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RETAINED SURGICAL SPONGE IN A DOG: CLINICAL ASPECTS AND SURGICAL APPROACH

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ABSTRACT. Although retained surgical sponges are rarely reported, their clinical aspect can sometimes vary and therefore, the diagnosis can be challenging. An eight-year-old mixed breed dog was brought in for a skin lesion on the lateral abdominal wall that appeared nine weeks previously, which could not be treated even though both local and general therapy had been carried out. During antibiotic administration, the dog's condition improved, but once the treatment was completed, the wound and secretions started to reappear. Diagnosis of a retained surgical gauze was based on history, clinical signs, radiological examination and confirmed by surgical exploration. This article aims to describe the clinical and surgical findings of this pathology, which appeared four years after the surgical procedure, in order to disseminate knowledge about the complications that may occur if negligence, disorganisation or lack of emergency protocols exists.

Keywords: dog; fistula; sponge; gauze; wound.

INTRODUCTION

Retained surgical sponges (RSSs) most commonly occur in large body cavities such as the abdomen and thorax, and may present as early as a few days after surgery, but most are discovered within weeks to months (Steelman *et al.*, 2018). This temporal variability is based on the two categories of reactions that may occur: first, an aseptic serofibrinous response (adhesion formation, complete encapsulation resulting in a foreign body granuloma), and second, an exudative response (the most frequent one in dogs and cats, leading to abscessation) (Tsioli *et al.*, 2004).

The RRS may also adhere and by pressure necrosis penetrate hollow

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organs, such as the urinary bladder or intestine. Clinical signs include depression, weight loss, elevated temperature, diarrhoea, vomiting, painful abdomen and sometimes an abdominal mass can be identified on palpation (Tsioli *et al.*, 2004).

The diagnosis must consider the existence of a previous surgery, as well as abdominal radiography and sinography. When sinus tracts are present, sinography can be used in order to reveal the RSS, by filling its network of fibres (Lamb *et al.*, 1994).

For confirmation, a fine needle aspiration can be used, in order to assess the granulomatous lesions, but sometimes the results may not be conclusive, sometimes even suggesting a tumoral process (Merlo and Lamb, 2000).

The treatment of choice in this pathology is surgical: an exploratory laparotomy with RSS identification and removal.

RSS diagnosis is difficult, as the symptoms are non-specific and may arise years after the surgical procedure. The aim of this article is to describe the clinical and surgical findings in a female dog with a RSS, in order to disseminate knowledge about the complications that may occur if negligence, disorganisation or a lack of standard protocols in emergency situations exists.

CASE PRESENTATION

An eight-year-old female dog, mixed breed, weighing 8.1 kg was brought to the Surgery Clinic of the Faculty of Veterinary Medicine, Iasi for a skin lesion on the right lateral abdomen, which appeared nine weeks previously. Local and general treatment had been carried out, but without any results. A local surgical treatment, with wound opening, cleaning and foreign body searching was made, but without success.

During those nine weeks, the patient received different types of antibiotics (amoxicilin with clavulanic acid, ceftriaxone, pradofloxacin) and anti-inflammatory drugs (meloxicam, firocoxib). During their administration, the dog's condition improved, but once the treatment was completed, the wound and secretions reappeared.

The patient had a history of dysorexia and depression, without vomiting, diarrhoea or a significant weight loss. The only medical history noted was an elective ovariohysterectomy done four years previously.

At presentation, the patient was alert and responsive, with a normal temperature of 38.6 and a heart rate of 130 bpm. During the physical consultation, a fistula of 2 cm was noted on the right side of the lateral abdomen (*Figure 1*; *Figure 2*). The patient's abdomen was tense, but a circular mass could be palpated (*Figure 3*).

Blood tests were normal, with only a discrete leucocytosis noted. Ultrasonography revealed a structure characterised by an hyperechogenic content with hypoechogenic areas. On radiological examination, an ovoid shaped structure with gas lucency was identified, but the origin of it could not be determined (*Figure 4*). Considering the findings, we opted for an exploratory laparotomy.

The patient was premedicated with butorphanol 0.4 mg/kg IM (intramuscular) and anaesthesia induction was made

with ketamine 100 mg/ml and diazepam 5 mg/ml administered as a 1:1 ratio with an anticipated total dose of 1 ml/20 kg IV. Anaesthesia was maintained using isoflurane as an inhalant anaesthetic.

