# ANALYSIS OF *FELINE AORTIC THROMBOEMBOLISM* CASES: A LITERATURE REVIEW FROM 2014 TO 2023

## Analisis kasus feline aortic thromboembolism: tinjauan literatur periode 2014-2023

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## Abstract

Feline Aortic Thromboembolism (FATE) is a condition with a poor prognosis. This case is also commonly called 'saddle thrombus', occurs when a thrombus forms in one part of the circulation which becomes embolized (aortic trifurcation), which is an area where the aorta branches in the pelvis to the right and left iliac arteries. This case study aims to elaborate on the etiology, clinical symptoms, treatment and prevention of Feline Aortic Thromboembolism cases. This research is a literature review using descriptive and systematic methods on 21 cases of Feline Aortic Thromboembolism obtained from 20 journals during the 2014-2023 period. The diagnosis of Feline Aortic Thromboembolism (FATE) can be determined from the dominan clinical symptoms that appear including paralysis/paresis (24%) unilaterally and (67%) bilaterally, cold paw (38%) and paw discoloration/cyanosis (29%). The results of supporting examinations that can be used to confirm the diagnosis of FATE include Echocardiography examination which was carried out in 15 of 21 cases (72%), Hematology examination (43%) which was carried out in 9 of 21 FATE cases, and Blood Chemistry (57%). Treatment for cats in cases of Feline Aortic Thromboembolism (FATE) includes administration of antiplatelets (57%), administration of anticoagulants (52%), as well as administration of analgesics and heart treatment (33%). The results of this paper provide a good understanding of the clinical symptoms, diagnosis and appropriate therapy regarding one of the rare cases in cats, namely Feline Aortic Thromboembolism.

Keywords: Aortic thromboembolism, descriptive analysis, feline

## Abstrak

*Feline Aortic Thromboembolism* (FATE) merupakan salah satu kondisi dengan prognosa yang kurang baik. Kasus ini juga biasa disebut dengan '*saddle thrombus*', terjadi ketika thrombus terbentuk di salah satu bagian sirkulasi yang menjadi emboli (trifurkasi aorta), yang merupakan area dimana aorta bercabang di bagian pelvis ke arteri dexter maupun sinister illiaca. Studi kasus ini bertujuan untuk mengelaborasi etiologi, gejala klinis, penanganan dan pencegahan kasus *Feline Aortic Thromboembolism*. Penelitian ini merupakan tinjauan literatur dengan metode deskriptif dan sistematik terhadap 21 kasus *Feline Aortic Thromboembolism* yang diperoleh dari 20 jurnal selama periode 2014-2023. Diagnosa *Feline Aortic Thromboembolism* (FATE) dapat ditentukan dari gejala klinis paling

dominan yang muncul meliputi kelumpuhan/paresis (24%) unilatertal dan (67%) bilateral, *cold paw* (38%) dan perubahan warna paw/sianosis (29%). Hasil pemeriksaan penunjang yang dapat digunakan dalam peneguhan diagnosa FATE, meliputi pemeriksaan *Echocardiography* yang dilakukan pada 15 dari 21 kasus (72%), pemeriksaan *Hematology* (43%) yang dilakukan pada 9 dari 21 kasus FATE, dan *Blood Chemistry* (57%). Pengobatan kucing pada kasus *Feline Aortic Thromboembolism* (FATE) meliputi pemberian antiplatelet (57%), pemberian antikoagulan (52%), serta pemberian analgesik dan *heart treatment* (33%). Hasil penulisan ini memberikan pemahaman baik dari gejala klinis, diagnosa, dan terapi yang tepat mengenai salah satu kasus yang jarang terjadi pada kucing yaitu *Feline Aortic Thromboembolism.*

Kata kunci: Aortic thromboembolis, analisa deskriptif, kucing

## INTRODUCTION

Feline Aortic Thromboembolism (FATE) is one of the severe emergency conditions in cats. This condition, also commonly referred to as 'saddle thrombus,' occurs when a thrombus forms in one of the circulatory regions that serves as an embolus (trifurcation of the aorta), which is the area where the aorta branches into the pelvic arteries, namely the dexter and sinister iliac arteries. Cats are highly susceptible to ATE compared to other species, partly (though not entirely) due to the high prevalence of myocardial disease. The prevalence rate of this condition in Indonesia has not been extensively elucidated, but in the United States, it has a prevalence rate of 12%, encompassing 79-85% of cases occurring in cats with a very low survival rate ranging from 14% to 40% when infarction occurs in bilateral pelvic limbs (Gonzalez, 2020; Locquet *et al.*, 2018; Vezzosi *et al.*, 2020).

