CVJ CLUJ VETERINARY JOURNAL

Case report

Splenic Abscessation Due to a Migrating Grass Awn in a Cat

Alexandr Morozov [1,*], Caren Dolgopolov [2] and Ivan Manchev [2]

[1] Moldova State University, Institute of Zoology, Center of Research of Biological Invasions, Laboratory of Systematics and Molecular Phylogeny, MD-2028 Chişinău, Republic of Moldova; alexandr.morozov@sti.usm.md
[2] Ciavdar Private Clinic, Chişinău, Republic of Moldova; carendolgopolov@gmail.com (C.D.); ivan-manchev89@gmail.com (I.M.)
* Correspondence: alexandr.morozov@sti.usm.md;

Abstract: Migrating grass awns are a recognized cause of foreign-body inflammation and abscessation in dogs and cats; however, splenic involvement in feline patients is exceptionally rare. To the best of our knowledge, this is the second documented feline case of splenic abscessation associated with a migrating plant foreign body. This report describes a 6-year-old domestic shorthair cat that presented with pyrexia, anorexia and a mass in the left cranial abdomen. Ultrasonography revealed focal splenic lesions, and exploratory laparoscopy identified a splenic abscess with localized peritonitis. The procedure was converted to exploratory coeliotomy and total splenectomy. Histopathological examination showed multiple abscesses, microinfarctions and a plant awn embedded in the spleen. This case highlights the importance of considering migrating foreign bodies in the differential diagnosis of atypical splenic lesions and demonstrates that surgical intervention can result in a favorable short-term outcome.

Keywords: grass awn; splenic abscess; migrating foreign body; plant foreign body; splenectomy; cat

Received: 23.06.2026
Accepted: 24.07.2026
Published: 03.08.2026

DOI:10.52331/v31i36j09

Copyright: © 2021 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).

1. Introduction

Grass awns (foxtails) are fusiform plant structures with sharp tips and backward-pointing barbs that favor unidirectional penetration and continued migration through tissue [1–3]. Entry may occur through the skin or a natural orifice, including the respiratory and gastrointestinal tracts; subsequent migration can cause chronic inflammatory tracts, granulomas and abscesses. Because the plant material is small and may be poorly conspicuous on routine imaging, the foreign body itself may not be identified even when secondary lesions are evident [3,4]. Splenic involvement is exceedingly rare in any species, and plant foreign bodies in the feline spleen have been reported only rarely [5]. A PubMed search performed on 10 March 2026, using combinations of the terms cat/feline, spleen/splenic and grass awn/foxtail/plant material/foreign body, identified only one previously published feline case in which plant material was embedded in the spleen and managed by splenectomy [5]. The present report describes an additional case of splenic abscessation associated with a migrating vegetal foreign body in a cat.

2. Materials and Methods

A six-year-old neutered male domestic shorthair cat with outdoor access presented with a five-day history of inappetence and intermittent pyrexia. On admission, the cat was quiet but responsive. Rectal temperature was 39.4 °C (adult reference 36.7–38.9 °C) [6]. Oral mucous membranes were pale and tacky, and skin tent was mildly prolonged. Heart rate was 180 beats/min. Respiratory rate was 58 breaths/min, which is within the range reported for cats examined in veterinary consultation rooms [7]. On abdominal palpation, a firm mass was detected in the left cranial abdomen.

As part of the diagnostic work-up, the following tests were conducted: haematology with manual blood-smear review (including platelet aggregation assessment), erythro-

cyte sedimentation rate, serum biochemistry, abdominal ultrasonography (Mindray Vetus 7, micro-convex transducer at 5–8 MHz), thoracic radiography in right lateral and ventrodorsal views (Mindray Vetix S300; 40–55 kVp, 2–4 mAs), and buccal mucosal bleeding time.