Figure 1 – Local aspect of the fistula

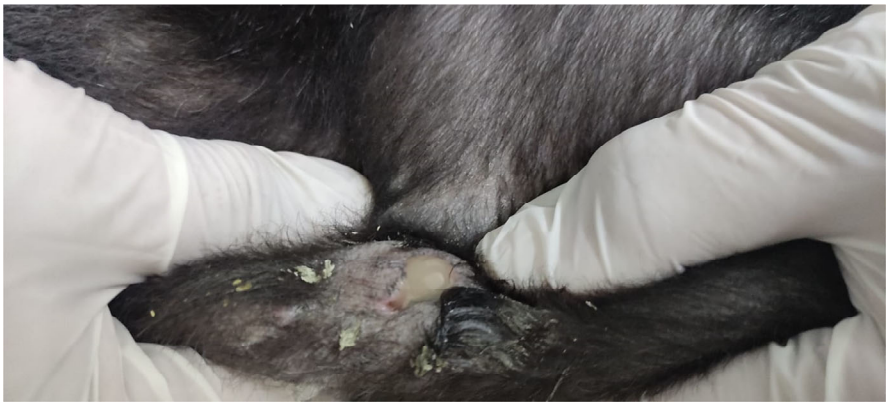

Figure 2 – Purulent content could be seen when compressing the area

Figure 3 – Identification of a palpable abdominal mass

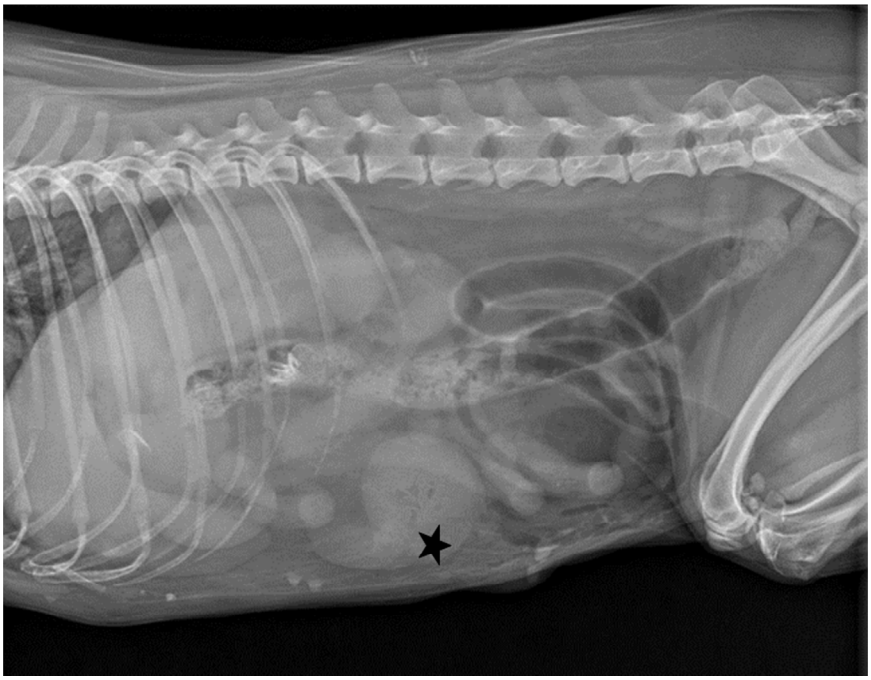

Figure 4 – Radiographic aspect of intra-abdominal RSS in a dog. Latero-lateral view. A structure containing central radiotransparent areas can be identified (star)

A ventral midline abdominal incision was performed in order to allow the entire abdomen to be explored (*Figure 5*).

Surgical exploration revealed a mass, close to the linea alba (*Figure 6*). Numerous adhesions were found between the structure and the right ventro-lateral abdominal wall. Additionally, associated adhesions with the intestinal tract were noticed, without affecting intestinal motility (*Figure 7*).

The adhesions were dissected by using a combination of digital manipulation, scissor dilaceration and bipolar electrocautery, until the mass removal was complete (*Figure 8*; *Figure 9*). Due to the strong attachment, a portion of the peritoneum was also removed, therefore an intermediate step of suturing the peritoneum to the abdominal muscles was necessary, to prevent the occurrence of hernias (*Figure 10*; *Figure 11*).

