

**Objective 7: The team will prevent inadvertent retention of instruments or sponges in surgical wounds.**

Inadvertently leaving a sponge, needle or instrument in a patient at the end of an operation is a rare but persistent, serious surgical error. Because of its rarity, it is difficult to estimate the frequency with which it occurs; the best estimates range from 1 in 5000 to 1 in 19 000 inpatient operations, but the likelihood has been estimated to be as high as 1 in 1000 (1–4). Retained sponges and instruments tend to result in serious sequelae, including infection, re-operation for removal, bowel perforation, fistula or obstruction and even death. A number of factors contribute to this error, but the evidence points to three clear risk factors: emergency surgery, high body mass index and an unplanned change in the operation (3). Other risk factors that may contribute are high-volume blood loss and the involvement of multiple surgical teams, although these factors did not reach statistical significance in the study. Sponges and instruments can be retained during any surgical procedure on any body cavity, regardless of the magnitude or complexity.

A team process for manually counting all instruments and sponges at the start and conclusion of a surgical operation is standard practice for numerous nursing organizations. The Association for Perioperative Practice (formerly the National Association of Theatre Nurses, United Kingdom), the Association of peri-Operative Registered Nurses (United States), the Australian College of Operating Room Nurses, Operating Room Nurses Association of Canada and the South African Theatre Nurse have all established recommendations and standards for sponge and instrument counts to reduce the incidence of retained sponges and instruments during surgery (5–9). Measures such as incorporating radio-opaque material in sponges make it possible to find those that have been retained on intraoperative radiographs if there is a miscount. The standards have several common elements, including standardization of the counting procedure and systematic tracking and accounting of items on the sterile field and in the wound.

Manual counting methods are not fool-proof, as they are subject to human error. Newer techniques, which include automated counting and tracking of sponges, appear to increase the accuracy of counting and the detection of inadvertently retained sponges. New methods include use of bar-coded sponges and sponges with radiofrequency identification tags. A randomized trial of a bar-coded sponge system showed a threefold increase in detection of miscounted or misplaced sponges (10). The cost of such systems, however, can range from US\$ 13 per case for bar-coded sponges to US\$ 75 per case for radiofrequency-tagged sponges.

**General criteria for counting**

As part of the overall tracking of items in the operating room, each facility should have a policy for surgical counts that specifies when they should be performed and by whom, what items should be counted and how counts (including incorrect counts) should be documented. A specific procedure for counting should be established to ensure that the protocols are standardized and familiar to operating room personnel. Specific low-risk procedures (e.g. cystoscopy, cataract surgery) can be exempted from the counting protocols, but they should be exceptions rather than a general rule. Most established protocols include all or nearly all the recommendations listed below.

A full count of sponges, sharps, miscellaneous items (small item such as tapes, clips and drill bits) and instruments should be performed when the peritoneal, retroperitoneal, pelvic and thoracic cavities are entered. Counts should also be done for any procedure in which these items could be retained in the patient, and must be conducted at least at the beginning and end of every eligible case. A tally of all counted items should be maintained throughout the operation. Any items designated as part of the counting protocol that are added during the procedure should be counted and recorded upon entry onto the sterile field. Ideally, preprinted count sheets for sponges, sharps and instruments should be used and included in the patient's record whenever possible. Other recording strategies, such as using whiteboards to track counts, are also acceptable, in accordance with hospital protocol.

Counting should be performed by two persons, such as the scrub and circulating nurses, or with an automated device, when available. When there is no second nurse or surgical technician, the count should be done by the surgeon and the circulating nurse. If a count is interrupted, it should be started again from the beginning. Ideally, the same two persons should perform all counts. When there is a change in personnel, a protocol for transfer of information and responsibility should be clearly delineated in hospital policy.

Items should be viewed and audibly counted concurrently. All items should be separated completely during a count. Counts should be performed in a consistent sequence, for example, sponges, sharps, miscellaneous items and instruments at the surgical site and immediate area, then the instrument stand, the back table and discarded items.

