

Case Report

Chronic vaginitis caused by long-term retained fetal bone fragments in a cat

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Abstract

Chronic vaginitis in cats is an uncommon but clinically relevant condition, typically having persistent vaginal discharge, perivulvar irritation and excessive licking or grooming. Underlying etiologies are varied, ranging from foreign bodies to rare inflammatory disorders; therefore, establishing an accurate diagnosis is critical for appropriate treatment and prognosis. We describe a case of chronic (7 years) purulent vaginal discharge in a cat caused by retained vaginal fetal bone fragments. After exclusion of potential causes of chronic vaginitis, a vaginal examination, performed under general anesthesia, revealed 40 fetal bone fragments. These fragments were progressively removed using rat-toothed forceps and 15 days later, the vaginal discharge had fully resolved and the cat recovered uneventfully. This case highlighted the importance of conducting a thorough vaginal examination in cats with chronic vaginal discharge, particularly when there is a history of dystocia or abortion.

Keywords: Ovariectomy, cat, vaginal discharge, chronic vaginitis, fetal maceration, fetal bone fragments

Introduction

Primary vaginitis is rare in cats. In most cases, vaginitis is secondary and may be associated with various underlying conditions such as vaginal foreign bodies, obstetric or coital trauma, pyometra, uterine stump pyometra (generally associated with ovarian remnant syndrome or progesterone treatment in previously ovariectomized/ovariohysterectomized animals), vaginal neoplasia, or urinary tract infection.^{1,2} Bacterial vaginitis may occur and is frequently associated with opportunistic urogenital bacterial (*Escherichia coli*, *Streptococcus canis*, or *Staphylococcus* spp.) colonization secondary to disruption of the normal vaginal flora that can be influenced by age, reproductive cycle stage, environmental conditions (e.g. hygiene) and breed.² Reported vaginal foreign bodies in cats include fetal bone fragments and grass awns.^{3,4} Retained fetal bones have been reported as a complication of dystocia in both dogs⁵ and cats,⁶ where fetal retention within the vagina led to persistence of bone fragments in the genital tract.^{5,6} These fragments can subsequently act as foreign bodies, leading to chronic vaginitis.^{3,6,7} Reports of retained fetal bone fragments causing chronic vaginitis in cats remain extremely limited.^{3,6}

Chronic vaginitis is commonly characterized by a persistent foul-smelling vaginal discharge, sometimes combined with perivulvar irritation without systemic signs.² Diagnosis of

underlying causes should include vaginal cytology and culture to identify bacterial pathogens, ultrasonography of the uterus or uterine stump, and urinalysis with culture via cystocentesis to rule out other causes of vaginal discharge.² Additional imaging techniques (e.g. retrograde vaginography or cystourethrography) may also be used to evaluate structural abnormalities.¹ However, vaginoscopy is generally considered the first-line diagnostic method, as it allows direct visualization of vaginal lesions, foreign bodies or congenital malformation and it ensures the complete removal of any foreign bodies.^{3,4,7} We describe an unusual retention of fetal bone fragments in the vagina of a cat, causing chronic vaginitis that persisted for 7 years.

Case presentation

An 11-year, domestic shorthair cat was referred for chronic (7 years) vaginal discharge. Cat was adopted at the age of 2 years and received progestogens every 2 weeks. At the age of 4, cat was presented to a veterinarian for suspected abortion or dystocia; abdominal ultrasonography revealed 3 macerated fetuses. Ovariectomy was performed; amoxicillin and clavulanic acid were given for 8 days. Over the following 7 years, the patient had intermittent bloody purulent vaginal discharge and was licking its vulva despite regular antibiotics (amoxicillin and clavulanic acid, doxycycline, sulfamethoxazole, trimethoprim) and probiotics treatment. Five years after

the onset of clinical signs and following multiple courses of antibiotics, a bacterial culture was performed that revealed slight growth of *Streptococcus canis*.

