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Patient Safety Tip of the Week

August 20, 2024

Air Traffic Control for the OR?

There are so many analogies between aviation and healthcare in terms of safety issues and interventions. Both fields can take lessons learned from each other to improve safety. So, it's only been a matter of time until the concept of air traffic control would serve as a model for management of OR activities.

In a recent issue of JAMA Surgery, Mathon and Kletz describe SAR or "Surgical Activity Regulation", a system developed in France in which a scrub nurse is used to regulate surgical activity in real time, like an air traffic controller (Mathon 2024).

Video cameras in each operating room (OR) transmit live footage to a control office to enable real-time monitoring and anticipation of procedure end times. That eliminates the need for physical visits to each OR, saving time, increasing comfort, and reducing the opening of OR doors and improving the air quality within rooms (see our many columns, listed below, on reducing OR foot traffic and door opening).

The controller nurse monitors those video feeds and collaborates with a surgeon and anesthesiologist to make decisions, such as adding emergency surgeries to the schedule.

A weekly multidisciplinary meeting attended by OR managers, surgeons, anesthesiologists, head nurses, and organizational engineers is used to analyze any difficulties or problems encountered in the previous week and to develop an optimized surgical plan for the ensuing week. Issues such as the availability of equipment and staff, case duration, operative position, and the uniform distribution of cases throughout the week are discussed at those meetings. The main goal is to accommodate the surgeons' schedules and develop optimal schedule slots to reduce same-day cancellations and address inaccurate case duration estimates, excessive turnover times, and off-hour surgeries. Virtually all OR's also have to deal with "add-on" cases and this system helps optimize handling those.

The researchers analyzed data from a 6-month period before and after the implementation of SAR in a multidisciplinary OR consisting of neurosurgery, otorhinolaryngology, and ophthalmology. While OR use rates remained relatively constant after implementation, the rate of off-hour surgeries (past 6 PM) was significantly reduced after SAR implementation (from 8.9% to 5.8%) by reducing turnover time and improving the sequence of interventions, resulting in a reduction in staff overtime. Predicting the conclusion of the preceding case via the video monitoring was a prime factor in reducing turnover time. Furthermore, it reduced the gap between planned and actual case durations, leading to a daily savings of 24 minutes per OR.

Of course, implementation of such a system will encounter all the challenges and barriers we see with any change management program. Surgeons, anesthesiologists, nurses and other OR staff will have to give deference to the controller nurse and the multidisciplinary steering committee. Having clinical champions would be helpful in getting buy-in from all those constituencies. Piloting such a project in a small group of OR's, as the French researchers did, can demonstrate the benefits of such a system, making it easier to expand the program. Our many columns on the use of video monitoring in the OR (listed below) also note some of the resistance likely to be encountered despite the many advantages of such monitoring.

We think this is a great concept. It will be most interesting to see how its expansion to other OR's at the French hospital fares and how pilot projects at other hospitals fare.

Air traffic control has had a rough year in the US with innumerable instances of runway incursions taking place (see our March 14, 2023 Patient Safety Tip of the Week "Runway Safety"). As we noted earlier, air traffic control can also learn from healthcare. A recent incident occurred where a Southwest plane in Portland, Oregon took off from a runway that was closed with a maintenance vehicle in its path (Leff 2024). In our October 2, 2007 Patient Safety Tip of the Week "Taking Off From the Wrong Runway" we discussed a fatal aviation incident where a large plane inadvertently tried to take off on a short runway that was only used for small aircraft. In healthcare, we learned the hard way that sometimes we need to implement restraints or forcing functions to prevent some accidents. The classic example was removing supplies of concentrated potassium solutions from nursing floors to prevent inadvertent administration of fatal doses of KCl. In the recent Portland incident, there were communication issues and timing issues that contributed, but we ask why there should not be a physical barrier that would prevent planes from entering any closed runway. While some airports use illuminated "X" markings to indicate closed runways, those cannot be expected to be as effective as a physical barrier.

Healthcare can learn from air traffic control systems, but air traffic control systems can use lessons learned from healthcare, too.

Our prior columns focusing on surgical case duration:

- March 10, 2009 "Prolonged Surgical Duration and Time Awareness"

- January 2010 "Operative Duration and Infection"
- July 21, 2012 "Surgical Case Duration and Miscommunications"
- August 26, 2014 "Surgeons' Perception of Intraoperative Time"
- December 30, 2014 "Data Accumulates on Impact of Long Surgical Duration"
- November 24, 2015 "Door Opening and Foot Traffic in the OR"
- July 26, 2016 "Confirmed: Keep Your OR Doors Closed"
- November 7, 2017 "Perioperative Neuropathies"
- December 2017 "A Fix for OR Foot Traffic?"
- January 2021 "Operative Time and Postoperative TKA Complications"
- March 28, 2023 "Intraoperative Team Continuity and OR Efficiency"

Our prior columns focusing on surgical OR foot traffic and door opening:

- March 10, 2009 "Prolonged Surgical Duration and Time Awareness"
- January 2010 "Operative Duration and Infection"
- August 26, 2014 "Surgeons' Perception of Intraoperative Time"
- December 30, 2014 "Data Accumulates on Impact of Long Surgical Duration"
- November 24, 2015 "Door Opening and Foot Traffic in the OR"
- July 26, 2016 "Confirmed: Keep Your OR Doors Closed"
- December 2017 "A Fix for OR Foot Traffic?"
- April 23, 2019 "In and Out the Door and Other OR Flow Disruptions"
- June 8, 2021 "Cut OR Traffic to Cut Surgical Site Infections"
- January 11, 2022 "Documenting Distractions in the OR"
- October 4, 2022 "Successfully Reducing OR Traffic"

Some of our previous columns discussing video recording:

- September 23, 2008 "Checklists and Wrong Site Surgery"
- December 6, 2010 "More Tips to Prevent Wrong-Site Surgery"
- November 2011 "Restricted Housestaff Work Hours and Patient Handoffs"
- March 2012 "Smile...You're on Candid Camera!"
- August 27, 2013 "Lessons on Wrong-Site Surgery"
- March 17, 2015 "Distractions in the OR"
- November 24, 2015 "Door Opening and Foot Traffic in the OR"
- March 2019 "Another Use for Video Recording"
- March 17, 2020 "Video Recording in the OR"
- June 2023 "WSJ on Video Recording in the OR"
- February 2024 "Both Sides of the Black Box"

References:

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