Case Report

Transmural migration of retained surgical sponges into the bowel after caesarian section: case series and literature review

Suliman H Suliman, FRCS[*], Omer El Faroug H Salim, FRCS[*], Abderrahim A Dabora, MD[*], Shakir Z Ibrahim-Elimam, FRCS[*], Abel-Mutalab Imam, MD[**], Nagwa A Dongola, MD, FRCR[***]

Department of Surgery[*], Department of Obstetrics & Gynaecology[**], Department of Radiology[***], Soba University Hospital and University of Khartoum, Khartoum, Sudan.

ألأطروحة: .انتقال الشاشة الجراحية المتبقية بتجويف البطن الى داخل الأمعاء

سليمان حسين سليمان1 (زمالة كلية الجراحين الملكية, بروفيسور مشارك فى الجراحة), عمر الفاروق سالم حافظ2 (زمالة كلية الجراحين الملكية, بروفيسور مساعد فى الجراحة), عبدالرحيم دبورة3 (دكتوراه الجراحة, الخرطوم), عبدالمنطلب امام4 (دكتوراه النساء والتوليد, الخرطوم), نجوى على دنقلا5 (زمالة كلية أخسائى الأشعة الملكية, بروفيسور مشارك فى الأشعة), شاكر زين العابدين ابراهيم الامام6 (زمالة كلية الجراحين الملكية, بروفيسور الحراحة).
1,2,3,6 قسم الجراحة, 4 قسم النساء والتوليد, 5 قسم الأشعة, كلية الطب, جامعة الخرطوم

ملخص الأطروحة:
ان الشاشة المتبقية سهوا بعد العمليات الجراحية حدث نادر قد تنتج عنه مضاعفات وتداعيات خطيرة. انتقال الشاشة الجراحية المتبقية من تجويف البطن الى داخل الأمعاء أمر نادر للغاية. أثبتت التجارب العلمية أن هذا الأمر يحدث على أربع مراحل. نقدم فى هذه الأطروحة 3 حالات ولادة قيصرية حدثت لهن هذه المضاعفة ألنادرة حيث وجدت الشاشة المتبقية سهوا بعد العملية فى مراحل مختلفة من الانتقال من تجويف البطن الى داخل الأمعاء. فى كل هذه الحالات أزيلت الشاشة بواسطة عملية جراحية. فى هذا الصدد نتج البحث عن الحالات المماثلة فى الدوريات العلمية العالمية عبر باحث المكتبة الوطنية لمجلس النواب الأمريكى (PubMed) عن 13 حالة فقط بعد العمليات القيصرية. هذه الأطروحة تضيف 3 حالات لهذه المضاعفة النادرة.

Abstract
A retained surgical sponge (RSS) is a rare event associated with serious complications and consequences. Transmural migration is an uncommon presentation of (RSS) after abdominal operations. Experimentally, the pathological progression of RSS from the peritoneal cavity into the bowel lumen passes through 4 phases. We report three female cases with RSS after emergency cesarean section (CS) with various phases of transmural migration into the bowel lumen. In all patients the sponge had to be removed by laparotomy. A systematic search of PubMed revealed 13 cases of transmural migration of RSS into the bowel after CS. Our series add 3 more cases.

Keywords: retained surgical sponge, retained surgical gauze, gossypiboma, textiloma, internal fistula, transmural migration, caesarian section.

Corresponding author
Shakir Z Ibrahim-Elimam,
Department of Surgery, Faculty of Medicine, University of Khartoum, PO Box 102, Khartoum 11111, Sudan.
Fax:+249-15511802.
Tel: +249-912390539
Email: shakirelimama@yahoo.co.uk

Introduction

Retained surgical sponge (RSS) is an infrequent event that can be associated with increased morbidity and mortality, added cost, and medical litigation[(1)]. Although risk factors have been defined[(2,3,4,5)] , yet the complication still occurs. The incidence is estimated to be 1/1000 to 1/5000[(2,5-8)]. In a systematic review covering the period 1960-2007, Zantvoord et al found 64 cases of transmural migration of RSS[(9)]. Migration occurred into almost all hollow organs and cavities. However, the commonest target organ for migration of RSS after abdominal operations was the ileum and the commonest associated operations were gynecological in nature. This communication shall add 3 more cases to what is in the literature.

