This is the first issue of a new quarterly newsletter devoted to patient safety. You say the last thing you need in your life is another hospital newsletter? What world do those Plaza folk live in! What are they thinking!?

What we are thinking is that we must all “walk the talk”:

- that patient safety must be paramount at Children’s;
- that while we succeed in delivering the highest quality care most of the time, we do from time to time fail to do so;
- that most failures represent systems and process failure, not provider failure;
- that to become the best children’s hospital in the nation we must continuously improve;
- that our failures and close calls are truly opportunities for improvement;
- that to take full advantage of such opportunities we must talk about them;
- and that we must share what we learn across the Children’s healthcare system.

In these stories we will make our safety processes more visible, demonstrate how patient safety incidents relate to system vulnerabilities, and promote systems thinking.

Some have expressed discomfort with the idea of a newsletter that “airs our dirty laundry” and concern that we will expose ourselves to bad publicity or additional liability and, perhaps most concerning, frighten our patients’ parents or our referrers.

We believe the potential benefits of this newsletter greatly outweigh the risks. The parents of the patients whose care is referred to in these pages, their referring physicians and the care teams directly involved all will have been fully informed of the patient safety events retold here that involved their child.

We understand that talking about our care system failures and near-misses could open us all to poor publicity, but we believe the risk to our patients’ safety of not talking about them is much greater.

The Editorial Board welcomes your comments, advice and suggestions for future issues.

Gastroenteritis in a Child on Diuretics

What happened?

A preschool-age child with severe heart disease was admitted to the PICU with worsening chronic congestive heart failure and pulmonary edema. After several weeks of treatment with diuretics and cardiac medications, the patient’s condition improved. Care was then focused on adjustment of home medications, nutritional support, and promotion of oral feeding.

On the day prior to a holiday weekend this child developed diarrhea and vomiting. Both the child’s parents and a nurse noted concerns about fluid status, and that the child appeared thirsty, but to prevent cardiac overload the patient was maintained on diuretic therapy and free water restriction.

On the third day of diarrhea the patient appeared more ill. Serum electrolytes revealed a very elevated serum sodium and metabolic acidosis. The child was transferred to the PICU critically unstable, and early the next morning suffered a cardiac arrest. Despite prolonged efforts the patient could not be resuscitated.

How could this happen here?

There are usually numerous contributing factors when we fail to provide optimal care. Let’s look at some of the factors that may have resulted in the failure of multiple physicians and nurses to appreciate the severity of this boy’s condition:
1. Standard assessment rules cannot be applied to a child with non-standard physiology.

We are all taught to look at “I’s and O’s”, and know that urine output of >1cc/kg/hour is a sign of good hydration – or is it? A child who is on diuretics may continue to produce urine, even in the face of dehydration or even shock.

Similarly, we routinely look for a rapid pulse as an indicator of dehydration or shock, but a child who is on beta-blockers may not develop tachycardia in response to intravascular volume depletion.

When we care for a child who has complex disease at baseline, interpretation of clinical data can be very difficult.

2. Communication breakdown(s)

The structure of work rounds varies between teams and clinical units. Multidisciplinary rounds do not occur daily on all units, and face-to-face nurse-physician communication may not occur.

Appropriate questioning of the judgment of someone in authority may be perceived as risky, particularly for a parent or a new and inexperienced staff member. Will we take offense or be dismissive when a parent or caretaker with intimate knowledge of a patient, but limited medical knowledge, tells us “something is wrong”? Do our patients’ families or all members of our staff know how to access the “chain of command” if their concerns are not heard? What is our responsibility to go “up the line” if we believe that a patient’s safety is in jeopardy?

3. Staffing constraints

While our patients don’t get any less sick in the evenings, on weekends or on holidays, our staffing patterns change. Access to ancillary services decreases. Hand-offs from nurse to nurse and doctor to doctor increase, each an opportunity for a communication breakdown. Maintaining continuity of care and a coordinated team approach is challenging.

What did we do?

When a patient safety incident occurs, it is our responsibility to learn as much as we can from that event to understand how and why it occurred and to prevent a recurrence. In that spirit, when a serious event such as this one occurs we convene a multidisciplinary team to systematically review the patient’s course.