Cats with Aortic Thromboembolism often experience pain and difficulty in sudden mobilization accompanied by acute vocalization. The emerging characterization is indicated by the '5P': pain, paresis, pulseless, pallor, and polar. It can be said that the affected body parts will exhibit pain, paresis (paralysis/decreased muscle strength), impalpable pulse, discoloration of footpads (cyanosis), and a sense of coldness. Dyspnea and panting may occur as a result of pain. The prognosis of this condition is cautiously considered, as a study reported that 61% of cats are euthanized when this condition first occurs, and the majority of cases are bilateral (78%) (Locquet *et al.*, 2018; Mitropoulou *et al.*, 2022; Vezzosi *et al.*, 2020).

The exact etiology of Feline Aortic Thromboembolism (FATE) is unknown, possibly occurring as a complication of Hypertrophic Cardiomyopathy (HCM). However, other causes such as neoplasia and hyperthyroidism have also been reported. Cats with a history of HCM have a 5-21% incidence of ATE. Therefore, the objective of this case study is to elaborate on the etiology, clinical symptoms, management, and prevention of Feline Aortic Thromboembolism.

## RESEARCH METHODS

The data collection techniques employed in this Literature Review were executed with a comprehensive approach, involving screening and classification based on predefined criteria including the identification of signalments, anamnesis, physical examination, supporting diagnostic procedures, as well as the diagnosis and treatment protocols associated with Feline Aortic Thromboembolism cases. Primary data for this study were derived from international case reports spanning the preceding 9 years, from 2014 to 2023. Additionally, secondary data were meticulously sourced from authoritative textbooks, peer-reviewed journals, and institutional repositories, ensuring a comprehensive scope of information pertinent to Feline Aortic Thromboembolism cases. The analysis and literature review concerning Feline Aortic Thromboembolism cases involved a meticulous examination of 21 case reports derived from 20 veterinary medicine literature sources. Through the literature review, a systematic and

transparent analysis was undertaken, involving the examination and description of data to form interpretative patterns related to existing propositions, theories, methodologies, and findings concerning the diagnosis and management of Feline Aortic Thromboembolism cases.

## Signalments and Anamnesis

Based on the literature review concerning cases of Feline Aortic Thromboembolism (FATE), as depicted in Table 1, it is observed that out of 21 cats used as subjects in case reports, Aortic Thromboembolism patients comprised 67% Domestic Shorthair, along with 5% of cats from various breeds such as Domestic Longhair, Mixed-breed, Persian, Siamese, and Scottish Fold. Additionally, through signalments, it was found that 43% of Feline Aortic Thromboembolism patients were male cats, 33% were female cats, and the remaining 19% had an unknown gender. The presentation of Feline Aortic Thromboembolism (FATE) can occur at various ages, ranging from 7 months to 14 years. The majority of cats fall into the Mature and Senior age categories (28%; 7-10 years and 11-14 years), 14% are in the Junior age group (7-24 months), and 19% are in the Adult age group (3-6 years), with 9% having unknown ages.

Based on the literature review of Feline Aortic Thromboembolism (FATE) cases, it was found that out of the 21 cats used as case subjects, the main complaints reported by owners of cats with Aortic Thromboembolism were clinical symptoms such as paralysis/paresis (24%) either unilateral or bilateral, pale (15%), and cold paws (38%). Additionally, specific conditions mentioned by certain individuals include vomiting (5%), lack of appetite, and vocalization (10%).

