

# Forgotten surgical items: lessons for all to learn

## Case report and 3-year audit of retained surgical items at a tertiary referral centre

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### Introduction

It is an unavoidable fact that errors occur in medicine and, in particular, the operating room [1, 2]. Fortunately, cases of retained items after surgery are rare events but the consequences: physical, emotional and financial can be severe for the patient, the surgeon and the hospital. Many attempts have been made to decrease the frequency in which surgical equipment is left inside a patient during an operation. Past studies have looked at risk factors that might be associated with retained surgical equipment [3]. However, despite extra vigilance in the operating room, retained surgical equipment continues to be a problem.

### Case report

A 38-year-old woman with a fibroid uterus, causing unacceptable pressure symptoms, underwent a laparoscopic sub-total hysterectomy. The device used for uterine manipulation was the KOH Colpotomizer (CooperSurgical Trumbull, Connecticut) consisting of: RUMI® tip, handle and KOH™ cup. The hysterectomy was uncomplicated and the patient went home after one night in hospital.

Fourteen months after her operation, the patient saw her local medical officer for a routine cervical smear. At the examination, she detected a blue object in the vagina apparently attached to the cervix and sent a picture to the surgeon (Fig. 1). The surgeon was able to identify the object as a KOH™ cup. The patient was seen immediately and the KOH™ cup was removed in the office without difficulty.

The KOH™ cup fits over the patient's cervix and is used to stretch the upmost regions of the vagina and to distinguish the fornices from the surrounding tissue. The KOH™ Colpotomizer system gives excellent uterine manipulation in the anterior, posterior and the lateral planes [4]. The three parts of the KOH™ Colpotomizer system are assembled by the surgeon and fitted into the patient. At the conclusion of the case, the handle is withdrawn and the KOH™ cup and RUMI® uterine tip manipulator will come out attached to it. Unfortunately, it is possible for the three parts to detach. In this case, the handle and uterine tip were removed but the cup remained around the cervix.

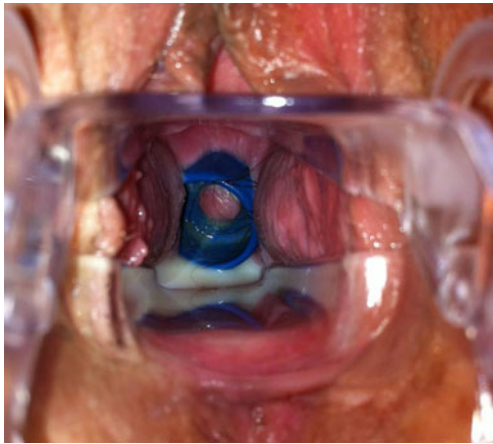
On reviewing the notes, it became apparent that the surgical count was incorrect. The KOH™ cup, disposable RUMI® tip and RUMI®™ handle were labelled as “RUMI® System”—1; hence, not all three components were counted on the instrument tray. The scrub nurse who started the case and handed the surgeon the equipment had finished her shift and rotated with a second nurse during the operation. The surgical assistant who had removed the system was a junior registrar who had not used the system before and was not aware that the cup could detach.

An education programme was undertaken for perioperative personnel to explain the components of the KOH™ Colpotomizer system. The count sheets now appropriately reflect the number of pieces. All members of the surgical team now inspect the components of the KOH™ Colpotomizer system at the conclusion of the case.

### Discussion

The exact rate of retained surgical equipment is unknown and likely to be under reported. Earlier studies estimated the rate to have been 1:1,000—1:1,500 intra-abdominal operations [5, 6]. Studies looking at malpractice claims found a

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**Fig. 1** A KOH™ cup (*blue object*) seen in the vagina at speculum examination 14 months post operatively

rate of 1:8,801–1:18,760 but these claims are likely to under represent the problem [7]. Another study from 2005 found an incidence of 1:5,027 operations [8]. Cima et al. from the Mayo Clinic in 2008 reported an overall incidence of actual retained foreign objects of 0.178 per 1,000 operations or approximately 1 per 5,500 operations [9].

Over the past 3 years, our institution, a tertiary referral centre for obstetrics and gynaecology, had a rate of one retained surgical item for 4,943 operations (Table 1). This figure is comparable with the international literature. The two cases not described above were both of retained vaginal packs. In both cases, the pack was inserted at the conclusion of a hysteroscopy for bleeding encountered from the cervix secondary to manipulation. The patients were both discharged home without knowledge of the pack and removed the pack themselves when they discovered it the following day. Both cases involved the pack not being documented in the count and no instructions in the post-operative orders about the pack's presence or when to remove it. Fortunately, none of the patients had any significant sequelae and neither case was considered a "sentinel event" as they did not require any further surgery to remove the item.