A diagnostic laparoscopy was undertaken initially to inspect the abdominal cavity; after purulent effusion and a splenic abscess were identified, the procedure was converted to a ventral midline coeliotomy for definitive source control. General anaesthesia was induced with propofol (4 mg/kg intravenously; PropoFlo, Zoetis, USA) after premedication with butorphanol (0.3 mg/kg intramuscularly (IM); Butomidor, Richter Pharma, Austria) and midazolam (0.2 mg/kg IM; B. Braun, Germany). Anaesthesia was maintained with isoflurane in oxygen. Broad-spectrum perioperative antimicrobial therapy was administered because infection was strongly suspected. The cat received amoxicillin–clavulanate (20 mg/kg intravenously every 12 h; Amoxigard 140 mg/mL, Nita-Farm, Russia) in accordance with local veterinary guidelines [8]. Analgesia comprised tramadol (2 mg/kg intravenously every 12 h; Tramadol 50 mg/mL, KRKA, Slovenia) and meloxicam (0.1 mg/kg subcutaneously; Meloxivet 5 mg/mL, Provet, Ukraine). Intravenous fluid therapy consisted of a balanced crystalloid solution (Ringer's lactate, Infomed, Moldova) delivered by infusion pump (Mindray BeneFusion, China) at 4 mL/kg/h during anaesthesia.

A total splenectomy was performed using a standard hilar approach. The splenic vascular pedicle and major hilar branches were isolated and ligated in a routine manner prior to transection, using 2 metric polydioxanone suture (PDS II; Ethicon, USA). Total operative time was approximately 95 min, and estimated intraoperative blood loss was approximately 25 mL. The abdominal cavity was thoroughly lavaged with copious volumes of warm 0.9% sterile saline (Iuria-Farm, Republic of Moldova).

The coeliotomy incision was closed routinely in layers: the abdominal wall (linea alba) with a simple continuous pattern using 2 metric polydioxanone (PDS II; Ethicon, USA), and the subcutaneous tissue and skin with simple interrupted sutures using 4-0 poliglecaprone 25 (Monocryl; Ethicon, USA). The excised spleen was submitted for histopathological analysis. Before closure, a homemade active closed-suction drain was placed in the abdominal cavity.

Histological sections of the excised spleen were stained with haematoxylin and eosin (H&E) and examined using a Motic Panthera DL light microscope (Motic, China) equipped with a UC-MF 10×/22 eyepiece (10× magnification; field number 22 mm) and 10× and 20× objectives. Representative fields were photographed using the 10× and 20× objectives; with the 10× eyepiece, these corresponded to nominal visual magnifications of 100× and 200×, respectively. Image scale was calibrated with a stage micrometer graduated in 0.01-mm divisions.

3. Results

Haematology demonstrated anaemia (haemoglobin 8.0 g/dL; reference interval: 10–16 g/dL), marked leucocytosis (16 × 10^9/L; reference interval: 5–14 × 10^9/L) characterized by neutrophilia with a left shift (65% segmented and 17% band neutrophils), and severe thrombocytopenia on the automated count (37 × 10^9/L; reference interval: 180–500 × 10^9/L). Manual review of a blood smear, including assessment for platelet aggregation, showed an adequate platelet estimate, raising suspicion that the automated platelet count was spuriously low. The erythrocyte sedimentation rate was markedly increased (70 mm/h; reference interval: <20 mm/h). Serum biochemistry demonstrated a mild increase in total protein (81 g/L; reference interval: 60–80 g/L). Other measured biochemical parameters were within reference intervals.

Ultrasonography (Figure 1a, b) showed an unevenly enlarged spleen with irregular but well-defined external margins and diffusely heterogeneous, moderately hypoechoic parenchyma. Two principal focal lesions, each approximately 1–2 cm in diameter, were hypoechoic to anechoic, with heterogeneous internal echogenicity, fine echogenic septations and irregular, poorly defined margins. Multiple hyperechoic foci casting distal acoustic shadowing were interpreted as possible mineralization. The splenic veins were mildly dilated. The adjacent omentum was moderately hyperechoic, consistent with focal omentitis, and a small volume of anechoic free fluid was present adjacent to the splenic tail. No discrete foreign body was visualized.

