Higher awareness may lower the odds of retained surgical items

Although the retention of a surgical item after surgery is rare—estimates range from 1 in every 1,000-1,500 procedures (Rowlands and Steeves) to 1 in 7,000 surgeries (Egorova et al.)—the effects of such events can be significant. Retained surgical items can set off a chain reaction of negative events: additional procedures to remove the items, unwelcome media exposure, and legal claims to determine the source of negligence. Settlements and verdicts in these cases range in the hundreds of thousands of dollars or more, such as in a 2010 Indiana case that resulted in a $564,000 verdict against an obstetrician/gynecologist when a surgical towel was retained in a woman’s abdomen following a hysterectomy (Tsikitas).

Organizations and accrediting bodies have emphasized that cases of retained surgical items should not occur. For example, unintentionally retained surgical items are considered a serious reportable event by the National Quality Forum and a sentinel event by the Joint Commission. In addition, the Centers for Medicare and Medicaid Services includes retained surgical items in its list of hospital-acquired conditions for which it will no longer provide payment under the Inpatient Prospective Payment System.

Risk factors and outcomes
Understanding the risk factors for retained surgical items can help health care facilities develop methods to prevent such occurrences. Identified risk factors for retained surgical items include the following (Rowlands and Steeves; Pennsylvania Patient Safety Authority; Greenberg et al.):

- emergency surgery
- unplanned changes in the procedure
- high patient body mass index
- personnel changes during the procedure
- communication breakdowns.

Noise, disruptions, or an environment in which staff feel rushed to complete tasks can compromise counts of surgical items and increase risk (Rowlands and Steeves). Sponges, the most frequently retained items, account for 48% to 69% of all retained surgical items (Steelman). Other items that may be retained include towels, needles, scalpels, solution bottles or bottle caps, electrosurgery instrument parts, other surgical instruments or parts, laparotomy sponge rings, umbilical and hernia tapes, and vascular inserts. The abdomen and pelvis are the most frequent locations for retained items; however, items can be retained in any part of the body, even at very small incisions (AORN).

When an item is left in the patient following surgery, physical effects include the following (Murdock): acute pain, bowel perforation, fistula, organ damage, sepsis, stroke, and death. Patients may also experience emotional distress, have prolonged hospital stays, or require additional surgeries to remove the item, resulting in increased medical costs (Murdock).

Prevention strategies
Health care facilities that perform surgical or invasive procedures should develop
standardized practices to account for all instruments and items used during surgical procedures. Unless otherwise noted, the strategies listed below are adapted from AORN’s Recommended Practices for Prevention of Retained Surgical Items.

**Manual counts of surgical items**
All sponges, sharps, and instruments should be counted concurrently and audibly by two health care workers, at least one of whom should be a registered nurse circulator. A baseline count should be performed before the procedure begins, and items added to the field should be counted and documented. Staffing changes should prompt counts—for instance, when either the scrub or the circulating nurses are permanently relieved. Counts should also be taken at the closure of a cavity within a cavity (eg, uterus), before wound closure begins, and at the end of the procedure.

Broken or disassembled sharps or instruments should be accounted for in their entirety by the surgical team. Staff members conducting the counts should ensure all instruments remain intact after the procedure and all parts of the instruments or devices are removed from the patient. If it is not possible to remove a device fragment from the patient, the surgeon should inform the patient of the fragment that was left and its characteristics if known (eg, size, material composition, location) and should discuss with the patient the risks and benefits associated with retrieving the fragment or leaving it in the patient.

Prepackaged sponges and instrument sets often include counts printed on the outside, but AORN notes that perioperative personnel should not rely on these counts. Rather, the sponges or instruments should be counted before they are used, and packages containing incorrect counts should be removed from the operative field and isolated from other items.

Instrument sets can allow facilities to make counting more efficient and accurate. The counting process can be expedited by using preprinted count sheets that match standardized sets. The facility can create instrument sets with the minimum types and number of instruments needed for various procedures—if fewer instruments are introduced into the field, there is a smaller chance for error.

AORN emphasizes that all processes used to account for items should be standardized and consistent in order to minimize human error. For example, counts should always be conducted in the same sequence (eg, largest to smallest items, proximal to distal from the wound). Accuracy can be improved by ensuring that all items counted during the procedure are kept within the procedure room until counts are reconciled and completed, including items placed in linen and waste containers. In addition, all staff members should ensure that accurate counting procedures are being followed and should be empowered to speak up if they notice a count discrepancy.

Sponge and instrument counts may be waived when patient safety may be compromised by conducting the counts (eg, surgical emergencies). In such cases, the surgical team is obliged to count instruments as soon as possible or use x-ray scans to detect potential retained items, and then to remove any retained items when the patient has recovered sufficiently to tolerate the surgery. All actions taken should be documented.

