Nigerian Veterinary Journal
Vol 33 (4) 605-608
CASE REPORT

Perirenal Hematoma Secondary to Renal Rupture with Concurrent Splenic Rupture in a Twelve-Week-Old Boerbeol Puppy: A Case Report

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INTRODUCTION

The dog kidneys are elongated and are located retroperitonealy between the thirteen thoracic vertebrae and the third lumber vertebrae. The right kidney is usually more cranial than the left (Feeney and Johnston, 2007). Each kidney consists of an outer cortex and an inner medulla which projects into the pelvis. The kidney receives approximately twenty percent of the cardiac output through the renal arteries.

Renal injury is observed in about ten percent of cases of abdominal injury in humans (Razali et al., 2010). However, the exact incidence of renal injury in dogs is unknown. Majority of renal injuries are attributable to blunt trauma, while the rest are due to penetrating injuries, commonly gunshot wound and stab wounds (Kawashima et al., 2001; McAninch and Santucci, 2002). Renal injuries from blunt trauma usually occur as a consequence of a direct blow to the flank or from rapid deceleration (Razali et al., 2010). A direct blow will crush the kidney, causing a laceration or lacerations of the renal parenchyma and resulting in a subcapsular, intrarenal or perinephric hematoma (Dunnick et al., 2001).

The development of perirenal haematoma is rare and primarily the result of trauma, malignancy, or a connective tissue disease (Pavel et al., 2008). Infrequently, persistent or mild trauma can cause severe perirenal haematoma resulting in abdominal pain, hematuria and shock. In humans, kidney injury is common with falls and automobile accidents; however there is dearth of information of the causes of kidney rupture in dogs.

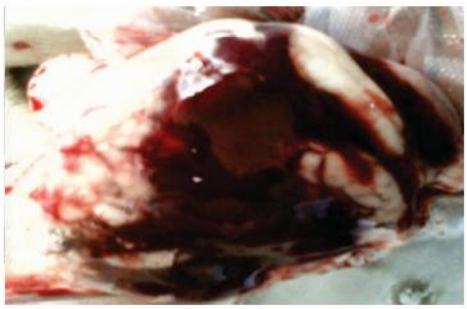
In veterinary patient, trauma and neoplasia have been recognized as the two most common causes of haemoperitoneum (Vinayak & Krahwinkel, 2004). Vehicular trauma has reportedly caused intraabdominal injury in 6.3 – 13 percent of injured animals (Brockman et al., 2000). The liver, spleen, kidneys and major vessels are the commonly affected structures, while the liver and the spleen are the most likely sources of severe haemorrhage (Fossum, 1997). Blunt trauma to the spleen and liver can involve a delay of up to three hours or more before signs of shock will develop (Vinayak & Krahwinkel, 2004). This report presents a case of severe haemoperitoneum from splenic laceration and perirenal hematoma secondary to renal rupture in a twelve week old Boerboel puppy after reportedly falling from a height.

Case Report:

A twelve week old intact female Boerboel puppy (weight = 7.8kg was presented in comatose state at the Veterinary Teaching Hospital of the Federal University of Agriculture, Abeokuta following complaint that it fell from the balcony of the house about 5hours before presentation. Three weeks prior to presentation, the dog had earlier been dewormed and vaccinated with canine

distemper, hepatitis, leptospirosis and parvovirus vaccines. At presentation, the dog was unconscious with no nociceptive response. The mucous membrane was pale. Heart rhythm was fast (180 beats/min) and weak, while the femoral pulse was weak, thready and irregular. Breathing was initially normal and abdominal (respiratory rate was 34 breadth/min), however it worsened (became shallow with reduced respiratory rate) within a period of ten minutes. In addition, there was mild abdominal distension which on paracentesis yielded frank blood. Also, there was bloody vulva discharge and cutaneous purpural haemorrhages on ventral abdomen. However, there was no evidence of fracture in any of the limbs or the ribs based on absence of crepitation and pain on palpation.

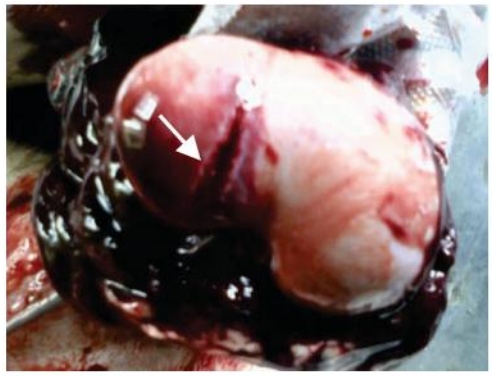
Plate 1: Perirenal hematoma in a twelve week old Boerboel puppy showing oval shaped transparent mass containing subcapsular haemorrhage.



