

Which type of reaction in retained surgical sponge is more dangerous?



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BACKGROUND: Retained surgical sponge is a term to define forgotten surgical sponges during operation. RSS causes two kinds of reactions in the body. The first one is to develop an abscess through exudative inflammatory reaction in early phases and second one is to form a mass through aseptic inflammatory reaction which can stay asymptomatic for months, even for years. In this study we aimed to investigate the time of hospital admission, type of reaction and effect of need for bowel resection on prognosis in patients with retained surgical sponge.

METHODS: In the study, we scanned the files of 18 patients with retained surgical sponge who had been operated at Dicle University Medical Faculty General Surgery Clinic between January 1994 and July 2012, retrospectively.

RESULTS: Need for intestine resection was higher in patients who were operated in the early phase ($p:0.034$). Morbidity and duration of hospital stay were significantly higher (respectively $P:0.02$, $P:0.007$) in patients who had underwent intestine resection.

CONCLUSION: In patients with retained surgical sponge, need for intestine resection is increased due to exudative reaction in the early phase. This increase is giving rise to morbidity rates and prolonged hospital stay.

KEY WORDS: Morbidity, Retained surgical sponge.

Introduction

Retained surgical sponge is a term to define forgotten surgical sponges during operation and it was used for the first time by Wilson at 1884¹. Even though the actual incidence of RSS is unknown, it has been reported

that it is seen in 1/100-1/3000 of all surgical interventions and 1/1000-1/1500 of intra abdominal operations^{2,3}. In the abdomen, omentum and intestines try to surround the RSS. At this stage, RSS causes two kinds of reactions in the body. The first one is to develop an abscess through exudative inflammatory reaction in the early phase⁴⁻⁶. The second one is aseptic fibrous reaction which progresses by forming a capsule or granule around RSS. Most of these cases can stay asymptomatic for months even for years and are found out incidentally⁴⁻⁶. Emergence time of RSS signs and symptoms can range between a couple of days and 40 years, depending on the reaction type in the body, earlier in the exudative type^{4,7}. Symptoms and complications of RSS can mimic various intra abdominal pathologies, so it is difficult to diagnose. The primary complications of

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RSS are perforation of the intestines, peritonitis, adhesion, abscess development, sepsis, and migration to the lumen of gastrointestinal or urinary systems^{8,7}. Radiological imaging techniques, abdominal X-ray, ultrasonography (US), computed tomography (CT), magnetic resonance imaging (MRI) are used in the diagnosis of RSS. Clinical signs and findings of RSS differ according to the intra abdominal location and quantity of bacterial contamination¹. In this study we aimed to investigate the time of hospital admission, type of reaction and effect of need for intestine resection on prognosis in patients with retained surgical sponge.

Materials and Methods

18 patients with retained surgical sponge, who had been operated at Dicle University Medical Faculty General Surgery Clinic between January 1994 and July 2012, were included in the study. Retrospectively, age, gender, previous and second operations, time between two operations, diagnosis and techniques used to diagnose, complaints of patients, duration of hospital stay, if intestine resection or additional operations had been done, morbidity and mortality data is recorded.

Patients are classified in terms of need for intestinal resection to investigate its effect on morbidity. The effect of treatment interval on need of intestinal resection is also studied. Patients operated before 7 months are classified as early admission, others as late admission⁹. In the evaluation of the study results, SPSS (Statistical Package for Social Sciences) Windows 11.5 program was used for statistical analysis. In comparison of the groups, Mann Whitney-U test was used in the analysis of non-para-

metric data, while Chi-square test was used in the analysis of categorical data. P values < 0.05 were accepted to be significant for all variables.

Results

Of the 18 patients included in the study, 11 (61.1%) were females and 7 (38.9%) were males and the average age was 47.3 (25-75) years. 10 of the previous operations (55.5%) were emergent, 8 were elective surgery (44.5%). 10 of the previous operations (55.5%) were carried out in the general surgery clinic, 6 (33.3%) in gynecology and 2 (21.2%) in the urology clinic. All of the second operations were done in the general surgery clinic. 4 of the previous operations were done in our center, while 14 were done at other centers. Mean therapy interval was 21.3 months (10days-84months). 12 of the patients operated for RSS were early admissions, 6 were late. Demographic data of the patients is summarized in Table I. According to the signs and symptoms during admission to the hospital, radiological imaging techniques, abdominal X-ray, US, CT, and MRI are used in the diagnosis of RSS. For patient no. 7 cystoscopy was used to diagnose RSS in bladder, for patient no. 16 colonoscopy was done with suspicions of colon tumor. RSS's were taken out surgically in all patients, and during operation in six patients (33.3%) (Patients no 1, 4, 5, 9, 16, 17) intestine resection was needed. Need of intestine resection was higher in patients operated in early phase compared to patients operated in late phase (p: 0.034). Morbidity was seen in a total of eight patients (44.4%) (patients no 1, 4, 5, 11, 16, 17, 18), surgical site infection in six and evisceration and surgical site