## Physical Examination and Clinical Findings

Based on the literature review on the results of physical examinations, various clinical findings characteristic of Feline Aortic Thromboembolism (FATE) cases were identified. The largest percentage was cyanosis (29%), occurring due to an increase in the amount of deoxygenated hemoglobin caused by obstructive factors (thromboemboli), vasoconstriction (hypothermia), arterial supply reduction, pulseless femoral artery (62%), which was attributed to the lack of detection of pulsus (62%). Other observed manifestations included tachypnea (48%), tachycardia (38%), conditions such as heart murmur (14%), and dyspnea (5%). Additionally, hypothermia (33%), dehydration (19%), lack of sensory response (5%), and lack of motor response (14%) were noted.

## Diagnostic Tests

A comprehensive review of 21 case reports related to Feline Aortic Thromboembolism (FATE) identified seven diagnostic ancillary investigation methods for confirming the diagnosis. These methods encompassed Echocardiography, conducted in 15 out of 21 cases (72%), Hematology examination (43%) performed in 9 out of 21 FATE cases, Blood Chemistry (57%), Radiography (38%), Abdominal Ultrasonography for visualizing the aortic trifurcation with Doppler technique (5%), Thermographic imaging (5%), and CT Scan (5%).

## Echocardiography

Echocardiography examination in cases of Feline Aortic Thromboembolism (FATE) serves as a support for 21 cases. In the examination, clinical pathological findings were observed, including left atrial dilatation (29%), left ventricular hypertrophy (43%), and several clinical pathological findings found in only one individual (5%), such as right atrial dilatation, right ventricular hypertrophy, subvalvular aortic stenosis, and mitral valve thickening.

### Hematology

Hematology examination in cases of Feline Aortic Thromboembolism (FATE) serves as a support for 21 cases. The examination revealed clinical pathological findings, including lymphopenia (14%), polycythemia, leukocytosis, and thrombocytopenia (10%), and several clinical pathological findings found in only one individual (5%), such as microcytosis, granulocytosis, anemia, and neutrophilia.

### Blood Chemistry

Blood chemistry examination in cases of Feline Aortic Thromboembolism (FATE) revealed clinical pathological findings, including decreased blood urea and increased creatine kinase (24%), hyperglycemia, increased alkaline phosphatase, increased aspartate aminotransferase (14%), and several clinical pathological findings found in only one individual (5%), such as hyperproteinemia, increased creatinine, hypoproteinemia, and hyperkalemia.

### Radiography

Radiography examination in cases of Feline Aortic Thromboembolism (FATE) serves as a support for 21 cases. The examination revealed clinical pathological findings, including pulmonary edema (24%), cardiomegaly (14%), alveolar pattern, and peritoneal effusion (10%), and several clinical pathological findings found in only one individual, including hepatomegaly, splenomegaly, and renomegaly (5%).

### Other Diagnostic Tools

Other supporting examinations that can be used in diagnosing cases of Feline Aortic Thromboembolism (FATE) include CT scan, ultrasonography Doppler, and thermography. A summary of clinical pathological findings in other supporting examinations can be seen in Table 2.

### Diagnosis

Based on the results of signals, anamnesis, physical examination, clinical findings, and supporting examinations as described in each case report, the diagnosis derived from 21 cats is Aortic Thromboembolism, with clinical conditions characterized by hindlimb paresis in 24% unilateral and 67% bilateral. The exact etiology of Feline Aortic Thromboembolism (FATE) is unknown, possibly occurring as a complication of heart disease (Hypertrophic cardiomyopathy) and genetic influences. According to Szarkova et al (2022), in cats, this disease is more common in Ragdoll, Maine Coon, oriental breeds (Himalayan, Burmese, Sphynx, Persian), and Devon Rexes, but it is also frequently diagnosed in Domestic Short Hair cats. Other common causes related to HCM that need to be ruled out include aortic stenosis, dehydration, systemic hypertension, hyperthyroidism, and acromegaly.

