



Retained foreign objects in surgical patients continue to be a significant public health issue. Retained foreign objects refer to any surgical sponge, instrument, or tool that is left in the patient following completion of the operation. The rate of retained foreign objects ranges from 1:1,500 to 1:19,000 operations.^{1,2} Roughly two-thirds of retained foreign objects are sponges, and one-third are instruments. With more than 28 million operations performed nationwide, it is possible that 1,500 retained foreign bodies occur in the U.S. each year. At that rate, a large hospital could experience one case of a retained foreign body per year.

Prevention of retained foreign objects

by LTC Paul Brisson, MD, FACS

Although 1,500 cases of retained foreign objects sounds like a large per-year number, it is a relatively small number when viewed on a national level. Individual surgeons and operating room (OR) staff members have very limited experience with this devastating complication, thus giving surgical staff members the impression that this is not a serious problem. Also, since a retained foreign body may not be identified for many years postoperatively, in some cases for as long as 25 years, the statement “that has never happened here” may not be true for any institution.³

Instruments as large as 14 inches have been left in surgical patients.⁴ The consequences for the patient of a retained foreign body can be devastating. Reoperation for infection, intestinal obstruction, or fistula is common. Death as a result of a retained foreign body occurs in approximately 0 to 35 percent of reported cases.^{1,2,5,6} The consequences for the surgeon can be equally devastating—personally, professionally, and legally.

Multiple-risk factors have been suggested by the medical community, and many interventions have been recommended in order to prevent retained foreign bodies. The tenets of this article are taken from a community hospital training program, and describe specific interventions and educational tools that can be employed to continually reinforce the principles for the prevention of retained foreign objects. The goal is not only to make preventive practices routine for the surgical staff, but also to eliminate relying on memory in the prevention of retained foreign bodies.

Risks related to 4x4 sponge use

The use of 4x4 (Raytec) sponges during many surgical procedures is risky due to their small size and the difficulty in identifying them on routine X rays. In abdominal cases, these sponges can be particularly hazardous due to the difficulty in palpating the sponge, and also due to the fact that X-ray identification of sponges is unreliable, despite the presence of the radio-opaque marker.² Unfortunately many surgeons were trained to pack 4x4 Raytec sponges into small spaces, but the use of 4x4 sponges in neck and groin cases should definitely be avoided. This training program recommends elimination of 4x4 sponges completely from all cases.

The ring is the thing

I have been unable to identify a reported case where a surgical laparotomy sponge with an attached radio-opaque ring was left in a patient undergoing surgery, whereas thousands of laparotomy sponges *without* attached radio-opaque rings have been left in surgical patients. A radio-opaque ring attached to a laparotomy sponge requires a portion of the sponge, specifically the ring, to remain outside the patient. A hard ring is easier to palpate than a soft, wet sponge when performing a hand exploration of the abdomen at the conclusion of the case. A large radio-opaque ring is more easily identified on an X ray than a small, irregular radio-opaque thread. The community hospital training program on which this article is based recommends adding radio-opaque rings to all laparotomy sponges. Also notable is the fact that the authors of the Advanced Trauma Operative Management course also recommend the use of radio-opaque rings on laparotomy sponges as a patient safety initiative in all trauma cases.⁷

Thorough, thoughtful search

Prior to initiation of the wound closure, a thorough, thoughtful search of the wound should be made for foreign bodies. The surgeon must remember to perform the search—but unfortunately, memory is unreliable. Therefore, we have added a “closing checklist” to our open abdominal surgery cases. The circulating nurse reads this checklist when the surgeon announces that he is about to start his abdominal wound closure. A “thorough, thoughtful search” is part of this checklist (see Figure, page 30). The recommended checklist includes all the issues that should be reviewed at the end of the case, without relying on memory. Of notable interest: sponges or instruments that are used in closing the abdominal fascia (malleable, rubber fish, laparotomy sponges) are at particularly high risk for becoming retained foreign bodies.^{4,8,9}

Risk factors for retained foreign bodies

Many risk factors have been identified regarding retained foreign objects, but our surgical department has focused on three primary concerns:

- Emergency cases
- Cases with a change in the planned procedure

- Obese patients

At the conclusion of the surgical procedure, these three risk factors should be reviewed, and patients with one or more risk factors should be considered for X ray, even in the face of a normal instrument and sponge count.^{1,10} (A review of “High risk factors for retained foreign bodies” is also part of our closing checklist.

