Effectiveness of the Surgical Safety Checklist in Correcting Errors: A Literature Review Applying Reason's Swiss Cheese Model

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ABSTRACT

Approximately 2,700 patients are harmed by wrong-site surgery each year. The World Health Organization created the surgical safety checklist to reduce the incidence of wrong-site surgery. A project team conducted a narrative review of the literature to determine the effectiveness of the surgical safety checklist in correcting and preventing errors in the OR. Team members used Swiss cheese model of error by Reason to analyze the findings. Analysis of results indicated the effectiveness of the surgical checklist in reducing the incidence of wrong-site surgeries and other medical errors; however, checklists alone will not prevent all errors. Successful implementation requires perioperative stakeholders to understand the nature of errors, recognize the complex dynamic between systems and individuals, and create a just culture that encourages a shared vision of patient safety. *AORN J* 100 (July 2014) 65-79. © AORN, Inc, 2014. http://dx.doi.org/10.1016/j.aorn.2013.07.024

Key words: *checklists, surgical safety checklist, patient safety, OR safety, medical errors, preventable adverse events, error prevention, teamwork, just culture, Swiss cheese model.*

Although more than a decade has passed since the 1999 release of the Institute of Medicine report *To Err Is Human: Building a Safer Health System*,[1] there remains ample need for the use of standardized processes to reduce the risk of human error, thereby improving patient care. The OR is characterized by fast-paced activity, numerous distractions, a hierarchical reporting structure, advanced technology, and complex equipment, all of which can affect health care professionals, making them prone to making errors.[2] Medical errors place patients at great risk of harm.[3] Examples of errors and adverse events related to surgical procedures are wrong anatomic site, incorrect procedure, equipment failure or malfunction, administration of an antibiotic despite a noted allergy, nerve damage related to positioning, implantation of orthopedic appliances that are not appropriately sterilized, postoperative development of deep vein thrombus related to incorrect placement of sequential compression devices, and retained sponges.[4]

http://dx.doi.org/10.1016/j.aorn.2013.07.024
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In recent years, there has been a strong focus on eliminating wrong-site surgeries. Of 7,147 sentinel events reported from 1995 to 2010, The Joint Commission[5] identified 956 cases of wrong-site surgeries (13.4%), with communication breakdowns reported as the main cause of such errors. In 2008, in an attempt to reduce the risk and occurrence of wrong-site surgery, the Centers for Medicare & Medicaid Services[6] announced that it would no longer reimburse institutions for surgical errors related to wrong-site surgery or retained surgical objects. This change in reimbursement policy was driven by data indicating that 48% of all surgical complications are preventable.[7,8]

Surgical safety also is an international focus. According to the World Health Organization (WHO),[9] each year approximately 234 million major surgical procedures are performed worldwide, which is one operation for every 25 people alive. In the United States, there are more than 48 million inpatient surgical procedures[10] and more than 53 million ambulatory procedures performed annually.[11] In industrialized countries, for example, the United States, analysis of data has shown the rate of major complications associated with inpatient surgery to range from 3% to 17% and the rate of deaths to range from 0.4% to 0.8%.[7,8]

Analysis of errors by Reason[12] revealed that most accidents are rarely the result of isolated errors committed by individuals but instead are the result of multiple, smaller errors occurring in an environment with fundamental system flaws.[13] The Swiss cheese model by Reason[12] illustrates this type of occurrence but also that a system with multiple checks can prevent errors. According to the Swiss cheese metaphor, the slices of cheese are layered and each layer is a defense (eg, the surgical safety checklist) against the holes in the cheese, which represent a problem or error in the system (eg, active and latent failures). The more layers of cheese, the less likely it is that the holes will line up for an error to occur (Figure 1).[12]

The importance of systems' contributions to patient safety and adverse outcomes prompted members of a project team to apply the model by Reason[12] to a narrative review of the literature related to surgical checklists. Members of the project team included doctoral students, capstone committee members, a nurse manager, and a perioperative RN. The goal of the project was to determine the effectiveness of surgical checklists in correcting and preventing error-prone processes in the OR as well as to identify the types of errors that lead to adverse outcomes.

SURGICAL SAFETY CHECKLISTS

In 2004, the magnitude of the wrong-site surgery problem[14] was evident from the number of sentinel events being reported. According to The Joint Commission, wrong-site surgery was the most common sentinel event reported between 2004 and 2010.[15] In response to this patient safety issue, the WHO developed and implemented a surgical safety checklist, which it updated in 2009.[16] The surgical safety checklist applies to three phases of surgery: before induction of anesthesia, before skin incision (ie, time out), and before the patient leaves the OR. Running safety checks at each phase involves all members of the surgical team, whereby the team conducts a verification process, and all members must be in agreement with one another before the procedure can continue. Team validation has been shown to reduce errors in perioperative processes.[7]

Versions of the WHO surgical checklist are in use at the global, national, and state levels to promote patient safety in the OR. The United Kingdom, for example, mandated the use of this checklist in every hospital,[17] and, in 2008, the Institute for Healthcare Improvement[18] called for all US hospitals to use the surgical safety checklist in at least one of their ORs. The Safe Surgery 2015 initiative at the Harvard School of Public Health, Boston, Massachusetts, is committed to all hospitals in the United States routinely using a version of the checklist in their ORs by 2015. This initiative has three focal points: preventing wrong-site surgery, reducing surgical-site infections, and reducing complications.[19] Additionally, in 2013, the Centers for Medicare and Medicaid Services announced that ambulatory surgery centers and hospitals

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