The mesenteric gap that appeared as a result of the adhesions was also closed, to prevent the occurrence of mesenteric hernias (*Figure 12*; *Figure 13*).

The margins were prepared, and the abdominal wall was closed routinely in a three layer suture (*Figure 14*; *Figure 15*).

The fistula was examined, and the sinus tract identified using a haemostatic clamp (*Figure 16*; *Figure 17*). To ensure the complete closure of the abdominal wall, the tract was opened and the area was thoroughly examined. Before closing it in a three layer suture (*Figure 18*) (musculature, subcutaneous and skin layer), the region was cleaned with betadine (*Figure 19*).

Figure 5 – Ventral midline laparotomy

Figure 6 – Structure identification (star), near to the linea alba

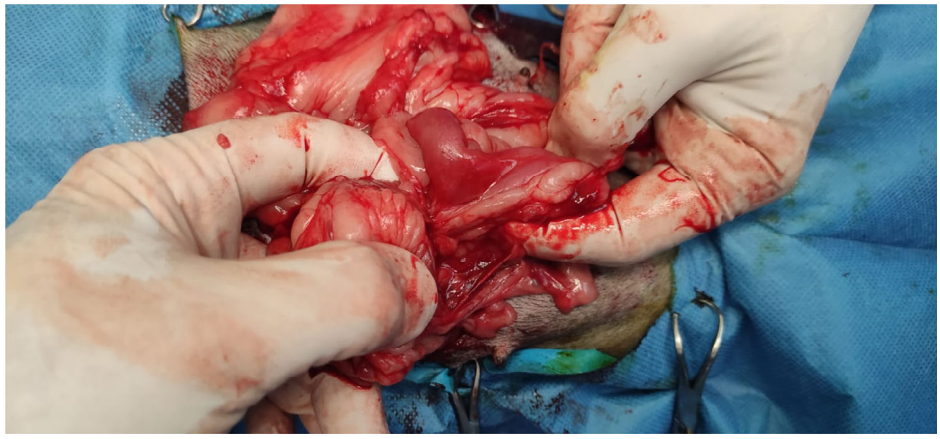

Figure 7 – Associated adhesions between the mass and the intestinal tract

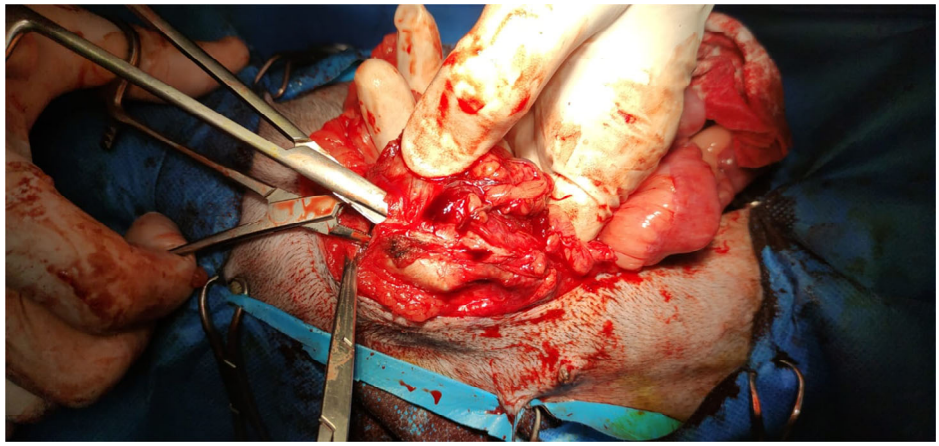

Figure 8 – Dilaceration

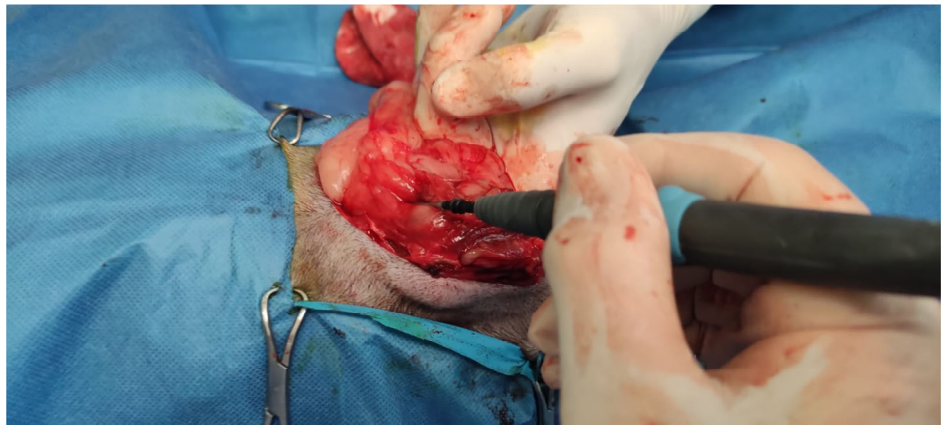

Figure 9 – Dilaceration

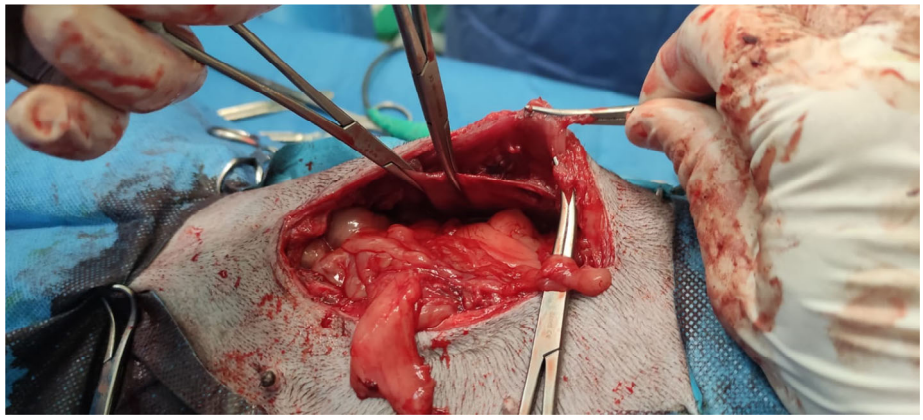

Figure 10 – Peritoneum identification

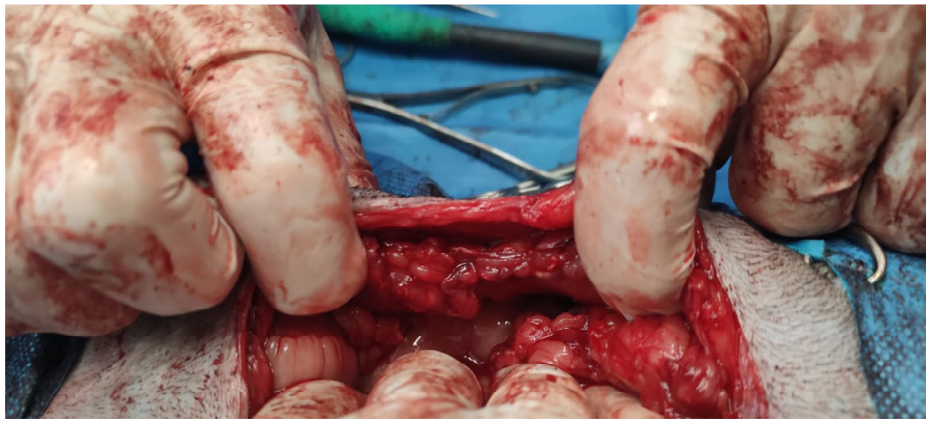