The team carried out a Root Cause Analysis (RCA) to identify the key factors that contributed to this care failure, focusing primarily on systems and processes, rather than on individual performance. Using this technique, they repeatedly asked “why?” – looking at the contribution of human resources, communication, access to information, environment and culture to determine what factors contributed to this child’s outcome, and to develop an action plan to try to close the gap between optimal and actual care delivery.

Based on that analysis, six actions were proposed. These ranged from a recommendation to flag diuretic orders on the MAR to prompt nurse-physician communication if the child develops vomiting or diarrhea, to making an institutional commitment to promote an environment where any care team member – including a family member – who believes that patient safety is being compromised is empowered to speak up.

Summary

Our patients’ illnesses and our care system are complex. Despite our best intentions and efforts, patient safety events will occur at Children’s. Whenever we fail to provide the quality of care we aspire to, we must recognize it, talk about it openly and focus on systems rather than individuals. We must systematically analyze our care to learn the multiple reasons why a failure occurred, find ways to prevent a recurrence, and implement what we learn throughout our care system. Learning from our errors is both part of our individual professional responsibility and a key component of continuous improvement.

Digoxin Overdose

What happened?

A 3 kg infant was admitted from the ED in the evening for evaluation of a fever – “rule out sepsis.” The patient had underlying congenital heart disease and digoxin was part of the child’s home regimen. In the ED under nursing supervision the patient received a digoxin dose of 0.2 mL from the family’s home supply, which had been obtained from an outside pharmacy and was
labeled as **GIVE CHILD 0.2 mL (100 mcg) EVERY 12 HOURS.**

Admitting orders were written in the ED. Digoxin was ordered at a dose of **0.1 mg PO BID** – consistent with the label on the infant’s home medication. When the order was received, both pharmacy and nursing staff questioned if the dose was too high. Pharmacy suggested that because the agent has a long half-life, it would be reasonable to hold the morning (next) dose until the dose could be discussed on rounds.

The treating house officer requested that the dose be administered as ordered (and it was) and noted in the infant’s chart that “digoxin dose higher than usual; will also discuss with cardiology. Keep on CR monitor. Will check digoxin level.” The supervising house officer added a note: “Addendum – patient seen and examined. Agree with above.”

The AM dose (digoxin 100 micrograms PO) was administered to the patient. Discussion with the attending cardiologist revealed that the child’s correct dose was **10 micrograms PO BID** and that the child had received a 10-fold overdose of digoxin. After noting the 10x error, digoxin was held and serial digoxin levels were followed until the patient’s level was back in the therapeutic range.

However, when it was decided to restart digoxin the following afternoon, the house officer then on call apparently referred to the original order and again ordered digoxin at **0.1 mg PO q12h!** The pharmacist recognized this as being an error from the previous day and had the order changed. Despite the 10-fold dosing error associated with a drug with a narrow therapeutic index, the patient did not have any adverse outcomes.

**How could this happen here?**

Review revealed that the principal factors contributing to this patient safety incident were:

- The outside pharmacy had mislabeled the patient’s prescription as **GIVE CHILD 0.2 mL (100 mcg) EVERY 12 HOURS** when in fact the product was filled with a standard digoxin liquid of 50 mcg/mL; thus 0.2 mL would be 10 mcg, not 100 mcg. So although the label was wrong, the child had been receiving the correct dose. A number of recent studies have shown that there is a surprising rate of error when outpatient prescriptions are closely studied.

- There is no standard guideline for digoxin dosing at Children’s, but we do have a policy stating that digoxin orders should be written as micrograms. Using both microgram and milligram notations, particularly if abbreviated as mcg and mg, introduces another potential source of error.

- While both nursing and pharmacy staff questioned the dose repeatedly and house staff reviewed the dose, no one chose to “stop the line” or insisted on going up the chain of command to an attending physician on the night of admission.

While these seem the principal factors, multiple other factors also contributed to creating a milieu in which this error occurred: staff workload during evening shifts, reliance on ED staff to write admitting orders, and other factors. Unlike warfare, where victory has many authors and defeat few, both medical success and medical errors have multiple authors.