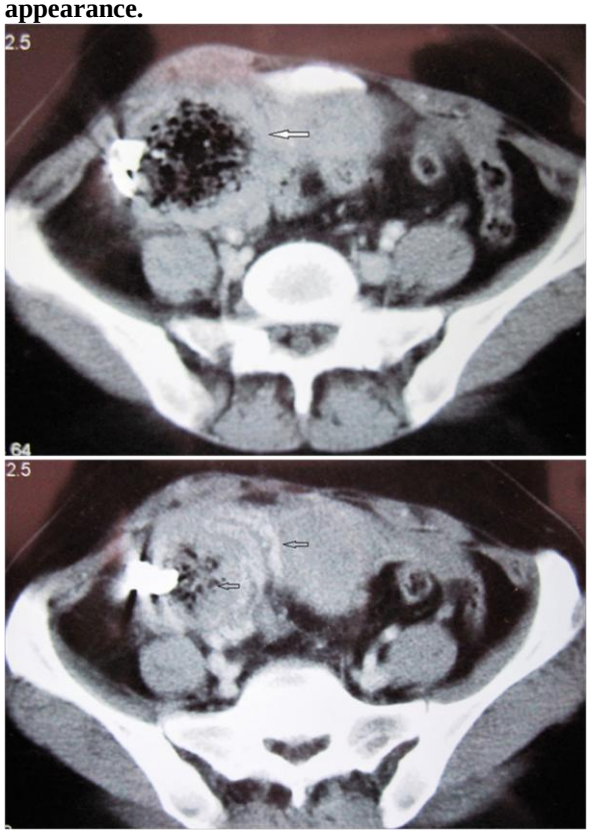
Case series

Between the first of January 2008 and the 31st of January 2013 six cases of RSS after emergency CS were treated in the Department of Surgery, Soba University Hospital, Khartoum, Sudan. In three of these cases the sponge was found to have undergone three different forms of migration into the ileum. The patient's ages ranged between 24 to 32 years. All cases had early postoperative features of abdominal infection which responded to conservative treatment and antibiotics. They were discharged well from hospital within 14 days. One patient had her CS at our hospital which is a tertiary referral center. Of the other 2 patients, one had her CS in a peripheral hospital and the other in a rural hospital. The duration between their index CS and discovery RSS ranged from 5 months to 2 years.

Case 1

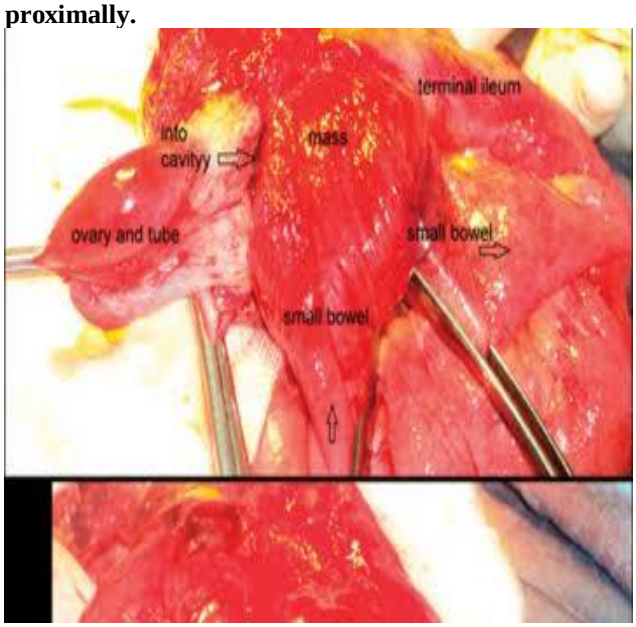
The first case, a 24 years old female, presented 5 months after CS with recurrent abdominal pain, vomiting, fever and marked weight loss. She had a tender mass in the right iliac fossa. Abdominal ultrasound showed a complex bowel mass with an acoustic shadow. CT scan of the abdomen was diagnostic of RSS (Fig 1).

Fig 1:
Top: CT scan of the abdomen with oral contrast of the second patient showing a right iliac fossa well defined mass with an enhanced wall and the central spongiform appearance due to gas bubbles.
Bottom: CT scan of the abdomen in another cut showing the gas bubbles and the whorled appearance.



At operation she was found to have a thick walled cystic mass inseparable from the caecum and terminal ileum, with adherent right ovary and fallopian tube (Fig 2 top).