Figure 11 – Musculature and peritoneum suture

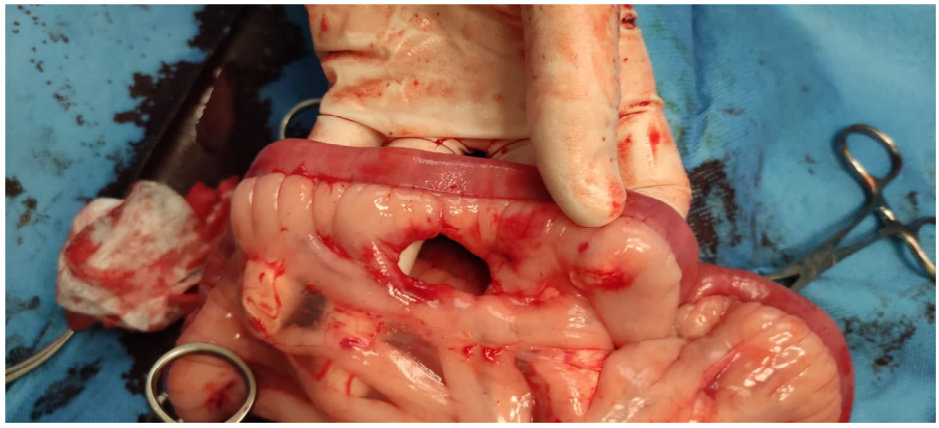

Figure 12 – Identification of a mesenteric gap

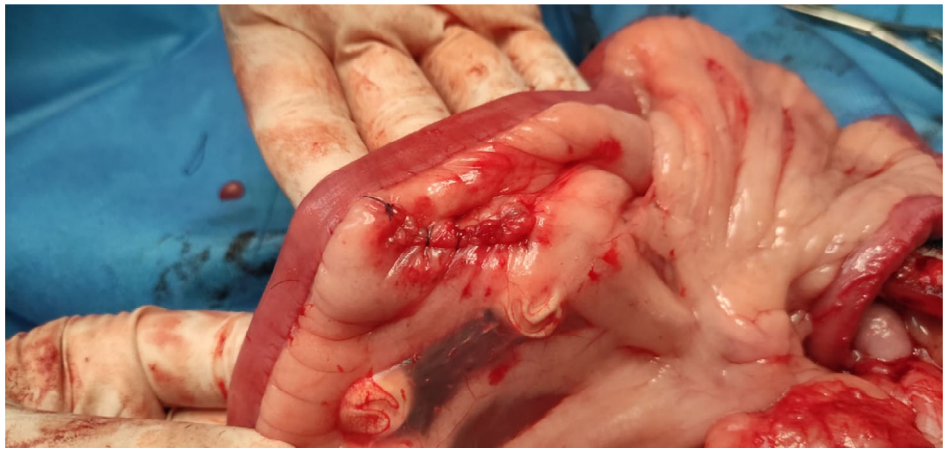

Figure 13 – Mesenteric gap suture

Anaesthesia and recovery were uneventful. Postoperative care included administering a balanced hypotonic crystalloid fluid, analgesics and antibiotics.

Two and four weeks after surgery, the patient was re-evaluated (*Figure 20*). His general and local condition was improved, the fistula did not recur, and the sutures were removed.

