Improving Patient Safety in the Peri-Operative Setting

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Objectives

• Understand why reporting serious events, incidents, and near misses are important to patient safety
• Recognize how system thinking will help detect latent failures in the organization that allow errors to reach patients
• Identify high-leverage safety strategies that can improve patient outcomes
Perioperative Errors

Patient hypotensive post-operatively in PACU, STAT verbal order from anesthesiologist to RN to administer EPHEDRINE 5 mg IV. The RN obtained PHENYLEPHRINE from the ADC and administered the wrong medication.

Error discovered by RN and anesthesiologist when patient became hypertensive following the administration of the medication.
Verbal Orders
Perioperative Errors

Patient ordered Ancef 1 gm, but Norcuron (vecuronium) 10 mg administered.

Patient was intubated and given a total of 5 mg of neostigmine and propofol to maintain ventilation.
Error Reporting Systems

- Internal reporting programs allow organizations to learn about
  - potential risks
    - risks hidden in patient care processes
  - actual errors
    - errors that occur during patient care
  - causes of errors
    - Reveals underlying weaknesses in the system and processes of care that explain why an error happened
  - prevention
    - ways of preventing recurrent events
Error Reports

• System/process improvement reports
• Robust explanatory information and causative factors
  – How it happened
    • conditions that led to an event or pose a hazard
  – Why it happened
    • the system-based caused or hazardous condition
  – At-risk behaviors
    • staff work-around/over-ride of warnings, incentive for work-around
  – How to prevent it
    • what system or process changes can be instituted to reduce or eliminate the error reaching the patient
System Key Elements

- Patient Information
- Drug/equipment Information
- Communication of Drug/equipment Information
- Labeling, Packaging, and Nomenclature
- Drug/equipment Storage, Stock, Standardization, and Distribution
- Device Acquisition and Use
- Environmental Factors
- Patient Education
- Staff Competency and Education
- Quality Processes and Risk Management
Patient Information Problems

Patient received from nursing home into short procedure unit for surgery. After procedure completed, patient in PACU and received Dilaudid PCA. Patient had 2 episodes of apnea, PCA was discontinued and transferred to CCU.

During the next 2 shifts, five Duragesic patches were found on patient's skin with various dates of application written on them. These were promptly removed and patient's pain controlled with morphine prn.
Patient Information Problems

Patient admitted to short procedure unit. Asked if pregnant. Stated no. Pregnancy test ordered and collected based upon admission orders. Administered Valium and Reglan IV pre-op.

Pregnancy results were positive. Anesthesia advised and procedure was then done under local. Risk of Valium in 1st trimester increases incidence of cleft lip/palate.
Patient Information Problems

• Without information, practitioners depend only on heuristic process

• With information, practitioners are guided to the appropriate selection of medications, doses and routes of administration, etc.
Patient Information Problems

• High risk patient populations
  – renal/liver impairment
  – pregnant/bread feeding
  – neonates/pediatrics
  – elderly/chronically ill
  – behavior health
  – polypharmacy
Patient Information
Error Reduction Strategies

• Basic demographic and clinical information (age, height, weight, allergies, diagnosis)
• Co-morbidities (renal/hepatic disease, diabetes, hypertension, pregnancy, sleep apnea)
• Patient monitoring information (lab values, vital signs)
• Past complications with anesthesia
Drug Information Problems

CRNA read vial gentamicin 40 mg per mL but gave the entire vial (20 mL) multidose vial new to OR complex. When CRNA became aware of the error the surgeon was notified immediately.

Patient was hydrated to dilute medication. Patient and mother made aware of error. Patient without side effects. Patient discharged to home after hydrating.
Drug/equipment Information

Error Reduction Strategies

• All changes in drugs, equipment, procedures need to be communicated to all staff
  – competency should be documented prior to new equipment use

• A pharmacist and biomedical is available to answer emergency questions 24 hours a day
  – On-call numbers are readily accessible

• Malignant hyperthermia carts contain current reference material
  – Include preparation and administration of dantroline

• Resuscitation carts contain current reference material
  – Current ACLS and PALS protocols
Communication Problems

Patient in OR was ordered insulin 2 units, 20 units insulin administered by anesthesia.

Patient's blood glucose 29. Patient required frequent blood glucose checks every 15 minutes and treated with D50 bolus as well as D10 drip x 4 hours.
Communications Problems
Ambiguous Orders

3-year-old undergoing IV anesthesia induction was ordered lidocaine was 40 mg. The volume of medication delivered was based on a lidocaine 1% concentration, but lidocaine 2% was used and the child was administered lidocaine 80 mg.

The child had a grand mal seizure, was administered propofol and intubated.
Sum the digits below reading left to right:

1000 + 20 + 1000 + 30 + 1000 + 40 + 1000 + 10 = ?
Communication Problems
Verbal Orders

• Inherently problematic
  – different accents and dialects
  – background noise, interruptions, distractions
  – limited short-term memory capacity
  – Limited to one thought at a time
  – unfamiliar terminology and drugs
The Arthur Andersen partner was on his cell phone when he said,

"Ship the Enron documents to the feds,"

but his Secretary heard,

"Rip the Enron documents to shreds."

It turns out that it was all just a case of bad cellular.
Verbal Order for 18 Month Old

“Get this kid .8 morphine”
Baby’s death called tragic ‘human error’

By JOEL BRINKLEY and ROBERT L. PEIRCE
Courier-Journal Staff Writers

A Kosair-Children’s Hospital spokesman blames “a mistake in communications” for the fatal morphine overdose of a 17-month-old girl Monday afternoon.