**What are we doing?**

a. Digoxin dosing is complex. The microgram per kilogram dose and volume should be calculated when an order is written. Many experienced clinicians ask a colleague to check their calculation.

b. A digoxin guideline is in preparation. Computerized practitioner order entry will allow introduction of multiple safeguards including checking of dose calculations based on patient weight.

c. Creating a work environment where staff feels empowered and able to access the chain of command and, if necessary, stop the line is a hospital goal for Fiscal Year 2002.

**Summary**

Doses of high-risk, error-prone medications must be calculated. Relying on previous orders or labels can cause or perpetuate errors. If uncomfortable with a clinical decision or action, access the chain of command. If in your judgment the situation warrants, stop the line.

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*(Patient summary contributed and Root Cause Analysis led by Helen Kurre, RPh)*

**continued...**
Unstable Airway

What happened?

An infant with multiple congenital anomalies required a semi-emergent intubation at 3:00 AM in the PICU for impending respiratory failure. Despite the child having an apparently normal-sized jaw, the attending intensivist found that the patient could not be intubated using usual techniques but could be ventilated by bag and mask. When he went to get the equipment used to accomplish such difficult intubations (a fiberoptic bronchoscope) he found it was not in the expected location in the OR. He maintained the patient on bag and mask with oxygen saturations >90% for over an hour while awaiting emergency assistance from an otolaryngologist who was able to intubate the child. The child suffered no ill effect from the delayed intubation. In follow-up discussion the patient’s mother stated that her child had been intubated three months previously, reportedly without difficulty.

How could this happen here?

On review we learned that:

- Fiberoptic bronchoscopes had recently been broken at a very high rate so none were on any of the three carts kept in the OR for difficult intubations.

- The medical record notations at the time of the child’s prior intubation documented that at that time intubation could not be accomplished by PICU fellows or a staff anesthesiologist. The assistance of an ENT surgeon was required.

This child’s course highlights the importance of reviewing patient safety incidents from the perspective of Children’s care system: systems thinking.

What are we doing?

Medical equipment: Emergency equipment was not in its expected location.

At the time of the incident efforts were already underway to solve the bronchoscopic breakage problem. This incident demonstrated the need to reserve for emergency use only a difficult intubation airway cart with fiberoptic bronchoscope.

Medical information: Neither the child’s care team, nor apparently the child’s parent, were aware that the child had been very difficult to intubate in the past. This important – indeed vital – information was buried in the child’s voluminous old records. Parents and patients are essential members of the team and included in these important facts.

How to ensure that a child’s medical record is “flagged” so as to alert all care providers to critical information is a far more challenging problem to solve. How can we be certain all who need to know do know if a child is allergic to a medication, is the subject of a CASPER, has had an adverse reaction to anesthesia, was difficult to intubate, or has a modified code status – all while appropriately safeguarding patient confidentiality? Stickers on the front of a clinic chart are often covered by sheets of paper. Problem lists are not consistently completed or referred to. All caretakers may not consult a patient’s electronic record at every encounter. The problem is under study by the Clinical Information Steering Committee but at this time, no single system-wide solution is evident. For the present we must rely on:

- inclusion of critical information in all clinical summaries;
- highlighting such information in the patient’s medical record;
- fully informing parents of such conditions and adverse reactions and the importance of communicating them;
- asking parents about medication allergies and prior adverse reactions to medical interventions;
- suggesting use of medical alert bracelets;
- designing such alerts into the clinical information system now under development.

Summary

When reviewing a patient safety incident, view it from the perspective of Children’s health care system. What changes in our care system would have prevented the incident? Here, had the child’s physicians been alerted to the child’s prior difficult intubation, the needed staff and equipment could have been assembled and a potentially life-threatening thrash avoided. ✷

(Patient summary and analysis contributed by David Jardine, MD)

PS: FYI is a quarterly newsletter devoted to patient safety stories at Children’s. This publication is part of Children’s quality program and was developed to facilitate learning from patient safety incidents and foster continued improvement in our care and related processes. Distribution should be limited to Children’s employees, clinical care providers (including students and residents), and Medical Staff.

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