Thoracic radiography detected no pulmonary or mediastinal abnormalities. Buccal mucosal bleeding time (BMBT) was 3.5 min (reference interval: <4 min). Given the severely reduced automated platelet count, perioperative transfusion was considered; however, neither feline blood products nor a suitable donor were available.

Differential diagnoses included splenic abscess or granuloma, haematoma, lymphoma and haemangiosarcoma. The cavitary lesions and adjacent inflammatory change favored an inflammatory or infectious process, although neoplasia could not be excluded on ultrasonography alone. At laparoscopy, purulent effusion, fluctuant encapsulated splenic nodules and dense inflammatory adhesions made lymphoma and haemangiosarcoma less likely; histopathological examination subsequently excluded neoplasia.

On laparoscopic examination, the spleen appeared moderately enlarged and was adherent to the omentum and intestinal loops. A small amount of perisplenic fibrinous exudate and approximately 30 mL of purulent free fluid were observed; the volume was estimated visually during laparoscopy. Further exploration revealed several well-defined, encapsulated nodular lesions on the splenic surface, with firm adhesions to the adjacent mesentery, omentum, intestinal loops and abdominal wall. The lesions were fluctuant on palpation, suggesting fluid content; however, no rupture, penetrating wound or visible foreign material was observed at this stage. The procedure was converted to open coeliotomy.

Following surgery, the cat recovered steadily without complications. Within 48 h, appetite resumed, and body temperature stabilized at 38.3 °C (adult reference range: 36.7–38.9 °C) [6]. The patient received intravenous Ringer's solution (Iuria-Farm, Republic of Moldova) at 4 mL/kg/h for the first 24 h postoperatively. Antimicrobial therapy was continued with amoxicillin–clavulanate (Clavusan; KRKA, Slovenia) administered orally at 12.5 mg/kg every 12 h for 7 days. Analgesia was maintained with meloxicam (0.05 mg/kg per os once daily; Meloxivet 5 mg/mL, Provet, Ukraine) for 3 days postoperatively.

Postoperative haematology was performed to monitor recovery. Two days after surgery, haemoglobin was 10.0 g/dL (reference interval: 10–16 g/dL), platelets were 152 × 10^9/L (reference interval: 180–500 × 10^9/L), and white blood cells were 20.2 × 10^9/L (reference interval: 5–14 × 10^9/L).

The cat was discharged 48 h postoperatively with the drain in place and instructions for drain care, output monitoring and recognition of complications. Outpatient management was considered acceptable because the cat was clinically stable, a medically trained member of the household could provide the required care, and prompt re-evaluation was available.

Gross pathological examination of the excised spleen revealed multiple thick-walled cavities containing purulent material distributed throughout the parenchyma. Approximately 40–50% of the organ was estimated grossly to have been replaced by firm connective tissue. Several small, sharply demarcated infarcts were also evident on the capsular and cut surfaces. Within one of the abscess cavities, a linear fragment of plant material consistent with a grass awn, approximately 4 cm in length, was identified (Figure 1c–e).

Microscopically, in the affected regions, normal splenic architecture was completely effaced by severe pyogranulomatous inflammation, characterized by areas of coagulative necrosis surrounded by dense infiltrates of neutrophils, macrophages, lymphocytes and proliferating fibroblasts. Multifocal granulomas were present, and numerous small blood vessels showed thrombosis and disruption, correlating with the grossly observed microinfarcts. Multiple irregular refractile fragments of foreign material with preserved, regularly compartmentalized cellular architecture and discernible cell walls, consistent with plant tissue, were present within the affected splenic tissue (Figure 2). Clear spaces surrounded some fragments, which were closely associated with inflammatory and fibrous tissue. No evidence of neoplasia was detected in any examined section.

