

Intra-abdominal Retained Surgical Gauze in Two Dogs

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Abstract : This report describes the retained surgical gauze in two dogs that had ovariohysterectomy previously. The elapsed time between surgery and diagnosis of retained surgical gauze in two dogs was 30 and 16 months, respectively. Radiographic signs included localized abdominal mass (case 1, 2) and soft tissue swelling (case 2). Retained surgical gauze was imaged by survey radiography, ultrasonography and computed tomography (CT). Ultrasonography revealed a hypoechoic mass with irregular hyperechoic center in case 1, and hypoechoic mass with oval hyperechoic center and acoustic shadowing in case 2. In CT examination of case 2, hyperdense mass with a thick peripheral rim enhancing in contrast study was shown. Cytologic examination of both cases revealed abscess and granuloma respectively. The lesions were surgically removed. The possibility of retained surgical gauze should be considered in animals with a history of previous surgery with abnormal mass.

Key words : complications, CT, dog, retained surgical gauze, ultrasonography.

Introduction

Retained postoperative foreign bodies include suture material, needles, surgical instruments, starch powder from gloves, fragments of lint from towel, and gauze sponge (5,11,12). Although retained foreign body is not rare, it is seldom reported due to medicolegal implications (1,12,15). In humans, incidence of retained surgical foreign bodies has appeared in the literature (1,14,17). Especially, retained surgical gauze is recognized easily in humans because most contain radiopaque marker (1,11,12,20). The use of radiopaque gauze is not as common in veterinary medicine and, as a result, the diagnosis can be very difficult (11). Diagnostic tools for retained surgical gauze are survey radiography, ultrasonography, sinography, computed tomography (CT), magnetic resonance (MR) imaging and cytology of fine needle aspiration showing the granulomatous lesion (11,12,15,17).

This report describes the radiographic findings in two dogs with retained surgical gauze and discusses the relation between history, clinical signs, ultrasonography and CT characteristics.

Case reports

Case 1

A 12-year-old, spayed female Maltese had history of depression, anorexia and abdominal distension for 4 days. The dog had taken ovariohysterectomy (OHE) for the treat-

ment of pyometra 2.5 years prior to admission. Abdominal tenderness and round mass of about 4 cm diameter was palpated in the mid-abdomen. Hematologic and serum biochemical findings were within reference range.

Survey radiographic signs of abdomen included localized, round mass of soft tissue opacity in the left ventral abdomen (Fig 1). An abdominal ultrasound was performed using a 7.5 MHz transducer Medison. A round shaped hypoechoic mass (2.8 cm long × 3.4 cm wide) with irregular hyperechoic center was found in the middle of abdomen (Fig 2). This mass was well circumscribed and no acoustic shadowing.

A fine needle aspirate of the mass was obtained under ultrasonographic guidance. The specimens consisted almost exclusively of a homogeneous population of degenerative leukocytes. A tentative diagnosis of abdominal abscess was made based on the clinical signs, radiographic and ultrasonographic identification of a solitary abdominal mass and cytologic examination.

An exploratory laparotomy was performed. The mass was well-encapsulated within the mesentery near the intestinal loop and was removed. Surgical gauze was easily seen within the mass. The final diagnosis was intra-abdominal abscess secondary by retained surgical gauze during the OHE of 30 months ago. The patient recovered uneventfully with routine postoperative antibiotic therapy.

Case 2

A 10-year-old, spayed female Yorkshire-Terrier presented with progressive abdominal distension, abdominal tenderness, depression, anorexia and swelling of left rump and hind limb. Rectal temperature was 40.3°C. The whole blood analysis showed a mild leukocytosis (17280/ul) with neutrophil predomi-

