Standardized Counting Procedures to Prevent Retained Surgical Items

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Prevention of Retained Surgical Items

Retained surgical items (RSIs) after surgical procedures are a rare, but serious surgical complication. RSIs often go undiagnosed and are under-reported; making it difficult to know exactly how often, patients experience RSIs. The definition of “when an item is retained” continues to be vague and varies by institution and regulatory bodies. Inconsistency in definitions of RSIs contributes to lack of reporting and difficulty in interpreting those that are reported. The actual incidence is unclear; however, Cima et al. (2008) estimated that one in every 1,000 to 1,500 abdominal procedures, to one in every 8,000 to 18,000 inpatient procedures annually in the United States result in a RSI. In a descriptive study by Steelman, Graling, and Perkhounkova (2013), surveys were sent to all nurses that are members of the Association of periOperative Nursing (AORN). The survey’s aim was to identify what operating room (OR) nurses believe or perceive to be the top patient safety issues in their practice. Out of 3,137 responses, 61% of the responses came back indicating they believed preventing retained surgical objects was the highest priority. Retained surgical items can cause serious health complications, emotional distress, physical disabilities, and can result in death. Norton, Martin, & Micheli (2012) cited mortality rates resulting from RSI are estimated to be as high as 35% in the United States. RSIs not only affect the patient, but also have a negative impact on the institution and medical team involved. The Joint Commission received 772 voluntary reports of RSIs from 2005 to 2012, resulting in 16 deaths, and approximately 95 percent of these incidents resulted in additional care and/or an extended hospital stay (The Joint Commission, 2014). In addition to the medical problems patients with RSIs face, studies have shown that items left behind after surgery may cost as much as $200,000 per case in medical and liability payments (The Joint Commission, 2014). Many studies have looked at the causes of RSIs, but few have delved into
possible strategies to reduce the incidence of this unfortunate adverse event. The goal of this paper is to examine evidence and determine if a standardized counting practice or the use of technological devices can prevent retained surgical items in surgical patients. There are currently three technological devices to reduce retained sponges available for use in the operating room (OR) on the market: bar-code scanning, radiofrequency detection (RF), and radiofrequency identification (RFID).

The literature search included databases located on the MidAmerica Nazarene University (MNU) website and The University of Kansas Hospital (TUKH) PubMed. The MNU online library includes; EBSCO host Database Search containing the Cumulative Index of Nursing and Allied Health Literature (CINAHL) Plus, Cochrane Central Register of controlled Trials, Cochrane Database of Systematic Reviews, Cochrane Methodology Register (CMR), MEDLINE, Health Technology Assessments (HTA), and NHS Economic Evaluation Database. The search was limited to articles published in English. Key search words included; surgical patients, retained surgical objects, retained surgical items, retained foreign objects, patient safety, and surgical counts. The search was limited to articles published between 2007 and 2014. The majority of literature reviewed was published within those parameters, but some data from earlier were included.

**Background**

Multiple organizations have identified prevention of RSIs as a national patient safety priority. AORN, the American College of Surgeons (ACS), and The Joint Commission (TJC) have been instrumental in bringing awareness to this patient safety issue considered to be a “never event”. TJC lists RSI as a sentinel event. The Joint Commission (2014) defines a sentinel event as any unexpected occurrence not related to the patient’s illness or underlying
condition, which involves death, serious physical or psychological injury, or risk thereof. The National Quality Forum has “unintended retention of a foreign object in a patient after surgery or other procedure on its list of 28 serious reportable events (National Quality Forum, 2007). “The Centers for Medicare & Medicaid Services (CMS) refers to RSIs as “never events” currently on the list of hospital acquired conditions that require reporting and for which CMS will not reimburse hospitals for additional related care” (as cited by Feldman, 2011, p. 865). Reporting of RSIs to regulating bodies varies from state to state, making it difficult to know exactly how often this occurs. Differing definitions of when surgery ends and when a RSI should be reported increases the reporting discrepancies (Feldman, 2011). In 2012, TJC identified RSI as the most frequently reported sentinel event. In the 2014, second quarter report, RSI fell to the third most frequently reported event to TJC, surpassed only by wrong site surgery and delay in treatment.

