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Retained foreign bodies after surgery: A high price to pay

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***Abstract*---**Retained foreign body is an important sentinel event in medical practice worldwide. It is associated with significant harm, hospital readmission, huge financial cost, litigation and sometimes death. Stringent adherence to principle of surgery, good communication among the theatre team, traditional counting of swabs, mops and instruments before wound closure still remain key to prevention.

***Keywords*---**retained foreign bodies, surgery, RSFB.

Introduction

Unintended or accidental retention of surgical foreign bodies (RSFB) in the body is most sentinel event reported in surgical practice[1,2]. The estimated incidence of RSFB continues to be approximately 00.3-1.0 per 1,000 abdominal operations[3]. This phenomenon is a serious problem in healthcare setting worldwide but fortunately quite uncommon[4]. The incidence of retained sponges, instruments, needles, guide wires or catheters is considered to be about one out of every 1,500 operative procedures that involve an open abdomen or open chest [4-9] However the frequency of RSFB in the body is rarely documented owing to medico- legal (criminal or civil) amongst other reasons. Each of such reported incidents acquires major importance because of excessive media publicity which can jeopardize the reputation of the surgeon among his professional contemporaries and the public at large[9-11].

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Retained foreign object may lead to a plethora of adverse events such as readmission, prolonged hospital stay, sepsis, organ injury, bowel perforation, abscess formation, undue pain, re-operation, and even death [12-15] Surgical sponges and abdominal mops are the most common types of RSFB are made from cotton materials, and they excite two major types of tissue reactions; an exudative inflammatory reaction (abscess formation) and an aseptic fibrotic reaction (mass formation).[1,4,16,17] The patients may develop symptoms of intestinal obstruction or develop a malabsorption type syndrome.[16,17] The risk of RSFB after surgery significantly increases in emergencies, unplanned changes in procedure, in major body cavity (abdomen or pelvis), errors in instrument or sponge counts, loss of communication between members of the surgical team, in patients with higher body-mass index, in surgeries with blood loss of greater than 500mls, unexpected intra-operative events, incorrect surgical procedures and longer operative procedures [8,13,18-20]

The authors of this paper overtime have been involved in the management of RFB after surgery in their private health facilities as well as in other similar facilities in Benin City, Edo State, Nigeria on invitation of the proprietors to salvage similar cases. We document the experiences garnered by managing some cases of RSFB in this case series. The objective of this study was to describe the unique characteristics of patients, risk factors and outcomes of salvage surgeries to remove retained surgical foreign articles from the body in patients within a decade with a view to suggesting ways to prevent such sentinel events.

Patients and Methods

The records of all the patients who underwent abdominal operations in Ohize Medical Centre, Faith Medical Centre and Igbinobaro Medical Centre all in Benin City Edo State, from August 2010 to July 2020 were reviewed in this retrospective study of retained surgical foreign bodies. Of the 5,200 total cases that had abdominal surgeries, 17 cases were identified. The retained surgical foreign bodies consisted of surgical sponges, instruments, sharps and drains. These were unintentionally left in the body after surgery. These foreign bodies either required reoperation to remove them or were spontaneously expelled from the body. Personal data were collected from hospital records of the patients in three centers under study in Benin City Edo state, Nigeria; one of the 36 states in Nigeria.

The parameters collected and categorized were age, sex, primary diagnosis and operative procedures performed, the cadre of operating surgeons, the composition of members of operating teams, characteristics of the foreign bodies retained, locations of the foreign items in the patient’s body, complications from retained foreign bodies, duration of hospital admissions and mortalities if any, arising from RSFB. The collated data were analyzed as, mean age, age range, sex ratio and percentages. The approval for the study was given by the Ethical Board of the Edo State Ministry of Health Benin City. Patients' consent was considered not necessary because of the retrospective nature of the study and the anonymity of the cases.

Results

In this descriptive retrospective study, 17 cases of retained foreign body (RSFB) were retrieved and evaluated. There were eight males (47.1%) with a male to female ratio of 0.9:1. The ages ranged from 26 to 80 years with a mean age of 47.5 years. Of the total numbers of foreign items retained, seven (41.1%) were abdominal mops, six (35.3%) were gauze, while two (11.8%) of the articles were sharps (scalpel blades) and drains each (Table1). Seven (41%) cases were urological procedures, six (35%) obstetric and gynaecological operations, two (11.8%) abdomino-pelvic surgeries undertaken by two surgical teams (general surgeon and gynaecologist), and two (11.8%) general surgical cases (Table 2).

