Original Article

RETAINED SURGICAL FOREIGN BODIES: CAN THESE BE PREVENTED?

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ABSTRACT

Objectives: To determine the frequency and modes of presentation of retained surgical foreign bodies.

Methodology: This study was carried out mainly at a private teaching hospital i.e. Isra University Hospital and four other non-teaching private hospitals of Hyderabad city over a period of five years from June 2004 to May 2009.

Results: A total of 15 patients with retained surgical foreign body were found during the above mentioned study period. Female patients were more common than male patients. Gynaecological procedures were more frequently associated with surgical retained foreign bodies. Most (60%) of the causative procedures were performed as emergency procedures. Retained sponge was the most frequent foreign body (60%) followed by gauze piece. Discharging sinuses and abdominal masses (33.3% each) were the most frequent presentations followed by intestinal obstruction (20%).

Conclusion: Retained surgical foreign body is a rare but well known iatrogenic complication of surgery mostly seen in procedures done as emergency. Discharging sinuses, abdominal mass and intestinal obstruction are the most common modes of presentation. Proper frequent double sponge count and use of radioopaque markers are the major preventive measures to safeguard against this dangerous complication.

KEY WORDS: Gossypiboma, Retained surgical foreign body, Retained sponge.

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INTRODUCTION

Medical errors during surgery are usually under reported. While the incidence and outcomes of specific types of surgical errors are relatively well described, the mechanism related knowledge of these errors is incomplete. Retained surgical foreign bodies (gauzes, sponges, instruments, needles etc) are one of the most perplexing examples of these surgical errors.[1] It is estimated that such errors occur in one of every 1000-1500 intra-abdominal operations.[2] These retained foreign bodies are one of the known complications after abdominal surgery, especially when the surgery is performed in non-ideal environment, patient is

obese and there is negligence on the part of medical personnel. It is the responsibility of the operating surgeons and operation theatre staff to ensure that no such material is left behind inside the patient before the closure of abdominal cavity.

The true magnitude of this problem is difficult to be appreciated owing to the reluctance to report such cases due to possible litigation and wild critical press coverage. The presentation of these retained foreign bodies is highly variable. The clinical presentation of retained surgical foreign bodies may be acute or delayed.[3] Such patients present to surgical units with pain, abdominal mass, non healing ulcers, discharging sinuses, intra abdominal abscesses and acute or sub acute intestinal obstruction. While many retained surgical foreign bodies are identified and retrieved immediately or shortly after surgical wound closure, some may go undetected for years or even decades.[4,5] The diagnosis is based on history, clinical examination, plain abdominal radiographs, ultrasound, CT scan and MRI. Yet some patients are diagnosed on operating table during re-exploration. Surgical exploration is the answer to the problem. Removal of foreign body, drainage of pus, debridement and proper antibiotic coverage usually give good results. Postoperative out come is good in cases where the pus is localized and presentation is early. The generalized peritonitis, systemic complications and presentation of acute intestinal obstruction are associated with high mortality.[5]

The purpose of this study was to determine the frequency and various modes of clinical presentation of retained surgical foreign bodies.

METHODOLOGY

This study was carried out mainly at a private teaching hospital i.e. Isra University Hospital and four other non-teaching private hospitals of Hyderabad city over a period of five years from June 2004 to May 2009. Patients of all age groups and both sexes having previous history of abdominal surgery, urological surgery and gynecological & obstetrical surgeries were included in the study. Patients with retained surgical foreign bodies during orthopaedics and cardio-thoracic surgical procedures were excluded. All patients underwent abdominal radiographs and ultrasound examination while some selected patients had CT scan abdomen. A proforma was designed and patients age, sex, nature and indication of previous operation, the number of previous operations, interval between probable causative operation and the discovery of the foreign body, clinical presentation, imaging investigations performed, nature of foreign body removed, post operative recovery and post operative complications (if any) were recorded.

RESULTS

During the above mentioned study period, a total of 15 patients were found to be having retained surgical foreign body. There were five males and ten females with a ratio of 1:2. The mean age was 35 years with age ranging from 8 to 55 years. Among retained surgical foreign bodies, sponges accounted for 60% (9/15) of patients, gauze were found in five (33.3%) patients and artery forceps was retrieved in one patient. Gynaecological procedures (8/15, 53.3%) were the most common procedures which led to the retention of surgical foreign bodies. Six of these patients had caesarean section while one patient each had abdominal hysterectomy and laparotomy for ovarian cyst. In remaining seven patients, three had cystolithotomy, two had exploratory laparotomy for intestinal obstruction, and one each had cholecystectomy and pyelolithotomy. About 60% of original causative operations were emergency operations whereas 40% were elective operations. The time interval between the causative operation and occurrence of symptoms was variable from one month to one year.

