Case Report

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Retained surgical needle and gauze after cesarean section and adnexectomy: a case report and literature review

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Abstract

Although the incidence of retained surgical items (RSIs) is low, it is nevertheless an important preventable cause of patient injury that can ultimately lead to the patient's death and to subsequent high medical and legal costs. Unintentional RSI is the cause of 70% of re-interventions, with a morbidity of 80% and mortality of 35%. The most common RSIs are sponges or gauze (gossypiboma or textiloma), while retained surgical instruments and needles are rare. Perioperative counting of equipment and materials is the most common method of screening for RSIs, while a diagnosis can later be confirmed by the clinical appearance and by imaging studies. We present a rare case of a 43-year-old patient who was admitted to our hospital because of two retained needles following a cesarean section, despite several subsequent laparotomies. One needle had been removed previously, but in addition to the remaining needle, we also removed a retained gauze. The diagnosis of RSIs is extremely important, and safe surgical practices including the addition of new imaging technologies should be encouraged to detect RSIs.

Keywords

Retained surgical item, surgery, cesarean section, surgical count, imaging, needle, gauze

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Introduction

Retention of a surgical item is a common preventable event that can result in patient injury.[1] Despite the almost universal implementation of manual counting protocols

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for surgical instruments and sponges, incidents of retained sponges and other surgical instruments still occur.[2] It was estimated that at least one case of a retained surgical item (RSI) occurred per year in a hospital carrying out approximately 8,000 to 18,000 major surgeries annually.[3] An RSI may be a large or small sponge, gauze, a surgical instrument, or a needle,[4] often located in the abdomen, pelvis, or vagina, but potentially also in the thorax, spinal canal, brain, face, or extremities. RSIs may cause complications such as pain, infection, a granulomatous response with an abscess, fistula formation, or intestinal obstruction, while organ damage, bowel perforation, sepsis, severe pain, and even death can be caused by retained clamps, needles, and retractors. RSIs are more common in emergent surgical cases, in situations where the surgical procedure changes unexpectedly, and in patients with a higher body mass index.[5] At the end of the surgery, it is essential to account for all surgical sponges and instruments to avoid items being inadvertently left inside the patient. The current approach uses a well-documented and standardized manual counting protocol.[2] We present a previously undescribed case of a 43-year old patient with multiple RSIs after three surgeries, including two cesarean sections and a unilateral salpingo-oophorectomy.

Case report

A 43-year-old woman was admitted to the Department of Gynecology at the University Clinical Center, Maribor, for planned surgical treatment due to recurrent pelvic inflammation and a suspected retained surgical needle in the pelvis after previous surgeries. The patient signed written informed consent agreeing to the use of her medical records for research purposes.

The patient had undergone several previous laparotomies. She had also undergone two cesarean sections in 1991 and in 1995, respectively, after which she suffered from continuous lower abdominal pain. It was suspected that two surgical needles had been left in her abdomen after the surgeries. She underwent magnetic resonance imaging of the pelvis in July 2014 because of continuing abdominal pain, general weakness, occasional chills, and fever, but no retained needles were visible in the pelvis. Appendicitis was therefore suspected and appendectomy was performed. She developed venous thrombosis in the left external and common iliac vein postoperatively. Her pelvic pain intensified again over the following months, and X-ray examination and targeted iriography were performed in December 2014, which revealed the RSIs in her abdominal cavity. Surgery was performed but only one surgical needle was removed. She then underwent pelvic ultrasonography in December 2015 because of recurrent pelvic pain. A right-sided tubo-ovarian abscess was seen. Antibiotic treatment was unsuccessful, and a right-sided salpingo-oophorectomy and omentectomy were performed, but the remaining needle was again not removed. She was admitted to our hospital in March 2016 for planned removal of the remaining needle, which was detected by pelvic X-ray examination performed at our hospital (Figure 1). Pelvic ultrasound showed a hyperechogenic structure at the junction of the uterine corpus and cervix (Figure 2) and a structure with mixed echogenicity on the right side of the pelvis beside the uterus (Figure 3). We performed a total abdominal hysterectomy with left-sided salpingo-oophorectomy. In addition to removing the needle on the right side of the uterus, we also removed a retained gauze in the right obturator fossa. After the surgery, X-ray examination of the removed uterus using low-energy X-rays showed the remaining needle in the right lateral part of the cervix just below corpus uteri (Figure 4). The patient recovered with

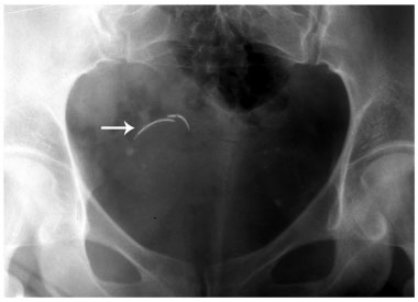

Figure 1. Retained needle on pelvic X-ray examination.