At presentation (7 years after the onset of clinical signs), the cat had not received any medication since the last antibiotic treatment 2 months ago. Cat was in good physical condition; however, a bloody purulent foul-smelling vaginal discharge and perivulvar dermatitis were observed. Furthermore, the owner reported pollakiuria.

Differential diagnosis included uterine stump pyometra, vaginal neoplasia, infectious vaginitis, vaginal foreign body, congenital abnormalities (e.g. vaginal septa or stenosis) or urogenital malformations (e.g. ectopic ureter remnants), urethrovaginal fistula and urinary tract disorder (e.g. cystitis).

As the cat exhibited marked sensitivity in the vulvar region, manipulation was highly uncomfortable and we therefore decided not to perform a vaginal smear.

Abdominal ultrasonography revealed no uterine anomaly; small uterine stump (3.2 x 5.1 mm) with a normal parietal and luminal structure was identified dorsal to the urinary bladder (Figure 1). Additionally, kidneys were normal in size (left: 3.8 x 1.9 cm; right: 3.1 x 1.6 cm) but had mildly irregular contours and a slightly reduced corticomedullary distinction. No renal pelvic or ureteral dilation was observed. These findings were consistent with mild chronic degenerative renal changes compatible with the animal's age. No other anomaly was identified. Urine sample was collected by ultrasonography-guided cystocentesis in the conscious cat; urinalysis revealed no abnormalities. Complete serum biochemistry was also unremarkable.

Urinary or uterine origins of the vaginal discharge were therefore excluded and a vaginal origin (i.e. foreign body or vaginal tumor) was suspected. Vaginotomy was proposed but owner

declined due to financial constraints. However, a vaginal examination and vaginal cytology under anesthesia was scheduled a few days later. Cat was routinely premedicated with intramuscular medetomidine (10 µg/kg; Sedato, Dechra, West Sussex, UK) and methadone (0.2 mg/kg; Comfortan, Dechra). Anesthesia was induced with intravenous ketamine (4 mg/kg; Imalgene, Boehringer, Ingelheim am Rhein, Germany) and diazepam (0.25 mg/kg; Ziapam, Ecuphar, Greifswald, Germany). Following induction, the cat was endotracheally intubated and anesthesia was maintained with isoflurane (IsoFlo, Zoetis, Malakoff, France) in oxygen. The perivulvar area was shaved and dermatitis on the vulval dorsal commissure was confirmed (Figure 2).

Diagnosis and treatment

Vagina was inspected using a directional lamp with high-intensity illumination. A brown foreign body, corresponding to a bone fragment, was visible in the vestibule (Figure 3). This fragment was carefully grasped and removed using rat-toothed forceps. Following removal of this first fragment, additional bone fragments located deeper within the vaginal canal became visible and were progressively removed using the same technique. A total of 40 small pieces of fetal bones (skull fragments, ribs, long bones resembling humerus) were retrieved from the vagina (Figure 4). Several fragments were partially embedded in the vaginal mucosa that required gentle traction for removal. After removal of the fragments, vaginal lumen was carefully reinspected using high-intensity directional illumination. Vaginal mucosa appeared diffusely reddened and thickened with marked congestion and mild edema. Multiple small focal mucosal defects were observed at the sites where bone fragments had been embedded; however, no additional visible fragments were identified. After the procedure, medetomidine was reversed with intramuscular atipamezole (40 µg/kg; Antisedan, Zoetis) and the cat recovered uneventfully.

Findings were consistent with retained fetal bone fragments within the vaginal canal, most likely originating after dystocia