The team member responsible for the count should be aware of the location of all counted items throughout the operation. Items included in the count should not be removed from the operating room until the final count is completed and the counts are reconciled. The results of counts should be announced audibly to the surgeon, who should give verbal acknowledgement. In the event that an incision is re-opened after the final count, the closure count should be repeated. When a count cannot be performed, an X-ray should be taken before the patient leaves the operating room, if the patient's status permits, or as soon as possible thereafter.

*Sponge count (e.g. gauze, laparotomy sponges, cotton swabs, dissectors):* An initial sponge count should be done for all non-exempt procedures. At a minimum, sponges should be counted before the start of the procedure, before closure of a cavity within a cavity, before wound closure (at first layer of closure) and at skin closure.

When available, only X-ray-detectable sponges should be placed in body cavities. Sponges should be packaged in standardized multiples (such as 5 or 10) and counted in those multiples. Sponges should be completely separated (one by one) during counting. Packages containing incorrect numbers of sponges should be repackaged, marked, removed from the sterile field and isolated from the other sponges. Attached tapes should not be cut. Non-X-ray-detectable gauze used for dressing should be added to the surgical field only at skin closure.

When sponges are discarded from the sterile field, they should be handled with protective equipment (gloves, forceps). After they have been counted, they should be organized so as to be readily visible (such as in plastic bags or the

equivalent) in established multiples. Soiled dissecting sponges (e.g. peanuts) should be kept in their original container or a small basin until counted.

*Sharps count (e.g. suture and hypodermic needles, blades, safety pins):* Sharps should be counted before the start of the procedure, before closure of a cavity within a cavity, before wound closure (at first layer of closure) and at skin closure. Suture needles should be counted according to the marked number on the package. The number of suture needles in a package should be verified by the counters when the package is opened. Needles should be contained in a needle counter or container, loaded onto a needle driver or sealed with their package. Needles should not be left free on a table.

*Instrument count:* Instruments should be counted before the start of the procedure and before wound closure (at first layer of closure). Instrument sets should be standardized (i.e. same type and same number of instruments in each set) and a tray list used for each count. Instruments with component parts should be counted singly (not as a whole unit), with all component parts listed (e.g. one retractor scaffold, three retractor blades, three screws). Instruments should be inspected for completeness. All parts of a broken or disassembled instrument should be accounted for. If an instrument falls to the floor or is passed off the sterile field, it should be kept within the operating room until the final count is completed. No instrument should be removed from the operating room until the end of the procedure.

### **Documentation of counts**

Counts should be recorded on a count sheet or nursing record. The names and positions of the personnel performing the counts should be recorded on the count sheet and in the patient's record. The results of surgical counts should be recorded as correct or incorrect. Instruments and sponges intentionally left with the patient should be documented on the count sheet and in the patient's record. Any action taken in the event of a count discrepancy or incorrect count should be documented in the patient's record. Reasons for not conducting a count in cases that normally demand a count should be documented in the patient's record.

### **Count discrepancies**

Every health-care facility should have a policy for the procedure to follow in case of a count discrepancy. When counts are discrepant, the operating-room personnel must perform a recount, and, if they are unable to reconcile the counts, they should immediately notify the surgeon and the operating room supervisor and conduct a search for the missing item, including the patient, floor, garbage and linen. If the counts remain unreconciled, the team should ask for a radiograph to be taken—when available—and document the results on the count sheet and in the patient's record. When a count ought to be performed but is not, the surgeon and operating room supervisor should be notified, a radiograph taken at the completion of the procedure and an accurate record of why the count was not undertaken and the results of the radiographs noted.