In Australia, hospitals adhere to the Standards of the Association of Operating Room Nurses [10]. This requires that all instruments are counted at the beginning and end of an operation. In addition, it requires that packs have a radioopaque marker and be counted once at the start and twice at the completion of the surgery. Two nurses must be

involved in the check count, and that where possible, the same two nurses retain responsibility for all surgical counts during a procedure [11].

Several risk factors have been identified as to why surgical equipment may be retained in a patient. These include: (1) an operation performed on an emergency basis or an unexpected change in procedure, (2) a patient with increased body mass index, (3) a change in nursing staff during a procedure and (4) fatigue in the surgical team [3, 11, 12].

Operating room culture is obviously very important. Rapidly changing technology has resulted in an influx of new technologies in the operating room. These new technologies, where possible, should be understood by all staff in the operating team. It has been reported that changeover of operating personnel during an operation can be associated with discrepancies in the count at the end of the procedure [13, 14]. The surgical count is not always accurate and should not be relied on as the only step in avoiding retained surgical items [12].

In our case of the retained KOH™ cup, there was a change in nursing staff during the procedure. This is important as the nursing staff involved in the set-up of the cup, uterine manipulator and handle were no longer in attendance at the conclusion of the case. This is a sobering illustration of how a change in staff can have a negative impact on a patient's outcome. It is important that operating staff, wherever possible, are not rotated through the same operation.

Retained pieces of surgical equipment have the potential for grave consequences. These include intestinal obstruction, intestinal perforation, intra-abdominal abscess and death [5, 15]. The risk of complications increases when the cotton texture of a surgical sponge incorporates into the surrounding tissue with the potential for internal or external fistulae due to local inflammation and pressure [16].

There are of course important medico-legal implications as demonstrated by Gawande et al. who reviewed the medical records of claims with a large malpractice insurer associated with retained surgical items [3]. The event can also affect the reputation of clinicians and treating institutions.

Advances in minimally invasive surgery have seen a rapid introduction of new equipment. Every member of the surgical team needs to understand how the new equipment works. It has been postulated that minimally invasive surgery will be associated with fewer cases of retained surgical items [17]. Our case demonstrates that, unfortunately, this may not be true and there are other reports in the literature of KOH™ cup retention [18]. The case presented clearly illustrates the importance of understanding how many pieces comprise the equipment. In the case of the KOH™ Colpotomizer, it was inadequate to call it the "RUMI® System—1" on the count sheet when it was actually three

**Table 1** Retained surgical items by year

	2009	2010	2011
Number retained surgical items	1	1	1
Number of operations	4,939	4,840	5,051

components and will be four components if the vaginal occluder is used for total laparoscopic hysterectomies. We have taken steps at this institution to make sure this will not happen again by having all parts listed separately on the operating count sheets. It is essential that surgeons and surgical assistants inspect the RUMI-KOH system as soon as it is removed from the patient to verify that all components are present [18]. Surgical staff who assemble, operate or handle the KOH Colpotomizer system need to be aware that the components may detach during use.

Concerning retained vaginal packs, the literature clearly shows that counts of sponges are often omitted after the closure of an episiotomy or vaginal tears after delivery and this can lead to retained sponges [3]. Our two cases of retained vaginal packs were post-gynaecology procedures when unexpected bleeding was encountered. These cases demonstrate the importance of including “emergency packs” on the count sheet. They also highlight the risk factor of “a change in operative procedure” and the association with retained surgical equipment [3, 19].

Clearly, it is imperative that there is good communication between surgeon and recovery room staff. It is now routine procedure at our institution to list packs inserted at the end of a procedure on the count and report this to recovery room staff, with appropriate instructions on removal clearly documented in post-operative orders.

## Conclusion

Despite our best intent and efforts, it is likely that we will continue to see surgical items retained in patients. Operating room culture is an important factor in reducing this unwanted surgical complication. All members of the operating room team should be familiar with new equipment introduced into the theatre. Good communication between surgeon, surgical assistant and perioperative personnel both nursing and other must be open and encouraged. The surgical count is clearly but one of the crucial steps needed to ensure there is no retention of surgical equipment. We must continue to report these human errors so that we can learn from our mistakes and continually strive for improvement.

**Conflict of interest** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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