Patient Safety: Are you ready for it?

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Disclosures

• None
Objectives

• Review history of patient safety in medicine.
• Describe tools to improve patient safety, including team training and root cause analysis.
• Construct a plan to develop an inter-professional team training curriculum.
• Recognize barriers to patient safety in the practice of anesthesiology.
What we talk about when we talk about Patient Safety
History

- Institute of Medicine 1999 report
  - “To Err is Human”
  - Medical Errors = 8th leading cause of death
  - Goal of reducing errors 50% over 5 years

- 20 years later…
  - Medical Errors = 3rd leading cause of death
  - ~70% of errors in the perioperative period are due to communication failures
Culture

• “What results from the complex layered aggregation and interactions of an organization’s shared values, beliefs, attitudes, and underlying theories and assumptions on navigating the world.”

DeSocio et al 2019
Definition of Patient Safety

• Outcome to be achieved
• Science and Processes necessary to do so
• Intention and Desire to combine these into meaningful action

DeSocio et al 2019
Optimal conditions…

- Workflow is well planned
- Information is correct, timely, and available
- Roles are clear and resourced
- Time, attention and money are not constraints
- Participants functioning at optimal levels
Optimal conditions…for failure!

- Patient information incomplete, incorrect, unavailable
- Roles of team vary over time and space
- Team composition dynamic (participation and skill)
- Time, attention and money ARE constraints
- Participants are human
4 Themes

• Excessive dependence on hard work and vigilance

• Benchmarking to mediocrity

• Processes rarely designed to meet specific, targeted reliability goals

• Permissive attitude toward clinical autonomy
Going back to human error

**Person approach: Decision-making process**
- Policy and procedure
- Education/Re-education
- Disciplinary actions
- Force adherence to workflows
- Eliminate variation

**System approach: Context of operating system**
- Resilient systems
- Recover after error occurred

DeSocio et al 2019
How to change

- Organizational Leadership
  - Most knowledgeable about the overall institution
  - Ability to create and manage culture
  - Focus on values to achieve goals
  - System accountability
    - Vs. Individual accountability

- High-reliability organizing
  - Systematic and integrated system> individual event prevention
Leaders (and best)

- Contributing factor for adverse events
- Ownership of teams’ performance
- Critically analyze
- Construct plan for success
- Trust and accountability
  - Transparent approach
  - Shift from identifying provider error
- Set the standard
  - Baseline metrics
  - Targeted and triaged approach to intervention

DeSocio et al 2019
Be a Leader for Patient Safety
Blueprint

- Understand current patient safety environment
- Trust, respect and inclusion
  - Individual and Team goals
  - Promote transparent process
- Engage leadership
- Education and professional development
- Celebrate behaviors
Where to start

- Low hanging fruit
  - Technology
    - Phones vs. Pagers
    - Electronic charts, order, bar code scanning for meds
    - Photographs, video, telemedicine
  - Event Reporting
    - How best to analyze and provide feedback

Call et al 2019; Soto et al 2006
Root Cause Analysis

• Analyze mishaps and near-misses
• “Root cause” = a threat whose removal from a sequence of events would have prevented an incident from occurring
• Health care failures have multiple causes
  • Parallel, not linear
• Goes beyond blame
• Result in changes to policy, procedure, training, competency verification, enhancements to IT

Call et al 2019
Where to continue

• Safety II
  • Examine the causes of success!
  • Success often arises in parallel with failures
  • Suited to large and complex organizations

Call et al 2019
Where are we on checklists?
EMERGENCY NUMBERS:

ACLS (for perioperative setting)
- Asystole ........................................ 1
- Bradycardia – Unstable ................. 2
- PEA .................................................. 3
- SVT – Stable Tachycardia ................. 4
- SVT – Unstable Tachycardia .............. 5
- VF/VT ............................................. 6

BROAD DIFFERENTIAL DIAGNOSES
- Hypotension .................................... 15
- Hypoxemia ..................................... 16

SPECIFIC CRITICAL EVENTS
- Amniotic Fluid Embolism ................. 7
- Anaphylaxis ..................................... 8
- Asystole ......................................... 9
- Bradycardia – Unstable .................... 2
- Bronchospasm ................................ 9
- Delayed Emergence ......................... 10
- Difficult Airway – Unanticipated ...... 11