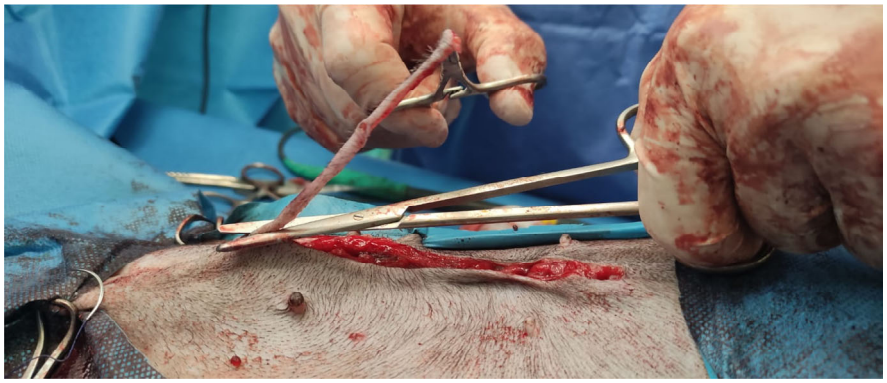

Figure 14 – Preparing the surgical margins

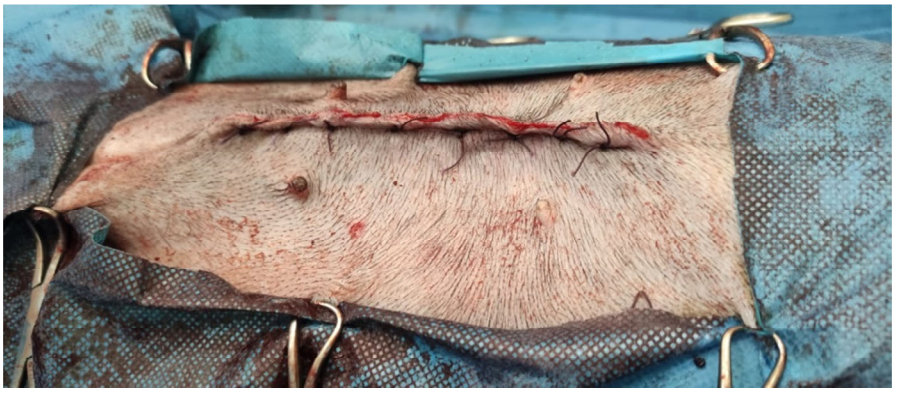

Figure 15 – The skin was closed in a horizontal mattress pattern

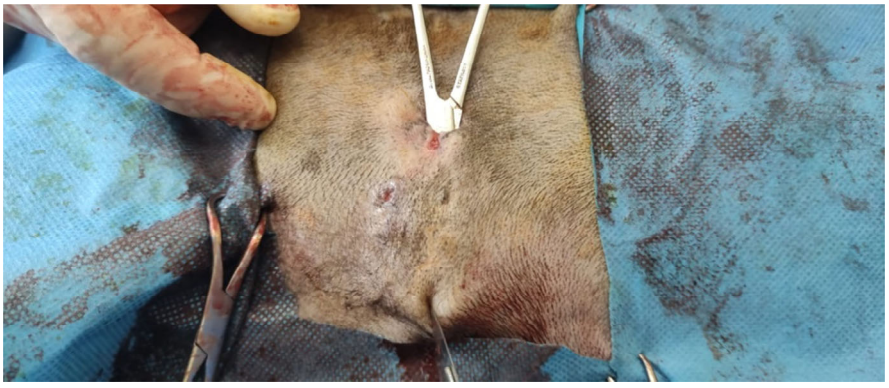

Figure 16 – Fistula tract identification

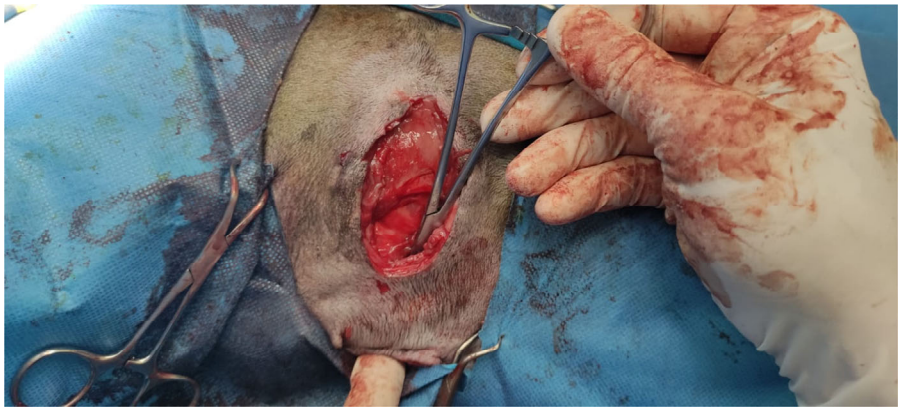

Figure 17 – The tip of the haemostatic clamp reaches the place from which the mass was previously removed.