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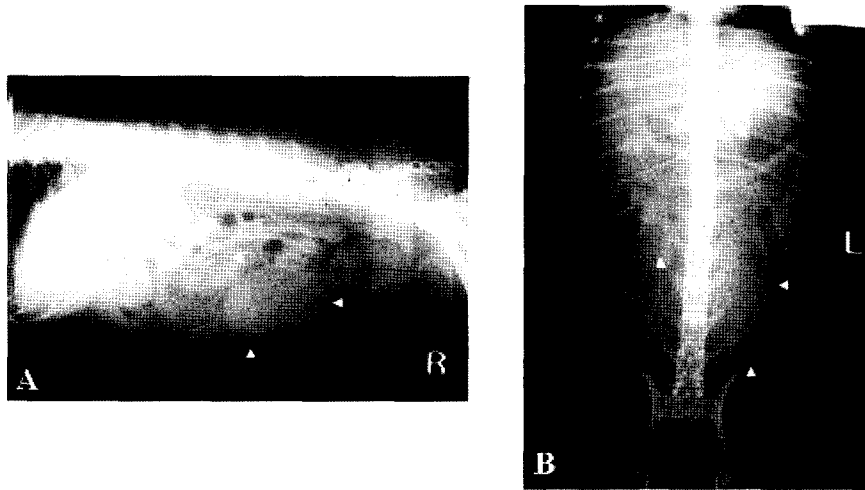


Fig 1. Radiographic appearance of retained surgical gauze in case 1. Lateral (A) and ventrodorsal (B) radiographs in which a focal, well-circumscribed mass with soft tissue opacity was visible in the ventral part of the abdomen. The margin was described by arrowhead.

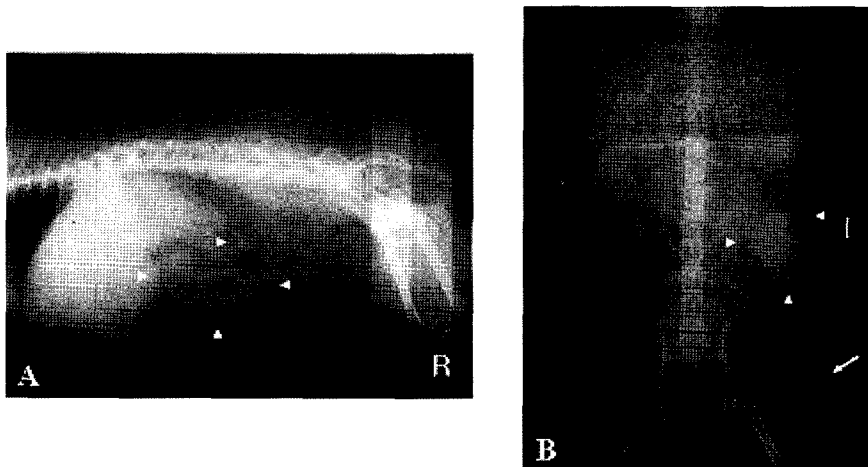


Fig 3. Survey radiography of retained surgical gauze in case 2. Lateral (A) and ventrodorsal (B) radiographs in which a localized and irregular mass with soft tissue opacity was visible in the left abdomen. Swelling of the left rump was shown (arrow).



Fig 2. Ultrasonographic appearance of retained surgical gauze in case 1. A round marked hypoechoic mass containing irregular hyperechoic center was shown.

nance. The serum creatine kinase and alkaline phosphatase values were 400 IU/L and 848 IU/L, respectively. Other biochemical parameters were within normal limits.

Survey radiographic signs of abdomen included localized and irregular mass of soft tissue opacity in the left abdomen and swelling of the left rump (Fig 3).

Abdominal ultrasound examination was performed. A well-defined oval abdominal mass (3.2 cm long × 2.0 cm wide) was identified at the caudal region of the left kidney. The hypoechoic mass included oval shaped hyperechoic center. A strong acoustic shadow was present deep to the mass (Fig 4). The mass could not be related to a specific abdominal organ even though the left kidney seemed to be in close relation with in on some images.