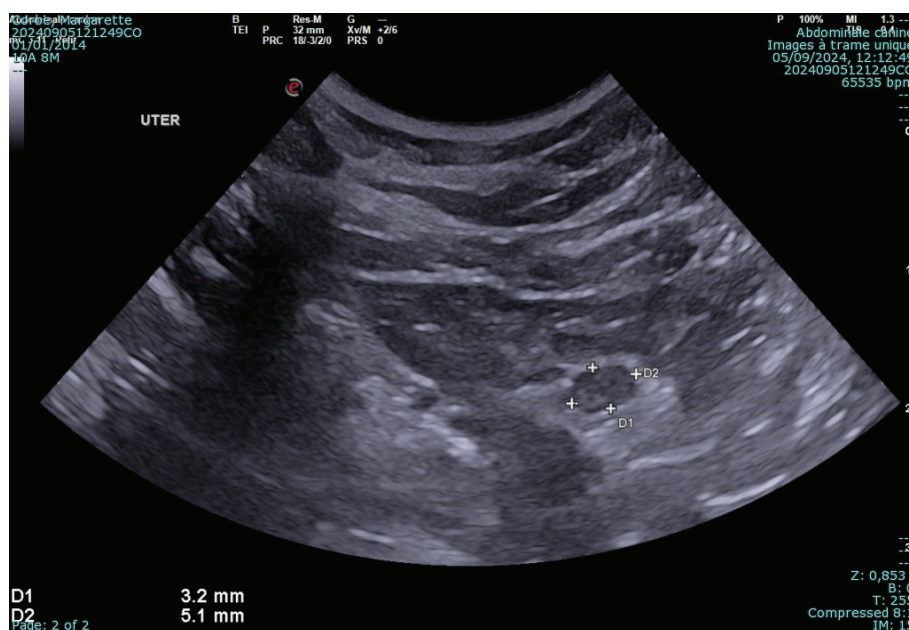


Figure 1. Transabdominal ultrasonographic image; note uterine stump (3.2 x 5.1 mm) identified with calipers

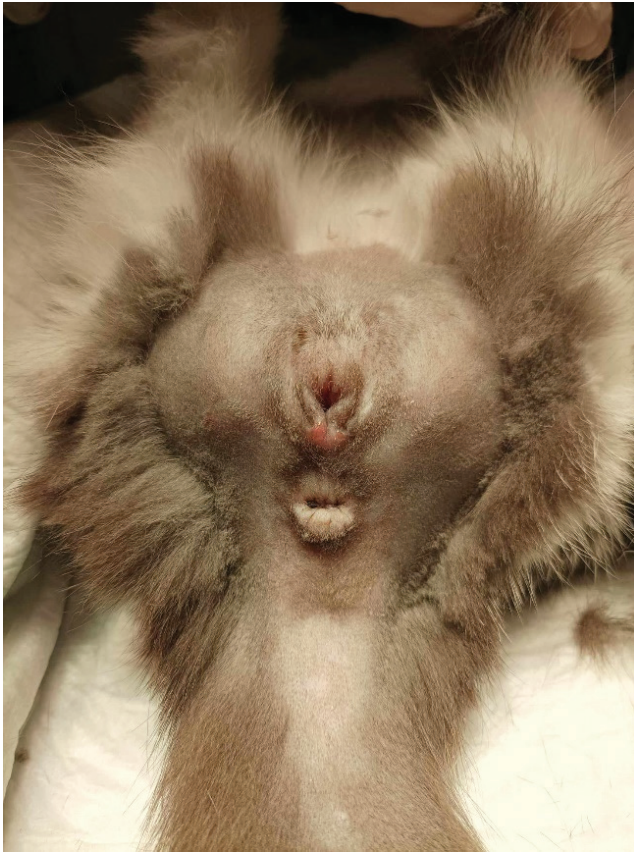


Figure 2. Perivulvar region after clipping in dorsal recumbency; note erythema, partial alopecia, and moist skin irritation around the dorsal vulvar commissure consistent with perivulvar dermatitis



Figure 3. Vaginal examination in dorsal recumbency; note a brown fetal bone fragment (black arrow) located within the vestibule

or abortion that was diagnosed 7 years earlier. Macerated fetal bones had acted as vaginal foreign bodies leading to chronic vaginitis. Vagina was flushed with 0.9% NaCl solution then 0.2% chlorhexidine solution. Subcutaneous robenacoxib (6 mg [1 mg/kg]; Onsior, Elanco, France) was given followed by oral treatment (once daily for 3 days). Owner was informed that radiography was recommended to confirm complete removal of all fragments but was declined. No postoperative antibiotics were prescribed, as the infectious component was considered secondary to foreign bodies and furthermore the inflammatory stimulus had been eliminated. Moreover, the cat had no signs of systemic illness.