Fig 2:
Top: intraoperative view of the anatomical landmarks of the mass.
Bottom: intraoperative view of the opened cavity. The cavity was drained, and the intact sponge is being teased out of the cavity, ileum, and coecum. There was a fistulous communication between the cavity and the coecum distally and to the ileal loop proximally.

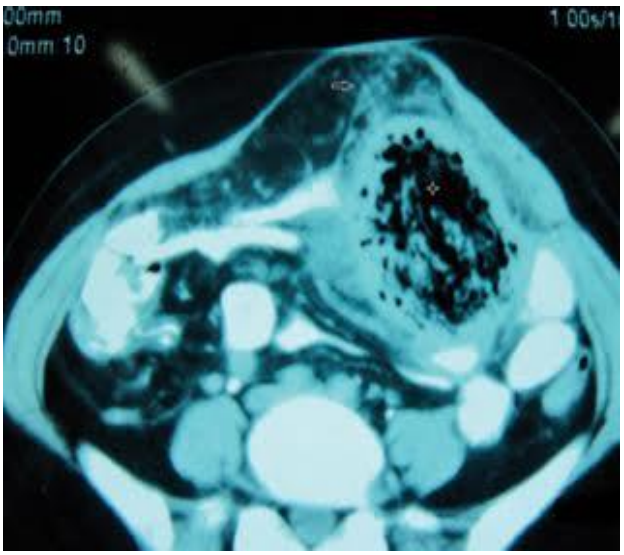


The mass cavity contained thick pus, feculent material and part of a 30x20 cm surgical sponge. It migrated into a terminal ileal loop proximally, and the coecum and ascending colon distally. The sponge was removed (Fig 2 bottom) and a limited right hemicolectomy with drainage of the area was performed. The patient was discharged well on the 8th postoperative day.

Case 2

A 30 years old female presented two years after CS with intermittent vague abdominal pain and persistent fever, weight loss, and a left-sided abdominal mass. Abdominal ultrasound showed a vague complex bowel mass with strong acoustic shadow. CT scan of the abdomen revealed a rounded thick walled mass with multiple air bubbles and irregular opacities suggestive of RSS. Part of the sponge was seen in the adjacent bowel loop (Fig 3).

Figure 3:
CT scan of the abdomen shows a left sided well defined mass (star) with enhanced thick wall, gas bubbles, and obvious opaque irregular material which is the sponge. Part of the sponge has migrated into the bowel lumen (arrow). At operation one month later the cavity has collapsed into a bowel inflammatory mass, and the sponge has migrated completely into the distal bowel lumen within the mass, with a residual ileo-ileal fistula.



Exploratory laparotomy was performed 6 weeks after the CT scan revealed a fibrous inflammatory mass involving the small bowel and omentum. Resection anastomosis was performed. The opened surgical specimen revealed a fistula between the afferent and efferent loops to the mass. A 30X20 cm surgical sponge was found in the distal small bowel lumen within the mass indicating migration during the period between the CT scan and the laparotomy. The post-operative course was uneventful and the patient was discharged home five days later.

Case 3

A 32 years old female was presented 10 months after CS with nine months pregnancy and features of small bowel obstruction. On the same day, she went into labor pains and was delivered vaginally. Abdominal X-rays revealed features of small bowel obstruction. At laparotomy, a mass of omentum and ileum was found adherent to the anterior abdominal wall near the umbilicus. The bowel distal to the mass was distended down to 50 cm proximal to the ileocaecal valve where an intra-luminal, thick, wormlike structured was found. The mass was resected with end to end anastomosis. A small enterotomy performed over the wormlike structured, revealed an elongated 30X20 cm abdominal sponge which was removed and the enterotomy closed. Inspection of the resected mass did not reveal any fistulous communication between loops of small bowel. She had a very stormy post-operative course in the form of pulmonary embolism despite prophylactic heparin, heparin induced thrombocytopenia, lower gastrointestinal tract bleeding, subphrenic abscess and pyothorax. All were treated successfully and the patient was discharged after 8 weeks.

Discussion

Retained surgical sponge after CS is rare. We could retrieve only 25 cases of RSS after CS reported since 1989. Out of these cases only 13 migrations of RSS into the bowel

lumen were reported[9-21]. Seven of these migrations were into the ileum (Table 1).

Table 1: reported cases of transmural migration of RSS into the bowel after cesarean section (N=13 cases + 3 in the present series).