Fire – Airway .................................... 12
Fire – Patient .................................... 13
Hemorrhage – MTG ............................ 14
Hypotension ................................. 15
Hypoxemia ..................................... 16
Local Anesthetic Toxicity ................. 17
Malignant Hyperthermia .................... 18
Myocardial Ischemia ......................... 19
Oxygen Failure ............................... 20
PEA ............................................... 3
Pneumothorax ................................. 21
Power Failure ................................... 22
SVT – Stable Tachycardia .................... 4
SVT – Unstable Tachycardia ............... 5
Transfusion Reaction ....................... 24
Venous Air Embolus ......................... 25
VF/VT ............................................. 6

CRISIS RESOURCE MANAGEMENT .. 26
Phone List .................................. 27

EMERGENCY MANUAL
COGNITIVE AIDS FOR PERIOPERATIVE CRITICAL EVENTS 2016, V3.1
STANFORD ANESTHESIA COGNITIVE AID GROUP
MALIGNANT HYPERThERMIA

By Stanford Anesthesia Cognitive Aid Group and Henry Rosenberg, MD

GO TO NEXT PAGE ➜

CALL FOR HELP.
CALL FOR MH CART.
INFORM TEAM.

START PREPARING DANTROLENE or RYANODEX!

MALIGNANT HYPERThERMIA
continued

8. Hyperkalemia – or suspect from EKG, treat with:
   - Calcium chloride 10 mg/kg IV. Max dose 2000 mg or Calcium gluconate 30 mg/kg IV, Max dose 3000 mg.
   - D50 1 Amp IV (25 g or 50 ml Dextrose) + Regular Insulin 10 units IV (monitor glucose).
   - Sodium Bicarbonate 1-2 mEq/kg, Max dose 50 mEq.

9. Arrhythmias are usually secondary to Hyperkalemia. Treat as needed except avoid calcium channel blockers. Go to ACLS events as relevant and return.

10. Actively cool patient with ice packs, lavage if open abdomen. Stop cooling at 30°C.

11. Send labs for ABG, Potassium, CK, urine myoglobin, coagulation studies, lactate.

12. Place Foley catheter. Monitor UO. Goal 1-2 mL/kg per hour. Can give IV fluid and diuretics.

13. Consider alkalizing urine if CK or urine myoglobin elevated (Sodium Bicarbonate 1mEq/kg/hour).

14. Arrange ICU bed. Mechanical ventilation usually required.

15. Continue Dantrolene or Ryanodex: 1 mg/kg every 4-6 hours or 0.25 mg/kg/hr infusion for at least 24 hours (25% of MH events relapse). Observe patient in ICU for at least 24 hours.

16. Call MH hotline (below) for any suspected case with any questions.

Contact the Malignant Hyperthermia Association of the United States (MHAUS hotline) at any time for consultation if MH is suspected:

1-800-MH-HYPER (1-800-644-9737)
or see suggestions online at http://www.mhaus.org
#5 Bleeding During Spine Surgery

**Verify Diagnosis:** Increase in Blood Loss, Hypotension, Tachycardia, Oliguria

**Stabilize Patient:**
- Control bleeding (surgical)
- Replace plasma volume
- Maintain BP with vaspressors as needed
- Verify blood product availability, consider MTP

**Drugs:**
- Tranexamic Acid: *Institutional protocols may vary and should be followed*
  - Low Dose: Load 1 mg/kg Infusion 1 mg/kg/hr
  - High Dose: Load 30 mg/kg Infusion 1-10 mg/kg/hr

**Treatment:**
- Confirm blood loss (suction canister, sponges, under drapes, etc.) and exclude other causes for hemodynamic problems
- Ensure adequate vascular access if not secured already, communicate with blood bank for need for blood products
- Consider use of red cell salvage techniques
- Check labs: (ABG, Hct/Hb, thromboelastography)
  - Correct deficiencies as indicated
  - Goal Hb >8.0 (may vary based on patient co-morbidities)

- Consider temporary wound packing until patient stabilized
- Restore plasma volume and temporize with vaspressors
- Ensure normothermia 36.0-37.9 °C
- Consider antifibrinolytics (Tranexamic Acid) and Factor VIIa

**Differential Diagnosis:**
- Overdose of anesthetic, pulmonary embolism, anaphylaxis, other forms of shock, or transfusion reaction.

**Common Causes:**
- Multilevel spine surgery, tumor resection, trauma, infection
- Revision surgery
- Patient age, obesity, known coagulation defects
Routine workflow checklists?