An abdominal CT (CTmax® GE, USA) in transverse plane using soft tissue window (window 400, level 40) was performed with a thickness of 1 mm (with an absence of interslice gap). Non-enhanced CT revealed a well-encapsulated mass in the

lateral to the left kidney. No gas or calcification was shown. Hyperdense lesion was also seen at the left rump muscle. Following an intravenous contrast injection at a dose of 2 ml/kg (Omnipaque® 300 mg I/ml), there was marked peripheral enhancement of the mass (Fig 5). Sagittal reformation of enhanced CT supported the invasion or pressure of the abdominal

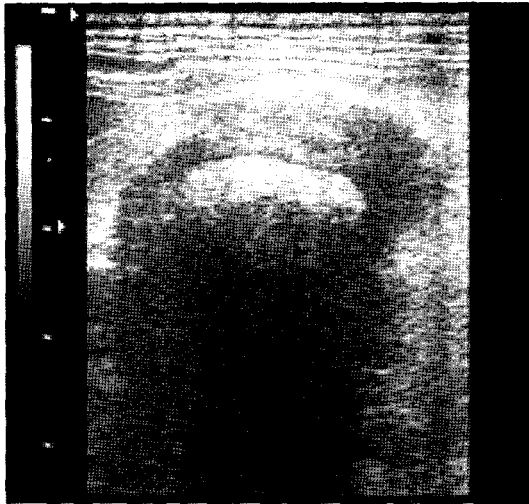


Fig 4. Ultrasonographic appearance of the abdominal granuloma in case 2. An oval marked hypoechoic mass containing hyper-echoic center was shown. A strong acoustic shadow was present deep to the mass.

mass to the left kidney. Reformatted 3D image of kidney revealed an indentation of caudal portion in the left kidney.

A fine needle aspirate of the mass was obtained under ultrasonographic guidance. The specimens consisted of a cluster of macrophages, neutrophils and occasional small lymphocytes. On several specimens, numerous large clusters of medium sized round to oval cells were seen (Fig 6). A tentative diagnosis of abdominal granuloma was made based on the clinical signs, radiography, sonography, CT and cytologic examination. An exploratory laparotomy was performed. The well-encapsulated mass that was adherent to the mesenteric root, left adrenal gland, left kidney was found at the left peritoneal cavity. The mass was removed. On gross examination, a piece of surgical gauze was found at the center of thick-wall granulomatous lesion (Fig 7). Cytologic examination of the left hind limb revealed lots of degenerative leukocytes and macrophages. Left hind limb was treated by lavage and drainage. The final diagnosis was granuloma resulted from the retained surgical gauze during the OHE performed 16 months ago. The patient was not recovered even though antibiotics and conservative treatment. Six days after surgery, the patient was died.

Discussion

The most common foreign body after surgery is the laparotomy sponge that has radiopaque markers, which are readily visible on plain radiographs (3,20). The incidence of retained surgical sponge (also known as gossypiboma, textiloma and

