References

Prevention of Retained Surgical Items in the Surgical Unit

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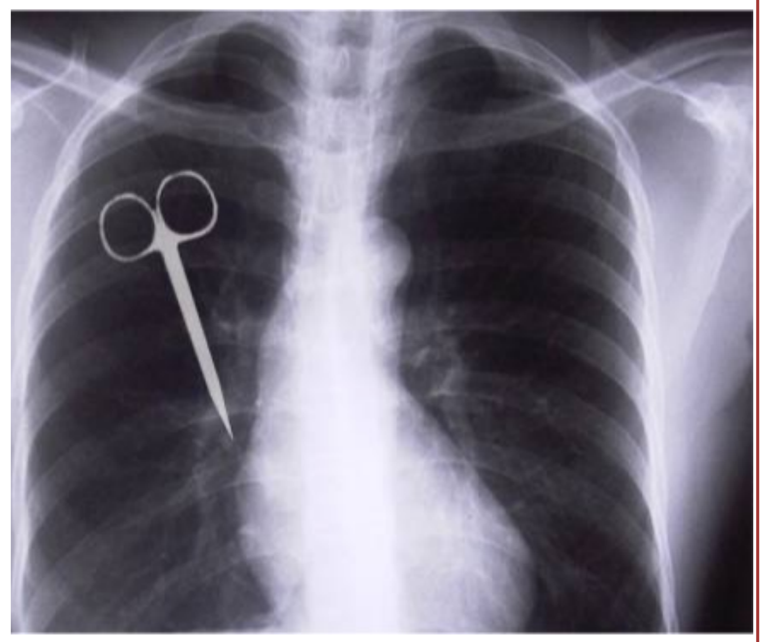
BACKGROUND

Retained surgical items (RSI) refer to any surgical sponge, instrument, or device unintentionally left in a patient at the completion of a surgical procedure[1]. RSI are classified as either soft (e.g. gauze, sponges) or hard (e.g. needles, blades, wires) items[2]. RSI are medical errors that have potential to induce significant harm including: readmission, secondary surgery to remove the RSI, abscess, visceral perforation, sepsis, and death[3]. The Joint Commission, an organization that certifies and accredits hospitals nationwide, refers to RSI as "never-events" or preventable errors in the medical field that pose serious consequences. RSI prevention is a national patient safety goal in the surgical setting.



Pictured left: hemostatic artery forceps used to control bleeding[13]. Pictured right: a radiograph of artery forceps retained in a patient following completion of a surgical procedure[14].

EVIDENCE FOR THE PROBLEM

The Leapfrog Group is a hospital safety grading organization dedicated to driving quality, safety, and transparency in U.S. health systems. According to The Leapfrog Group, Pomona Valley Hospital Medical Center's (PVHMC) November 2021 score for RSI is 0.162. The national standard for RSI occurrences is 0.02, which indicates that the RSI rate in PVHMC is eight times higher than the national average[4].

Evidently, RSI are a topic of concern at PVHMC. RSI rates are often inaccurate due to common underreporting of near-miss sentinel events. Reasons for underreporting include fear of: litigation, damaging surgeon reputation, and damaging hospital reputation[5].

PURPOSE

The purpose of this quality improvement initiative is to reduce RSI occurrences in PVHMC's surgical unit by 15% from the November 2021 baseline over a period of seven consecutive months. This initiative is set to be fulfilled through the addition of a radio frequency identification device (RFID) to current surgical count policies.

EBP FRAMEWORK

The change theory for this initiative is the Spradley Model Eight Step, based on Lewin's Theory. The Spradley Model Eight Step is an evidence-based model that promotes positive patient health outcomes[6]. The first step in this theory is to recognize the complication: high RSI occurrences following surgical intervention. The second step is to diagnose the complication, termed RSI. The third step is to analyze alternatives. This step includes determining the need for practice changes or system changes with appropriate stakeholders. The fourth step is to determine the desired change, a 15% reduction of RSI rates within a seven-month interval. The fifth step is to plan the change. PVHMC's surgical unit will incorporate the use of RFID to surgical count policies. The sixth step is to implement the change process above. The seventh step is to evaluate the change, and the eight step is to stabilize the change to yield positive health outcomes[6].

EVIDENCE-BASED INTERVENTIONS

A RFID is the evidence-based intervention implemented to prevent RSI. The RFID utilizes a handheld detector connected to a calibrating console, and micro-chips sewn into surgical sponges. The method of machine performance is as follows: a handheld detector is scanned over a patient prior to surgical closure of a body cavity. If a tagged sponge is scanned and stimulated by the handheld detector, the tagged sponge transmits a signal to the detector, which identifies a retained presence in the patient's body[7]. The reliable communication between the detector and the tagged sponge enables quick identification of RSI. The RFID detects retained surgical sponges with 100% sensitivity and specificity up to sixteen inches through the body, in the presence of fat, dense tissue, blood, bone, and near metal[7]. This device promotes patient safety and positive health outcomes by reducing RSI-associated harms.