Source, year[ref]	Presentation	Transmural migration into bowel
Alsalem, 1989[10]	Intestinal obstruction	Jejunum
Gupta, 1997[11]	Simulating intestinal tuberculosis	Jejunum
Manabe, 1997[12]	diarrhea	Sigmoid colon. ultimately passed per- rectum
Wig, 1997[13]	Intestinal obstruction	Ileum.
Silva, 2001[14]	Intestinal obstruction by sponge	Ileum. No fistula
Rajagopal , 2002[15]	Partial obstruction by sponge	Ileo-ileal fistula
Al Thubaity,, 2005[16]	Obstruction by sponge with gangrene	ileum
Choi, 2006[17]	Abdominal pain, mass	Colon. Per-rectal passage
Zantvoord ,2008[9]	Tiredness, diarrhea, iron deficiency anemia	Probably sigmoid. Per-rectal passage
Tandon, 2009[18]	Intestinal obstruction	Simultaneously in jejunum and transverse colon
Patil, 2010[19]	Intestinal obstruction	Ileum. No fistula
Govarjin, 2010[20]	Intestinal obstruction,	Ileum. Cutaneous and ileocoecal fistula
Sumer, 2010[21]	Abdominal pain, abdominal mass	Ileum. Fistula between ileum, coecum and ascending colon
Present series: 3 cases Case 1	Recurrent abdominal pain, vomiting, Fever, weight loss, and abdominal mass.	Simultaneously in ileum, coecum and ascending colon.
Case 2	Abdominal pain, fever, weight loss, and abdominal mass.	Complete migration into ileum with ileo-ileal fistula.
Case 3	Intestinal obstruction by sponge	Complete migration into ileum without a fistula

The clinical presentation of RSS depend on the degree of bacterial contamination at the time of surgery. Symptoms of RSS may appear early in the post operative period, or years later[2,22]. Early presentation is similar to that of intra-abdominal infection[2,7], a feature shared by all our patients, who responded to conservative treatment. One of them presented acutely with intestinal obstruction a frequent complication of RSS[8,10,14,18,19,23-28]. In this case the obstruction was caused by the sponge after complete migration into the ileum without a breach in the continuity of the intestinal wall, a reported unique presentation[14,25,26,27,28]. Abdominal pain, and a palpable abdominal mass, a common presentation of RSS[2,23,29], was encountered in the other two patients. Both of them had, persistent fever with marked weight loss, a rare manifestation of RSS[30,31].

All our patients were treated surgically. Different forms of transmural migration into the ileum were found in these patients. They presented 5, 10 and 23 months after their CS. Peritoneo-ileal migration of RSS following gynecological operations has been reported to occur within a period as short as 4 months[14], and as long as 31 years[2].

Pathologically two reactions to the sponge have been described. One is an early exudative type with bacterial infection and abscess formation[2,7]. The other is an aseptic reaction induced by the foreign body resulting in fibrous tissue encapsulation of a RASS[32]. It is the former reaction that is commonly associated with transmural migration. It has been suggested that bacterial infection and abscess formation is followed by intestinal perforation with initiation of sponge migration into the lumen of the bowel[25]. This is most likely the phase when internal fistulation is a dominant feature[18,33-35]. Two of our patients were in this phase during their operations. In case 1, the sponge was inside the abscess cavity and both ileum and the coecum. In case 2, the cavity has collapsed after migration of the sponge distally within the inflammatory mass, but there was a fistula between the

afferent and efferent loops to the site.

In a study on Wister rats, Wattanasirichaigoon demonstrated four stages in the process of transmural migration[36]. These are: foreign body reaction, secondary infection, mass formation during which the sponge migrates into the lumen, and finally remodeling when the sponge has moved completely into the lumen. The three cases in this communication support to some degree this experimental study, and Dhillon and Parks postulation[25]. Each one of our cases represented a different phase of migration, from erosion into the bowel lumen, to distal migration with residual fistula, to complete migration with closure of the fistula. Once the sponge migrates completely into the bowel lumen, it has been shown that it may cause intestinal obstruction[14,26-28], as in our case, or it may pass spontaneously through the rectum[8,9,17,37-39].

The time lapse to migration is variable. Reports have shown that an abdominal RSS can remain dormant for years and then undergoes transmural migration[2,40,41]. It seems that this process involves reactivation of the infective inflammatory process thus initiating the migration. In support of this is the discovery of pus around the sponge in cystic lesions discovered and treated years after the index operation[42,43].