### Treatment and Management

The treatment of Feline Aortic Thromboembolism (FATE) cases involves several aspects, including the administration of antiplatelet Aspirin (14%) and Clopidogrel (52%), anticoagulants Dalteparin (14%) and Enoxaparin (5%), Heparin (33%), thrombolytic treatment with Streptokinase (10%) and tPA (14%), administration of heart treatment Atenolol (10%), Benazepril (10%), Enalapril (5%), Furosemide (19%), and Pimobendan (5%), analgesics Bupivacaine (5%), Methadone (14%), and Tramadol (14%), anticonvulsants Buprenorphine (10%) and Gabapentin (10%), antibiotics Amoxicillin (10%) and Ampicillin, anti-inflammatory drugs Dipyrone (5%), Meloxicam (10%), and Prednisolone (10%), administration for digestive therapy Omeprazole (5%) and Ranitidine (5%), and antiemetic administration Famotidine (5%). A summary of therapy selection in managing Feline Aortic

Thromboembolism (FATE) cases found in the literature review from 2014 to 2023 can be seen in Table 3.

**Prognosis**

Prognosis is a medical term used to predict the development of a disease, including predictions regarding treatment, duration, and the ultimate outcome of a disease. Prognosis itself may arise after the diagnosis is made and usually before the treatment plan begins. Based on the analysis of literature case studies of Feline Aortic Thromboembolism (FATE) from 2014 to 2023, involving 21 cases, it was found that 3 cases (14%) died before treatment, and 2 cases were euthanized before treatment (10%). Five cases (24%) died after treatment, 5 cases (24%) survived after treatment and were euthanized with the owner's consent, 5 cases (24%) showed a positive response after treatment and survived, and 1 case (5%) underwent surgical embolectomy, and one and a half years after the operation, the cat showed no clinical signs of ATE or congestive heart failure. A summary of prognosis data for Feline Aortic Thromboembolism (FATE) cases found in the literature review from 2014 to 2023 can be seen in Table 4.

## RESULTS AND DISCUSSION

Feline Aortic Thromboembolism (FATE) is caused by slow blood flow in the atrium, resulting in diastolic dysfunction and abnormal atrial pressure. Thromboemboli refer to blood clots in the heart caused by left atrial enlargement, where the clots exit to the systemic circulation. This occurs when blood clots adhere to the peripheral circulation system, obstructing blood flow supplied by the blocked blood vessels to the heart. The commonly observed location is in the distal aorta (saddle thrombus) at the aortic trifurcation, leading to paralysis in both caudal extremities. Less frequently affected locations include cerebral, renal, or mesenteric arteries, with varied clinical presentations such as central nervous system signs, abdominal pain, gastrointestinal signs, and sudden death (Szarkova *et al*., 2022).

Clinical manifestations vary widely depending on the thrombus location, occlusion duration, and collateral circulation degree. Cats with FATE often experience severe pain, vocalization, and sudden paralysis. These signs are often misinterpreted by owners as resulting from trauma, such as a traffic accident. However, a distinctive saddle thrombus diagnosis, especially at the aortic trifurcation, can be achieved through clinical examination using the '5 P' terminology. Pain occurs due to neuromuscular ischemia resulting from blood vessel occlusion, paresis involves the dragging of one or more limbs due to thrombus-related blood vessel obstruction and muscle involvement, pulselessness is the absence of femoral pulse in the affected extremities due to undetectable pulsus caused by the thrombus, poikilothermia refers to the affected extremities feeling cold, and pallor, usually seen in the paw, appears pale or cyanotic in the affected extremities (Pavelkova, 2019).

Cats with ATE may also have a history of heart disease such as cardiomyopathy, but not all experience Chronic Heart Failure (CHF) during thromboembolic events. An increased respiratory rate is not automatically interpreted as CHF diagnostics; however, tachypnea can occur due to the pain experienced by the cat. Conversely, the detection of abnormal sounds during thoracic auscultation indicates the presence of CHF and potential pulmonary edema. Distinguishing between cats with a rapid respiratory rate related to pain or stress from those with pulmonary edema is challenging unless rales are identified during auscultation (Fuentes, 2012).

Echocardiography is recommended to diagnose underlying heart disease. However, a small percentage of cats with ATE do not show heart abnormalities on echocardiography. Most cats experience left atrium (LA) dilation, and some may have left ventricular systolic dysfunction.