The abdominal drain produced a total of 10–15 mL of serosanguineous fluid and was removed without sedation four days postoperatively. The cat remained normothermic (38.3 °C; adult reference 36.7–38.9 °C). The incision was clean, with no swelling or discharge. At the two-week follow-up, the cat was bright, alert and eating well, and the surgical site had healed.

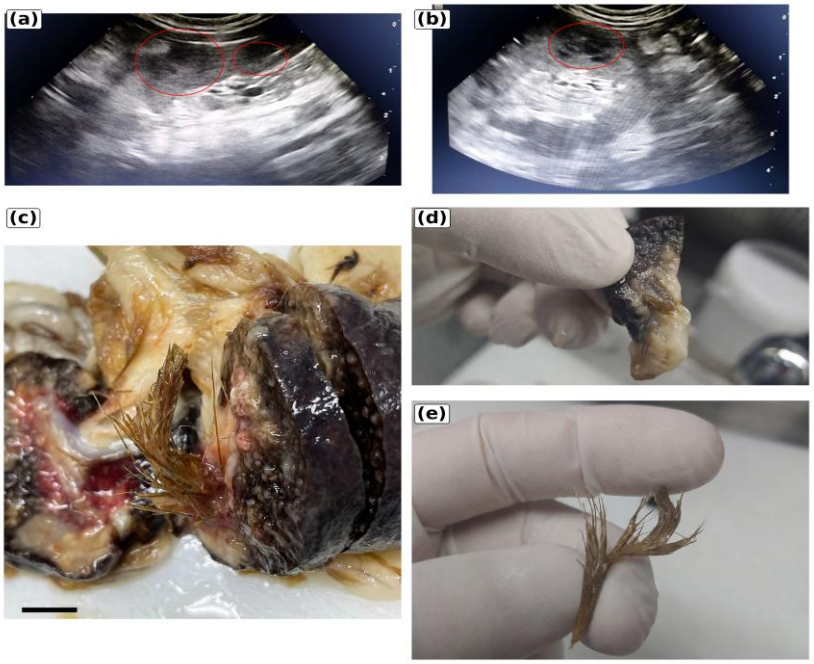


Figure 1. Composite imaging and gross pathological findings: (**a**,**b**) ultrasonographic appearance of heterogeneous cavitary splenic lesions with irregular internal architecture; (**c**) cross-section of the spleen demonstrating intraparenchymal abscessation and necrosis, with the plant awn visible in situ (scale bar = 1 cm); (**d**) gross appearance of the excised spleen with the foreign body in situ; (**e**) the approximately 4-cm barbed plant awn removed from the splenic abscess after splenectomy. Red circles indicate the focal splenic lesions.