Discharging sinus and abdominal mass were the main presentation in 33.3% of patients each. Three patients presented with signs and symptoms of intestinal obstruction while two presented with persistent localized abdominal pain and one patient had retention of urine. This child had cystolithotomy one year ago and he

presented with retention of urine. X-ray KUB showed a radioopaque shadow in urinary bladder area and cystolithotomy showed a small stone along with a small gauze piece.

Table-I shows the detailed account of age, sex, causative operation, nature of operation, clinical presentation and nature of foreign body removed.

DISCUSSION

Retained Surgical foreign bodies belong to some of the most puzzling examples of preventable surgical errors that cause harm to patient and carry serious professional and medico legal consequences to practitioner and the involved health services.[1] The overall incidence of retained surgical foreign body is less than 1% (0.3 – 1% per 1000 cases) and rate of retained sponge after abdominal surgery is estimated to range between 1/1000 – 1/6000 operations.[2,6-9]

It is an under reported figure,[6,8,10] the reason for this are related to the medico legal implications, wide print / electronic media coverage leading to adverse publicity of surgeons and hospitals and fear of litigation which may result in malpractice claims and heavy compensations.[11]

Different technical terms are used for different types of retained surgical objects. Gossypiboma (Latin word "gossyppium" meaning cotton and "boma" meaning place of concealment) is the term used for retained sponges. A synonym for gossypiboma is "textiloma" which combines the word textile (until recently most surgical sponges were made of cloth) and the suffix – oma meaning tumour or growth. Muslinoma (named after cotton cloth imported from the city of Mosul, Iraq). Gauzoma is used for retained gauze.[1] There are no specialized medical terms for retained surgical instruments and needles.

Table-I: Retained surgical foreign bodies (n=15)

#	*Age*	*Sex*	*Causative operation*	*Nature of procedure*	*Clinical Presentation*	*Nature of foreign body removed*
1	25	F	Caesarean section	Emergency	Discharging sinus	Gauze piece
2	50	F	Caesarean section	Emergency	Localized persistent Abdominal pain and fever	Sponge
3	35	M	Exploratory laparotomy Intestinal obstruction	Emergency	Abdominal mass	Sponge
4	55	F	Obstructed paraumbilical hernia	Emergency	Acute intestinal obstruction	Sponge
5	30	F	Caesarean section	Emergency	Abdominal mass	Sponge
6	30	F	Laparotomy for ovarian cyst	Elective	Abdominal mass	Sponge
7	45	F	Hysterectomy	Elective	Discharging sinus & Vaginal Discharge	Sponge
8	30	M	Exploratory laparotomy For Gunshot wound	Emergency	Discharging sinus	Gauze piece
9	10	M	Cystolithotomy	Elective	Discharging Sinus	Gauze piece
10	55	F	Cholecystectomy	Elective	Abdominal mass	Sponge
11	39	M	Cystolithotomy	Elective	Discharging sinus	Gauze piece
12	41	F	Caesarean Section	Emergency	Intestinal Obstruction	Sponge
13	35	F	Caesarean Section	Emergency	Abdominal mass	Sponge
14	39	F	Caesarean Section	Emergency	Persistent abdominal pain	Artery Forceps
15	8	M	Cystolithotomy	Elective	Retention of urine	Gauze piece

In this study, retained sponge accounted for 60% of all retained surgical foreign body followed by gauze piece in 33.3% and solitary case of metallic instrument (artery forceps). This higher rate of retained sponge among other retained surgical foreign body is consistent with some other studies.[2,6,12] In 70% of cases, fibre items (sponge etc) are left behind while 30% are metal objects.[6] Two thirds of patients were females and they outnumbered the male patients in this study. This is probably because majority of causative operations were gynaecological operations and this finding is consistent with the observations reported in earlier studuies.[8,12] In this study, majority of (9 out of 15), the causative procedures were performed as emergency procedures. This finding is also consistent with the observations reported in earlier international[2,6,8,12] and national studies.[13,14] The Spectrum of clinical symptoms is very diverse and is closely connected to the subsequent destination of retained foreign body. Metallic instruments tend to cause more acute symptoms in an earlier time as compared to sponges.[6] Persistent discharging sinus and abdominal masses were the more frequently observed modes of presentation in this study. The other less common presentations were intestinal obstruction, persistent localized abdominal pain and retention of urine. Acute presentation generally follows a septic course with abscess and/ or granuloma formation while delayed presentation may follow months or years after the original causative procedure and usually present with intestinal obstruction or with abdominal mass. The commonly reported modes of presentation in literature are intestinal obstruction (58.3%), abscess formation with peritonitis or systemic septic symptoms (16.7%) and pseudo-tumoral (abdominal mass) 8.3% .[6,7,15,16]