Concurrent evidence-based interventions include the use of sponge-counters and the use of two surgical personnel instrument counts. To specify, a registered nurse and a surgical technician perform independent surgical item counts synchronically throughout the surgical procedure.

(Center): The blue RFID body scanner is placed under the patient[15]. (Top left) the white wand is scanned over the patient and is connected to the gray calibrating console (top right). The white tagged sponges are used during procedures (bottom right)[16].

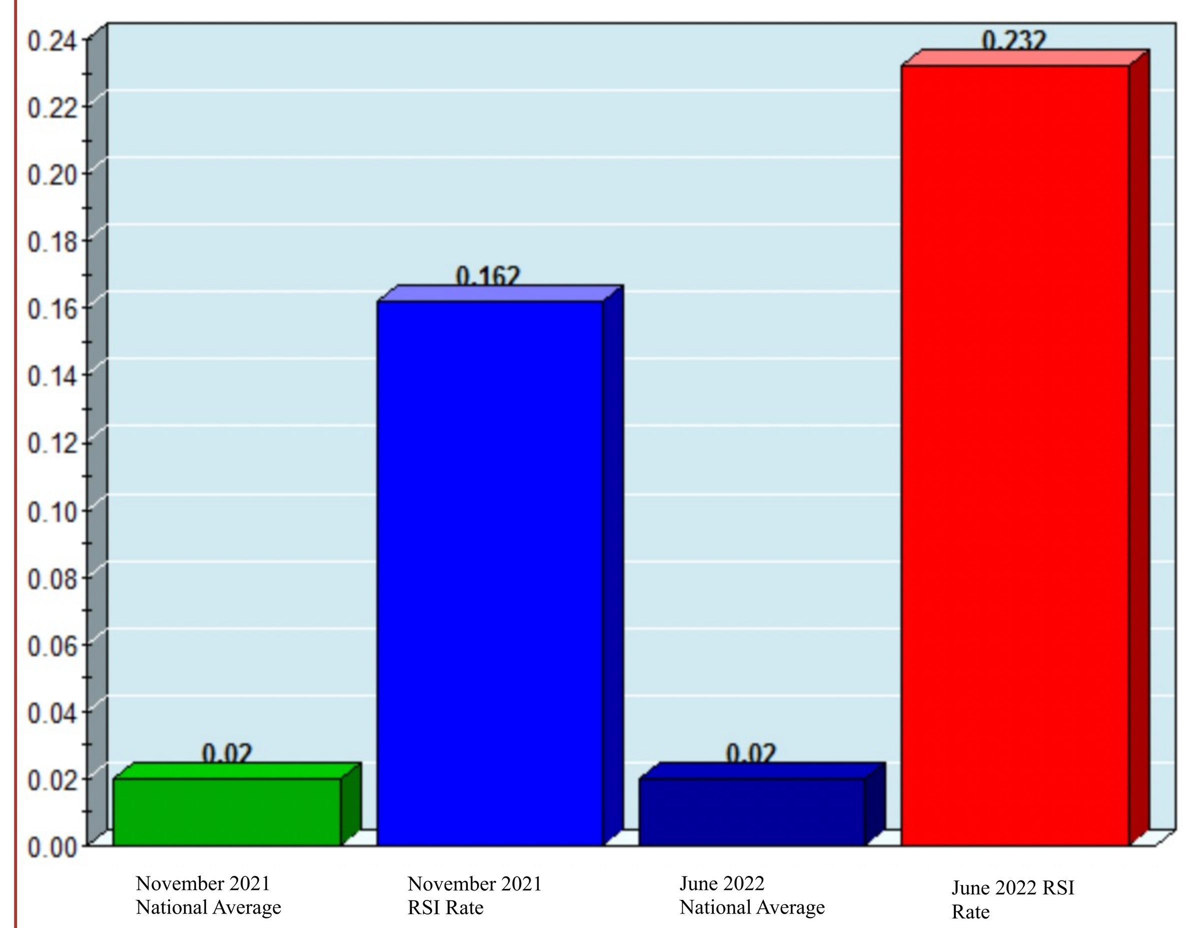
COST-BENEFIT ANALYSIS

The Centers for Medicare & Medicaid Services do not reimburse healthcare organizations for RSI-associated costs, which may include: loss of reimbursement for the procedure, additional hospitalization to manage the complication, litigation, and malpractice settlements[8]. AORN explains that the annual cost of RSI prevention technology, such as RFID, is $191,352. Additional cost savings, such as decreased x-ray use and OR time needed to locate a RSI, as well as decreased readmission rates, secondary surgery, and legal occurrences were $441,534[9].