TABLE I - Clinical characteristics of the patients with RSS

Patients		Age	Gender	Previous Operation	Clinical Presentation	Interval
1	Emergency	30	F	Caesarean section	Abdominal abscess	10 days
2	Elective	71	F	Hysterectomy	Pseudotumor	60 months
3	Elective	60	M	Hydatid disease of the liver	Ileus	4 months
4	Emergency	71	F	Laparotomy for intestinal tuberculosis	Ileus	5 months
5	Elective	25	F	Excision of benign ovarian cystic teratoma	Ileus	2 months
6	Emergency	50	M	Perforated duodenal ulcer	Pseudotumor	60 months
7	Elective	75	M	Prostatectomy	Recurrent urinary infection	48 months
8	Elective	68	F	Cholecystectomy	Acute abdomen	7 months
9	Emergency	37	F	Caesarean section	Abdominal abscess	3 months
10	Elective	55	F	Cholecystectomy	Pseudotumor	84months
11	Emergency	45	M	Appendectomy	Pseudotumor	60 months
12	Elective	39	F	Pyelolithotomy	Abdominal abscess	6 months
13	Emergency	25	M	Appendectomy	Acute abdomen	3 months
14	Emergency	47	M	Appendectomy	Ileus	13 months
15	Emergency	40	F	Ileus	Ileus	16 days
16	Elective	42	F	Hysterectomy	Pseudo tm	6 months
17	Emergency	34	M	Appendectomy	Acute abdomen	17 days
18	Emergency	39	F	Caesarean section	Acute abdomen	5 months

TABLE II - The imaging methods, surgical procedures and outcomes of the treatments.

Patients	Imaging methods	Surgical procedure	Morbidity\Mortality	Duration of hospital stay (days)
1	X-RAY, US, CT	Removal and Resection of Ileum+Ileostomy	Evisceration and surgical site infection	38
2	X-RAY, CT	Removal and drainage	dead	3
3	X-RAY, US	Removal and drainage	-	11
4	X-RAY, US	Removal and Resection of leum+Ileostomy	Surgical site infection	11
5	X-RAY, US	Removal and Right hemicolectomy+ileostomy	Evisceration and surgical site infection	15
6	X-RAY, CT	Removal	-	10
7	X-RAY, CT, Cystoscopy	Removal and Cystostomy	-	8
8	X-RAY, US	Removal	-	7
9	US	Removal and Resection of Ileum +appendectomy+tube cecostomy	Surgical site infection	7
10	X-RAY, CT	Removal and Appendectomy	-	4
11	CT,MRI	Removal	Surgical site infection	7
12	X-RAY, US	Removal and drainage	-	7
13	US	Removal	-	6
14	X-RAY, CT	Removal	-	10
15	X-RAY	Removal	-	7
16	X-RAY, CT, Colonoscopy	Removal and small-bowel resection	Surgical site infection	14
17	X-RAY, US	Removal and small-bowel resection	Surgical site infection	11
18	X-RAY, CT	Removal	Surgical site infection	9

infection in two patients. Morbidity was significantly higher in patients who had intestine resection comparing to patients who had not ($P: 0.02$). Due to a preexisting cardiac problem, mortality was seen in one patient (patient n. 2). Mean hospital stay was 10.2 days (3-38). For patients who had intestine resection mean hospital stay was 16 days and this was significantly higher when compared to patients' who didn't have intestine resection (6.6 days) ($p: 0.007$). Diagnostic modalities, second operations, hospital stay morbidity and mortality data are summarized in Table II. Nausea and vomiting, abdominal pain and abdominal distension were the leading causes which brought the patients to the hospital.