It has been reported that the interval between the probable causative operation and diagnosis of retained surgical foreign body can be extremely broad ranging from days to years as long as 40 years.[17] The range of time interval between the causative operation and occurrence of symptoms in this study was one month to one year.

A good understanding of radiological appearance of retained surgical foreign body helps in better management. Various diagnostic modalities have been used to improve the preoperative diagnoses of retained surgical foreign body. Radiographs may reveal radioopaque materials either as incorporated in retained sponge or gauze or itself like the metallic instrument or needle. Ultrasonography depicts the retained surgical foreign body as a hypoechoic mass with encapsulation. In this study, 46% patients were correctly diagnosed preoperatively on the basis of radiological investigations while remaining 54% patients were diagnosed on second exploration. Talciyldiz et al[15] diagnosed more than 65% of the patients with retained surgical foreign body preoperatively with the combination of clinical and radiological investigations while on the other hand Yildirim et al[18] diagnosed only 36% of the patients preoperatively. Unlike developed countries, majority of the operation theatres in Pakistan traditionally don't have sponges and gauze with radio opaque markers incorporated in them. These radioopaque markers in sponges and gauze will help in identification if the count is not correct at the end of procedure. However, Bani Hani et al[8] diagnosed only 18% of patients with retained sponges on X-rays.

In this study, all patients with retained surgical foreign body underwent exploration. Different other methods are also available such as laparoscopic removal, endoscopic removal, ultrasound assisted removal, percutaneous removal or some times it may pass spontaneously through rectum.

Various risk factors have been identified in different studies associated with retained surgical foreign bodies. A particular high risk is seen in emergency settings, in unexpected changes in surgical procedure, higher body mass index, shift changes of nursing staff during the procedures, performing more than one major surgical procedure and involvement of more than one surgical team.[12,19]

The retained surgical foreign body is an iatrogenic complication of a surgical procedure. The true incidence of retained surgical foreign

body is lower and underreported because of its medico legal implications. Despite being a rare condition, when it happens it poses a serious problem because of unwarranted morbidity and mortality. Prevention remains the key to avoid this complication. The American College of Surgeons[20] statement on the prevention of retained surgical foreign bodies after surgery has suggested following guidelines.

* Sharing of common ethical, legal and moral responsibility by all concerned personnel.
* Methodical wound exploration before wound closure.
* Use of radioopaque markers in all surgical items.
* Proper documentation of surgical items, notification of surgical personnel, items left intentionally e.g. packing and actions in case of count discrepancy.
* Regular periodical review of policies and procedures for the prevention of retained surgical foreign bodies.

The Association of Perioperative Registered Nurses[21] further refined the guidelines for sponge count regarding the timing of count. The recommended timings were before the procedures, before closure of cavity, before wound closure and upon skin closure of end of procedure.

Proper effective communication and consistent application of standardized counting procedures is important. The most important preventive measure is the strict adherence to the protocol of counting all gauzes, sponges and surgical instruments before and after the procedure by at least two personnel in operating room. Surgical sponges and gauze that do not contain radioopaque markers should be avoided. All operation theatres should have a board highlighting the count of all sponges, gauzes and instruments used during that particular procedure at the commencement of procedure and compared at the time of wound closure. The used gauzes and sponges should be hung on a predisignated and labeled stand and counted so that none gets inadvertently discarded. It is the responsibility of operating surgeon and operation theatre staff to ensure the correct count of sponges, gauzes and instruments. If the count is not correct, then through search should be made before closure. Visually or acoustically controlled monitoring before wound closure is recommended to eliminate the "human error" as thoroughly as possible.