### **Methodical wound exploration before closure**

Alternative methods for tracking and accounting for surgical sponges, instruments, sharps and other items should be considered as they become available and validated. Manual counts nevertheless remain the most readily available means of preventing retained sponges and instruments. Counting clearly prevents retained items from being left in a patient's body cavity but is fraught with error. In a study of retained surgical instruments, Gawande et al. (3) noted that in 88% of cases of retained sponges and instruments in which counts were performed, the final count was erroneously believed to be correct. This implies a dual error: leaving an item in the patient, and a counterbalancing miscount that results in a false 'correct' count.

Preventing the unintentional retention of surgical objects in a surgical wound requires clear communication among the team members. All operating-room personnel have a role to play in avoiding this error. While the task of keeping track of sponges and instruments placed within a surgical wound is commonly delegated to the nursing or scrub staff, the surgeon can decrease the likelihood of leaving a sponge or instrument behind by carefully and methodically examining the wound before closure in every case. This practice has been advocated by the American College of Surgeons as an essential component of preventing retained sponges and instruments (11). This type of evaluation addresses counterbalancing errors in counting that might lead to a false 'correct' count. It is cost-free and provides an added safety check to minimize the risk of leaving a sponge or instrument behind.

### ***Recommendations***

#### *Highly recommended:*

- A full count of sponges, needles, sharps, instruments and miscellaneous items (any other item used during the procedure and is at risk of being left within a body cavity) should be performed when the peritoneal, retroperitoneal, pelvic or thoracic cavity is entered.
- The surgeon should perform a methodical wound exploration before closure of any anatomical cavity or the surgical site.
- Counts should be done for any procedure in which sponges, sharps, miscellaneous items and instruments could be retained in the patient. These counts must be performed at least at the beginning and end of every eligible case.
- Counts should be recorded, with the names and positions of the personnel performing the counts and a clear statement of whether the final tally was correct. The results of this tally should be clearly communicated to the surgeon.

#### *Suggested:*

- Validated, automatic sponge counting systems, such as bar-coded or radiolabelled sponges, should be considered for use when available.

## References

1. Bani-Hani KE, Gharaibeh KA, Yaghan RJ. Retained surgical sponges (gossypiboma). *Asian Journal of Surgery*, 2005, 28:109–15.
2. Egorova NN, et al. Managing the prevention of retained surgical instruments: what is the value of counting? *Annals of Surgery*, 2008, 247:13–8.
3. Gawande AA, et al. Risk factors for retained instruments and sponges after surgery. *New England Journal of Medicine*, 2003, 348:229–35.
4. Gonzalez-Ojeda A, et al. Retained foreign bodies following intra-abdominal surgery. *Hepatogastroenterology*, 1999;46:808–12.
5. National Association of Theatre Nurses. Swab, instrument and needles count. In: *NATN standards and recommendations for safe perioperative practice*. Harrogate, 2005:233–7.
6. Association of peri-Operative Registered Nurses. Recommended practices for sponge, sharp, and instrument counts. In: *Standards, recommended practices and guidelines*. Denver, Colorado, AORN, Inc, 2007:493–502.
7. Australian College of Operating Room Nurses and Association of peri-Operative Registered Nurses. Counting of accountable items used during surgery. In: *Standards for perioperative nurses*. O'Halloran Hill, South Australia, ACORN, 2006:1–12.
8. Operating Room Nurses Association of Canada. Surgical counts. In: *Recommended standards, guidelines, and position statements for perioperative nursing practice*. Canadian Standards Association, Mississauga, 2007.
9. South African Theatre Nurse. Swab, instrument and needle counts. In: *Guidelines for basic theatre procedures*. Panorama, South Africa, 2007.
10. Greenberg CC, et al. Bar-coding surgical sponges to improve safety: a randomized controlled trial. *Annals of Surgery*, 2008;247:612–6.
11. American College of Surgeons. Statement on the prevention of retained foreign bodies after surgery. [http://www.facs.org/fellows\\_info/statements/st-51.html](http://www.facs.org/fellows_info/statements/st-51.html) (accessed 5 February 2008).