Outcome

Cat was presented 2 weeks later for follow up: no vaginal discharge was observed, perivulvar dermatitis had disappeared, and the animal was in good physical condition. To minimize stress associated with repeated clinical visits in this otherwise stable patient, longer-term follow up was conducted through regular email communication with the owner. At 6 months after the procedure, owner reported no recurrence of vaginal discharge or other clinical abnormalities.

Discussion

Retained fetal bones in the vagina have been described in dogs^{5,7} and cats.^{3,6} Causes of fetal retention include late-term



Figure 4. Fetal bone fragments from the vagina

abortion, dystocia^{3,6} and congenital abnormalities. A 2-year ovari-hysterectomized cat with chronic purulent vulvar discharge had bony fragments within the vaginal lumen that were anatomically identified as fetal kitten bones. A 3-year cat with long-term vaginal discharge following cesarian surgery had a kitten that had been

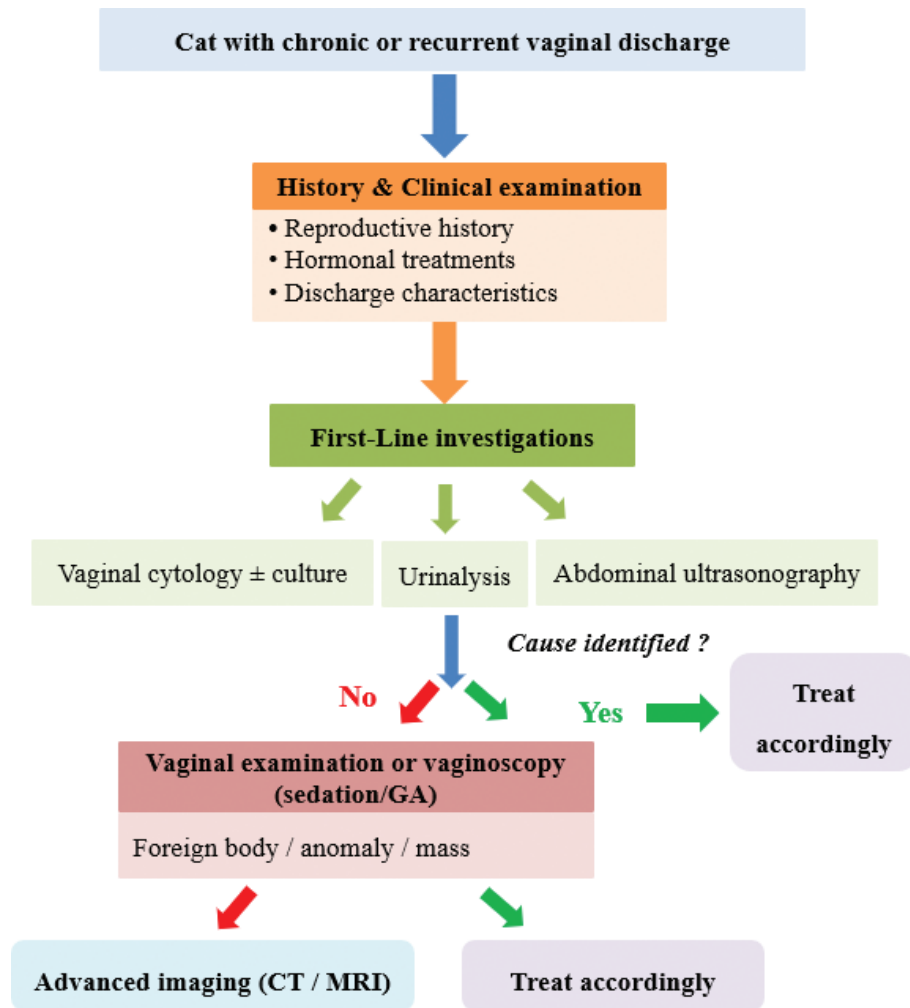


Figure 5. Proposed diagnostic algorithm for decision-making pathway for evaluation of chronic vaginal discharge in an ovariohysterectomized cat. The algorithm emphasizes the role of clinical examination, vaginal cytology, urinalysis, and abdominal ultrasonography as first-line investigations, followed by thorough vaginal examination or vaginoscopy when initial tests fail to identify the underlying cause