CONCLUSION

Retained surgical foreign body is a rare but well known iatrogenic complication of surgery. The frequency of this is more in procedures performed on emergency basis. The diverse spectrum of clinical manifestation range from discharging sinus, abdominal mass, persistent abdominal pain and features of intestinal obstruction. Double sponge count before and after surgical procedure as well as the use of sponge with radioopaque markers are considered as the major pillars of preventive strategy to reduce the rate of this complication. Preventive measures must be taken to prevent this dangerous complication.

REFERENCES

1. Stawicki SP, Evans DC, Cipolla J, Seamon MJ, Lukaszczyk JJ, Prosciak MP et al. Retained surgical foreign bodies: a comprehensive review of risks and preventive strategies. Scand J Surg 2009;98:8-17.
2. Lincourt AE, Harrell A, Cristiano J, Sechrist C, Kercher K, Heniford BT. Retained foreign bodies after surgery. J Surg Res 2007;138:170-174.
3. Wang CF, Cipolla J, Seamon MJ, Lindsey DE, Stawicki SP. Gastrointestinal complications related to retained surgical foreign bodies (RSFB): a concise review. OPUS 12 Scientist 2009;3:11-8.
4. Hadrami J, Rojas M, deFenoyl O, Kharsa G, Marzelle J, Chotard Y et al: Pulmonary textiloma revealed by hemoptysis 12 years after thoracotomy. Rev Med Interne 1998;19:826–9.
5. Roumen RM, Weerdenburg HP: MR features of a 24-year-old gossypiboma. A case report. Acta Radiol 1998;39:176–8.
6. Schonleben K, Strobel A, Schonleben F, Hoffmann A. Retained foreign bodies from the surgical point of view. Chirurg 2007;78:7-12.
7. Sarda AK, Pandey D, Neogi S, Dhir U. Postoperative complications due to a retained surgical sponge. Singapore Med J 2007;48:e160-e4.
8. Bani-Hani KE, Gharaibeh KA, Yaghan RJ. Retained surgical sponges (gossypiboma). Asian J Surg 2005;28:109-15.

9. Mefire AC, Tchounzou R, Guifo ML, Fokou M, Pagbe JJ, Essomba A et al. Retained sponge after abdominal surgery: experience from a third world country. Pan Afr Med J 2009;2(10).
10. Gonzalez –Ojeda A, Rodriguez-Alcantar DA, Arenas-Marquez H, Sanchez Perez-Verdia E, Chaves-Perez R, Alvarez-Quintero R et al. Retained foreign bodies following intra-abdominal surgery. Hepatogastro-enterology 1999;46(26):808-12.
11. Kaiser CW, Friedman S, Spurling KP, Slowick T, Kaisra HA. The retained surgical sponge. Ann Surg 1996;224:79–84.
12. Gawande AA, Studdert DM, Orav EJ, brennan TA, Zinner MJ. Risk factors for retained instruments and sponges after surgery. N Engl J Med 2003;348:229–35.
13. Ahmed G, Rehman SA, Anjum MZ. Retained Sponge after Abdominal Surgery. J Coll Physicians Surg 2003;13(11):640-3.
14. Nizamuddin S. "Gossypiboma" An operative team's dilemma. Pak J Surg 2008;24(3):159-62.
15. Tacyildiz I, Aldemir M: The mistakes of surgeons: "gossypiboma". Acta Chir Belg 2004;104:71–75.
16. Grassi N, Cipolla C, Torcivia A, Bottino A, Fiorentino E, Ficano L et al. Transvisceral migration of retained surgical gauze as a cause of intestinal obstruction: a case report. J Med Case Reports 2008;24; 2:17.
17. Kato K, Suzuki K, Sai S, Murase T, Haruta J. A case of paravesical foreign body granuloma due to surgical sponge retained for 40 years. Hinyokika Kiyo 2000;46(7):491-4.
18. Yildirim S, Tarim A, Nursal TZ, Yildirim T, Caliskan K, Torer N et al. Retained surgical sponge (gossypiboma) after intraabdominal or retroperitoneal surgery: 14 cases treated at a single center. Langenbecks Arch Surg 2006;391:390–5.
19. Wang CF, Stawicki SP, Cook CH, Thomas YM, Whitmill ML, Lindsey DE et al. Proceedings of the Central Surgical Association Annual Meeting, Sarasota, Florida (March 7, 2009).
20. American College of Surgeons. Statement on the prevention of retained foreign bodies after surgery. Bulletin of American college of surgeons 2005;90(10):15.
21. Camazine B. The persistent problem of the retained foreign body. Contemp Surg 2005;61(8):398-400