Five (29.4%) of the cases presented with abdominal masses, one (5.9%) each as intestinal obstruction, abdominal abscess and as an incidental finding of RFB on reoperation for a different reason, four (23.5%) cases presented with retained gauze related irritative and obstructive bladder symptoms while five (29.5%) foreign bodies (gauze) were extruded from the body spontaneously via the wound site and the urethra (Table 3).

In four (23.5%) cases, RSFB were retrieved on the same day of surgery while 11(64.7%) of the cases were re-operations. Foreign objects were left behind in the abdominal cavity in nine (52.9%) cases, urinary bladder in six (35%) cases, and in the inguinal canal in two (12%) cases. The mean number of days to discovery of RFB was 138 days, with a range of day of surgery to 5years after the initial surgical procedure. Most objects were discovered from symptoms presented by 11(64.7%) of the patients and five (29.4%) had spontaneous extrusion of the foreign articles from the body while one (5.9%) was found incidentally in a second operation for intestinal obstruction secondary to adhesions.

Radiological and ultrasonographic investigations were used to confirm the presence of RSFB in symptomatic cases. General surgeons were involved in eight (47%) of the cases, two (11.8%) were done by medical officers, three (17.6%) by family physicians and two (11.8%) by a combined team of general surgeons and gynaecologists and two (11.8%) by gynaecologists. Nine (52.9%) of the RSFB (mops) were discovered in the abdominal cavity, Six (35%) found in the bladder (gauze and scalpel blades) and Two (12%) in the inguinal region (gauze).(Table 4). The mean duration of hospital admission was 12 days with a maximum period of 30 days. Two deaths were recorded in this study from complications of reoperation; development of faecal fistulae (11.8%)(Table5).

Table 1
Characteristics of Retained Foreign Bodies after Surgery

Characteristic	No. of cases (%)
Type of Foreign Body Retained	
Abdominal mop	7 (41.1%)
Gauze	6 (35.3%)
Scalpel blade	2 (11.8%)
Drains (plastic)	2 (11.8%)

Table 2: Type of Operation

Obstetrics & Gynaecology	
Abdominal Hysterectomy	4 (23.5%)
Myomectomy	1 (5.9%)
Caesarean Section	1 (5.9%)
Urology	
Prostatectomy	3 (17.6%)
Closed Cystostomy	2 (11.8%)
Cystolithotomy	1 (5.9%)
Nephrectomy	1 (5.9%)
Multi-Disciplinary Abdominal Surgeries	
Hysterectomy & cholecystectomy	1 (5.9%)
Hysterectomy & Ureteric Re-implantation	1 (5.9%)
General surgery	
Herniorrhaphy	1 (5.9%)
Appendicectomy	1 (5.9%)

Table 3: Mode Of Presentation

Abdominal mass	5 (29.4%)
Intestinal obstruction	1 (5.9%)
Abdominal abscess	1 (5.9%)
Incidental finding of RFB during an unrelated operation	1 (5.9%)
Spontaneous extrusion of RFB	5 (29.4%)
Lower urinary tract symptoms	4 (23.5%)

Table 4: Locations Of Discovered Foreign Body

Abdomen	9(52.9%)
Urinary bladder	6 (35%)
Inguinal canal	2 (12%)

Table 5: Outcomes

Death	2 (11.8%)
Readmission	5 (29.4%)
Reoperation	10 (58.8%)
Morbidity	5 (29.4%))

Discussion

This study has revealed a trail of adverse events that follow the inadvertent retention of foreign bodies in the body after surgical procedures or interventions. The mortality rate of 11.8% in this study is higher than that in other studies (0-4%)[6,10,18,20]. Perhaps this observation is due to the sources of data in the different studies and the under reporting of RFB cases generally. However this rate lies within the mortality rate range (11%-35%) in a meta-analysis systematic review article on RFB.[2] The high mortality rate in this condition underscores the importance of prevention. The cause of death may or may not be directly related to the RFB[16], however old age, the stress of a reoperation and acute renal failure were important factors that resulted in the death of one of our patients.