Attempt to secure venous access was unsuccessful and the dog consequently died about fifteen minutes after presentation.

Autopsy of the puppy revealed extensive haemoperitoneum measuring up to about one litre of blood. There was heavy clot of

Plate 2: Left kidney of a twelve week old Boerboel with deep laceration (Arrow): Note the thickened perirenal blood clot

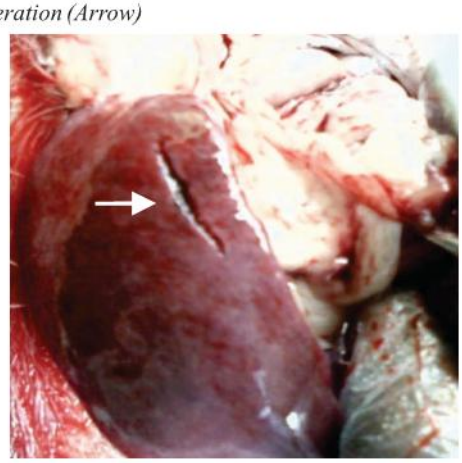


blood about one centimeter in thickness within the capsule of the left kidney which gave it an oval shaped appearance (Plate 1). In addition, the left kidney had a deep laceration measuring about 1.5 centimetres (Plate 2). Both kidneys were pale with no observable changes in their cortex or medulla. In addition, the spleen also had a deep laceration measuring about 2.5 centimetres (Plate 3). Other abdominal organs were grossly normal except that they were pale. Also there were no haemorrhages in the thoracic cavity or frank haemorrhages in the brain. Death was therefore attributed to hypovolemic shock secondary to renal and splenic rupture.

DISCUSSION

Spontaneous peritoneal haemorrhage is an uncommon condition that occurs because of bleeding either from the liver, spleen, kidney

Plate 3: Spleen of a twelve week old Boerboel puppy with severe laceration (Arrow)



or other abdominal structures and may be associated with haematoma of the ruptured organ if the organ is covered by a capsule. Peritoneal bleeding in the case of this puppy was secondary to severe rupture of the spleen. This might have accounted for the severe blood loss of about one litre over a short period of time, thus resulting in severe hypovolemic shock and death. The hypovolemic shock was further compounded by the blood loss which accompanied the renal rupture. However, the renal capsule prevented the escape of the blood, thus resulting in the formation of peri-renal haematoma.

The development of perirenal haematoma is rare and primarily the result of trauma, malignancy, or a connective tissue disease (Pavel et al., 2008). Penetrating renal injuries commonly from gunshot and stab wounds constitute the major cause of perirenal hematoma in dogs (Slatter, 2003). Trauma was assumed to be the cause abdominal injury in this puppy because of the history of a fall from the balcony as reported by the owner. However, the inability to observe evidence of fracture of the limbs or the ribs coupled with cutaneous haemorrhage on ventral abdomen made us to suspect that the trauma might actually be due to a kick to the abdomen rather than a fall from the height as reported by the owner. Spontaneous rupture of a kidney tumor was not considered due to the age of the puppy and the absence of neoplastic renal lesions from the autopsy.

There are several classifications of renal injuries based on either imaging or surgery (Razali et al., 2010). Federle classification is a widely used imaging- based grading system, while the American Association for the Surgery of Trauma (AAST) renal injury severity scale is a commonly used urological surgical staging in renal trauma (Santucci et al., 2004). The severity of the renal injury in this puppy can be classified as Grade three based on the AAST renal injury severity scale.

The morbidity and mortality associated with splenic rupture is very severe and requires urgent diagnosis and careful management (Vinayak & Krahwinkel, 2004). Mortality is often associated with hypovolemic shock resulting from the extensive blood loss to the abdominal cavity. Acute death of this puppy may be associated with severe hypovolemic shock resulting from rupture of both the kidney and the spleen. Inability of the dog to respond to nociception might probably be the comatose state of the dog occasioned by the shock.

The key to successful management of patients with renal trauma is an accurate assessment of renal injury. It is generally believed that renal parenchyma injuries will heal without surgical exploration (Smith et al., 1993). However, emergency renal exploration might be required if the haematoma results in adverse effects on the blood pressure. The severity of the renal and splenic laceration in this puppy resulted in severe intraperitoneal bleeding with consequent hypotension and hemodynamic instability. In conclusion, concurrent splenic rupture with attendant intraperitoneal haemorrhage and renal rupture with peri-renal haematoma is a surgical emergency that requires rapid and accurate diagnosis and consequent management to ensure haemodynamic stability.

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