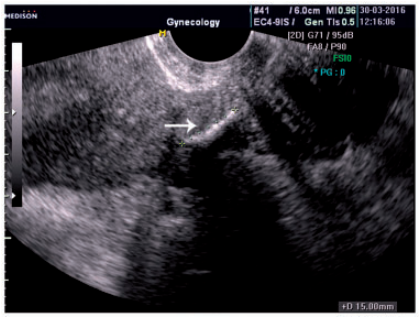

Figure 2. Pelvic ultrasound showing a hyperechogenic 15 mm long structure at the junction of the uterine corpus and cervix.

no major complications and was discharged 9 days after surgery.

Discussion

The incidence of RSIs is generally low, but is considerably higher in surgeries performed with open cavities such as cesarean section (17.9%), abdominal hysterectomy (16.3%), exploratory laparotomy for acute abdomen (13.5%) or trauma (7.3%), cholecystectomy via subtotal incision (6.6%), colectomy (4.1%), and appendectomy (3.6%). Unintentional RSI is the cause of 70% of re-interventions, reaching 80% morbidity and 35% mortality, and potentially resulting in considerable medical and legal costs.[4]

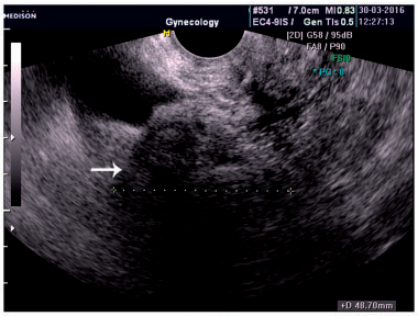

Figure 3. Pelvic ultrasound showing a structure of mixed echogenicity on the right side of the pelvis beside the uterus.

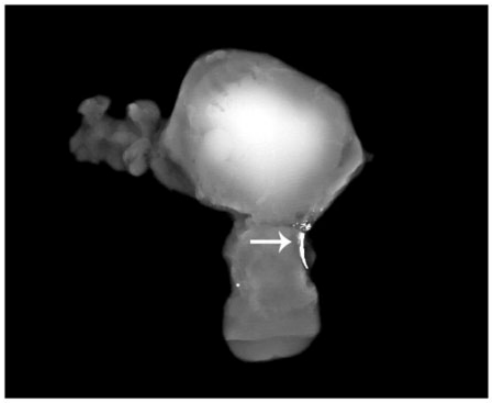

Figure 4. Retained needle on X-ray examination using low-energy X-rays in the right lateral part of the cervix just below the uterine corpus.

Although the incidence of RSIs is usually low, as noted above, its reported incidence varies among studies. Corbin et al.[6] noted an incidence of RSIs as high as 1 in 1000 to 1 in 1500 intra-abdominal surgeries, while Hariharan and Lobo[7] suggested an incidence of 1 in 5500 to 1 in 18,760 inpatient surgeries. There are various reasons for the apparent differences in the incidence of RSIs. The reported studies are usually retrospective in nature, and notably, hospitals and clinicians are generally reluctant to reveal these errors publicly because of the sensitive nature of the incidents. In addition, many incidences of

RSIs are discovered incidentally after many years, because the patients may not show any symptoms. Furthermore, insurance and legal claims are subject to confidentiality requirements, which may additionally hinder the publication of data on RSIs.[7] Nevertheless, the topic has been widely publicized, and Styskel et al.[8] identified a total of 281 reported cases of RSIs between 1909 and 2015.