- 10-17% of the time at least 1 important item either missing or not functioning prior to induction
- Failure to check or inspect as the cause of 22-33% of all critical incidents with significant negative outcome
- Consider checklists for
  - Room set up
  - Pre-induction
  - Post-induction
  - Sweep checklists
  - Emergence

Krombach et al 2015
Team training
OK to start small...

- Team building
- Team bonding
- Development
- Wellness

“IT STARTED AS A TEAM-BUILDING EXERCISE.”
Time for team exercise...
Telestrations

1. Word is written
2. Draw the word that is written on page 1
3. Write what was drawn on page 2
4. Draw the word that is written on page 3
5. Write what was drawn on page 4
6. Draw the word this is written on page 5
7. Write the word that is written on page 6
How did that go?
Team Training

Association Between Implementation of a Medical Team Training Program and Surgical Mortality

Julia Neily, RN, MS, MPH
Peter D. Mills, PhD, MS
Yinong Young-Xu, ScD, MA, MS
Brian T. Carney, MD
Priscilla West, MPH
David H. Berger, MD, MHCMD
Lisa M. Mazzia, MD
Douglas E. Paul, MD
James P. Bagian, MD, PE

Context: There is insufficient information about the effectiveness of medical team training on surgical outcomes. The Veterans Health Administration (VHA) implemented a formalized medical team training program for operating room personnel on a national level.

Objective: To determine whether an association existed between the VHA Medical Team Training program and surgical outcomes.

Design, Setting, and Participants: A retrospective health services study with a contemporaneous control group was conducted. Outcome data were obtained from the VHA Surgical Quality Improvement Program (VASQIP) and from structured interviews in fiscal years 2006 to 2008. The analysis included 182,409 sampled procedures from 108 VHA facilities that provided care to veterans. The VHA’s nationwide training program required briefings and debriefings in the operating room and in...

• 18% reduction in annual mortality!

Neily et al 2010
Team training

- Find your team
  - Planning
  - Getting key players on board

- Objectives
  - For all team members
  - From the individual to the institution level

- Scenario
  - So many to choose from!

- Fidelity
Team Training

- **Resources**
  - Time (to plan and run the program)
  - Money
  - Location
  - Supplies

- **Assessment/Evaluation**
  - Surveys
  - Validated scales

- **Impact**
  - On the team
  - On efficiency
  - On Patient Safety
In-situ Multidisciplinary ORTT

- Anesthesia, Otolaryngology, Nursing, Scrub, Tech
- In the OR during committed education time
- Went through scenario twice with debriefing after each
  - Patient undergoing I&D of face lacerations with MAC
- Team stayed together for the day
- Surveys and NOTECHS II assessment
- $5 to the cafeteria at completion
<table>
<thead>
<tr>
<th><strong>Table 1. Operating theatre team Non-Technical Skills (NOTECHS) assessment tool[14].</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership and management</strong></td>
</tr>
<tr>
<td>Leadership                                                                                                            Involves/reflects on suggestions/visible/accessible/inspires/motivates/coaches</td>
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<tr>
<td>Maintenance of standards                                                                                                Subscribes to standards/monitors compliance to standards/intervenes if deviation/deviates with team approval/demonstrates desire to achieve high standards</td>
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<tr>
<td>Planning and preparation                                                                                              Team participation in planning/plan is shared/understanding confirmed/projects/changes in consultation</td>
</tr>
<tr>
<td>Workload management                                                                                                   Distributes tasks/monitors/reviews/tasks are prioritised/allots adequate time/responds to stress</td>
</tr>
<tr>
<td>Authority and assertiveness                                                                                             Advocates position/values team input/takes control/persistent/appropriate assertiveness</td>
</tr>
<tr>
<td><strong>Teamwork and co-operation</strong>                                                                                           Relaxed/supportive/open/inclusive/polite/friendly/use of humour/does not compete</td>
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<tr>
<td>Team building/maintaining                                                                                            Helps others/offers assistance/gives feedback</td>
</tr>
<tr>
<td>Support of others                                                                                                     Listens to others/recognises ability of team/condition of others considered/gives personal feedback</td>
</tr>
<tr>
<td>Understanding team needs                                                                                                Keeps calm in conflicts/suggests conflict solutions/concentrates on what is right</td>
</tr>
<tr>
<td>Conflict solving                                                                                                      Keeps calm in conflicts/suggests conflict solutions/concentrates on what is right</td>
</tr>
<tr>
<td><strong>Problem-solving and decision-making</strong>                                                                               Uses all resources/analytical decision making/reviews factors with team</td>
</tr>
<tr>
<td>Definition and diagnosis                                                                                               Suggests alternative options/asks for options/reviews outcomes/confirm options</td>
</tr>
<tr>
<td>Option generation                                                                                                     Estimates risks/considers risk in terms of team capabilities/estimates patient outcome</td>
</tr>
<tr>
<td>Risk assessment                                                                                                       Reviews outcomes/reviews new options/objective, constructive and timely reviews/makes time for review/seeks feedback from others/conducts post treatment review</td>
</tr>
<tr>
<td>Outcome review                                                                                                        Checks and reports changes in team/requests reports/updates</td>
</tr>
<tr>
<td><strong>Situation awareness</strong>                                                                                               Considers all team elements/asks for or shares information/aware of available of resources/encourages vigilance/checks and reports changes in team/requests reports/updates</td>
</tr>
<tr>
<td>Notice                                                                                                                 Knows capabilities/cross checks above/shares mental models/speaks up when unsure/updates other team members/discusses team constraints</td>
</tr>
<tr>
<td>Understand                                                                                                             Identifies future problems/discusses contingencies/anticipates requirements</td>
</tr>
<tr>
<td>Think ahead                                                                                                           Identifies future problems/discusses contingencies/anticipates requirements</td>
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doi:10.1371/journal.pone.0090320.t001
**Table 2. Behavioural parameters of Oxford NOTECHS II.**