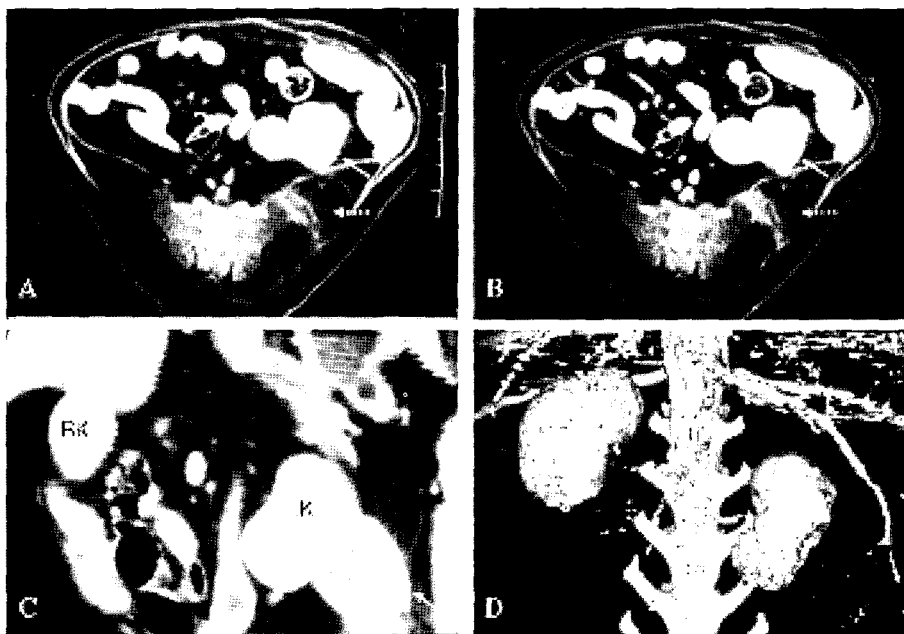


Fig 5. Pre-contrast (A) and post-contrast (B) transverse CT images at the level of the 3th lumbar vertebra in case 2. Note the hyperdense pararenal mass with a thick peripheral rim that showed a marked rim enhancement after contrast agent infusion (arrow). No gas or calcification was shown. Hyperdense lesion was seen at the left rump muscle (dotted arrow). The sagittal reformatted CT images, the invasion or pressure of the abdominal mass to left kidney is identified (C). Reformatted 3-D image of kidney revealed pressure of caudal portion in the left kidney (D).

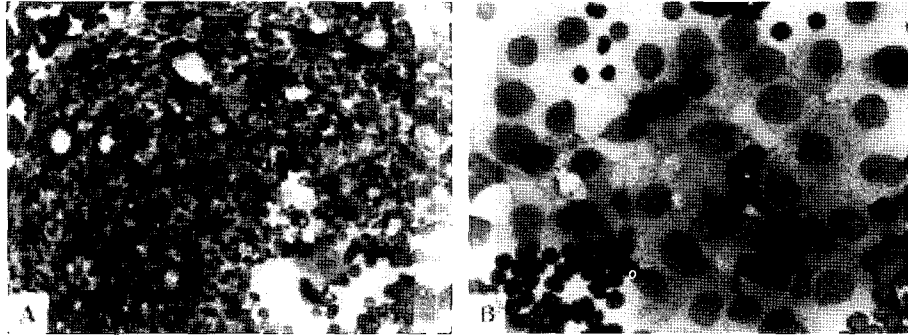


Fig 6. Fine needle aspirate from the intra-abdominal mass in case 2. (A), The inflammatory population consisted of a cluster of macrophages, neutrophils and occasional small lymphocytes (Diff-Quick stain; x200). (B), Numerous large clusters of medium sized round to oval cells were seen (Diff-Quick stain; x 1000).

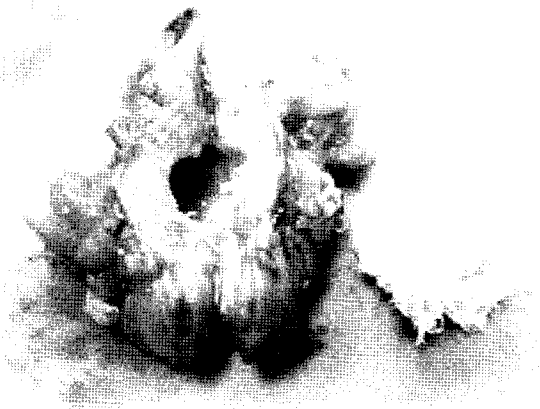


Fig 7. A piece of surgical gauze was enclosed in the thick-wall granulomatous mass in case 2.

cottonoid) is difficult to estimate because some patients remain asymptomatic and are never discovered, and because of the lack of documentation of some diagnosed cases (1,10,15). However, the reported incidence varies between 1/1,000 and 1/14,000 procedures (1,4,17-19). Retained surgical gauze is most frequently discovered in the abdomen (6,10,14). However, their occurrences in the thorax, extremity, central nervous system, and breast have also been reported in humans (6,9,10,16,18). The most common initial surgical procedure reported was OHE because it is the most common surgical procedure in small animal practice (11,12,17).

The retained surgical gauze may induce aseptic serofibrinous responses that result in fibrosis, adhesion or encapsulation leading to granuloma formation. Less often the presence of exudative responses result in formation of abscess, sometimes leading to a sinus or fistula (9-12,14,16,17,20).

Clinical appearances are variable, depending on the location and chronicity of the retained surgical gauze (3,16). Clinical signs reported in dogs and cats with intra-abdominal retained surgical gauze include sinus discharge, palpable abdominal mass, elevated temperature, anorexia, vomiting, diarrhea, painful abdomen, depression, and weight loss (11,12,17). In addition, foreign body osteomyelitis and osteosarcoma formation associ-

ated with retained surgical gauze have been reported in dogs (13,17). In present cases, two dogs revealed common clinical findings such as a palpable abdominal mass and abdominal tenderness after a few months from OHE.