**Reconciling counts**
One observational study of 148 elective procedures found that count discrepancies occurred in one in eight surgeries. Surgical staff identified the missing item in 59% of those cases, indicating a high risk for items being left in patients and the importance
of reconciling count discrepancies. Forty-one percent of the count discrepancies involved miscounts, mathematical errors, or documentation errors. The study also found that during personnel changes, such as a change in shift, discrepancies were three times as likely as when personnel remained the same (Greenberg et al.). The accuracy of counts can also be affected by communication breakdowns among surgical staff, equipment noise, conversations, interruptions, fatigue due to extended procedures, lack of sufficient staff members, routine noncompliance with rules or policies, and pressures to increase productivity (Pennsylvania Patient Safety Authority).

Count discrepancies should not be ignored or assumed to be miscounts. If all items are not accounted for postoperatively, the staff members conducting the counts should notify the surgeon, who should delay closing the surgical wound, if possible. The entire surgical team should then conduct exhaustive searches of both the surgical wound and the area around the surgical field, including the floor, kick buckets, and linen and trash receptacles. If the item is still not found, the surgical team should use an x-ray scanner to locate the item within the patient. If the wound has already been closed and the patient removed from the procedure room, a radiograph should be ordered as soon as medically feasible. Radiograph results should be evaluated by a radiologist, and results should be communicated to the surgeon as soon as possible. All these actions should be thoroughly documented in the patient’s record, including when lost items are located.

To facilitate the radiograph process, only radiopaque sponges should be used during a surgical procedure. X-ray detectable sponges should be left in their original configuration and should not be cut. If they are cut, some of the embedded radiopaque indicators could be removed, eliminating the potential to find the sponges with radiograph studies and increasing the risk that portions of the sponge will be left in the patient (Greenberg et al.).

Downsides to radiographs include their potential ineffectiveness in detecting small needles (Greenberg et al.), the time needed to conduct x-ray scans, and that conducting radiographs may increase the amount of time the patient remains in surgery (Pennsylvania Patient Safety Authority; Steelman).

**Technological support**

In addition to x-ray studies, other technological methods are available to supplement manual counts of sponges and other surgical items. For example, radiofrequency identification (RFID) systems use tags that are embedded in sponges, towels, or other soft items; a wand that emits an alarm when passed over the tags; and a software system that tracks detected tags. Studies have found that RFID technology is highly effective at detecting retained sponges embedded with RFID tags, including in patients who are morbidly obese (Steelman).

Barcode scanning also can track items used during surgery. Surgical items are la-
beled and passed through a barcode reader to provide a count of each item. Barcoding may help reduce the risk of count discrepancies; however, unlike RFID, the technology cannot detect items that are retained in a patient (Pennsylvania Patient Safety Authority).

**Documentation**
Actions taken related to accounting for sponges, sharps, instruments, and other items—and resolving identified discrepancies—should be documented in the patient’s intraoperative record. Documentation should include at least the following information:
- item type (eg, sponges, sharps) and number of counts performed
- names and titles of personnel performing the counts
- results of counts
- notification of the surgeon about counts
- instruments remaining in the patient or sponges intentionally retained as therapeutic packing
- composition, size, location, and manufacturer of any unretrieved device fragments left in the patient
- actions taken if counts reveal discrepancies
- any technology used (eg, RFID) and whether the technology detected retained items
- rationale if counts are skipped or not completed according to the facility’s policy (eg, if an emergency precludes counts).

**Behavioral and environmental changes**
A team-based approach to minimizing unnecessary distractions and reducing the risk of human error can significantly improve surgical processes. For example, facilities may organize a group of clinicians and perioperative staff to identify problem areas and brainstorm solutions, such as instituting a rule that no staff member may play music or make excessive noise during surgical counts (Rowlands and Steeves). One health care organization’s team approach led to a decreased retained surgical items rate from 1 every 16 days to 1 every 69 days (Cima et al.).

Health care organizations should provide orientation and periodic training sessions on proper practices for preventing retained surgical instruments as well as the facility’s policies and procedures. Education should include, but not be limited to, proper counting techniques for various kinds of instruments, use of available technology, staff roles and responsibilities, practices for reconciling discrepancies, and reporting known or suspected retained items.

*Information and resources on preventing retained surgical items are available from No Thing Left Behind, a national campaign to provide education and encourage surgical staff to prevent retained surgical items, at http://www.nothingleftbehind.org.*

**References**


Murdock D B. Trauma: when there’s no time to count. AORN J. 2008;87(2):322-328.


