

Pathological findings of traumatic acute respiratory distress syndrome in a domestic cat

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ABSTRACT: Case reports of acute respiratory distress syndrome (ARDS) in cats that occurs due to traumatic events have not been widely discussed. The results of a necropsy performed on a cat that was known to have experienced a traumatic event (run over by a motor vehicle) can provide an overview of the pathological findings of ARDS. The pathological findings from the necropsy results included the presence of pink rose-colored foamy fluid in the trachea, hemorrhage, and petechiae in the lungs, accompanied by blood accumulation in the pleural cavity (hemothorax). Acute brain damage due to the head region being run over by a motor vehicle, such that the head shape becomes asymmetrical, is also one of the main causes of death in this cat.

Keywords:

acute respiratory distress syndrome, traumatic, necropsy, pathology anatomy, cat

■ INTRODUCTION

Acute Respiratory Distress Syndrome (ARDS) is a severe respiratory condition characterized by diffuse damage to the alveolar and capillary endothelium leading to impaired oxygenation in the lungs (DeClue & Cohn, 2007). This damage often arises from underlying diseases, trauma, drug toxicity, or exposure to harmful substances (Boiron *et al.* 2019). ARDS has a high mortality and morbidity rate, with approximately 25% of cases classified as mild and 75% as moderate-to-severe (Diamond *et al.* 2023). Common triggers include severe trauma, pneumonia, sepsis, gastric aspiration (Matthay *et al.* 2019), and drowning (McEwin & Gerdin, 2016). This necropsy case study examined the pathological manifestations of ARDS in cats following traumatic injury, and provided critical insights into its progression and impact.

■ CASE

Anamnesis and Signalement: A domestic cat aged <1 year was brought to the Animal Hospital in Cikole, West Java Indonesia. The animal was brought to an unconscious state, and after examination, the cat was found to be dead. The cat was known to have experienced a traumatic incident (run over by a motor vehicle), which caused it to die shortly after the accident. The cat body was preserved in a freezer.

Physical Examination: The cat weighed 2.1 kg (BCS: 2/5). Physical examination revealed an asymmetrical head cavity, epistaxis, and part of the left eyeball that had sunk (Figure 1).

Necropsy: Necropsy was performed 3 months later to determine the condition of the cat's internal organs and to confirm the diagnosis related to the case. The cat's body was thawed from the ice state to fresh so that necropsy could be performed. **Pathological Findings:** Pulmonary edema, encephalomalacia, hemothorax, epistaxis, pulmonary

hemorrhage, subcutaneous hematoma, head injury, eye injury, anemia and oral hemorrhage. **Diagnosis:** Acute Respiratory Distress Syndrome (ARDS). **Prognosis:** Infrausta.



Figure 1 The condition of a domestic cat that was a victim of a traffic accident shows that the shape of its head is asymmetrical.

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■ RESULTS AND DISCUSSION

Necropsy (post-mortem examination) was performed to determine the cause of death by performing cadaver surgery (McEwen & Gerdin 2016). Necropsy is performed sequentially from the external to the internal state of the organ so that each organ is observed properly. The findings of necropsy results in the head region are an asymmetrical head shape due to being pressed by a heavy blunt object (run over by a motor vehicle) accompanied by the left eyeball being pressed inward (the left side of the head is on top) and epistaxis due to pressure on the area, causing rupture of blood vessels in the nose. Other pathological findings included encephalomalacia (influenced by the storage time of the cadaver in the freezer and the organ thawing process). This encephalomalacia condition makes it difficult to further identify the brain to determine other pathological conditions in the brain, such as bleeding.

Findings in the thoracic region were pink rose foam in the trachea, indicating pulmonary edema (Figure 2) and acute respiratory distress syndrome (ARDS). ARDS is characterized by sudden dyspnea due to trauma or irritation of the lungs. Cats with ARDS are characterized by pink rose-foam fluid in the respiratory tract, originating from the lungs. Other symptoms include an increased respiratory rate, cyanosis of the skin and mucous membranes, coughing, and abnormal breathing sounds (Weir & Barnette 2023). There is an accumulation of 6 mL of blood between the visceral and parietal pleural cavities (hemothorax) (Figure 2), which can be caused by chest trauma, thrombocytopenia, or tumors in the chest (Kuehn 2023).

Hemorrhage and pulmonary petechiae were observed in all lobes due to trauma. Pulmonary trauma causes rupture of blood vessels, resulting in bleeding in the lungs. Hemorrhage is defined as the progression of petechiae when chronic (Park *et al.* 2017). Petechiae and hemorrhage of feline lung organs can also be caused by medical conditions, including suppurative tracheobronchitis, acute respiratory distress syndrome (ARDS), and muscle necrosis (Barnes *et al.* 2023). The mechanism of death in cases of acute respiratory distress syndrome (ARDS) is related to poor oxygenation due to damage to capillaries and alveolar endothelium in the lungs. ARDS is accompanied by pulmonary arterial vasoconstriction, which triggers pulmonary hypertension (Diamond *et al.* 2023).



Figure 2 Pathological findings during the necropsy of a cat's body showed (A) foamy fluid in the trachea (pulmonary edema) and (B) pulmonary hemorrhage and hemothorax.

■ CONCLUSION

The necropsy findings confirm acute respiratory distress syndrome (ARDS) as the primary cause of death in this feline case. Key pathological features include pinkish frothy fluid in the trachea, pulmonary hemorrhage with petechiae, and hemothorax (pleural blood accumulation). Additionally, acute brain damage, evidenced by cranial asymmetry due to vehicular trauma, further contributes to fatality. Collectively, these findings underscore severe multiorgan dysfunction secondary to traumatic injuries.

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