In humans, many reports have described the imaging findings in retained surgical gauze (2,4,6,8-12,14,16,18-20). On radiography, the diagnosis is easy when a radiopaque marker is seen. However, this imaging method is not helpful when these markers are disintegrated or fragmented over time (16,20). The most frequent radiographic sign was a localized gas lucency, which appeared either speckled or whirl-like (7,12). Gas bubble associated with a sterile sponge can persist for several months, hence the presence of gas does not indicate infection (7). In both our cases, a localized gas lucency within the mass was not identified.

Ultrasonography is another diagnostic tool which may well demonstrate foreign bodies (4,21). Ultrasonographic appearances of retained surgical gauze are variable, depending on the type of reaction (17,20). They can be cystic with coarse, complex, or solid internal echoes and may present foci of high echoes casting acoustic shadows due to gas or calcification (9,11,12,17). In these cases, the nidus of the lesion revealed an abscess cavity with irregular hyperechoic center in case 1. This pattern is considered to be characteristic of aseptic abscessation. In case 2, a strong acoustic shadow with a very homogeneous hypoechoic appearance with hyperechoic center was identified. High amplitude echoes with acoustic shadowing reported previously are likely to represent the retained surgical gauze and any trapped gas (12,20). This pattern can also occur in the absence of gas or calcification, produced by the large number of interfaces resulting from gauze fibers (11,12,20).

On CT, retained surgical gauze may manifest as a cystic lesion with internal spongiform appearance with mottled gas bubbles, hyperdense capsule, concentric layering, or mottled mural calcification (1,4,7,10,12,20). Especially CT is the most effective method for detection of a retained surgical gauze in the pleural cavity (16). However, CT findings of retained surgical gauze may be indistinguishable from intra-abdominal abscess since air bubbles and calcification of the cavity wall as well as contrast enhancement of the rim may be seen in both condition

(4,7,21). The CT appearance in case 2 was a hyperdense mass with a thick peripheral rim that showed a marked rim enhancement after contrast agent infusion. This might be a clue leading to the diagnosis of the granuloma due to the retained surgical gauze. Cytologic examination allows identification of the granulomatous nature of the tissue response as the case 2.

In conclusion, retained surgical sponge has to be a considered as a strong diagnostic possibility in postoperative patients presenting with unexplained symptoms such as pain and abdominal distension. Also, the appearance of a retained surgical gauze is very variable and can lead to misinterpretations. Therefore a diagnosis of retained surgical gauze was made based on the history, radiography, ultrasonography, CT and cytologic examination. First of all, prevention of retained surgical gauze is far more important than cure.