inadvertently left within the vaginal canal.⁶ Incomplete removal of fetuses during dystocia management or cesarian surgery can lead to chronic vaginal discharge and vaginitis.

Exogenous progestogens (e.g. medroxyprogesterone acetate) treatment for estrus suppression may prolong uterine quiescence by inhibiting uterine contractility and cervical dilation,⁸ potentially predisposing queens to iatrogenic uterine inertia.⁹ This mechanism may explain the findings in the present case. In fact, ovariohysterectomy was performed after dystocia or abortion and retention of fetal bones in the vagina resulted likely from incomplete fetal expulsion. Given the limited information available owing to the long interval since the onset of clinical signs, the exact cause of fetal death could not be identified retrospectively. However, as the cat had received progestogens every 2 weeks for almost 2 years before the onset of vaginal discharge, prolonged progestogen treatment might have contributed to iatrogenic uterine inertia, leading to incomplete fetal expulsion, fetal maceration, and subsequent long-term vaginal retention of fetal bones. A congenital vaginal septum could also have contributed to fetal retention; however, no such lesion was identified on vaginal examination in the present case. Moreover, congenital vaginal septum

has been very rarely reported in cats and to our knowledge, none of these cases has been associated with fetal retention.^{10,11}

Foreign bodies in the vagina can cause various complications. In woman, injuries, vaginal perforation, vaginal adhesion and fistulas involving bowels, bladder, uterus and vagina have been reported.^{12,13} Vaginal fibrosis¹³ and infertility¹⁴ have been also described. In dogs, complications appear less frequent; in a retained fetal bone fragments in the vagina of a dog,⁷ a fibrous band within the vestibule was described, likely resulting, according to the author, from chronic inflammation induced by the foreign body. Previous reports of vaginal foreign bodies in cats did not describe vaginal complications.^{3,4,6} In the present case, however, chronic vaginitis was associated with bloody purulent foul-smelling vaginal discharge, perivulvar dermatitis, and excessive licking. Vaginal inflammation and congestion were evaluated visually during the vaginal examination performed after removal of bone fragments. Although vaginoscopy would have provided a more detailed assessment, the macroscopic findings observed were considered sufficient to support the diagnosis of chronic vaginitis associated with long-standing retention of fetal bone fragments.

The diagnosis of chronic vaginitis caused by vaginal foreign bodies in cats can be challenging, as clinical signs are often nonspecific and may persist for long periods without systemic illness (Figure 5). Furthermore, frequent grooming behavior in cats may also mask mild vaginal discharge, delaying recognition of clinical signs by owners. In this case, that the cat was presented 7 years after the onset of vaginal discharge and after receiving multiple courses of antibiotics highlighted the potential for misdiagnosis or delayed recognition.

Vaginal endoscopy remains the gold standard for identifying and retrieving vaginal foreign bodies in small animals.^{3,4,7} In humans, it is likewise considered the gold standard for definitive diagnosis and therapy of vaginal foreign bodies in adult and pediatric patients.^{15,16} In a previously reported case of retained fetal bone fragments in a cat, vaginoscopy was successfully used to identify and retrieve the fragments, with complete resolution of the vaginal discharge.³ However, in a more recent report, bone fragments were removed manually using forceps without endoscopic guidance; clinical signs likewise resolved following foreign material removal.⁶ In the present case, direct vaginal examination under general anesthesia allowed visualization and removal of multiple fetal bone fragments using rat-tooth forceps. Clinical signs resolved rapidly after the procedure. This highlighted that, although vaginoscopy represents a valuable diagnostic and therapeutic tool, successful removal of vaginal foreign bodies may also be achieved using simpler techniques when endoscopic equipment is not available.