Complete blood examination can be performed to assess the cat's condition. Some cats may show anemia, lymphopenia, microcytosis, and thrombocytopenia. Anemia is a condition where the number of red blood cells is below normal, lymphopenia is when the lymphocyte count in the bloodstream is lower than normal, microcytosis is a condition where red blood cells are smaller than normal, and thrombocytopenia is a condition of a low platelet count in the blood. Most cats will exhibit stress-induced hyperglycemia, and azotemia and hyperphosphatemia are also common. Azotemia is usually prerenal, though it can also be associated with renal artery thromboembolism. Typically, serum creatine kinase concentration dramatically increases due to muscle ischemia (Fuentes, 2012).

Chest radiography is used as a diagnostic test to confirm or even rule out the presence of CHF, especially if thoracic auscultation yields inconclusive results and the possibility of pulmonary pathology is considered. CHF can be caused by increased volume (valve disease), decreased muscle contractility, decreased blood flow, and increased pressure due to long-term stress, leading to ventricular wall thickening. ATE diagnosis in cats with hind limb paresis/paralysis is usually based on distinctive clinical findings from imaging results. Ultrasonographic imaging is commonly used to identify a thrombus in the terminal aorta. Thermography is a fast and non-invasive method relevant in emergencies for assessing vascular changes affecting a cat's hind limbs. Additional diagnostic tests confirm hypertrophic cardiomyopathy, and necropsy indicates the presence of a thrombus, aiding in determining the patient's prognosis (Locquet *et al.*, 2018; Silva *et al.*, 2022).

Cats displaying clinical signs and physical examination findings can undergo additional diagnostic tests to confirm ATE. ATE occurs due to the presence of a thrombus in the left atrium, which then breaks into smaller pieces and flows throughout the body via the aorta, forming emboli at the aortic trifurcation and disrupting blood flow. Thrombus formation in healthy individuals is coordinated through signaling pathways' interaction among platelets, coagulation factors, and the endothelium, resulting in appropriate hemostasis without the risk of inappropriate thrombosis. Intact endothelium in physiological conditions produces antithrombotic factors that help maintain thrombosis resistance, while damaged endothelial surfaces trigger the coagulation cascade. Platelets can also be activated through an alternative divergent pathway, leading to platelet plug formation with many platelets along with fibrinogen. Initially, the thrombus is rich in platelets but gradually becomes rich in fibrin, accompanied by the growth and maturation of blood clotting (Goggs *et al.*, 2012).

The management and treatment of ATE events can be divided into acute and long-term components. Acute ATE management includes: 1. providing pain management, 2. inducing a state of hypocoagulation to reduce further thrombus formation, 3. improving blood flow to the infarcted artery base, 4. treating concurrent CHF if present, and 5. providing supportive care. Antiplatelet agents are one of the treatments for FATE cases, where these drugs can improve collateral flow by reducing the amount of vasoactive substances released by platelets. Antiplatelet agents that can be used include Clopidogrel and Aspirin. Clopidogrel is given for thromboprophylaxis, reducing thrombus formation and the risk of thromboembolism. In its action, clopidogrel irreversibly binds to the ADP(2Y12) receptor on platelets, preventing primary and secondary platelet aggregation in response to stimulation. Aspirin, an NSAID used as an analgesic, anti-inflammatory, and antipyretic, is also used as therapy for its effects on platelet aggregation in DIC treatment and pulmonary artery disease in dogs, and in cats with cardiomyopathy (Ramsey, 2017).

The administration of anticoagulants aims to inhibit the coagulation cascade by interfering with the formation of one or more active coagulation factors. Anticoagulants that can be used include heparin, as well as low molecular weight dalteparin and enoxaparin. Indications for

anticoagulant administration include the treatment of thromboembolic complications and hypercoagulation syndrome. Cases of FATE can also be treated with thrombolytic therapy, resulting in a lower mortality rate; however, consideration is required in cases of cerebral or renal infarction, as this therapy is not recommended or even contraindicated with antiplatelet and anticoagulant agents. Reperfusion of suddenly ischemic tissues pushes ischemic metabolites, such as potassium and free oxygen species, into the bloodstream, causing reperfusion injury, a life-threatening complication leading to arrhythmia, kidney dysfunction, and acid-base disturbances (Locquet *et al*., 2018).

