WebM&M
Morbidity and Mortality Rounds on the Web

Spotlight

Too Many Cooks in the Kitchen

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

PSNet
PATIENT SAFETY NETWORK

Source and Credits

- This presentation is based on the August 2020 AHRQ WebM&M Spotlight Case
  - See the full article at https://psnet.ahrq.gov/webmm
  - CME credit is available
- Commentary by: Richard P. Dutton, MD, MBA
  - AHRQ WebM&M Editors in Chief: Patrick Romano, MD, MPH and Debra Bakerjian, PhD, APRN, RN
  - Spotlight Editors: Patrick Romano, MD, MPH and Garth Utter, MD
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Objectives

At the conclusion of this educational activity, participants should be able to:

- Explain the role of shared decision-making and “stopping rules” in planning operative interventions in patients with multiple chronic comorbidities
- List at least two safety-related disadvantages of starting complex surgical cases late in the day
- Describe the problem of perioperative fixation error and approaches to help minimize the risk of such error
- Describe the role of decision-support alerts in postoperative care, and identify several factors that might trigger such alerts based on cardiac risk after non-cardiac surgery

TOO MANY COOKS IN THE KITCHEN

A case describing deviations in the plan for anesthesia and postoperative care, which ultimately contributed to the death of a patient with osteoporosis and multiple comorbidities undergoing femoral fracture repair

Case Details

- 40 year-old man with multiple comorbidities (diabetes, hyperlipidemia, hypertension, coronary artery disease, chronic renal failure and severe aortic stenosis)
- Patient was admitted for a pathologic pelvic fracture (secondary to osteoporosis) after a fall from standing
- Trauma Surgery was the primary team, with involvement from Nephrology, Cardiology and General Internal Medicine services
- Orthopedics considered the fracture stable based on post-mobilization x-rays
- The patient's recovery was slow due to ileus and severe deconditioning

Case Details

- On Day 13, while being assisted to standing, the patient's leg buckled and he developed hip pain
  - X-rays showed an intracapsular left femoral neck fracture with severe osteopenia secondary to renal osteodystrophy
- Cardiology, Cardiothoracic Surgery, Trauma Surgery, and Orthopedics agreed to proceed with an operative hemiarthroplasty with a cardiac anesthesiologist, including intraoperative trans-esophageal echocardiography (TEE)

Case Details

- On Day 24, the patient underwent surgery under general anesthesia starting at 16:00 and concluding at 22:30.
  - The operation was prolonged due to unsuccessful epidural catheter placement and intraoperative periprosthetic fracture requiring plating, but otherwise uneventful
  - Neither a cardiac anesthesiologist nor TEE was utilized, given the late hour of surgery

Case Details

- Patient was hypertensive in the post-anesthesia care unit (PACU) and then transferred back to the surgical unit (not ICU) with only routine vital signs and nursing checks every four hours
- Patient's systolic blood pressure after transfer was 60 mmHg
  - On-call Trauma Surgery team was notified one hour later and administered 500 mL of IV fluids
- Enroute to the ICU, the patient arrested and died

TOO MANY COOKS IN THE KITCHEN

THE COMMENTARY

By Richard Dutton, MD, MBA

Background (1)

- While a stable pelvic fracture is easily survived in most cases, the evident frailty of this patient was a cause for concern and the trauma surgery team and orthopedic consultant were correct to adopt a conservative approach
  - Trauma patients who die in the subacute phase typically have multiple comorbidities
  - Severe aortic stenosis is a known risk for anesthesia, and the high relative mortality extends to other physiologic stessors, including recovery from trauma

Background (2)

- The patient developed a serious complication – ileus – possibly induced by use of opiate pain medications
- This complication prolonged the hospital stay and impaired mobilization
  - Prolonged hospital bedrest leads to loss of muscle and bone mass and increases risk of pressure ulcers, venous thromboembolism and hospital acquired-infection.
  - Pneumonia leading to sepsis and organ failure is a leading cause of death in immobile older trauma patients

Background (3)

- Efforts at mobilization led to a second fracture
- Osteoporotic fracture repair is harder than in healthy bone
  - The clinical team must be prepared for substantial blood loss, a possibility of insufficient healthy bone, and the need to add a plate following fracture repair

Approach to Improving Safety

Approach to Improving Safety (1)

- Primary failure in this case was the decision to proceed with a major surgical procedure
  - Team should have considered palliative care consult and institution of comfort-care measures in the absence of other achievable goals
  - Likely that the patient would have died before leaving the hospital, regardless of the approach
  - Shared decision making about the goals of care between the physicians, the patient and the family should have occurred
  - “Stopping rules” would have limited increasingly futile resuscitative efforts, based on that shared decision-making

