

Arterial Thromboembolism in a Domestic Cat – A report

M. Ranjithkumar*, A. Vijay, R. Sureshkumar, M. Chandrasekar

Resident Veterinary Services Section, Madras Veterinary College, Chennai - 600007.

Tamil Nadu Veterinary and Animal Sciences University, Chennai - 600051

Abstract

Arterial thromboembolism is more common in cats. Generally, it develops without premonitory signs. When the thrombus lodged in aortic trifurcation posterior paresis develops. This paper documents one such case and its successful management. A four-year-old male domestic shorthair cat was presented with the sudden history of being unable to stand and walk for the past three hours. Clinical examination revealed that there was paraparesis on the hind limbs, pulse deficit in both the hind limbs, cold extremities, and cyanotic digital paws. Echocardiographic, radiographic and hemato-biochemical analyses were inconclusive. The absence of femoral pulse, pain in hind limbs and absence of blood flow in the Doppler blood pressure and ultrasonographic exam of abdominal aorta cranial to the iliac bifurcation confirmed the aortic thromboembolism. The animal was treated with buprenorphine @ 0.02 mg/kg every 6 hours, injection enoxaparin @ 1 mg/kg every 8 hours, and tablet clopidogrel 75 mg total dose (1/4 - 0 - 0). On the fourth day of therapy, the animal showed deep pain, improvement in digital pad and mild voluntary motor activity. On the seventh day of therapy, the animal showed significant improvement and after 10 days of therapy, the animal showed an uneventful recovery. The paper presents paraparesis due to aortic thromboembolism in a domestic cat and its management.

Keywords: Thromboembolism, Paraparesis, Enoxaparin, Clopidogrel

Arterial thromboembolism (ATE) has been reported in both dogs and cats. Thrombosis is the pathologic formation of a blood clot within a vessel, while an embolus occurs when a thrombus breaks off and obstructs blood flow in a distal location (Williams et al., 2016). ATE is mostly reported in male cats with no breed predisposition (Chuang et al., 2001; Ferasin, 2009). ATE occurs as a complication of dilated cardiomyopathy, unclassified cardiomyopathy, other forms of cardiac disease, hyperthyroidism, and neoplasia (Smith et al., 2003). Distal aortic thromboembolism is one of the most serious complications in the cat and one of the most common causes of hind limb paresis (Schoeman, 1999). Saddle thrombus is a catastrophic lesion where a blood clot gets embolised and lodged into the aortic trifurcation (Borgeat et al., 2014). It is a fatal disease that may progress very quickly as a cat can go from being healthy to be in severe distress within few minutes (Brent et al., 2006). Arterial blood flow is decreased to tissues distal to the thrombus as a result of mechanical obstruction and vasoconstriction of the collateral blood supply (Fuentes, 2012). ATE is characterised by an acute onset of paraparesis or paraplegia, weak or absent femoral pulses, pain, pale or cyanotic footpads and nails and hypothermia of the distal limbs (Goncalves et al., 2008). For clinical purposes, it is often defined as thromboembolism to more

than one limb (Borgeat et al., 2014). ATE often doesn't have advance warning (Fuentes, 2012). Motor function is usually absent or reduced distal to the stifles, with skin sensation absent distal to the tarsus. The combination of pelvic limb lower motor neuron signs with absent femoral pulses and cold extremities is pathognomonic for ATE (Volk et al., 2003). If the embolised thrombus is small, rapidly lysed or collateral circulation is quickly re-established, motor function may be present by the time the cat is presented (Fuentes, 2012). The prognosis is considered guarded if both hind limbs were affected and the survival rate varies from 29–45% (Borgeat et al., 2014; Mitropoulou et al., 2022). Medical treatment aimed at thromboembolic diseases consists of the use of antiplatelet drugs, heparin products, and vitamin K antagonists (Lunsford and Mackin, 2007). The present paper describes a clinical case of posterior paresis due to iliac thromboembolism in an Indian short hair cat and its successful management.

Case History and Treatment

A four-year-old male domestic short hair cat was presented to the Emergency and critical care unit of Madras Veterinary College with the history of being unable to stand and walk (Fig 1) for the past three hours. The history happened suddenly without any other premonitory signs. The animal had severe non-specific pain on the hind limbs. Paraparesis on the hind limbs, absence of pulse in both the hind limbs, cold extremities