In conclusion, this study reports three cases of transmural migration of RSS into the ileum after CS. Three different phases of migration were encountered. Infection probably plays an important role in this process. These cases had significant morbidity and had to undergo surgery to remove the sponges. We stress the importance of using radio-opaque lined gauze in all cavity operations and vigilant adherence to sponges and instruments count in all surgical procedures.

References

1. Kaiser CW, Friedman S, Spurling KP, Slowick T, Kaiser HA. The retained surgical sponge. Ann Surg 1996;224(1):78-84.
2. Hyslop JW, Maull KI. Natural history of the retained surgical sponge. South Med J 1982;75:657-60.
3. Gawande AA, Studdert DM, Orav EJ, Brennan TA, Zinner MJ. Risk factors for retained instruments and sponges after surgery. N Engl J Med 2003;348:3-229-35.
4. Mcleod RS, Bohnen JMA. Canadian Association of Surgeons, Evidence based reviews in surgery: 9 risk factors for retained foreign bodies after surgery. Can J Surg 2004;47(1):57-9.
5. Cima RR, Kollengode A, Garnatz J, Storsveen A, Weisbrod C, Deschamps C.Incidence and characteristics of potential and actual retained foreign object events in surgical patients. J Am Coll Surg 2008;207:80-7.
6. Rappaport W, Haynes K. The retained surgical sponge following intra-abdominal surgery. Arch Surg 2006;125:405-7.
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. Langenbeck Arch Surg 2006;391:390-5.
8. Bani-Hani KE, Gharaibeh KA, Yaghan RJ. Retained surgical sponges (gossypiboma). Asian J Surg 2005;28(2):109-15.
9. Zantvoord Y, van der Welden RMF, van Hoof MHA. Transmural migration of retained surgical sponges: a systematic review. Obstet Gynecol Surv 2008;63(7):465-71.
10. al-Salem AH, Khawaia S. Intestinal obstruction due to retained, eroding surgical sponge. Case report. Acta Chir Scand 1989;155(3):199-200.
11. Gupta MM, Bandlish MK, Kumar A, Gupta R, Aahi KS. Retained surgical

sponge simulating intestinal tuberculosis. Indian J Gastroenterol 1997;16(2):68-9.
12. Manabe T, Goto H, Mizuno S, Kanematsu M, Hoshi H. A case of retained surgical sponge penetrated into the sigmoid colon. Nihon Igaku Hoshasen Zasshi 1997;57(5): 279-80.
13. Wig JD, Goenka MK, Suri S, Sudhakar PJ, Vaiphei K. Retained surgical sponge: an unusual cause of intestinal obstruction. J Clin Gastroenterol 1997;24(1):57-8.
14. Silva CS, Caetano MR, Silva EA, Falco L, Murta EF. Complete migration of retained surgical sponge into the ileum without sign of open intestinal wall. Arch Gynecol Obstet 2001;265(2):103-4.
15. Rajagopal A, Martin J. Gossypiboma "a surgeon's legacy": report of a case and review of the literature. Dis Colon Rectum 2002;45(1):119-20.
16. Al Thubaity FK. Intestinal obstruction due to retained eroding surgical sponge: a case report. Journal of King Abdulaziz University: Med Sci 2005,12:127-32.
17. Choi JW, Lee CH, Kim KA, Park CM, Kim JY. Transmural migration of surgical sponge evacuated by defecation: mimicking an intraperitoneal gossypiboma. Korean J Radiol 2006;7(3):212-4.
18. Tandon A, Bhargava SK, Gupta A, Bhatt S. Spontaneous transmural migration of retained surgical textile into both small and large bowel: a rare cause of intestinal obstructrion. Br J Radio 2009;82(976):72-5.
19. Patil KK, Patil SK, Gorad KP, Panchal AH, Arora SS, Gautam RP. Intraluminal migration of surgical sponge: gossypiboma. Saudi J Gastroenterol 2010;16(3):221-2.
20. Govarjin HM, Talebianfar M, Fattahi F, Akbari ME. Testiloma, migration of retained long gauze from abdominal cavity to intestine. J Res Med Sci 2010;15(1): 54-7.
21. Sumer A, Carparlar MA, Uslukava O, Bayrak V, Kotan C, Kemlik O, Iliklerden U. Gossypiboma: retained surgical sponge after a gynecologic procedure. Case Report Med 2010;2010:917626.
22. Wells HA Jr, Hyun BH, Mitchell RE Jr. A retained surgical sponge with interesting sequelae. Am J Med 1963;335:423-6.
23. Mefire AC, Tchounzou R, Guifo ML, et al. Retained sponge after abdominal surgery: experience from a third world country. Pan Afr Med J 2009;5:2-10.
24. Gokalp A, Sanal I, Maralcan G, Aybasti N, Erkol H. Strangulated intestinal obstruction due to forgotten eroding laparotomy pad. Acta Chir Hung 1995-1996;35(3-4):271-6.
25. Dhillon JS, Park A. transmural migration of a retained laparotomy sponge. Am Surg 2002;68(7):603-5.
26. Kalliakmanis V, Pikoulis E, Hitos A, Karavokvros IG, Gougoudi E, Leppaniemi A. A retained foreign body in the peritoneal cavity causing intestinal obstruction by intramural migration. Zentralalbl Chir 2007;132(1):70-2.
27. Grassi N, Cipolla C, Torcivia A, et al. Trans-visceral migration of retained surgical gauze as a cause of intestinal obstruction: a case report. Journal of Medical Case Reports. 2008;2:17 doi:10.1186/1752-1947-2-17.
28. Ogundiram T, Avandipo O, Adeniji-Sofoluwe A, Ogun G, Ovewole O, Ademola A. Gossypilboma: complete transmural migration of retained surgical sponge causing small bowel obstruction. BMJ Case Rep 2011;2011:Pii bcr0420114073
29. Botet del Costillo FX, Lopez S, Reyes G, et al. Diagnosis of retained abdominal gauze swabs. Br J Surg 1995;82(2):227-8.