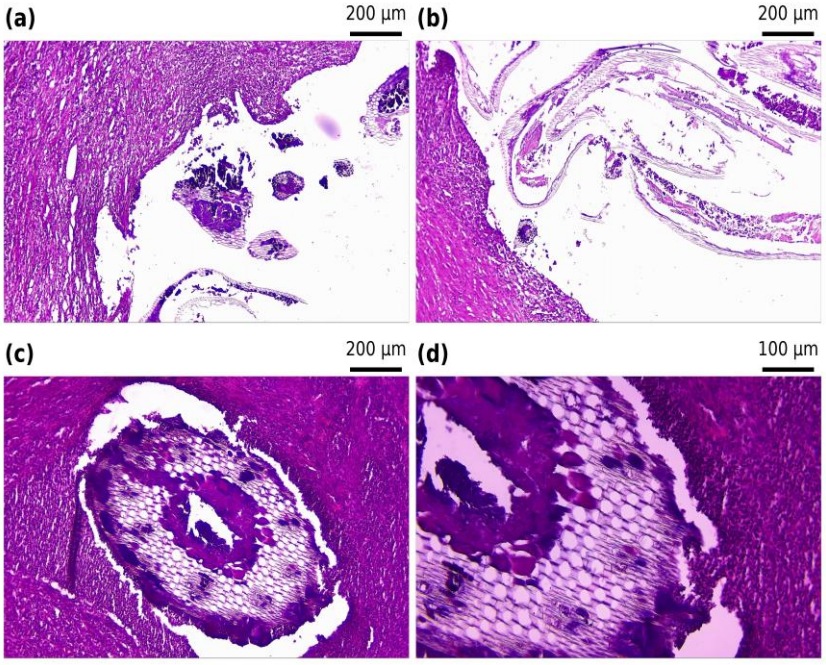


Figure 2. Histological appearance of plant material within the splenic lesion (H&E). (**a**, **b**) Photomicrographs obtained using a 10× objective, showing multiple irregular fragments with preserved, compartmentalized plant cellular architecture; clear spaces surround some fragments, with adjacent inflammatory and fibrous tissue. (**c**) obtained using a 10× objective, showing a larger plant fragment within the lesion. (**d**) Photomicrograph of the same fragment obtained using a 20× objective, demonstrating its organized cellular architecture and preserved cell walls.

4. Discussion

The initial haematological abnormalities (marked leucocytosis with a left shift, an apparently severe thrombocytopenia on the automated count and elevated erythrocyte sedimentation rate (ESR)) were consistent with an acute inflammatory or septic process. The discrepancy between the automated platelet count and the adequate platelet estimate on blood smear suggested pseudothrombocytopenia or analyzer underestimation; platelet clumping is common in feline samples. Inflammatory consumption and splenic sequestration could not be excluded. The rapid postoperative increase in platelet count was compatible with a transient process but did not distinguish among these possibilities. Although the BMBT was within the reference interval, this did not exclude a consumptive or evolving coagulopathy in the context of systemic inflammation.

ESR is a non-specific inflammatory marker that can increase during infection [9,10]. It was used in this case because the assay was locally available, whereas serum amyloid A, C-reactive protein and alpha-1 acid glycoprotein assays were unavailable. The absence of these more commonly used inflammatory biomarkers is a limitation. A complete blood count was repeated 48 h postoperatively to monitor the response to source control. Haemoglobin and platelet count increased, whereas the leucocyte count remained elevated; leucocyte counts are non-specific and may not decline within the first 48 h despite effective treatment [11].

Ultrasonography is a practical first-line imaging modality when a migrating plant foreign body is suspected. The foreign body is not always visualized directly, whereas secondary lesions along its migration path are often detectable [3]. Computed tomography (CT) can assist localization and surgical planning, but direct visualization is inconsistent: in a series of 44 dogs and 10 cats with confirmed grass seed foreign bodies, the seed was visible on CT in 19% of cases, while secondary lesions were visible in 96% [4]. CT might have provided additional information in the present case but was not available, which is a limitation.

The migration route could not be established. Ingestion followed by transmural migration from the stomach or adjacent gastrointestinal tract is anatomically plausible because of the spleen's position in the left cranial abdomen. Inhalation with caudal migration through the thorax and transdiaphragmatic extension is an alternative route [1–4]. The absence of thoracic radiographic abnormalities and of a visible diaphragmatic tract made the respiratory route less strongly supported, although a healed migration tract cannot be excluded; no gastrointestinal perforation was identified at surgery either.

Ultrasonographic splenic lesions in cats are non-specific, and imaging alone cannot reliably distinguish inflammatory from neoplastic disease [12]. Non-neoplastic lesions such as haematoma or hyperplasia accounted for only 4% (19/455) of submissions in a pathology-based survey [13], and neoplasia was diagnosed in 81% (50/62) of cats in a recent referral cohort undergoing splenectomy [14]. Lymphoma and haemangiosarcoma therefore remained initial considerations. At surgery, however, purulent rather than haemorrhagic effusion, fluctuant encapsulated lesions and dense inflammatory adhesions favored abscessation; histopathological examination excluded neoplasia. Once an infectious splenic focus was identified in this case, open exploration and splenectomy provided definitive source control.