Opioid analgesics (Tramadol) should be administered at adequate doses and titrated to achieve the desired effect. Additionally, in the case of respiratory disturbances, oxygen supplementation should be provided without further compromising the patient. Inspiratory rhonchi and gallop rhythm strongly indicate concurrent congestive heart failure (CHF). In specific cases, methadone is also used for pain management, exhibiting pharmacological properties similar to morphine. Anticonvulsants, acting as antispasmodics and muscle relaxants, are used as analgesics with neurotransmitter regulation decline, indicated as adjunctive therapy for seizure treatment, chronic pain/neuropathic pain, contraindicated in animals with myasthenia gravis, kidney disorders, behavioral abnormalities, or severe liver disease. The anticonvulsants administered are buprenorphine and gabapentin. Some supportive drugs related to specific conditions in individuals, such as antibiotics, gastrointestinal treatment, and antiemetics, may be administered.

Based on history, clinical symptoms, physical examination, and diagnostic tests, a diagnosis of FATE in cats is associated with a poor prognosis. Due to this unfavorable prognosis, euthanasia is typically chosen as the preferred course of action. This decision is based on the severity of clinical signs and accompanying diseases. However, it is not ruled out that treatment in such cases can be successful, resulting in a good quality of life and the restoration of limb function, although some may experience irreversible muscle atrophy (Borgeat *et al*., 2014).

## CONCLUSION AND SUGGESTION

### Conclusion

The study reveals that Feline Aortic Thromboembolism primarily affects Domestic Shorthair breeds, with a higher incidence in males. Clinical symptoms typically manifest between the ages of 7 months and 14 years, predominantly affecting cats aged 7-14 years. Common diagnostic tools include Echocardiography, Hematology, Blood Chemistry, Radiography, Doppler Ultrasonography, CT Scan, and Thermography. Case management involves pain management, induction of a hypocoagulable state, improvement of blood flow, treatment of concurrent heart failure/heart disease, and supportive care, resulting in a spontaneous death prognosis of 38%, euthanasia in 33%, and survival in 29%.

### Suggestion

Suggestions that can be given for cases where good management can be carried out to reduce stress conditions due to the disease that attacks them, so that the recovery rate for this disease provides maximum therapeutic results, and supporting examinations can be carried out as an evaluation of the success of the therapy that has been carried out.

## ACKNOWLEDGEMENT

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**Tabel**

Table 1. Signalments in cases of Feline Aortic Thromboembolism according to a literature review spanning the period 2014 – 2023.

| Breed | *Sex* | Age | Case | Literature |
|---|---|---|---|---|
| *Domestic Shortair* (DSH) | Male | ±3 Years | 2 | Chintari, 2022 |
| | Male | 14 Years | 1 | Guarino *et al.*, 2021 |
| | Male | 12 Years | 1 | Lee *et al.,* 2023 |
| | Male | ND | 1 | Silva,R *et al.,* 2016 |
| | Female | ND | 1 | Vezzosi *et al.*, 2020 |
| | Female | 9 Years | 1 | Sutton *et al.,* 2022 |
| | Female | 7 Years | 1 | Darie *et al.,* 2022 |
| | Female | 14 Years | 1 | Schaefer *et al.*, 2020 |
| | Female | 7 Years | 1 | Cho *et al.*, 2017 |
| | Male | 2 Years | 1 | Carvalho *et al.,* 2019 |
| | Male | 8 Years | 1 | Hannabus, 2019 |
| | Female | 11 Years | 1 | Stee *et al.,* 2014 |
| | Female | 8 Years | 1 | Tindales *et al.,* 2022 |
| *Domestic Longhair* | ND | 4 Years | 1 | Silva *et al.,* 2022 |
| *Mixed-Breed* | ND | 7 Months | 1 | Ferreira *et al.,* 2018 |
| *Persian* | Male | 10 Years | 1 | Mateus *et al.,* 2020 |
| *Siamese* | ND | 13 Years | 1 | Figueroa *et al.,* 2014 |
| | Male | 4 Years | 1 | Belachsen, 2017 |
| *Chincilla* | ND | 14 Years | 1 | Huang *et al.,* 2014 |
| *Scottish fold* | Male | 2 Years | 1 | Salci *et al.,* 2016 |