Recommendations

Members of the surgical staff should be made aware that this public health issue requires multiple interventions and constant vigilance, similar to other complex surgical problems. The following list highlights recommendations for the prevention of retained foreign objects.

- It is important to make sure your staff is acutely aware that the surgical count can be unreliable. It is very disappointing and alarming to learn that in 62 to 90 percent of the cases of retained foreign bodies, the surgical count was correct.^{2,10} Although a count is important to every case, it is only one of multiple interventions required to prevent retained foreign objects. Also, consider adding a “miscellaneous” category to the count sheet to include objects not usually listed on the count sheet.

- The staff should be made aware that intra-operative X rays, often used to rule out retained foreign bodies, can be unreliable and misread. A high index of suspicion for retained foreign bodies is required, even in the presence of a normal X ray, and, in fact, your suspicion that something is wrong may even lead to reopening the patient’s wound.¹¹

- Surgeons should continually remind their staff about the major risk factors for retained foreign bodies, particularly emergency cases, cases with a change in the planned procedure, and obese patients. Utilize your OR newsletter, e-mail, or posters as constant reminders. Consider adding an OR checklist to eliminate the reliance on memory. Reliance on memory has been identified as a high risk factor that contributes to medical errors.¹² Note that one very recent publication *did not* identify a correlation between these three factors and retained foreign bodies, suggesting that vigilance is required on every case.²

- Eliminate 4x4s from surgical cases. These

Figure. Closing checklist

The following is a safety checklist that should be read at the completion of the case to ensure that important interventions have been accomplished.

Closing checklist: Open abdominal surgery

✓	Sponge and instrument count
✓	Thorough and thoughtful search of wound
✓	Adequate IV access
✓	Is a drain needed?
✓	Is a NGT needed or positioned?
✓	Is a gastrostomy or jejunostomy tube needed?
✓	Is a seprafilm needed?
✓	Is local anesthetic for wound needed?
✓	Is a continuous flow pain device needed?
✓	Are there risk factors for retained foreign objects (do we need an X ray)? Such as: —Emergency procedure —Change in procedure —Obese patient

sponges are easy to lose and difficult to detect on X ray.

- Be aware that any sponge or instrument that is used to aid the closure of the abdominal fascia is at particularly high risk for becoming a retained foreign body. If you cannot eliminate the use of sponges or tools to aid the closure of the abdominal fascia, then avoid placing the entire sponge or tool completely beneath the fascia.¹³

- Non-radiographically detectable sponges or towels should never be used,¹⁴ but recognize that surgical sponges that contain radiographically detectable threads are not completely reliable in the prevention of retained sponges. The X-ray detection of surgical sponges is dependent on the

size of the sponge and its location in relation to bone.^{2,15}

- Notify your staff that the Centers for Medicaid and Medicare Services has identified “retained foreign bodies” as a preventable event (“never event”) and that hospital costs related to this problem may not be reimbursed. Private insurers will surely follow.

- Look to the future. Private industry is far ahead of health care in the fields of quality and safety. One example is the ubiquitous use of bar coding and radiofrequency microchips to keep track of products.¹⁶ Both systems are currently available for OR use.

- Your surgical department should emphasize the urgency of the problem and identify surgeon champions and staff champions for the cause. Make “Prevention of Retained Foreign Objects” an organized performance improvement program for your department of surgery or OR committee. Articles like this one should be required reading for credentialing of your hospital’s surgeons.

There are many barriers to the institution of these changes. Long-established habits of surgeons and OR staff are difficult to change. The current goal of the community hospital training program on which this article is based is to educate surgeons and OR staffs in the processes that can provide safer surgery for their patients. □

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