Diagnostic laparoscopy was used to assess the spleen and extent of peritoneal involvement, not to establish a definitive diagnosis by visual inspection alone. Once purulent effusion was identified, conversion to open coeliotomy allowed comprehensive exploration, lavage, tissue sampling and definitive source control [15].

Preoperative abdominocentesis was not performed, which is a limitation. Cytological evaluation and comparison of peripheral blood and peritoneal fluid glucose concentrations might have supported an earlier diagnosis of septic peritonitis [16] and prompted earlier surgical exploration.

Neither peritoneal nor abscess fluid was submitted for bacterial culture; consequently, the organisms involved remain unknown and antimicrobial therapy could not be tailored to culture and susceptibility results. This is a notable limitation.

Migrating vegetal foreign bodies can introduce mixed environmental and host flora, including *Staphylococcus*, *Streptococcus*, *Pasteurella*, *Escherichia coli*, *Actinomyces* and *Nocardia* species [17]. *Actinomyces* species are anaerobic or facultatively anaerobic, whereas *Nocardia* species are aerobic, and both may require specific culture conditions [17,18]. *Staphylococcus* species and *E. coli* have also been commonly isolated from inhaled plant foreign bodies [19]. Empirical antimicrobial therapy should ideally provide coverage against likely aerobic and anaerobic pathogens and should be adjusted when culture and susceptibility results become available. Amoxicillin–clavulanate was selected empirically in this case; intraoperative culture would nevertheless have been preferable.

The homemade closed-suction drain was used because a commercial system was unavailable. Evidence has not established a single optimal approach to abdominal closure or drainage in septic peritonitis, and no consistent survival benefit has been demonstrated for one method [20–24]. Closed-suction drainage can evacuate inflammatory exudate but carries risks including obstruction, loss of suction, loss of protein-rich fluid and ascending infection [20,23]. Discharge with the drain in place was an individualized decision based on the cat's clinical stability, the presence of a medically trained caregiver able to monitor the system, and access to prompt re-evaluation; it should not be considered routine practice.

Deep abdominal migration of vegetal foreign bodies is uncommon in cats. In the previously reported feline splenic case, plant material was identified only during splenectomy and had not been detected ultrasonographically [5]. A separate report described a retroperitoneal abscess in which the migrating awn was discovered only at a second surgery several months later [25]. These cases illustrate the diagnostic difficulty posed by small, non-radiopaque plant material and the importance of investigating persistent focal inflammatory lesions.

Fragmented plant material may histologically resemble exogenous fiber or suture material, particularly when viewed without gross context or when different planes of section produce repeated angular or elongated profiles. As an informal check, selected photomicrographs were shown without case information to two experienced pathologists, both of whom initially considered the structures to represent thread or suture material. This illustrates a potential interpretive pitfall. In this case, the repeated demonstration of organized, cell-walled architecture in multiple microscopic fields, together with gross recovery of a grass awn from the splenic lesion, supported a plant origin. Histological interpretation of foreign material should therefore be correlated with the surgical and gross pathological findings.

5. Conclusions

This case describes a migrating plant awn within the spleen of a cat, associated with abscessation and localized peritonitis. Total splenectomy and peritoneal lavage resulted in complete clinical recovery during the two-week follow-up period.

Author Contributions: Conceptualization, A.M. and C.D.; investigation, C.D. and I.M.; writing—original draft preparation, A.M.; writing—review and editing, A.M. and C.D.; visualization, A.M. and C.D.; supervision, C.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: This is a case report on a patient from a veterinary practice. It is not an animal study and accordingly no ethics application was submitted to the competent authority in advance.