Discussion

Acute inflammatory reaction due to RSS causes formation of abscess, internal or external fistula intra abdominally (Fig. 1). This result usually gives rise to early detection and surgical removal. Multiple intestinal fistulas or intraluminal bacterial overgrowth causes malabsorption type syndrome and this syndrome results in abdominal pain, nausea, vomiting, anorexia, and weight loss in patients⁴⁻⁶. The other reaction which RSS causes formation of mass is aseptic fibrous reaction. Due to effect of mass, pseudo tumor syndrome occurs which causes pain and gives the opportunity for diagnose (Fig. 2)⁴⁻⁶. Although there is no specific study investigating the effect of intestine resection on morbidity, it has been shown that intestine resection is effective on morbidity in other abdominal operations^{10,11}. In our study, morbidity in



Fig. 1: The operation appearance of RSS causing abscess and destruction after exudative reaction.

patients who had intestine resection was significantly higher when compared with other group of patients ($P: 0.02$). In this group of patients it has been also seen that hospital stay is significantly longer ($P:0.007$). Another important factor effecting intestine resection in RSS is therapy interval. In our study patients, the need for intestine resection was statistically higher ($P:0.034$) for the ones who had been operated in the early phase, compared to the ones operated in the late phase. The reason for this rise might be the destruction which occurs at intestinal lumen and surrounding tissues due to exudative reaction which is an important factor for early admission. Another important issue due to exudative



Fig. 2: Coronal plan CT imaging of the patient who was admitted with mass as a consequence of fibrous reaction. The mass containing retained surgical sponges with a thick wall around it that has pushed intestinal structures is seen.

reaction in RSS is migration of it from the walls of luminal organs like stomach, duodenum, jejunum, ileum, colon, or bladder to the lumen. Even in some cases it can come out of rectum, bladder or surgical incisions spontaneously^{7, 12}. In our study, migration of RSS in to the bladder was seen in one patient (patient no 7). Apter et al.¹³ and Botet del Castillo et al.¹⁴ reported that after gynecologic procedures gossypibomas are more frequently observed, and that they were followed by upper abdominal operations. In the present study, the previous operations mainly include the procedures in the right lower abdomen. In addition, strikingly high rates of gossypiboma have been reported after appendectomy, cholecystectomy, and gynecologic surgery⁷. The previous operations in the study were gynecologic surgery (in 6 cases, 33.3%), appendectomy (in 4 cases, 22.2%) and cholecystectomy (in 2 cases, 11.1%). If there is not radiopaque marker in surgical sponges it is hard to identify them because they can mimic hematoma, abscess, granulomatous process, cystic masses or neoplasm. RSS might have an atypical calcification and air bubbles as well¹⁵. So there is not a standard radiologic imaging technique to diagnose RSS. We used different imaging techniques according to the age and complaints of patients. In literature, it has been reported that therapy interval between previous operation and diagnosis may range from 1 day to 40 years⁷. For our patients this interval ranged from 10 days to 7 years. The most common clinical symptoms in RSS are pain, palpable mass,

abdominal distension, nausea, vomiting, abscess and fistula formation^{7, 16}. In our study, abdominal pain, abdominal distension, nausea and vomiting (77.7%) were the most frequent symptoms. Possible causatives of surgical sponge retention are emergency surgery, unexpected change in the surgical procedure, disorganization, hurried sponge counts, long operations, unstable patient condition, inexperienced staff, inadequate staff numbers, and patient with high body mass index¹⁷. In our study previous operation of 10 patients (55.5%) had been done emergently. RSS is an avoidable medical issue caused by the personnel. First of all, support personnel in surgery department must be trained periodically. All surgical sponges must be counted twice before surgery, small sponges mustn't be used in abdomen and sponges with radiopaque markers must be used. Before closing the abdomen, surgeon must explore the abdomen very carefully without getting bored and if there is a suspicion, X-ray graphs must be taken during operation.

Conclusion

Exudative reaction presents findings in the early phase due to its aggressive progression. This condition gives a rise in need of intestine resection in patients who admitted early. And this rise results in higher morbidity rates and longer hospital stay.

Riassunto

Può accadere che al termine di un intervento chirurgico possano essere dimenticate sul campo operatorio delle garze (RSS). Questa situazione provoca uno dei due tipi di reazioni locali. La prima è lo sviluppo precoce di un ascesso mediato da una reazione infiammatoria essudativa, e la seconda è la formazione di una massa formata da una reazione infiammatoria asettica che può restare asintomatica per mesi ed anche per anni.