But, the spokesman says, hospital personnel were probably violating Kosair-Children’s policies when they injected the drug that quickly killed young Jessica Henson.

It’s the second death due to an accidental drug overdose at Kosair-Children’s Hospital in the past 14 months, and the Jefferson County coroner’s office along with Louisville police homicide detectives are investigating.

But Dr. George Nichols, Kentucky’s chief medical examiner, who performed an autopsy yesterday morning, said: “We’re looking at human error here. It’s tragic as hell, but it’s a human error.”

The error occurred after a doctor gave a nurse an oral order for morphine for young Jessica, who was suffering from a congenital heart disease. The doctor ordered .8 mgs., but the nurse brought .8 ccs, Nichols and Bill Loader, a hospital spokesman, said.

That’s 10 times the dosage the doctor had intended.

The drug was administered by injection — Loader won’t say whether the doctor or the nurse gave the shot — and about 15 minutes later the nurse noticed the mistake. But by then it was too late. Despite the hospital’s best efforts, the infant died a few hours later.

Jessica, daughter of Mrs. and Mrs. James Henson of New Albany, Ind., was admitted to Kosair-Children’s Hospital on Sunday because her disease was restricting the flow of blood from her heart. She was turning purple.

Until about noon on Monday, her father said, the girl seemed to be doing well. But then, he said, she “began acting as if she weren’t feeling well.”

“She was a very sick young girl,” Nichols said. But, he said, her condition was treatable — perhaps even curable through surgery.

In the short term, however, morphine is often used to treat the problem. It can help improve the blood flow, said Dr. Duncan M. Millan, acting chairman of the University of Louisville Medicine.

See BABY’S
Communication Problems

Intimidation

• Effective communication is hindered when practitioners relate to one another in a hierarchy rather than that of a team
  – Horizontal or lateral
  – Communication flows only in ONE direction
  – Silo thinking – not consistent with the complex, multidisciplinary nature of providing safe care
  – Ownership
    • “That’s not my job, it’s their job”
Communication
Error Reduction Strategies

• Eliminate dangerous abbreviations and symbols
• Do not abbreviate drug names (pit, nitro)
• Say 1-5 for 15 (confused with 50)
• Read/repeat-back verbal orders
• Before administering medication, state the drug’s name and dose
Communication
Error Reduction Strategies

• Pre/post conference
• Teamwork Training
  – crew resource management
• Rescue communications (Red Rules)
  – requires an environment of respect (psychological safety) to allow anyone to stop an action (stop the line)
Communication
Error Reduction Strategies

• Policy to follow for practitioners disagreement about real or perceived unsafe orders
  – well-defined chain of command

• Zero tolerance for “bad behavior”
  – addressed within 24 hours of incident
Drug Storage Problems

Administered Norcuron (vecuronium 20 mg (muscle relaxant) instead of Ancef (cefazolin) 2 g (antibiotic) to patient (this was scheduled as an IV sedation case).

Ventilated the patient, notified the attending anesthesiologist and surgeon, and secured the patient's airway with an endotracheal tube. The patient was sedated and ventilated in the PACU until the muscle relaxant wore off.
Drug Storage Problems

Patient was in the OR for planned rapid sequence induction with Etomidate. The anesthesiologist drew up labetalol from the anesthesia drug box instead of Etomidate and administered 8 mL (40mg) of labetalol IV followed by Anectine 100 mg.

The error was immediately recognized. Atropine 0.8 mg IV, ephedrine 10 mg IV, and brief CPR were administered for a heart rate of 10 beats per minute. The patient fully recovered and surgery was performed as planned.
Drug Storage
Error Reduction Strategies

• Standardize the storage of anesthetic medications on trays or in other devices

• Distinct labeling and bold warnings are used in all places where neuromuscular blocking agents are stored

• The amount of each drug provided on anesthesia medication trays is based on clinical patterns rather than for space

• Medication on trays are segregated by pharmacologic class
Assume That Errors Will Occur

• Assume that slips, lapses, and mistakes are inevitable

• Many factors, **latent** (blunt end) and **active** (sharp end), must be present and in proper alignment for error to occur

• Emphasis on redesign of system to make it impossible or more difficult to err
When selecting error-reduction strategies, choose as many from this list as possible, concentrating efforts on high-leverage strategies from the top of the list.

These strategies are considered high-leverage because of their reliability to consistently impact safety.

The low-leverage strategies at the bottom of the list depend upon human memory and behavior to be effective.
Error Rate of 0.1% or 99.9% Success Rate

- 12 babies given to wrong parents every day
- Major plane crash every 3 days
- 16,000 lost items every hour in the mail
- 37,000 errors every hour by ATM machines
- 107 erroneous medical procedures performed every day
Insanity is doing the same things the same way and expecting different results

Albert Einstein
PSRS Articles

- Prevention of Inadvertent Perioperative Hypothermia
- Dangers Associated with Shared Multidose Vials
- Obstructive Sleep Apnea May Block the Path to positive postoperative outcomes
- Propofol Infusion Syndrome: A Rate but Potential Fatal Reaction
- Delays in the OR: Stress Between “Running two Rooms” and “Time Out.”
- Let’s Stop this “Epi-demic:” Preventing Errors with Epinephrine
- New Guidance on Preventing Anesthesia Awareness
- Expecting the Unexpected: Ambulatory Surgical Facilities and Unanticipated Care