The operative team, made up of the surgeon, trained perioperative nurse, anaesthetist and surgical technologist share. The morbidity rates in other studies RFB are higher than that in this study[1,6]. Maybe the management of these associated morbidities were successful managed hence the lower mortality rates in their study compared to ours. The fewer cases in this study may be responsible for this observation. The Joint Commission Sentinel Event Database by Healthcare Facilities has proposed a harm score based on unexpected additional care/extended hospital stay, severe temporary harm, permanent loss of function, the psychological impact(depression, post-traumatic stress disorder, anxiety) permanent harm and death[1,18]. This score was not however utilised in this study. The adverse events of RFB in our study included readmission, long hospital stay, intestinal obstruction, abdominal abscess/sepsis and abdominal mass. Similar presentations and complications were also seen in other studies[7,21]. Other serious conditions like visceral perforations, fistula formation and gastrointestinal haemorrhage found in other studies were not seen in this study fortunately.[1,19]

Reasons for these complications were not explicitly stated in these studies. Anecdotally these events could result from unnoticed iatrogenic injury to the bowel, from retained sharps items like scalpels and needles in close proximity to major blood vessels. Bladder outlet obstruction coupled with painful and distressful spontaneous expulsion of RFB and vesical calculi per urethral from the retention of gauze after herniorrhaphy and prostatectomy occurred in four (23.5%) of our cases. Other studies have described cases of transmural migration of sponges into the intestinal lumen, thorax, scrotum and urinary bladder [2, 4,19].

The consequences of RFB extend beyond clinical complications and often include additional financial burdens such as extended lost time from work, additional expenses related to frequent follow up visits, patient care and additional medications[13]. Such complications also present a significant financial risk to health care providers[13,14]. In United State of America the average costs incurred as a result of the retention of a foreign object, was reported to be over $63,000 [11,2]. In Nigeria, the financial implication of RFB is not known but the financial burden is much worse as would be expected in resource poor country with low per capital income. This is compounded by the absence of health insurance coverage for a majority of the citizens of this country. It is common knowledge that landed properties and other valuables are sold by patients in order to raise

money for the treatment resulting complications and reoperations further worsening the already impoverished state.

There was no insurance claim noted in this study unlike in similar studies in advanced countries of the world. However there was an out of court settlement in one of the cases. Most of the patients were not informed about the nature of their illnesses and other reasons were given as indications for a second surgery to retrieve these items[6]. This form of damage control has been suggested by Singla and others[9]. The ethical issue raised by this proposal is questionable. The retention of surgical foreign bodies after surgery has been variously described as preventable, avoidable, negligent, a non-reimbursable hospital-acquired conditions, serious reportable events or a "never event", and as medical errors [7,10, 13, 18, 22, 23].

Although this condition is uncommon, the associated mortality and morbidity of this avoidable disease entity makes its study relevant[5,12-14]. Many surgeons shy away from reporting cases of RFB because of its potential professional and medico-legal consequences.[10,18,25] Anecdotally, for same reason, such cases are not documented on patients' case files and when they are, are written in coded words decipherable only to the surgeon and therefore the incidence of RFB after surgery is under reported. Nonetheless, with increasing rate of practice litigation[2], it behoves all surgeons and the operating team to therefore adhere strictly to measures that aid in the prevention of this event.

The natural history of objects left in the body during surgery is highly variable and depends on whether it is made of plant, metal or synthetic materials. Objects can be recognized incidentally during the postoperative period, manifest themselves clinically through symptoms or complications, or remain dormant for years. Clinical morbidity resulting from RFB includes persistent inflammation, pressure symptoms, obstruction, or septic complications[10]. Fistula formation, and erosion into major blood vessels that has been reported in other studies, [7, 21, 23] were fortunately absent in this study. In a study the RFB was extruded the rectum[11]. In this study, retained gauze were spontaneously expelled from the body via the urethral in the male after herniorrhaphy and prostatectomy and also from an infected appendicectomy wound.

In this study, we observed that foreign bodies were retained more in urological and obstetric and gynaecological procedures than in multiple major simultaneous surgical procedures and in general surgical procedures. A finding noted in other studies[7,10,13] in which RFB were left more in the pelvic and abdominal cavities in a majority of their cases. The abdominal and pelvic cavities are voluminous spaces where sponges can become obscured, and in the presence of technical difficulty, obesity and haemorrhage, the likelihood of leaving a foreign object behind is high [7,9,24].