Complementary diagnostic tools (e.g. ultrasonography, urinalysis) findings can rule out concurrent reproductive or urinary tract disease;² however, they do not allow direct visualization of cat's vagina and therefore cannot confirm vaginal foreign body. Although MRI is widely used in humans for the diagnosis of vaginal foreign bodies¹⁵ CT could have allowed visualization of retained bone fragment, these advanced imaging modalities are not recommended as first-line diagnostic tools in cats. Like a vaginal examination in cats, both MRI and CT require general anesthesia; however, they are considerably more expensive, less accessible in routine veterinary practice, and do not provide the same direct diagnostic and therapeutic information as a vaginal examination. Vaginoscopy is less expensive and allows confirmation of complete foreign body removal and detection of perforations or mucosal embedding. In this case, before considering advanced imaging techniques, a thorough direct vaginal examination was sufficient to establish the diagnosis and guide appropriate treatment, underscoring its importance. Nevertheless, complete removal of all fragments could not be guaranteed with absolute certainty, and the owners were informed that additional imaging or vaginoscopy might be required if clinical signs persisted. The favorable clinical outcome observed in this case suggested that there was no residual material.

Cat had neither bacteriuria nor abnormalities suggested lack of urinary tract infection and hence urine bacterial culture was not considered. In the diagnostic work up of cats with chronic vaginal discharge, additional investigations (e.g. complete blood count [CBC] or retrovirus testing) may be considered to evaluate systemic health status. In the present case, diagnostic procedures were adapted to the financial constraints of the owner, and priority was given to tests considered most relevant for the suspected local condition and anesthetic risk assessment. A serum biochemistry profile was normal; it was performed for reported pollakiuria and to further assess the

renal degenerative changes observed on ultrasonography, and as part of the preanesthetic evaluation. Although a CBC might have provided additional information regarding systemic inflammatory response, lack of systemic clinical signs and the chronic localized nature of the condition suggested that the underlying pathology was primarily confined to the reproductive tract. Similarly, retrovirus testing was not performed, as it was unlikely to influence the immediate diagnostic approach or therapeutic management. Resolution of clinical signs following retained fetal bone fragments removal further supported the localized nature of the disease.

Vaginal cytology and culture are recommended in chronic vaginitis cases,² primarily to document inflammation and to characterize epithelial changes but also, if applicable, to allow identification of the causative infectious agents. However, culture results must be interpreted with caution because, as in other mammals, the feline vagina is colonized by a mixed microbiome²; 77% of these bacteria are aerobic, nonpathogenic, and facultative pathogenic, with *Escherichia coli*, *Streptococcus canis* and *Staphylococcus* spp. being most commonly isolated.¹⁷ Moreover, primary vaginitis is reported to be rare and usually self-limiting in cats, with no specific treatment generally required. To the authors' knowledge, current veterinary literature does not identify specific infectious agents as causes of primary vaginitis in cats. In contrast, primary vaginitis in the dog has been associated with infectious agents such as *Brucella canis* or canine herpesvirus.¹ In cats, secondary vaginitis may occur following obstetrical or coital trauma, pyometra,¹ uterine stump pyometra, vaginal foreign bodies, vaginal neoplasia or urinary tract infection.² In such cases, bacterial colonization typically represents overgrowth of commensal or opportunistic organisms on already inflamed or anatomically altered vaginal mucosa; therefore, bacteria are more likely a consequence rather than the primary cause of disease.¹⁸ Under normal conditions, a dynamic balance exists between the female reproductive tract bacteria and the local immune system, maintaining mucosal homeostasis. However, this balance may be disrupted by various predisposing factors (stress, systemic or local disease, hormonal disturbances, structural abnormalities, repeated antimicrobial therapy, etc.). These alterations may promote mucosal damage, dysbiosis, and oxidative stress, ultimately leading to immune response and inflammation of the vagina.¹⁹ Regardless of the initial triggering factor, over time, sustained epithelial injury and microbial imbalance may contribute to chronic vaginitis.