Approach to Improving Safety (2)

- The multidisciplinary team developed a surgical plan, but this plan was not effectively implemented
  - Contributing factors likely included inertia, breakdown in communications, and inappropriate production pressure
- Failure to use TEE for intraoperative monitoring as planned
  - TEE allows for direct visualization of cardiac filling and contractility, and assessment of aortic valve function, right-heart distension and embolic load
  - Cardiac anesthesiologists are comfortable with placing a TEE probe and interpreting images, but this skill is less widespread in the community
  - Use of TEE to guide ongoing resuscitation would have enabled better management of the patient's hemodynamics

Approach to Improving Safety (3)

- The surgery began at 16:00 rather than first thing in the morning
  - Morning starts are recommended for high risk cases to allow for proper marshalling of resources and for all team members to be at their intellectual peak
  - Performing a complicated operation in the evening distracts attention from the care of other patients in the operating suite, potentially at a time when personnel and intellectual resources are already stretched thin.

Approach to Improving Safety (4)

- Procedure itself was complicated - an experienced orthopedic surgeon should be able to complete hemiarthroplasty in one hour (versus six hours in this case)
  - Prolonged operative time is a surrogate for tissue injury, inflammatory load, fluid volume shifts, exposure to anesthetic medications, heat loss and infection risk
  - Given the frailty of this patient, proper care should have included reducing the physiologic impact of the surgery by shortening operative time

Approach to Improving Safety (5)

- Failure to modify a surgical plan in the face of a difficult procedure is a common variant of perioperative fixation error
  - Cognitive error involving inordinate focus on one possible approach while ignoring others, akin to anchoring bias
  - Learning tools teaching “outside-the-box” or “lateral” thinking can circumvent fixation errors by increasing situational awareness
  - Other strategies to overcome fixation errors include ruling out the worst-case scenario, accepting that the first assumption or plan may be wrong, considering artifacts as the last explanation, and not biasing team members with any previous recommendations or conclusions

Approach to Improving Safety (6)

- The surgical team had trouble placing an epidural catheter, which would have been strongly indicated in this case
  - Instead of defaulting to general anesthesia, the team could have used intrathecal or regional anesthetic approaches
  - An epidural approach would have mitigated the potential for abrupt fluid shifts and helped avoid pain-induced tachycardia

Approach to Improving Safety (7)

- The patient should have been transferred directly to an ICU, with continued advanced hemodynamic monitoring and close observation
  - Postoperative fluid shifts and the ongoing need for analgesia and heart rate control should have been anticipated
  - ICU team should have been warned that this patient was at high risk for abrupt decompensation and death

Systems Change Needed/ Quality Improvement Approach

Systems Change Needed (1)

- Teams should have followed through on their preoperative multidisciplinary discussion
  - All teams should have been notified of the operation so they could prepare to see the patient again postoperatively in the ICU
  - The anesthesiology team could have used a structured hand-off tool to improve retention of planning information

Systems Change Needed (2)

- Decision-support alerts can identify patients at high risk for postoperative morbidity and trigger mandatory ICU admission or at least a consult (e.g., by cardiology) in the PACU
  - Given that severe aortic stenosis is a major risk factor for perioperative cardiac events, this patient would have triggered such an alert
  - Other major risk factors that should trigger alerts include heart failure, history of stroke, renal failure/creatinine, and emergency surgery

Systems Change Needed (3)

- Hospital policy requiring an in-person visit by the attending anesthesiologist or primary team physician prior to PACU discharge would help protect high risk patients
  - This policy could be triggered by patient characteristics (e.g., American Society of Anesthesiologists Physical Status 4 or 5), high-risk operations, or the occurrence of respiratory of hemodynamic instability in the operating room or PACU

Systems Change Needed (4)

- A hospital-wide Early Warning System based on networked bedside monitors could have triggered an early, automated call to the rapid response team
  - Research has shown that such systems improve response time and overall patient outcomes

TAKE HOME POINTS

Take-Home Points (1)

- Frail patients represent high-risk candidates for surgery and require multidisciplinary planning to achieve optimal results.

- Once the plan is developed for such a patient, it is important to follow it as prescribed. Deviation in the face of production pressure is a recipe for disaster.

Take-Home Points (2)

- Optimal care of frail patients hinges on a plan with the least possible perioperative stress, both surgical and anesthetic. The team should strive for shorter surgical time, less tissue trauma, and reduced need for fluid resuscitation or transfusion.

- For frail patients undergoing high-risk procedures, postoperative high-intensity care is required to avoid decompensation, or to detect and respond rapidly to early signs of decompensation

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