30. Lauwers PR, Van Hee RH. Intraperitoneal gossypiboma: the need to count sponges. World J Surg 2000;24(5):521-7.
31. Lourenco SC, Baptista A, Pacheco H, Malhado J. A misplaced surgical towel-a rare cause of fever of unknown origin. Eur J Intern Med 2008;19(5):377-8.
32. Sturdy JH, Baird RM, Gerein AN. Surgical sponges: a cause of granuloma and adhesion formation. Annals of Surgery 1967;165(1):128-34.
33. Gencosmanoglu R, Inceoglu R. An unusual cause of small bowel obstruction: gossypiboma-case report. BMC Surg 2003;8:3-6.
34. Sarda AK, Pandey D, Neogi S, Dhir U. Postoperative complications due to a retained surgical sponge. Singapore Med J 2007;48(6):160-4.
35. Kansakar R, Thapa P, Adhikari S. Intraluminal migration of gossypiboma without intestinal obstruction for fourteen years. JNMA J Nepal Med Assoc 2008;47(171):136-8.
36. Wattanasirichaigoon S. Transmural migration of a retained surgical sponge into the intestinal lumen: an experimental study. J Med Assoc Thai 1996;79(7):415-22.
37. Glockmann K, Frohlich H, Bernhards J, Buttner D. Peranal passage of a surgical sponge: fortunate outcome of an intraoperative oversight. Chirurg 2005;76(6):595-8.
38. Godara R, Marwah S, Karwasra RK, Goel R, Sen J, Singh R. Spontaneous migration of surgical sponges. Asian J Surg 2006;29(1):44-5.
39. Horvat JV, Machado RC, Vandesteen L, Moll RS, Oliviera GA. Intussusception following transmural migration and defecation of a surgical sponge. Clin Radiol 2009;64(12):1231-4.
40. Sinha SK, Gupta S, Behra A, et al. Retained surgical sponge: an unusual case of malabsorption. Trop Gastroenterol 1999;20(1):42-4.
41. Yeung KW, Chang MS, Huang JE. Imaging of transmural migration of a retained surgical sponge: a case report.Kaohsiung J Med Sci 2004;20(11):567-71.
42. Moslemi MK, Abedinzadeh M. Retained intraabdominal gossypiboma, five years after bilateral orchiopexy. Case Report Med 2010;2012:420357.
43. Lata I, Kapoor D, Sahu S. Gossypiboma, a rare cause of acute abdomen: a case report and review of the literature. Int J Crit Illn Inj Sci 2011;1(2):157-60.