Note: ND (no data)

Table 2. Clinical pathology findings in other diagnostic examinations employed in the diagnostic process of Feline Aortic Thromboembolism (FATE) cases, according to literature spanning the period from 2014 to 2023.
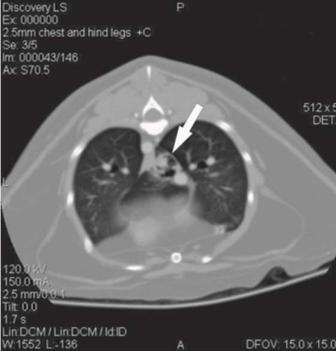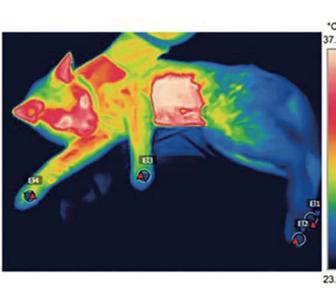
| Diagnostic Findings | Description | Literature |
|---|---|---|
| *CT Scan* | | |
|  | CT scan results revealed a partial thrombus in the right iliac artery. The pelvic region exhibited dilation of the right iliac artery (white arrow) with reduced arterial contrast and indicated the presence of an intraluminal mass effect. The left iliac artery (black arrow) demonstrated complete filling of the arterial lumen. | Stee *et al.*, 2014 |
| *Ultrasonography Doppler* | | |
|  | The results of abdominal Doppler ultrasound examination with color flow revealed the absence of blood flow in the trifurcation of the aorta, along with the presence of a hyperechoic structure. Additionally, no acoustic shadow formation was observed. The arrow identifies the thrombus. | Silva,R *et al.*, 2016 |
| *Thermographic* | | |
|  | Thermographic image of a cat with abdominal aortic thromboembolism. Measurement of the average temperature of distal extremities reveals significantly lower temperatures in the left (EI1: 24°C) and right (EI2: 24.3°C) hind limbs compared to the temperatures in the left (EI3: 26.7°C) and right (EI4: 27.7°C) forelimbs, respectively. | Silva *et al.*, 2022 |

Table 3. Clinical pathology findings in other supporting examinations used in the diagnostic process of Feline Aortic Thromboembolism (FATE) cases, according to literature from the period 2014 – 2023.