*Corresponding author : clmranjith@gmail.com



Fig 1. Paraparesis in cat due to ATE



Fig 2. Cyanotic digital pads due to is chemia

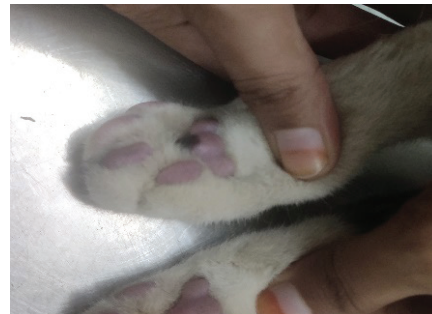


Fig 3. After therapy appearance of the digital pad (3th day)

with cyanotic digital paws (Fig 2) were the significant observations recorded. Neurologic examination reveals the absence of deep pain in the hindlimbs and tail. Radiography of the spine, pelvis, hind limbs, and thorax was inconclusive. On ultrasonographic examination, it was found that isoechoic thrombus in the iliac trifurcation and extending into both external iliac arteries. The heart rate and rhythm were normal in thoracic auscultation. The animal had normal cardiac biometry on echocardiography of the heart. Routine hemato-biochemical exhibit hyperglycemia i.e., serum glucose is 134 mg/dl. Further, the Doppler blood pressure over the distal meta tarsal artery proved an absence of blood flow. The case was diagnosed based on clinical signs, absence of a pulse in Doppler and ultrasonographic examination of abdominal aorta cranial to the iliac bifurcation confirmed the aortic thromboembolism. Immediately after diagnosis the animal was treated with buprenorphine @ 0.02 mg/kg every 6 hours, Injection enoxaparin @ 1 mg/kg every 8 hours and tablet clopidogrel 75 mg total dose (1/4 - 0). On the fourth day of therapy the animal showed deep pain, improvement in digital pad (Fig 3) and mild voluntary motor activity. On the seventh day of therapy, the animal showed significant improvement and after 10 days of therapy, the animal showed an uneventful recovery. Supportive care consisted of passive warming, analgesia, nutrition through a nasogastric tube, and physiotherapy. Limb reperfusion was defined as a

palpable and/or detectable pulse signal with Doppler BP machine.

Discussion

ATE occurs when a thrombus, often formed in the left auricle, embolizes to a peripheral artery leading to ischemia of the affected vascular bed (Schoeman, 1999). Several retrospective studies suggest that euthanasia at presentation is common and <50% of patients survive to discharge (Borgeat et al., 2014). If ATE affects two limbs, around 30–40% of treated cats survive to discharge (Schoeman, 1999; Smith et al., 2003). The favourable outcome in our present study might be due to its small size, rapidly lysed or collateral circulation is quickly re-established as stated by (Smith and Tobias, 2004). The exact etiology of ATE is unknown (Hassan et al., 2020). It may occur as a complication of feline hypertrophic cardiomyopathy (HCM). Approximately 12%–21% of cats with hypertrophic cardiomyopathy may develop ATE (Hogan et al., 1999; Fuentes, 2012). The etiology due to hypertrophic cardiomyopathy has been ruled out by echocardiographic examination. Other diseases associated with ATE may include pulmonary neoplasia and thyroid disease. Rarely, no underlying condition is found (Fuentes, 2009). Significant pulmonary carcinoma was not evinced in radiography. Hence the possible etiology might be hyperthyroidism. However, the owner was not willing for a thyroid profile

examination. The etiology in our case was arrived at based on exclusion criteria. Most cats presenting with ATE have no known history of cardiac disease, and peracute signs of pain and paralysis may be the very first indication of advanced cardiac disease. It is generally accepted that before the development of ATE in cats, the thrombus formed within the left side of the heart. Eventually, the thrombus dislodges and is carried through the systemic vasculature until it becomes lodged due to the diameter of the thrombus exceeding the diameter of the vessel lumen (Smith and Tobias, 2004). The higher level of blood glucose might be due to stress hyperglycemia which is a common phenomenon in cat. The exact mechanism leading to the formation of intracardiac thrombi is unclear, however (Fuentes, 2009). If the embolus settles in the “saddle” location at the aortic trifurcation, both rear limbs are affected. In one study this was the most common presentation, occurring in 71% of cases. Unilateral rear limb thromboembolism is much less common (Smith and Tobias, 2004). Most cats with ATE are presented for acute-onset lameness, plegia, or paralysis of the affected limbs. Affected limbs are virtually always painful, musculature is frequently firm, and pulses are weak or nonpalpable. Nailbeds and pads may appear pale to cyanotic depending on the degree of ischemia, and affected limbs may feel cooler than nonaffected limbs (Fuentes, 2009). The clinical signs reported in cases align with earlier reports. Human recombinant tissue-type plasminogen activators like Tenecteplase and Reteplase are available for clinical use. As a nonfeline protein, it has the potential to be antigenic. As these molecules are costly in nature they are used in this case. Massive administration of anticoagulant drugs as quickly as possible was crucial in preventing the irreversible damage of the limbs (Hassan et al., 2020). Enoxaparin is a low molecular weight heparin, given a dose of 100 U/kg (1 mg/kg) every 8 hours (Lunsford and Mackin, 2007). A study by Mitropoulou et al., (2022) reported the use of intravenous continuous rate infusion of enoxaparin in combination with oral clopidogrel @ 18.75 mg/cat q24h PO for cats with ATE. Intravenous enoxaparin with oral clopidogrel was used in our case with a successful outcome. Reports of mean survival times for cats treated for ATE range from 51–350 days (Moore et al., 2000). The article presents successful diagnosis of paraparesis due to aortic thromboembolism in a domestic cat and its management.

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