Nonmaleficence.
    - Avoid prolonged interventions that offer no benefit and may cause harm.

Ethical Framing for Field TOR

- Why TOR is Ethical Care
  - Justice.
    - Steward EMS resources and protect crew and public safety.
  - Respect for the child and family.
    - Honest presence, clear communication, and compassion matter.
  - PROTOCOLS PROTECT PROVIDERS
    - They remove individual moral burden and support sound judgment under stress.

Implications for Practice

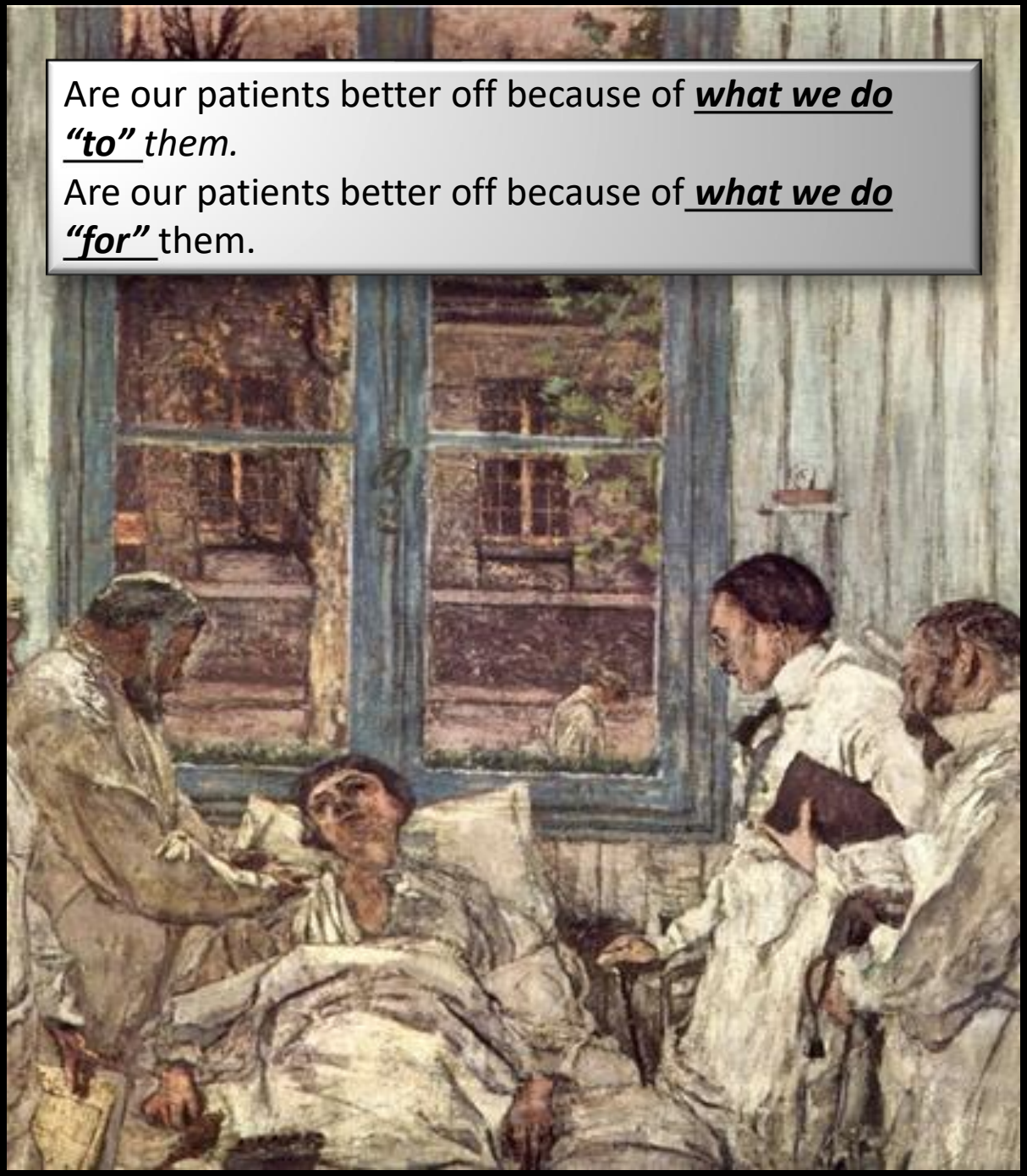
- Research needed
- Training in death notification important
- Family support strategies required
- Goal: humane and evidence-based care

Conclusion

- Pediatric and adult OHCAs are more alike than different.
- Evidence supports studying pediatric TOR protocols.
- Ethical care includes knowing when to stop.

Just because you CAN do something, SHOULD you?

It is sometimes difficult to face a family of a dying patient without some new technological offering. We feel better if we offer something…..


Are our patients better off because of ***what we do "to"*** *them.*
Are our patients better off because of ***what we do "for"*** them.

Final thoughts…

- The heart of medicine is a moral enterprise.
- Every contact with a patient is an ethical experience – a moral relationship.