| Treatment | Dose | Percentage | Literatures |
|---|---|---|---|
| Antiplatelet | | | |
| *Aspirin* | 0.5 mg/kg p.o q24h | 14% | Mateus *et al.,* 2020; Salci *et al.,* 2016; Vezzosi *et al*., 2020 |
| *Clopidogrel* | 18.75 mg/*cat* p.o q24h | 52% | Belachsen, 2017; Chintari, 2022; Cho *et al*., 2017; Ferreira *et al.,* 2018; Huang *et al.,* 2014; Lee *et al.,* 2023; Mateus *et al.,* 2020; Schaefer *et al*., 2020; Stee *et al*., 2014; Vezzosi *et al*., 2020 |
| Anticoagulant | | | |
| *Dalteparin* | | 14% | Cho *et al*., 2017; Huang *et al.,* 2014; Lee *et al.,* 2023; |
| *Enoxaparin* | | 5% | Ferreira *et al.,* 2018; |
| *Heparin* | 80-150 IU/kg s.c | 33% | Figueroa *et al.,* 2014; Mateus *et al.,* 2020; Salci *et al.,* 2016; Schaefer *et al*., 2020; Silva,R *et al*., 2016; Stee *et al*., 2014; Vezzosi *et al*., 2020 |
| *Thrombolitic Treatment* | | | |
| *Streptokinase* | | 10% | Cho *et al*., 2017; Huang *et al.,* 2014; |
| *Tissue Plasminogen Activator* (tPA) | 1 mg/*cat* p.o | 14% | Cho *et al*., 2017; Hannabus, J., 2019; Lee *et al.,* 2023; |
| *Heart treatment* | | | |
| *Atenolol* | 6.25-12.5 mg/*cat* p.o q12-24h | 10% | Chintari, 2022; Ferreira *et al.,* 2018; |
| *Benazepril* | 0.25-0.5 mg/kg p.o q24h | 10% | Mateus *et al.,* 2020; Vezzosi *et al*., 2020 |
| *Enalapril* | | 5% | Salci *et al.,* 2016; |
| *Furosemid* | 1-4 mg/kg i.v i.m q1-4h | 19% | Chintari, 2022; Figueroa *et al.,* 2014; Mateus *et al.,* 2020; Vezzosi *et al*., 2020 |
| *Pimobendan* | 0.1-0.3 p.o q12h | 5% | Lee *et al.,* 2023 |
| Analgesic | | | |
| *Bupivacaine* | 0.1-0.5 mg/kg | 5% | Stee *et al*., 2014 |
| *Methadone* | 0.1-0.3 mg/kg i.v | 14% | Belachsen, 2017; Ferreira *et al.,* 2018; Mateus *et al.,* 2020; |
| *Tramadol* | 1-2 mg/kg i.v s.c | 14% | Figueroa *et al.,* 2014; Mateus *et al.,* 2020; Schaefer *et al*., 2020 |
| Anticonvulsant | | | |
| *Buphernophine* | 0.02-0.03 mg/kg i.m i.v s.c q6h | 10% | Belachsen, 2017; Huang *et al.,* 2014; |
| *Gabapentin* | 5-10 mg/kg q8-12h | 10% | Chintari, 2022; Vezzosi *et al*., 2020 |
| Antibiotic | | | |
| *Amoxicillin* | 12.5–25 mg/kg p.o q12h | 10% | Ferreira *et al.,* 2018; Stee *et al*., 2014 |

| Treatment | Dose | Percentage | Literatures |
|---|---|---|---|
| *Ampicillin* | 10–20 mg/kg p.o q8h | 10% | Huang *et al.,* 2014; Vezzosi *et al.,* 2020 |
| Antiinflamation | | | |
| *Dipyrone* | 2.5 mg/kg s.c | 5% | Schaefer *et al.,* 2020 |
| *Meloxicam* | 0.1 mg/kg i.v 0.2 mg/kg p.o q24h | 10% | Stee *et al.,* 2014; Vezzosi *et al.,* 2020 |
| *Prednisolone* | 0.5-1 mg/kg p.o q12-24h | 10% | Mateus *et al.,* 2020; Salci *et al.,* 2016; |
| *GIT Treatment* | | | |
| *Omeprazole* | 0.75-1 mg/kg p.o q24h | 5% | Mateus *et al.,* 2020; |
| *Ranitidine* | 2.5 mg/kg i.v | 5% | Salci *et al.,* 2016; |
| Antiemetic | | | |
| *Famotidine* | 0.75-1 mg/kg p.o q24h | 5% | Huang *et al.,* 2014; |

Table 4. The prognosis of Feline Aortic Thromboembolism (FATE) cases based on a literature review spanning the period from 2014 to 2023.

| Treatment | Results | Percentages | Literature |
|---|---|---|---|
| No Treatment | Dead | 14% | Carvalho *et al.,* 2019; Darie *et al.,* 2022; Guarino *et al.,* 2021 |
| No Treatment | Euthanasia | 10% | Silva *et al.,* 2022; Tindales *et al.,* 2022 |
| Treatment for FATE | Dead | 24% | Cho *et al.,* 2017; Lee *et al.,* 2023; Schaefer *et al.,* 2020; Sutton *et al.,* 2022; Salci *et al.,* 2016 |
| Treatment for FATE | Euthanasia | 24% | Ferreira *et al.,* 2018; Figueroa *et al.,* 2014; Mateus *et al.,* 2020; Silva,R *et al.,* 2016; Stee *et al.,* 2014 |
| Treatment for FATE | Recover | 24% | Belachsen, 2017; Chintari, 2022; Hannabus, 2019; Huang *et al.,* 2014; |
| *Surgical Embolectomy* | Recover | 5% | Vezzosi *et al.,* 2020 |