

Open Access Maced J Med Sci electronic publication ahead of print,
published on January 05, 2017 as <https://doi.org/10.3889/oamjms.2017.005>

ID Design 2012/DOOEL Skopje, Republic of Macedonia
Open Access Macedonian Journal of Medical Sciences.
<https://doi.org/10.3889/oamjms.2017.005>
eISSN: 1857-9655
Review Article



Retained Surgical Foreign Bodies after Surgery

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Abstract

Citation: Zejnullahu VA, Bicaj BX, Vjosa ZA, Hamza AR. Retained Surgical Foreign Bodies after Surgery. Open Access Maced J Med Sci. <https://doi.org/10.3889/oamjms.2017.005>

Keywords: Retained surgical bodies (RSB); surgical sponge; surgical instruments; foreign bodies.

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Received: 07-Nov-2016; **Revised:** 17-Dec-2016; **Accepted:** 19-Dec-2016; **Online first:** 05-Jan-2017

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Funding: This research did not receive any financial support.

Competing Interests: The authors have declared that no competing interests exist.

The problem of retained surgical bodies (RSB) after surgery is an issue for surgeons, hospitals and the entire medical team. They have potentially harmful consequences for the patient as they can be life threatening and usually, a further operation is necessary. The incidence of RSB is between 0.3 to 1.0 per 1,000 abdominal operations, and they occur due to a lack of organisation and communication between surgical staff during the process. Typically, the RSB are surgical sponges and instruments located in the abdomen, retroperitoneum and pelvis.

Introduction

Retained surgical bodies (RSB) are any foreign bodies left inside the patient after the operation and in general, a further procedure is necessary. The consequence of foreign bodies after surgery may manifest in different forms immediately after the operation, months or even years after the surgical procedure. With more than 28 million operations performed nationwide, the number of cases in which foreign bodies are left behind during a procedure in the United States has been estimated at around 1500 cases per year [1, 2]. Surgery is challenging, with the risk of retained surgical bodies increasing particularly in complicated cases such as obese patients or trauma requiring the use of numerous instruments, retractors and surgical sponges. During surgery, systems are in place to create a safe environment for the patient while the surgeon works with sponges and instruments; however, they are not impervious to human error.

Commonly, the discovery of the foreign bodies after surgery occurs due to non-specific complaints. The retained bodies can present as a mass usually in the abdominal cavity and are diagnosed during a routine radiological examination. If patients complain in the period after the operation of pain, frequent infections and a palpable mass, this would suggest the presence of retained surgical bodies.

Regarding the type of RSB, sponges are the most many foreign bodies retained in the human body after surgery, being located in body cavities such as the abdomen, pelvis and retroperitoneal space. These sponges may remain in the body for days, months or even years before manifesting as inflammatory reactions. When retained bodies are suspected, diagnosis must be confirmed by computed tomography (CT) [3]. In addition, surgical instruments such as clamps, retractors, electrodes or drains can be left behind after operations, especially in the abdominal cavity [4]. Instruments made of stainless

steel, like retractors, may evoke minimal reactions but all foreign bodies have the potential to cause pain, obstruction, ileus or abscess. According to the literature, approximately 80% of cases diagnosed with RSB are those in which the number of declared materials was correct at the end of the operation [5, 6]. Good communication inside the operating room is essential for minimal errors during surgery. The retention of RSB after surgery has medical and legal implications, occurring as a result of mistakes by the entire medical team, not just the surgeon.

Before every operation instruments are counted by the scrub nurse and as a standard procedure, they are counted at the end of the procedures to ensure that they have all been accounted for, and nothing has been left behind in the patient. Counting instruments during operations is difficult, especially during emergency surgery such as abdominal trauma, in which the whole team is engaged in treating the patient.

Clinical manifestation of retained surgical bodies after surgical procedure

The RSB can manifest differently depending on their location and the type of material. They can remain in the nose, inside of the tracheobronchial tree, retroperitoneal space, uterus, and spine; however, they are commonly located in the abdominal cavity. RSB inside the abdominal cavity can produce pain, abdominal tumours that can raise suspicions for malignant mass, intraabdominal abscess, obstructive ileus, intestinal perforation, gastrointestinal fistula, bleeding and can migrate transmurally [7].

They can clinically manifest as acute reactions like an inflammatory response, infection or abscess within days or weeks after the operation. Furthermore, retained surgical foreign bodies inside the body cavity may also manifest as aseptic inflammation or exudative without infection, leading to nonspecific manifestation [8]. Patients may complain of pain and discomfort months or years after their procedure, especially in those cases where sponges remain [9]. Acute reactions after surgical procedures require immediate attention for further diagnosis and urgent surgery to remove the foreign body.

