Medication Compliance and Operating Room Efficiency

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Inefficiencies in the operating room (OR) can occur before, during and between cases and lead to multiple problems including delays in the delivery of patient care.

They also have a negative financial impact for the institution and cause frustration for surgeons, anesthesiologists, and other OR staff.

Ultimately, delays are leads to dissatisfaction among patients as well as health care providers.
The Institute of Medicine (Crossing the Quality Chasm) identified timeliness and efficiency as 2 of 6 areas for improvement for US hospitals.\(^1\)

**Monitoring Organizations**
- Centers for Medicare and Medicaid Services
- Agency for Healthcare Research and Quality
- Institute of Medicine
- Institute for Healthcare Improvement
- Joint Commission on Accreditation of Healthcare Organizations
- The Leapfrog Group

The National Quality Forum are beginning to monitor workflow of patient care in order to improve quality while reducing costs.\(^2\)
Approximately 187 million Americans take one or more prescription drugs. An estimated 20-50% of patients do not take their medications as prescribed and are said to be nonadherent or noncompliant with therapy. Non-adherence to medication has also been shown to result in increased health risks and costs of up to $290 billion. Patients who receive pharmacist services achieve better clinical outcomes than national standards for chronic disease, across-the-board. Among patients with chronic disease, poor adherence results in poor outcomes and increased medical costs. Yet, these are the patients who are at the most risks in surgery and therefore require the most care preoperatively. Delayed or cancelled surgeries result in idle operating room staff.
Medication Nonadherence prior to surgery

- Several studies have been done to evaluate the frequency of medication nonadherence prior to surgery and its effect on surgery cancellations.
- These studies have looked at a variety of factors related to patient preoperative education, medications, food intake, bowel prep, etc.
- In a study done by the VA of Puget Sound, it was found that 23% of patients undergoing ambulatory surgery were nonadherent to preoperative medication instructions.\(^8\)
- Studies looking at the impact of medication nonadherence and preoperative teaching on cancellation rate found that these were responsible for up to 7% of cancellations.\(^9-13\)
Patient seen in clinic for consult

Is patient a candidate for surgery?

No → treatment plan given. Patient is discharged

Yes → Surgery form completed/to be scheduled file

Coordinator contacts patient to schedule pre-op appts, surgery date and reviews medications

Write orders for med pre-op and neurosurg pre-op appts/ send letter with med instructions

Coordinator checks warfarin and cards recommendation

Cleared for surgery?

Scheduled surgery arrival date

Call from pharmacist

Med pre-op and neurosurgery pre-op appt/one on one pre-op teaching and consent
Methods – Study Design and Population

- The VA OR Efficiency Task Force identified medication compliance as a possible source of delay. A study was therefore undertaken to determine the compliance rate and its impact on operative delays.

- Study protocol is a quality improvement/quality assurance initiative, which does not require IRB or other Research oversight committee review as determined by the Institutional Review Board, Minneapolis VAHCS.

- Fifty consecutive patients undergoing neurosurgical procedures from May 2010 through July 2010 were retrospectively reviewed and evaluated.
Methods – OR Medication compliance Program: 5 points of contact

- The coordinator reviewed medications with patient at time of scheduling
- A letter was sent with specific instructions in regards to medications
- Pre-op medicine clearance
- Pre-op neurosurgery appointment
- Call from pharmacist one week before surgery
All patients had a pre-operative consultation with a pharmacist and the neurosurgery coordinator who reviewed all medications with the patient and gave specific instructions to the patient on which medications should be continued or discontinued prior to the surgery date.

This information was documented on the OR Medication Compliance Worksheet by the neurosurgery coordinator who included this in the patient’s pre-operative chart.

On the day prior to surgery, all active medications on this chart were reviewed with the patient by the anesthesiologist and documented on the OR Medication Compliance Worksheet.

The worksheet was then sent to the neurosurgery coordinator for secondary review and analysis.
Methods - for outcome

- To evaluate delays, we reviewed the anesthesiology records for the case.
- Delays - either cancellations of the case due to medication non-compliance which would make it unsafe to proceed with surgery or minor delays due to medication non-compliance which required further pre-operative assessment and workup before proceeding with surgery.
- Cancelled cases - final copy of the published operating room schedule that did not occur.
Result - Adherency to Medications

Medication adherence: 96%
Medication nonadherence: 4%

N = 50
Noncompliance – 2 patients

- First patient did not use their prescribed inhaler
- Second patient did not take their pre-operative pain medication.
- Review of the anesthesiology records did not document a delay or cancellation in any of the fifty cases.
- The first patient did receive a nebulizer treatment prior to surgery.
- All patients who were previously on anticoagulation therapy or anti-platelet therapy had discontinued these medications prior to surgery.
The operating room is one of the most expensive areas in an acute care hospital. Cancellations or delays can have significant negative financial implications (approximately $1500 per hour of revenues lost).

Causes are multifactorial and can be categorized in several ways. One way of classification refers to preoperative and perioperative delays. Preoperative delays refer to prolonged wait time and postponements where as perioperative delays include delays in getting into the OR once the patient has arrived in the hospital and during the operation. Many of these delays can be due to both human error and system deficiencies.
One study out of Toronto looked at different etiologies for delays in cranial and spinal procedures and found that equipment failure followed by physical transit into the OR were the top two reasons for delays.  

The process emphasized repetition and communication, involving five reminders between the date of OR scheduling and the date of the actual surgery. This simple process could likely be applied to other aspects of preoperative and perioperative care (preoperative scrub, proper equipment, etc.). We found that in this situation, redundancy in the workflow actually improved the efficiency of the patient’s hospital course.

Strum et. al. has defined efficiency as being maximal when operating room inefficiency is minimized, when OR inefficiency is the sum of under and overutilized time. Underutilized time is hours of operating room time staffed at straight time wages but not used for surgery, set-up or clean-up; and overutilized time is hours of operating room time staffed at overtime wages, multiplied by the relative cost of overtime compared with straight time. Medication noncompliance may affect both.

Within the OR, there are many perspectives to take into account when defining OR efficiency. For instance, Archer et al. elucidates several distinct perspectives: that of the healthcare institution, the individual practitioner, the patient, and evidence-based medicine.


References
Thank you.