Figure 18 – Cleaning the fistula tract

Figure 19 – Skin suture

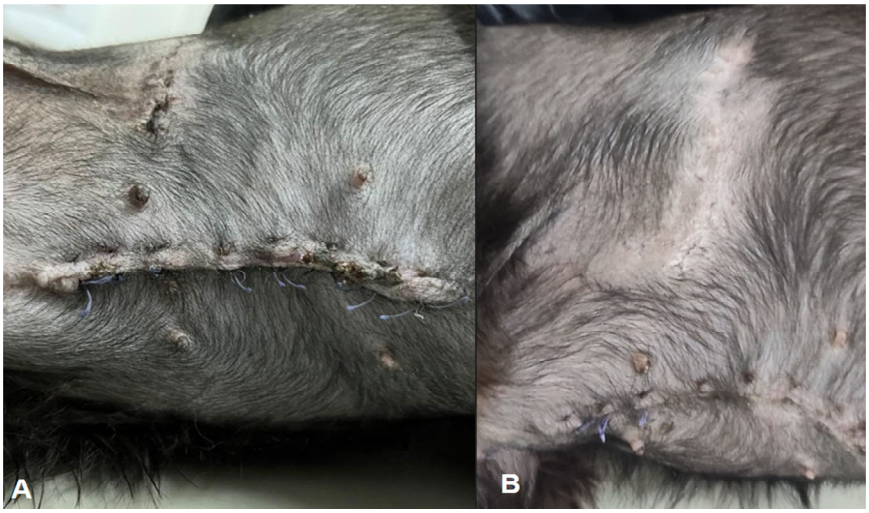

Figure 20 – Postoperative aspects at two (A) and four (B) weeks after surgery

DISCUSSION

Gross examination (*Figure 21*) of the mass revealed a fibrous connective tissue containing a surgical cotton gauze (*Figure 22*). The terms cottonoid, textiloma and gossypiboma are still commonly used to describe RSS, even if currently the sponges are usually made of synthetic material.

This pathology usually appears as a result of disorganisation, inexperienced staff, unstable patient condition, unexpected change in the surgical procedure or more frequently, in emergency surgeries. Due to reluctance to admit errors that may have medicolegal implications, the true incidence of the disease is unknown (Tsioli *et al.*, 2004). Even if an elective ovariohysterectomy is considered a safe intervention, like any surgical procedure, there are risks. The most common complications are haemorrhage, ureter ligation and granuloma formation following the uterine stump ligation (Oliveira *et al.*, 2019), but also RSS should be considered. The risk of foreign body retention after surgery significantly increases in emergencies when frequently unplanned changes in procedure appear, and in patients with a higher body-mass index (Gawande *et al.*, 2003).

There are also references about RSS in veterinary medicine, and it seems that the incidence has been underestimated. Different types of surgical procedures are reported with this complication including: ovariohysterectomy (elective or pyometra) (Oliveira *et al.*, 2019), laparotomy (retained testicle or intestinal biopsy), bite wound repair (Merlo and Lamb, 2000), cranial cruciate ligament repair (Miller *et al.*, 2006) and perineal herniorrhaphy (Tsioli *et al.*, 2004)

In a study on RSS in dogs, the median time between surgery and diagnosis was 9.5 months, and the most frequent previous surgery was ovariohysterectomy (Merlo and Lamb, 2000).

In this pathology, patients may not be symptomatic for months to years, and diagnosis is often incidental. When symptomatic, a palpable abdominal mass and draining sinus tracts should always be considered and imaging examination requested.

Due to false-negative results which can lead to misdiagnosis, knowing the advantages and limitations of the different imaging techniques is important. Even if until now information has been published about their characteristics, imaging data of textiloma are not specific. The most common techniques are ultrasound and radiological examination, mainly due to the cost-effective benefit. The ultrasonographic characteristics of abdominal gossypibloma are classified into three categories: an echogenic area with intense acoustic shadow; a well-defined cystic mass with marbled content; and a non-specific pattern suggesting a non-specific mass (Gavrić Lovrec *et al.*, 2018). In a 2000 study, each dog with RSS on ultrasonography presented a hypoechoic mass with an irregular hypoechoic centre (Merlo and Lamb, 2000). The disadvantage is that ultrasonographically, the RSS has similar characteristics to intestinal neoplasm. Conventional abdominal radiography is the most frequently used procedure for detecting RSS. The appearance varies according to the time that has passed since the previous surgery.

Radiographic findings are specific when the surgical sponge contains radiopaque material and a fine linear radio-opacity can be seen (Peace and Riggs, 2014), but the most frequent radiographic findings in a study on eight dogs with RSS (Merlo and Lamb, 2000) was a localised gas lucency which appeared either speckled or in a whirl-like configuration. The diagnosis is, however, difficult when simple compresses are used. For this method, false-negative results are common; therefore, higher sensitivity tests should be used.