A vaginal culture performed 2 years earlier by the referring veterinarian had revealed increased growth of *Streptococcus canis*. Over several years, the cat had been treated intermittently with systemic antibiotics (amoxicillin-clavulanic acid and doxycycline) that helped to reduce vaginal discharge but did not achieve complete resolution. Bacteria are known to carry antimicrobial resistance genes, regardless of whether the host has previously received antimicrobial treatment. Exposure to antimicrobials can increase the proportion of resistant bacteria within the population.¹⁷ Consequently, antimicrobial treatment may alter the population of commensal bacteria and increase the risk of urogenital tract colonization with potentially pathogenic bacteria.²⁰ In this context, performing a vaginal bacterial culture was not considered relevant in this case. Once the underlying source of inflammation was identified and the retained bone fragments were removed, the likelihood of a primary bacterial infection appeared low, and the value of performing a bacterial culture was reduced; it was considered that the long-term presence of these foreign bodies likely acted as both a

persistent mechanical irritant and a nidus for secondary bacterial colonization. Similarly, a vaginal smear was not performed at the initial presentation, due to the animal's signs of local discomfort and was instead scheduled to be carried out during the vaginal examination under general anesthesia. In addition, the diagnostic value of a vaginal smear for demonstrating vaginal inflammation was reduced, as purulent discharge was already visible at the vulvar entrance, indicating the presence of inflammation. During vaginal examination, the identification of bone fragments was sufficient to explain the observed inflammation; therefore, vaginal cytology was not considered.

Treatment of vaginitis due to foreign bodies requires removal of the offending material and management of the associated inflammation.^{3,4,7} In the present case, definitive treatment was achieved once retained fetal bones were successfully removed. In accordance with current veterinary antimicrobial stewardship principles and outcome-based evidence indicating limited benefit of prophylactic or postoperative antibiotics in many clean or clean-contaminated soft tissue procedures, postoperative antimicrobials were therefore withheld.²⁰ Resolution of vaginal discharge within 2 weeks further supported that elimination of the foreign material was sufficient to resolve the inflammatory process.

Conclusion

We described a cat that had a 7-year history of chronic vaginal discharge caused by long-term retention of fetal bone fragments; their removal allowed rapid and complete resolution of clinical signs. Therefore, in cats with chronic or recurrent vaginal discharge, particularly when a history of dystocia or abortion is suspected, careful vaginal examination should be considered early in the diagnostic work up to rule out retained fetal material(s). In such cases, removal of the retained foreign bodies remains the specific treatment.

Key learning points

- Vaginal retention of fetal bone is rare but not uncommon in female cats.
- Vaginal foreign bodies should be considered in cats with chronic or recurrent vaginal discharge, particularly when there is a history of dystocia or abortion.
- Long-term vaginal retention of fetal bone fragments may remain undiagnosed for years, as such foreign bodies can induce sustained local inflammation with minimal or no systemic clinical signs.
- Thorough vaginal examination or vaginoscopy represents a key first-line diagnostic approach in such cases that may allow both diagnostic and immediate treatment.
- Antibiotic therapy alone in vaginitis with foreign body is unlikely to result in complete clinical resolution; definitive treatment requires removal of the cause of inflammation.

Declaration of generative AI and AI-assisted technologies in the writing process:

During the preparation of this work, artificial intelligence tools, including ChatGPT (OpenAI), were used exclusively for language refinement, text rephrasing, and correction of grammatical or typographical errors. All scientific content, data interpretation, and conclusions remain the sole responsibility of the authors.

Authors' contribution statement and agreement

MC: case management, writing original draft; and AG: case supervision and reviewing. Authors have read and approved final submission.

Conflict of interest

None to report.

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