Past research has identified multiple risk factors associated with RSIs. Lincourt et al. (2007) linked RSIs with multiple surgical procedures performed simultaneously on the same patient and an incorrect surgical count. Gawande, Studdert, Orav, Brennan, & Zinner (2003) found that the occurrence of RSIs increased significantly in emergency procedures, when surgical procedures changed unexpectedly, in patients with higher body mass indexes, and when communication broke down. Although surgical counts are considered the first line of defense in preventing RSIs, Cima et al. (2008) showed the majority of RSIs occur in patients that actually have correct surgical counts giving the surgical team a false sense of security. Cima et al. (2008) suggested that relying on counting as a primary mechanism of avoiding RSIs is unreliable. Research has identified significant correlations between risk factors and the incidence of RSIs (Cima et al., 2008; Gawande et al., 2003; Moffatt-Bruce, Cook, Steinberg, and Stanislaw, 2014). The analysis suggests standardized counting processes in addition to the use of technological
devices that assist in the counting process can significantly reduce the number of retained surgical items (Feldman, 2011; Edel, 2012).

**Literature Review**

**Risk Factors**

Research consistently supports a relationship between risk factors and RSIs, although they vary the significance of each characteristic. Multiple research studies measured the relationship of contributing risk factors to RSIs. Research by Lincourt et al. (2007), Gawande et al. (2003), and Stawicki et al. (2013) found increased body mass index (BMI), unexpected intraoperative events, safety omissions or variances, and incorrect surgical counts were linked with the incidence of RSIs. Stawicki et al. (2013) identified procedure duration at a much higher rate than the two comparative studies. It is not surprising or hard to imagine that if counts are not completed or they are incorrect, that the incidence of RSIs would increase. Relying solely on a counting process that is subject to human error provides an opportunity for a much more reliable and predictable process to be developed to decrease the occurrence of RSIs.

**Standardized Process**

Although these studies bring attention to potential contributors that increase the risk of RSIs, they do not specifically address opportunities to help reduce the incidence of RSIs. Additional care and attention can be focused on surgical patients that have associated risk factors to reduce the occurrence of RSIs. However, the purpose of this study is to identify if a standardized counting process and the use of technological advances can further reduce the frequency of this “never event.” Additional research articles were reviewed and compared, showing recommendations to improve systems to minimize these events. Multidisciplinary team approaches, the use of technologically advanced sponges, standardizing processes, and
improving communication were suggested methods of reducing the incidence of retained surgical items (Norton, Martin, Micheli, 2012). Studies by Cima et al. (2008) and Gawande et al. (2003) both showed a high percentage of cases that had RSIs even though a correct count was thought to be achieved. This reinforces the need to find alternative or additional methods of verifying surgical counts.

Edel (2012) and Norton et al. (2012) looked at surgical count practices. Assessment of the policies indicated that clinical practice requirements varied greatly, and there was a high degree of count practice inconsistencies among staff members within organizations. Staff orientation, experience, and the tools available to document counts were identified as variables in counting practice. Standardized count practices reduce individual interpretation of the policy. Periodic validation studies, by observing staff as they perform the counting process, are essential to ensure compliance. A perfect policy has no value if the staff is not held accountable for following it. Staff input and education are key to success. Norton et al. (2012) showed a 50% reduction in count discrepancies over one year using a standardized method.

**Technological Devices**

Randomized-controlled studies by Greenberg et al. (2008) and Cima et al. (2011) discovered that using sponges containing a bar code, detected significantly more count discrepancies than traditional manual counting practices. The researchers also identified the bar code system introduced new technological difficulties and increased the time spent counting. However, after the staff had been involved in the study for an extended period, the staff improved on using the bar code equipment and had positive opinions on the system’s ability to decrease the risk of a retained surgical sponge. Cima and colleagues (2011) reported no retained items for 18 months after implementation of the bar-coded sponges. Prior to implementation,
they reported a retained sponge occurred on an average of every 64 days. Currently, bar coding is not available for surgical needles and it is more difficult to implement for surgical instruments, both of which can be retained postoperatively. For these reasons, bar-code technology is beneficial for prevention of retained surgical sponges, but does not help in reducing retention of needles, instruments, or other items.