In questo studio si è indagato il rapporto tra data del ricovero ospedaliero, il tipo di reazione e l'effetto prognostico sulla necessaria resezione intestinale in caso di ritenzione di garza chirurgica.

Sono state esaminate retrospettivamente le cartelle cliniche di 18 pazienti con ritenzione di garze chirurgiche operati presso la Dicle University Medical Faculty General Surgery Clinic tra gennaio 1994 e luglio 2012. La necessità di procedure ad una resezione intestinale è risultata più elevata nei pazienti operati precocemente (P: 0.034). La morbidità e la durata della degenza ospedaliera è risultata più elevata (rispettivamente P:0.02, P: 0.007) nei pazienti sottoposti a resezione intestinale. In conclusione la necessità di procedere a resezione intestinale è accresciuta nella prima fase quando si verifica una reazione essudativa, con accresciuta incidenza di complicazioni ed una più prolungata degenza operatoria.

References

1. Hyslop JW, Maull KI: *Natural history of the retained surgical sponge*. South Med J, 1982; 75:657-60.
2. Gawande AA, Studdert DM, Orav EJ, Brennan TA and Zinner MJ: *Risk factors for retained instruments and sponges after surgery*. N Engl J Med, 2003; 348:229-35.
3. Dux M, Ganten M, Lubienski A and Grenacher L: *Retained surgical sponge with migration into the duodenum and persistent duodenal fistula*. Eur Radiol, 2002; 12:74-77.
4. Gibbs VC, Coakley FD, Reines HD: *Preventable errors in the operating room: Retained foreign bodies after surgery. Part I*. Curr Probl Surg, 2007; 44:281-337.
5. Cruz RJ, Poli de Figueiredo LF, Guerra L: *Intracolonic obstruction induced by a retained surgical sponge after trauma laparotomy*. J Trauma, 2003; 55:989-91.
6. Akbulut S, Arikanoglu Z, Yagmur Y, Basbug M: *Gossypibomas mimicking a splenic hydatid cyst and ileal tumor: A case report and literature review*. 2011; 15:2101-107.
7. Yildirim S, Tarim A, Nursal TZ, et al.: *Retained surgical sponge (gossypiboma) after intraabdominal or retroperitoneal surgery: 14 cases treated at a single center*. Langenbecks Arch Surg, 2006; 391:390-95.
8. Erdil A, Kilciler G, Ates Y, Tuzun A, Gulsen M, Karaeren N, et al.: *Transgastric migration of retained intraabdominal surgical sponge: Gossypiboma in the bulbus*. Intern Med, 2008; 47:613-15.
9. Gümüş M, Gümüş H, Kapan M, Onder A, Tekbas G, Baç B: *A serious medicolegal problem after surgery: gossypiboma*. Am J Forensic Med Pathol, 2012; 33:54-57.
10. Kulah B, Kulacoglu IH, Oruc MT, Duzgun AP, Moran M, Ozmen MM, Coskun F: *Presentation and outcome of incarcerated external hernias in adults*. Am J Surg, 2001; 181:101-04.
11. Rai S, Chandra SS, Smile SR: *A study of the risk of strangulation and obstruction in groin hernias*. ANZ Surg, 1998; 68: 650-54.
12. Ozyer U, Boyvat F: *Imaging of a retained laparotomy towel that migrated into the colon lumen*. Indian J Radiol Imaging, 2009; 19: 219-21.
13. Apter S, Hertz M, Rubinstein ZJ, et al.: *Gossypiboma in the early postoperative period: A diagnostic problem*. Clin Radiol, 1990; 42: 128-29.
14. Botet del Castillo FX, Lopez S, Reyes G, et al.: *Diagnosis of retained abdominal gauze swabs*. Br J Surg, 1995; 82:227-28.
15. Kopka L, Fischer U, Gross AJ, Funke M, Oestmann JW, Grabbe E: *CT of retained surgical sponges (textilomas): Pitfalls in detection and evaluation*. J Comput Assist Tomogr, 1996; 20: 919-23.
16. Lauwers PR: *Hee RHV Intraperitoneal gossypiboma: The need to count sponges*. World J Surg, 2000; 24: 521-27.
17. Rajagopal A, Martin J: *Gossypiboma "a surgeon's legacy": Report of a case and review of the literature*. Dis Colon Rectum, 2002; 45: 119-20.