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>Frequency</th>
<th>Oxford NOTECHS II score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compromises patient safety and effective team work</td>
<td>Consistently</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Inconsistently</td>
<td>2</td>
</tr>
<tr>
<td>Could directly compromise patient safety and team work</td>
<td>Consistently</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Inconsistently</td>
<td>4</td>
</tr>
<tr>
<td>Maintains an effective level of patient safety and teamwork</td>
<td>Inconsistently</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Consistently</td>
<td>6</td>
</tr>
<tr>
<td>Enhances patient safety and effective teamwork</td>
<td>Inconsistently</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Consistently</td>
<td>8</td>
</tr>
</tbody>
</table>

doi:10.1371/journal.pone.0090320.t002
In-situ Multidisciplinary ORTT

Figure 2. NOTECHS II scores.
Organization Level: HRO

Each member of the team should feel that they have the right to speak up

Objectives:

- **Caring** - Reduces patient risk enabling us to provide even greater levels of patient care
- **Teamwork** – Brings teams together to collaborate and support each other to improve our patient-centered culture
- **Integrity** – Improves compliance and promotes high standards
- **Innovation** – Drives efficiency and streamlines processes and documentation, so more time can be spent on research and providing cutting edge patient care solutions
Leader Interventions: Messaging and constant reinforcement (living the safety message)
- Operational leadership of process improvements such as handoffs/ transitions, rounding, chain of command clarity, and policies/protocol simplification
- Fair and just accountability (Protect those who ask, feedback and coaching, communicate lessons learned, etc.)
- Local learning systems (safety surveillance suggestions to improve performance)

Employee interventions: Communication, thinking skills, and team thinking
- Stopping in face of uncertainty or when tempted to shortcut
- Self-checking and cross monitoring, especially for intelligent compliance
Michigan Medicine Safety Statement

Our promise to patients, families, and employees: Your safety is our most important priority.

We are open and transparent about errors, and will stand up for those who speak up.
We are accountable for our actions.
We learn from our errors without blame.
We do not tolerate reckless or disrespectful behavior.
Barriers
Surgeons…

• Hypothesis
  • Surgeons with higher number of reports from coworkers are at greater risk for postoperative complications

• 2 diverse academic medical centers that participate in NSQIP

• ~13,000 patients, 202 surgeons, 1583 complications

Cooper et al 2019
Figure 2. Estimated Complication Rate According to the Operating Surgeon’s Reports by Coworkers About Unprofessional Behaviors in the 36 Months Preceding the Operation

Analyses are adjusted for total coworker reports, patient factors (age, sex, race/ethnicity, functional status, American Society of Anesthesiologists class), and operative characteristics (wound classification, long operative time [calculated as >75th percentile for each Current Procedural Terminology code]). Error bars indicate 95% CIs.
Barriers

Supportive leadership
Organization
Conclusions

Patients continue to be at risk due to medical errors
It is our duty to form cultures that value patient safety
There are many different ways to implement a culture of patient safety
It is OK to start small within your group and have plans to move on to the larger organization
Don’t get discouraged by barriers
Thank you! Questions?
References