**Limitations**

These studies are limited based on retrospective data collection, lack of uniform reporting, and a certain degree of unwillingness among providers and hospitals to share their mistakes with those outside of their immediate practices and institutions. Some of the studies were limited because the samples were taken from one facility, which may not be representative of the population. Moffatt-Bruce et al. (2014) did a meta-analysis of the previous studies performed by Gawande et al. (2003), Lincourt et al. (2007), and Stawicki et al. (2013) that looked at risk factors associated with RSIs. The results were not found to be uniformly positive. “Among the common risk factors reported in all three case-control studies, seven synergistically show elevated RSI risk” (Moffatt-Bruce et al., 2014, p. 435). Moffatt-Bruce et al. (2014) suggests the development of a stratification scheme based on risk factors. Using the stratification system would create a heightened awareness in those patients with risk factors associated to increased incidence of RSI.

**Discussion**

Risk factors and errors in the counting process increase the risks of RSIs. Being aware of risk factors that increase the risk of RSIs can allow additional preventative measures to be taken. However, patients that do not present with or fall into a category of increased risk, still have the potential to have a RSI. The OR environment is complex, and manual counting of surgical items
is an inherently error-prone process. A standardized counting process used by all facilities and known nationwide would help to decrease the risk of RSIs in all patients. Adding technological devices to assist in the counting process can further decrease and even eliminate RSIs. Research shows that a standardized counting process and technological devices can reduce the incidence of RSIs in surgical patients (Cima et al., 2008; Gawande et al., 2003; Moffatt-Bruce et al., 2014).

To quantify the significance of technological devices, additional research is needed.

**Summary**

Count discrepancies occur regularly, and valuable OR time can be spent searching for the missing item. The first line of defense in preventing RSIs is a safe, thorough, and effective process of keeping track of surgical items and preventing count discrepancies. Manual counting is reliant on human performance and environmental factors that may affect subsequent counts, increasing the risk of human error. Incorrect documentation of surgical items can contribute to RSIs. Gawande et al. (2003) and Cima et al. (2008) showed that 62% to 88% of RSIs were associated with a surgical count that was thought to be correct. Adhering to a standardized counting policy is one way to prevent RSIs.

Gawande et al. (2003) recommended radiography at the end of surgical cases that included risk factors associated with RSIs. However, the study by Cima et al. (2008) found 33% of RSIs were not detected on radiographs. The cost of radiograph and increased patient and staff exposure to radiation, has to be considered when evaluating radiography as a possible solution.

A study by Stawicki et al. (2014) reported that 10 of 59 cases had incorrect counts that could not be reconciled, yet the procedures continued to completion. Counts are frequently incorrect, but subsequently become reconciled. These “false alarms” cause the staff to discredit the notification of an incorrect count. Using adjunct technology to aid in detection of a retained
or missing item can reduce the incidence of RSIs. Assistive technologies have the potential to reduce hospital litigation costs, unreimbursed return-to-surgery, surgical delays, and exposure, as well as costs associated with using radiation (Greenberg et al., 2008).

Current literature supports a standardized counting process and using technological devices to decrease the incidence of RSIs in surgical patient. Further research is needed on the subject and the different technological devices available. Implementing a standardized count practice and using technological devices to assist in the counting process can increase patient safety, reduce patient complications, and reduce returns to surgery. At a minimum, an incorrect count should require a hard stop, where all team members participate in the search to locate and acknowledge a missing item. These methods could also increase staff satisfaction and productivity.

AORN supports use of a standardized process incorporating a team approach (AORN, 2011). Gibbs as cited by Norton et al. (2012), suggests physicians take an active role and “pause for the cause.” In Gibbs “No Thing Left Behind” process, physicians perform methodical exploration of the wound and audibly announce when sponges are removed (Norton et al., 2012). The program also incorporates the use of pocketed sponges holders and dry erase count boards that are visible to the entire team. I encourage facilities to adopt and start utilizing these practices immediately. I encourage facilities to conduct research on the technological devices available to find the one that works best for them and submit a plan to administration to purchase it.


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