The most frequently recorded RSIs are surgical sponges, because they are so widely used,[9] while other items are rarely reported. The problem exists in all fields of surgical specialty and surgical procedures.[7] Essential patient safety practices in the operating room include the application of standard processes of care, the use of protocols and checklists to reduce reliance on memory, the employment of as simple processes as possible, the alleviation of conditions that predispose to human error (e.g. interruptions, fear, anger, time pressure, anxiety), and the design and use of error-proof devices coupled with frequent training in the use of these devices.[10]

The clinical appearance and management of RSIs vary. RSIs can cause different types of tissue reaction, including exudative reactions that present fairly early in the postoperative period, or aseptic fibrous reactions, which are usually slow and can remain asymptomatic for years.[7] Stawicki et al.[11] showed that the most common clinical and diagnostic findings were focal pain, fluid or abscess collection, and a mass, while the most common pathology findings were exudative reaction, fibrosis, purulence, or abscess. Fistula formation may occur leading to spontaneous extrusion, or a fibrinous response can be elicited, leading to encapsulation of the foreign body causing a mass and/or bowel obstruction.[10]

The diagnosis of RSIs is difficult due to their varied appearances, and an RSI should be considered in the differential diagnosis of a mass or neoplasm, abscess, lymphocele, or nonspecific imaging findings in a postoperative patient.[12–15] Imaging is the most efficient diagnostic approach. Plain radiography is the most common technique, though this is associated with a relatively high false-negative rate. Kaiser et al.[16] stated that radiography produced false-negative results in three of 29 cases in whom intraoperative X-rays were used to detect radiopaque sponges. In a separate study, Choi et al.[17] reported that plain radiography had a false-negative rate of 10% to 25% despite the presence of radiopaque markers on surgical sponges. Because of its higher sensitivity, computed tomography is the first-choice diagnostic imaging technique for excluding gossypibomas/RSI.[18] They present a typical imaging appearance on computed tomography of a spongiform pattern with a radiodense linear structure, with additional characteristic features including calcified reticulate rind or an inhomogeneous, low-density mass with a thin, high-density capsule showing marked enhancement in post-contrast studies, or heterogeneous central areas in intra-abdominal gossypibomas due to gas, calcification, and radiopaque markers.[12,19,20] Ultrasound can also be used as a diagnostic tool, and can allow three types of RSIs to be classified: a poorly defined echogenic area/echogenic strip with intense posterior acoustic shadowing; a well-circumscribed cystic mass containing internal mottled contents; and a nonspecific pattern simulating a complex mass.[21] Depending on the clinical situation, magnetic resonance imaging and other relevant radiological techniques such as barium contrast studies may also be used.[7]

RSIs can lead to multiple problems and are therefore treated by surgical removal of the item, although the removal of certain items less likely to cause serious clinical consequences (e.g. needles and sponges) is debatable and should be evaluated on a case-by-case basis.

The most widely used method of screening for RSIs involves counting the items before and after surgery, for which established protocols are in place.[7] However, retrospective analyses have shown that in most of cases of RSIs, the number of items (sponges) counted at the end of the operation was declared to be correct.[22] Greenberg et al.[2] showed intraoperative discrepancies in the counts in one of eight surgical cases, or once every 14 hours of operative time or once per 85 counting activities. The Association of Perioperative Registered Nurses suggests that if a discrepancy occurs, procedures should be followed by the perioperative team to locate the missing item, including the use of barcode scanning, radio-frequency detection, and identification or other adjunct technologies.[1] In a randomized controlled trial involving 298 patients, Greenberg et al.[23] compared traditional counting protocols with a contemporary computer-assisted system for counting sponges using barcodes. Significantly more counting discrepancies were detected by the barcode system compared with the traditional system, including misplaced and miscounted sponges. It is important to emphasize that a clear, concise counting policy and procedures are essential to ensure appropriate perioperative counts are carried out in an effective manner, that appropriate documentation is maintained, and that appropriate action taken in the event of an incorrect count outcome.[5]

The incidence of unintentionally RSIs is underestimated, which can be partially explained by the difficulty in making a diagnosis. In addition, there are potential legal consequences, as well as difficulties in reporting the malpractice and dealing with its consequences.[4] It is also necessary to consider the large number of variables during the somewhat unreliable perioperative counting process, which has led to the unacceptably high incidence of RSIs. Although RSIs are undesirable, the use of appropriate measures make them a preventable cause of surgical morbidity and mortality. All members of the operating team should be considered responsible for adopting safe surgical practices and counting surgical objects and tools. The adoption of new technologies, in addition to existing counting processes and protocols, should be encouraged in the future.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

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