Acknowledgments: The authors thank Dr. Alexandru Neguleanu for his assistance with the histopathological analysis of the splenic specimen. We are also grateful to Dr. Irina Kudrenko, the referring veterinarian, who initially examined the cat and facilitated the referral for diagnostics and treatment.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Brennan, K.E.; Ihrke, P.J. Grass awn migration in dogs and cats: A retrospective study of 182 cases. *J. Am. Vet. Med. Assoc.* **1983**, *182*, 1201–1204. https://doi.org/10.2460/javma.1983.182.11.1201.
2. Marx, M.B. Grass awn migration in dogs and cats. *J. Am. Vet. Med. Assoc.* **1983**, *183*, 390–410. https://doi.org/10.2460/javma.1983.183.04.390.
3. Caivano, D.; Corda, F.; Corda, A.; Moretti, G.; Bufalari, A. Application of ultrasound in detecting and removing migrating grass awns in dogs and cats: A systematic review. *Animals* **2023**, *13*, 2071. https://doi.org/10.3390/ani13132071.
4. Vansteenkiste, D.P.; Lee, K.C.L.; Lamb, C.R. Computed tomographic findings in 44 dogs and 10 cats with grass seed foreign bodies. *J. Small Anim. Pract.* **2014**, *55*, 579–584. https://doi.org/10.1111/jsap.12278.
5. Culp, W.T.N.; Aronson, L.R. Splenic foreign body in a cat. *J. Feline Med. Surg.* **2008**, *10*, 380–383. https://doi.org/10.1016/j.jfms.2007.12.005.
6. Levy, J.K.; Nutt, K.R.; Tucker, S.J. Reference interval for rectal temperature in healthy confined adult cats. *J. Feline Med. Surg.* **2015**, *17*, 950–952. https://doi.org/10.1177/1098612X15582081.
7. Dijkstra, E.; Teske, E.; Szatmári, V. Respiratory rate of clinically healthy cats measured in veterinary consultation rooms. *Vet. J.* **2018**, *234*, 96–101. https://doi.org/10.1016/j.tvjl.2018.02.014.
8. Perianu, T. *Tratat de Boli Infecțioase ale Animalelor: Bacterioze, Volume I*; Universitas XXI: Iași, Romania, 2011; pp. 48–57. ISBN 978-606-538-062-2.