The further operation to retrieve the RSB is very successful if performed soon after the first procedure, typically within two weeks. At this stage, they can be detected by X-ray or can manifest as an inflammatory reaction. In such cases, a reasonable approach is first to attempt to remove the RSB laparoscopically. In the case of chronic manifestation months or even years after the first

procedure, it is important to perform a CT scan first as a tumour-like mass or bowel obstruction, as well as various types of fistulae may be involved [7, 10]. Often, malignant tumours are suspected in such chronic manifestations, so CT and MRI scans are important to establish a diagnosis.

The RSB can be organised as a mass inside the abdominal cavity, and a tumour may be suspected [11], in which case, extensive diagnostic imaging can distinguish the RSB from a tumour mass. Fibrinous changes present as a soft tissue mass in about 27% [12] or as an aseptic RSB that can result in granulomatous reactions and adhesions. In some cases, RSB may be organised in an abscess and manifest with clinical signs of sepsis [13].

RSB may also manifest as inflammation in the area surrounding the retained surgical sponge and may be associated with a bowel obstruction [14]. These cases require immediate surgery once it has been established that the RSB is causing the blockage. The RSB can lead to perforation of the intestinal wall and pathological communication between the adjacent structures [7]. This erosion can result in fistula formation, another form of complication related to retained foreign bodies [15, 16]. Gastrointestinal bleeding from the upper gastrointestinal tract can also occur and may be life threatening for the patient, requiring urgent treatment with clinical restitution [17]. Transmural migration of the RSB after surgery can cause an intestinal obstruction when the RSB migrates from the abdominal to intraluminal space of the bowel [18]. Surgery is required to resolve this complication.

As previously mentioned, the most commonly retained surgical items are sponges due to their extensive use, especially when surgeons are dealing with trauma and massive bleeding [19]. Surgical sponges are referred to as "gossypiboma" or "textiloma" [1].

How to prevent RSB during surgical procedures

Approximately 88% of RSB cases occur in a situation where the sponge and instrument counts were declared "correct" [1]. Counting the surgical materials used during the surgical procedure is the responsibility of the nurses under a direction of the doctors. The Association of Operating Room Nurses published an uptodate.com policy in 2015 recommending the points below that are widely used in the United States hospitals [20]. Specifically, counts should be performed at the following time points during the procedure: - before the procedure begins (initial count); - whenever new additional items are

used during the operation; - before the surgeon closes the body cavity; - when the surgeon begins to close the wound; and - when the surgeon closes the skin (final count).

This accounting system was developed as part of the United States National Surgical Patient Safety Project (nothing left behind) with the aim to prevent retained surgical items [21].

Methods

Literature Review

The literature was searched via Pub Med, Scientific Commons and Google Scholar databases using the search term 'foreign bodies after surgery'. Only articles in the English language were included in the review.

Results

In total, more than 30 articles were found related to retained surgical bodies after surgery, reporting different reasons for the preserved bodies being left inside the operation field after the surgical procedure. According to Gawande and AI, in the majority of cases where sponges were left behind, the number of sponges before closing was always declared correct, suggesting that counting alone is not sufficient. In addition, studies showed that body mass index, intraoperative complications and unexpected events are associated with an increased risk for retained bodies after surgical procedures [22]. Furthermore, authors, in their study of 34 cases with retained surgical bodies, concluded that a breakdown in communication within the operation team was the most important factor in relation to the issue of surgical bodies [23].

Finally, the studies reviewed recommended that the best strategies to prevent retained surgical bodies were good communication in the operation theatre, systematic counting of materials used during the surgical procedure, use of tracking devices for electronic sponge counts and counting before the cavity and skin are closed.

Discussion

The aim of this review was to identify

weakness in the surgical team's performance which may result in foreign bodies being left in body cavities. The retention of foreign bodies is an issue for all surgical procedures but is often associated with cases of traumatic injury at the emergency unit and during elective operations requiring different teams during the surgical procedure. The diagnosis of an RSFB is based upon imaging studies, and if an RSFB is suspected in the immediate postoperative period, plain radiographs of the surgical field should be performed.

Radiopaque surgical instruments and devices should be immediately apparent on plain film and the characteristic appearance of radiopaque tape or wires of laparotomy pads and surgical sponges, respectively, should indicate their presence. The diagnosis of retained bodies can also be made using CT and gastrointestinal contrast studies.

Excellent communication within the surgical team was identified as a major factor to minimise the number of surgical bodies left after surgical operations in the body cavity. Therefore, to eliminate the occurrence of RSFB, the surgical team must work together to ensure a safe operation and good post-operative outcomes; excellent communication during the procedure between the surgeons, nurses and anaesthetists is key to success.

In conclusion, RSFB are still common despite new surgical techniques and equipment. The key to preventing the incidence of RSB is excellent communication within the surgical team, between the surgeons, nurses and anaesthetists.

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