References

- Bani-Hani KE, Gharaibeh KA, Yaghan RJ. Retained surgical sponges (gossypiboma). *Asian J Surg* 2005; 45:209-211.
- Bellin M, Hornoy B, Richard F, Davy-Miallou C, Fadel Y, Zaim S, Challier E, Grenier P. Perirenal textiloma: MR and serial CT appearance. *Eur Radiol* 1998; 8: 57-59.
- Crowe Jr DT, Bjorling DE. Peritoneum and peritoneal cavity. In: *Textbook of small animal surgery*, 3rd ed. Philadelphia: W. B. Saunders. 2003: 414-445.
- Gencosmanoglu R, Inceoglu R. An unusual cause of small bowel obstruction: gossypiboma. *BMC Surg* 2003; 8: 3-6.
- Hardie EM. General abdominal surgery. In: *Complication in small animal surgery*, 1st ed. Baltimore: Williams & Wilkins. 1996:333-368.
- Kominami M, Fujikawa A, Tamura T, Naoi Y, Horikawa O. Retained surgical sponge in the thigh: report of the third known case in the limb. *Radiat Med* 2003; 21: 220-222.
- 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: 919-923.
- Lamb CR, White RN, McEvoy FJ. Sinography in the investigation of draining tracts in small animals: retrospective review of 25 cases. *Vet Surg* 1994; 23: 129-34.
- Lo CP, Hsu CC, Chang TH. Gossypiboma of the leg: MR imaging characteristics. *Korean J Radiol* 2003; 4: 191-193.
- Lu YY, Cheung YC, Ko SF, Ng SH. Calcified reticulate rind sign: A characteristic feature of gossypiboma on computed tomography. *World J Gastroenterol* 2005; 11: 4927-4929.
- Mai W, Ledieu D, Venturini L, Fournel C, Fau D, Palazzi X, Magnol JP. Ultrasonographic appearance of intra-abdominal granuloma secondary to retained surgical sponge. *Vet Radiol Ultrasound*. 2001; 42: 157-160.
- Merlo M, Lamb CR. Radiographic and ultrasonographic features of retained surgical sponge in eight dogs. *Vet Radiol Ultrasound*. 2000; 41: 279-283.
- Pardo AD, Adams WH, McCracken MD, Legendre AM. Primary jejunal osteosarcoma associated with a surgical sponge in a dog. *J Am Vet Med Assoc* 1990; 196: 935-938.
- Prasad S, Krishnan A, Limdi J, Patankar T. Imaging features of gossypiboma: report of two cases. *J Postgrad Med* 1999; 45: 18-19.
- Singh R, Mathur RK, Patidar S, Tapkire R. Gossypiboma: its laparoscopic diagnosis and removal. *Surg Laparosc Endosc PercutanTech* 2004; 14: 304-305.
- Suwatanapongched T, Boonkasem S, Sathianpitayakul E, Leelachaikul P. Intrathoracic gossypiboma: radiographic and CT findings. *Br J Radiol* 2005; 78: 851-853.
- Tsioli V, Papazoglou LG, Patsikas MN, Kazakos GM. Retained surgical sponge. *Compend Contin Educ Tract Vet* 2004; 26: 634-644.
- Turgut M, Akyuz O, Ozsunar Y, Kacar F. Sponge-induced granuloma ("gauzoma") as a complication of posterior lumbar surgery. *Neurol Med Chir* 2005; 45: 209-211.
- Vayre F, Richard P, Ollivier JP. Intrathoracic gossypiboma: magnetic resonance features. *Int J Cardiol* 1999; 70: 199-200.
- Wan YL, Huang TJ, Huang DL, Lee TY, Tsai CC. Sonography and computed tomography of a gossypiboma and in vitro studies of sponge by ultrasound. *Clin Imaging* 1992 16: 256-258.
- Zbar AP, Agrawal A, Saeed IT, Utidjian MR. Gossypiboma revisited: a case report and review of the literature. *J R Coll Surg Edinb* 1998; 43: 417-418.

개의 복강내 잔존 수술용 거즈 2예

최호정 · 이기자 · 오이세 · 이재연 · 지현철 · 박성준 · 정성목 · 이영원¹

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요 약 : 난소자궁적출술을 실시한 두 마리의 개가 복부 팽만을 주증상으로 내원하였다. 첫 번째 환자는 복부 방사선 검사 결과 복강내 종괴를 확인하였고 초음파 검사 결과 중앙 부위에 불규칙한 영상의 고에코성의 물질을 포함하는 저에코성의 종괴를 관찰하였다. 이어진 세침흡인술 결과 다량의 염증세포를 확인하여 농양으로 잠정진단 후, 외과적 수술하여 복강내 잔존한 거즈에 의한 농양으로 확정진단하였다. 두 번째 환자는 복부 방사선 검사로 복강내 종괴와 연부조직의 종창을 확인하여 이어진 초음파 검사 결과 타원형의 균질한 고에코를 띠는 종괴를 포함하는 저에코성의 종괴를 관찰하였다. 컴퓨터단층촬영술을 통해 종괴의 둘레로 조영증강효과가 있음을 확인하였고 이어진 세침흡인술 결과, 다량의 염증세포 및 육아종성 세포를 확인하였다. 이에 육아종으로 잠정진단 내린 후, 외과적 수술 결과 복강내 잔존한 거즈에 의한 육아종으로 확정진단하였다.

주요어 : 개, 수술용 거즈, 초음파, 컴퓨터단층촬영술, 합병증