9. Diamanti, D.; Pieroni, C.; Pennisi, M.G.; Marchetti, V.; Gori, E.; Paltrinieri, S.; Lubas, G. The erythrocyte sedimentation rate (ESR) in veterinary medicine: A focused review in dogs and cats. *Animals* **2025**, *15*, 246. https://doi.org/10.3390/ani15020246.
10. Gori, E.; Pasquini, A.; Paltrinieri, S.; Lubas, G.; Militello, C.; Diamanti, D.; Carletti, C.; Pantoli, M.; Marchetti, V. Prospective application of the erythrocyte sedimentation rate (ESR) as a possible inflammatory marker in feline patients. *Vet. Med. Int.* **2024**, *2024*, 2313447. https://doi.org/10.1155/2024/2313447.
11. Kaneko, J.J.; Harvey, J.W.; Bruss, M.L., Eds. *Clinical Biochemistry of Domestic Animals*; 6th ed.; Academic Press: San Diego, CA, USA, 2008; pp. 117–118. https://doi.org/10.1016/B978-0-12-370491-7.X0001-3.
12. Bertal, M.; Norman Carmel, E.; Diana, A.; Desquilbet, L.; Specchi, S.; Pey, P. Association between ultrasonographic appearance of splenic parenchyma and cytology in cats. *J. Feline Med. Surg.* **2018**, *20*, 23–29. https://doi.org/10.1177/1098612X17697483.
13. Spangler, W.L.; Culbertson, M.R. Prevalence and type of splenic diseases in cats: 455 cases (1985–1991). *J. Am. Vet. Med. Assoc.* **1992**, *201*, 773–776. https://doi.org/10.2460/javma.1992.201.05.773.
14. Rossanese, M.; Williams, H.; De La Puerta, B.; Scott, P.; Chanoit, G.; Guillén, A. Prevalence of malignancy and factors affecting outcome of cats undergoing splenectomy. *J. Am. Vet. Med. Assoc.* **2023**, *261*, 1646–1652. https://doi.org/10.2460/javma.23.05.0258.
15. Campbell, B.G.; O'Marra, S.K. Diagnosis and surgical management of septic peritonitis in small animals: A review. *Vet. Surg.* **2026**, *55*, 13–31. https://doi.org/10.1111/vsu.70024.
16. Bonczynski, J.J.; Ludwig, L.L.; Barton, L.J.; Loar, A.; Peterson, M.E. Comparison of peritoneal fluid and peripheral blood pH, bicarbonate, glucose, and lactate concentration as a diagnostic tool for septic peritonitis in dogs and cats. *Vet. Surg.* **2003**, *32*, 161–166. https://doi.org/10.1053/jvet.2003.50005.
17. Whitney, J.; Barrs, V.R. Actinomycosis, nocardiosis, and mycobacterial infections. In *Clinical Small Animal Internal Medicine*; Bruyette, D.S., Ed.; Wiley-Blackwell: Hoboken, NJ, USA, 2020; pp. 977–984. https://doi.org/10.1002/9781119501237.ch108.
18. Clauss, H.E.; Lorber, B. Nocardiosis and actinomycosis. In *Principles and Practice of Transplant Infectious Diseases*; Safdar, A., Ed.; Springer: New York, NY, USA, 2019; pp. 473–480. https://doi.org/10.1007/978-1-4939-9034-4_27.
19. Flisi, S.; Dall'Aglio, M.; Spadini, C.; Cabassi, C.S.; Quintavalla, F. Microbial isolates from vegetable foreign bodies inhaled by dogs. *Vet. Med. Int.* **2018**, *2018*, 3089282. https://doi.org/10.1155/2018/3089282.
20. Mueller, M.G.; Ludwig, L.L.; Barton, L.J. Use of closed-suction drains to treat generalized peritonitis in dogs and cats: 40 cases (1997–1999). *J. Am. Vet. Med. Assoc.* **2001**, *219*, 789–794. https://doi.org/10.2460/javma.2001.219.789.
21. Staatz, A.J.; Monnet, E.; Seim, H.B. Open peritoneal drainage versus primary closure for the treatment of septic peritonitis in dogs and cats: 42 cases (1993–1999). *Vet. Surg.* **2002**, *31*, 174–180. https://doi.org/10.1053/jvet.2002.31043.
22. Greenfield, C.L.; Walshaw, R. Open peritoneal drainage for treatment of contaminated peritoneal cavity and septic peritonitis in dogs and cats: 24 cases (1980–1986). *J. Am. Vet. Med. Assoc.* **1987**, *191*, 100–105. https://doi.org/10.2460/javma.1987.191.01.100.
23. Culp, W.T.N.; Holt, D.E. Septic peritonitis. *Compend. Contin. Educ. Vet.* **2010**, *32*, E1–E14. Available online: https://vetfolio.s3.amazonaws.com/ae/f4/70668f0243289be84ffda261cd40/septic-peritonitis.pdf (accessed on 29 July 2026).
24. Zorn, C.M.; Walton, R.A.L.; McKeen, L.; Mochel, J.P.; Ward, M.; Blong, A.E. Retrospective comparison of outcomes in septic peritonitis with or without closed-suction abdominal drainage in 115 dogs (2009–2019). *Vet. Anim. Sci.* **2023**, *21*, 100304. https://doi.org/10.1016/j.vas.2023.100304.
25. Mastora, H.; Papazoglou, L.G.; Patsikas, M.; Kirmanidou, G.; Donas, A. Retroperitoneal abscess associated with a migrating grass awn in a cat: Treatment with omentalization and grass awn removal. *Top. Companion Anim. Med.* **2018**, *33*, 97–99. https://doi.org/10.1053/j.tcam.2018.08.007.