The reoperation and readmission rates were high in this study and these were comparable to the rates in other studies[10,18]. In some of the cases, the foreign objects were detected same day of surgery or before discharge from the hospital while some other cases had spontaneous expulsion of the foreign object from the body much later. This was also the finding in other studies.[17] The mean number

of days to discovery of RFB in this study was 138 days, with the longest discovery time of five years after the initial surgical procedure. In similar studies, the longest discovery time was 18 to 32 years [20,24].

Diagnosis was mainly clinical and radiological investigations were ancillary aids in this study. This does not however under rate the importance of conventional radiological abdominal imaging technique which includes gastrointestinal contrast studies, ultrasonographic scan, computerized tomographic scan and magnetic resonance imaging, as their roles in the management of RFB are well documented [19,23]. These facilities were a few in Benin City, expensive and unaffordable by our patients. Laparoscopy has also been used for detection and treatment (retrieval)[20]. Skeletal scintigraphy, endoscopy (oesophagoscopy), endoscopic retrograde cholecysto-pancreatography (ERCP), colonoscopy and hand held wand-scanning devices are other methods employed to detect and sometimes to retrieve such items.[4,20]

Similar to other studies of RSFB, abdominal mop and gauze constituted a majority of foreign body retained in this study.[7,10,23] This was probably due to the soft nature of this material, and the ease by which they could be obscured by blood stains and loops of bowel. The public and judges due to lack of understanding of the complexity of the abdominal cavity and its contents often fail to realize that to occasional inadvertently leaving foreign bodies after surgery is inevitable.[20]

Majority of the primary operations in this study were carried out by surgeons who were involved in performing a lot of major and difficult abdominal surgeries. Various factors have been given for forgetting foreign bodies in the body after surgical procedures and range from carelessness on the part of the surgeon, poor training, lack of surgical skills, undue haste, distraction, non-application of the principles of surgery, loss of control in the presence of unexpected occurrence during surgery and the relegation of duties to subordinates[25]. Other predisposing factors are lack of communication between the operating team, multiple intra-operative personnel changes, unplanned additional procedures, emergency procedures, blood loss greater than 500ml, difficult gynaecological operations, high body mass index, distraction, multi-tasking, time pressure, emergent trauma surgery, use of small size of sponges, suboptimal operating room environment and other human and system related factors[1,2,8,26]

The stake of reoperation for a RSFB is high in the perspective of a largely avoidable situation. Because of the high rate of re-admission, re-operation, morbidity and mortality and the high financial burden on the patient and the doctor, the excessive negative publicity on the reputation of the surgeon and the hospital, and the risk of surgical malpractice ,ethical, legal and moral responsibilities to promote optimal post-operative outcome[26]. Careful attention cautions expressed with use of small sponges and abdominal mops in open abdominal surgeries as well as consistent adherence to standardized counting procedures and bar coding is key to prevention of these incidences.[19, 26]

It is claimed that the best methods to reduce the risk of RSFB include good communication, adherence to standardized counting procedure, the use of radio-

opaque marked sponges and the use of tracking devices for e-sponge count before cavity and skin closure [2,19,26]. The use of cutting edge technology like automated counting devices, intra-operative imaging, computer tracking, bar-coding and radio-frequency detection systems (RFDS) are known to reduce the incidence of RSFB significantly.[1,8]

Conclusion

Retained foreign body is an important sentinel event in medical practice worldwide. It is associated with significant harm, hospital readmission, huge financial cost, litigation and sometimes death. Stringent adherence to principle of surgery, good communication among the theatre team, traditional counting of swabs, mops and instruments before wound closure still remain key to prevention.

Limitations of the study

It is a retrospective study, with limited number of cases studied and the findings cannot be generalised. Also information may have been scanty as some of the case notes were not found. No reasonable reasons were given and the authors cannot say if these were more serious case of RSFB.

Recommendation

We recommend that a more robust multicenter study be undertaken with a view to recruiting more cases of RSFB for generalization and better awareness stimulation amongst healthcare providers.

Declaration

We declare that there was no competing interest in this study and the study enjoyed no sponsorship from any organization or body.

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