The care for patients after a RSI occurrence increases costs to health care organizations by an estimated $70,767[8]. In settlements, hospital costs range from two to five million dollars even with positive patient outcomes[2]. A simple budget with anticipated return on investment estimates RFID implementation costs to be $75,000. The anticipated return on investment, however, is upwards of $800,000. Changes in revenues include: admissions, readmissions, length of stay, payment from insurers, new services provided, and penalty avoidance from insurers. Changes in costs included: intensity of care, operating costs, staffing, supplies, equipment, and avoidance of liability litigation[12].

EVALUATION RESULTS

PVHMC's November 2021 RSI score was 0.162. In June 2022, seven months post-RFID implementation, PVHMC RSI score was 0.232. The national average remained the same during the study interval, 0.02. The data indicates that RSI occurrences doubled within the seven month study period[4].



Even with RFID implementation, RSI occurrences are a continued concern in PVHMC's surgical unit[4]. It is unclear whether the rise in RSI rates is due to the RFID or inconsistency in staff adherence to count policies. The significant increase in RSI rates evidences that manual surgical counts must explicitly be conducted according to PVHMC's exceptional surgical count policies. Human error must be corrected prior to the incorporation of adjunct technology.

Surgical unit stakeholders must adjoin and reassess interventions to reduce RSI occurrences. One intervention to implement is biannual educational inservices over the course of twelve consecutive months to reeducate surgical count policies to surgical personnel. The educational inservices must reinforce surgical count procedures, documentation, and frequency of counts during a procedure. The personnel must also be taught how to adhere to count policies during distractions, competing priorities, time pressures, and demands at the surgical field[11]. The surgical personnel must take competency exams at the end of the educational inservices to determine policy comprehension levels. In the event of one's pass rate being less than 80%, the staff member must review the policy in a one-on-one session with a surgical clinical nurse supervisor, or surgical educator, and retest within 14 days. The goal of this intervention is to consolidate staff adherence to count policies.

Another intervention to solidify staff adherence to count policies is the incorporation of Peers Observing Peers (POP). POP is an evidence-based practice that incorporates the use of an additional staff member, referred to as the POP, who observes surgical counts take place between the surgical nurse and surgical technician. The POP must remain unbiased and follow a checklist that ensures proper visualization and verbalization of both personnel during instrument counts. The POP checklist ensures all relative requirements listed on the surgical count policies are met during the counts. The POP must document the findings of the final count and sign the checklist indicating that an unbiased observation was performed. The active monitorization of the POP directs accountability to surgical personnel. PVHMC may also implement a systems improvement through the addition of a POP checklist to the intraoperative record. This addition would further enforce adherence to count policies[10].

Pictured left: An x-ray detectable gauze. The x-ray detection (sewn blue rays and green tag) prevent accidental camouflage of surgical sponges with body tissues[17].

Pictured: radiographs of RSI in two different patients[18].

METHODOLOGY

Data retrieval consists of qualitative and quantitative methods. Qualitative data collection includes retrieval of RSI rates from The Leapfrog Group. Quantitative data retrieval includes conferences with surgical nurse supervisors and the surgical educator to discern unit practices.

STRENGTHS/LIMITATIONS

A strength of this quality improvement initiative includes the use of closed-loop communication feedback between surgical personnel. The strong communication skills result in authentic unit results. A limitation in this proposal includes the inability to monitor RFID use in all surgical procedures that took place in the surgical unit. Surgical personnel adherence to RFID protocols was unknown due to the lack of continual monitorization. There were no conflicts of interest during the duration of the study.

IMPLICATIONS FOR PRACTICE

The results of this quality improvement initiative are inconclusive due to COVID-19-related external factors. During the study period, there was back-orders of items necessary for proper surgical counts, such as biohazard bags and sponge-counters. Further, the data retrieved from The Leapfrog Group was vague and lacked specificity. The data did not specify if RFID was utilized in all surgical procedures, or only in certain specialty procedures, such as Orthopedics, Obstetrics, Gynecology, or Plastic. It is unclear if the RFID equipment contributes to the increase in RSI, or if the increase is due to human errors in surgical item counts; the data is not separated in such manner. Implications for future studies include the separation of surgical cases with use of RFID, and the separation of cases that solely utilize manual human counts. The separation of cases in two different categories will assist in determining the root cause of RSI rate increases.

CONCLUSIONS

The results of this study took an interesting turn and required a unique solution to minimize RSI occurrences. Specifically, the results place emphasis on mitigating errors associated with human behavior prior to the incorporation of adjunct technology. Surgical personnel have an ethical duty to adhere to PVHMC's exceptional surgical count policy, which explicitly states step-by-step surgical count instructions. Educational inservices serve as an additional method of policy comprehension. Surgical personnel are retaught count policies and how adhere to the policies during distractions that may compromise the integrity of the counts. The POP intervention offers unbiased monitorization during surgical counts, promotes integrity of the counts, and solidifies adherence to count policies. Once human behavior is corrected, adjunct technology may serve as a supplemental form of protection against RSI.

ACKNOWLEDGMENTS

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