Figure 21 – Structure examination

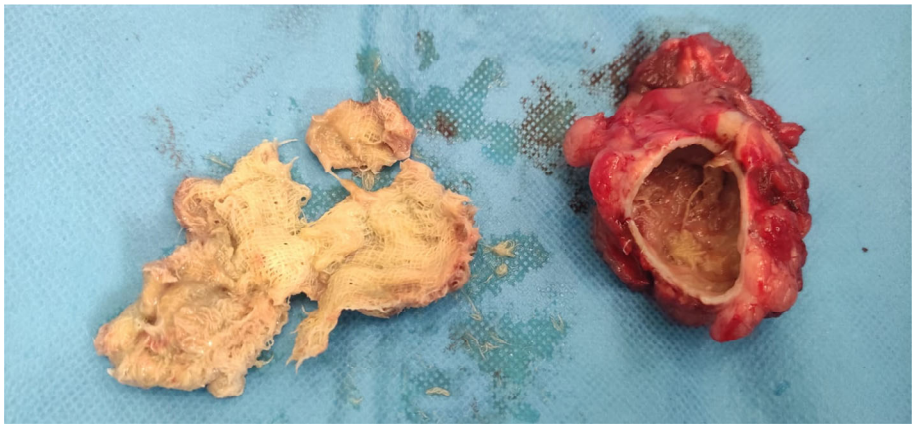

Figure 22 – Surgical sponge enclosed in a granulomatous capsule

CT scan is the first-choice method for excluding RSS in human medicine, but due to the higher costs, in veterinary medicine it is not so frequently used for this purpose.

However, when there are no financial limitations, a CT result will provide valuable information clarifying the diagnosis: structure of the mass (heterogenous, with a speckled or spongiform gas pattern); associations with other visceral; or fistulous tract existence (Auger *et al.*, 2019). Only a few reports are published regarding RSS aspects on MRI in dogs. A gossypiboma is usually seen as a whorled internal configuration on T2-weighted imaging (Manzella *et al.*, 2009). The RSS aspects identified on MRI in a dog were: heterogenous mass with a few circular, small, low-intensity structures, having a low to intermediate intensity, comparable to that of muscle (Terrier *et al.*, 1985).

In this case report, the first response of the organism, when the encapsulation was completed (the asymptomatic stage), lasted for four years. After four years, the second stage was reached: an abscess and fistula with the abdominal wall was formed.

Before arriving at our clinic, this case was managed in several veterinary clinics, over a period of nine weeks, and although the approaches were complementary, the diagnosis of RSS was not reached. Initially, the patient was treated symptomatically for a skin lesion. Because it did not heal, an antibiogram was performed and antibiotic therapy was initiated. During the antibiotic treatment, the fistula closed, but a few days after stopping the therapy, it reappeared. At this stage, a grass awn in the flank region was suspected, and a surgical treatment was applied. During the surgical intervention, no grass awn in the abdominal wall could be identified, therefore antibiotic therapy was again commenced.

Although there are case presentations about RSS in the literature, this article brings detailed pictures and descriptions of the diagnosis and therapeutic steps, facilitating a clinical approach to the pathology which, although it is frequently encountered, is underdiagnosed as a result of non-specific symptoms.

CONCLUSIONS

This is a particular case due to the long period of time that passed from the first symptoms until appropriate diagnosis and therapy were carried out. This highlights the fact that further awareness about the existence and high frequency of this pathology is needed among veterinarians.

Having standardised procedures, with a fixed number of surgical sponges, or counting them at the beginning of the procedure and before closing the incision, is the best option for preventing this pathology. Unfortunately, a retained gauze can occur even when the count is accurate. In human medicine, previous studies have shown that in 62–88% of retained surgical items, the count was correct (Feldman, 2011). It is critical to emphasise that in addition to clear counting procedures, taking appropriate measures in the event of an incorrect count outcome is also crucial. Moreover, at the end of the surgical procedure, the surgeons should meticulously explore the abdomen, avoiding complications such as those which occurred in this case. In order to decrease the RSS incidence, a multidisciplinary effort is needed, from all members of the operating team. The radiology team also has an important role, especially when the count outcome is not the expected one, and the methodical search for the sponge was not successful in solving the situation. However, a significant amount of data reveal that plain radiographs have a low sensitivity in a surgical sponge identification. In a 2008 study, intraoperative imaging detected retained foreign objects only in 67% of the cases (Cima *et al.*, 2008).

RSS following surgery is a ongoing problem in humans and animals. Radiopaque-marked sponges facilitate the diagnosis of this pathology, and should be used more in veterinary medicine.

Textilomas can sometimes be identified by accident during imaging investigations, or when they begin to be symptomatic, months to years after the initial surgical intervention. In the latter case, it is possible for the patient to reach advanced ages, already speaking of geriatric animals, in which tumoral processes represent the main probability from the differential diagnosis list of intra-abdominal masses. Therefore, it is important to highlight the fact that in patients that have undergone surgical interventions, even if they have an advanced age and neoplastic signs, exploratory laparotomy is still indicated for establishing the final diagnosis.

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