CASE REPORT

SEPTICEMIA WITH CONCURRENT BILATERAL HYDROCELE IN NEW ZEALAND WHITE RABBIT (ORYCTOLAGUS CUNICULUS)

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ABSTRACT. This paper describes a case report of septicaemia and concurrent bilateral hydrocele in a New Zealand White male Rabbit. One week before death, the animal was dull, depressed, inactive, and anorexic. Necropsy findings revealed hydrocele, bilaterally enlarged testes approximately 10 cm in length, and the presence of dried wound scab on the scrotal skin with flabby consistency. Upon excising the scrotal skin, a jelly-like substance was found in the scrotal sacs. Further to that, the lungs and heart were congested, stomach and small intestine were empty, and presence of digested pasty in the large intestine with pasty faeces. Histopathology examination revealed thickening of interalveolar septa, severe lung congestion with interstitial pneumonia, hepatitis, cytoplasmic vacuolation of the cardiomyocytes, congestion, and degeneration of the seminiferous epithelium with deposits of mononuclear cells, diffuse deposition of amyloid in the glomerular with tubular degeneration, and lymphoid depletion with neutrophilic infiltration of the spleen. Samples from the lung, heart, spleen, testes, and jelly-like substance were submitted for bacterial isolation and identification. All the samples showed numerous growths of *Streptococcus agalactiae* with few growths of *Klebsiella pneumoniae*, and moderate growth of *Staphylococcus aureus* from the jelly-like substance. It was concluded that the rabbit died due to septicaemia resulting from traumatic injury of the scrotum.

Keywords: septicaemia, hydrocele, Streptococcus agalactiae

INTRODUCTION

Septicemia is an overwhelming systemic infection by one or more bacterial species (Mayer & Donelly, 2013). Septicaemia may result from several infections. Complicated cases of septicaemia result in sepsis, which is considered a severe condition as it may cause generalised or systemic inflammation. Moreover, a rapid invasion through the endothelial cells of the vascular system is crucial in the pathogenesis and development of septicaemia (Annas *et al.*, 2015).

Although Streptococcus agalactiae, Klebsiella pneumonia and Staphylococcus aureus are normal flora of the mouth, skin, and intestines, they can cause destructive changes or infection leading to septicemia (Sumitha & Sukumar, 2014). Normal flora may become opportunistic pathogens when the animals are immunocompromised as seen in the presence of underlying diseases.

A hydrocele is a pathologic accumulation of serous fluid between the visceral and parietal layers of the tunica vaginalis (Steven *et al.*, 2011). It may occur either unilaterally or bilaterally anywhere along the path of testicular descent. This case was reported as information on hydrocele in rabbits is scarce.

Case Report

A one-year-old intact male New Zealand White Rabbit was found dead. Three months earlier, the

rabbit was diagnosed with an ulcerated wound on both sides of the testicles (Figure 1). Wound management was conducted.



Figure 1. Ulcerated wounds on both testicles (arrow).

The wound healed around 2 weeks posttreatment. Thereafter, on 14th May 2020,

the animal was observed to have bilateral engorgement of testicles (Figure 2).



Figure 2. Bilateral enlargement of testicles.

Physical examination revealed no remarkable findings other than bilateral enlargement of testicles. The rabbit was treated with enrofloxacin 5 mg/kg and meloxicam 0.2 mg/kg intramuscularly as an anti-inflammatory for 3 days. However, the symptoms did not resolve. In the following week, the animal was observed to be dull and depressed, with inappetence and inactive. The same treatment was planned to be re-administered for the next 3 days. Unfortunately, the rabbit died on the second day of treatment.

Diagnostic tests were conducted which included haematology, x-ray and ultrasound of the testicles. The complete blood count revealed that there was an increase in white blood cells count, particularly the granulocytes, indicative of bacterial infection. A fluid-filled space was observed on x-ray (Figure 3).



Figure 3. Radiograph of the testicles (lateral view) showing radiopaque structures in the scrotum with radiolucent fluid-filled lesion surrounding the testicles.

Ultrasound of both testicles showed the normal position of vas deferens, and anechoic space (yellow arrow) was surrounding the testicle which was suggestive of hydrocele (Figure 4). Necropsy was performed immediately, and samples were collected for further analysis.



Figure 4. Ultrasonography of one of the testes showing anechoic structure (yellow arrow) and hypoechoic structure (orange arrow).

Upon necropsy, it was observed that the testes were bilaterally enlarged (Figure

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5) by approximately 10 cm in length without inflammation signs.



Figure 5. Bilaterally enlarged testicles.

There was a presence of a dried superficial wound on the scrotum. The cut surface of the

testes revealed a jelly-like structure and a clear liquid flow out upon cutting (Figure 6).



Figure 6. Jelly like materials and clear liquid oozes out from the scrotum when cut.

There was generalised congestion of all lung lobes (Figure 7) and heart, while the digestive system was empty from the stomach to the small intestine. Conversely, pasty faeces were present in the large intestine (Figure 8).

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Figure 7. Congested heart and lungs.

Histopathology examination revealed thickening of interalveolar septa due to the

severe congestion with interstitial pneumonia (Figure 9).



Figure 8. In-situ organs during post-mortem showing empty stomach and small intestine, but large intestine filled with pasty faeces.



Figure 9. Photomicrograph shows severe thickening of interalveolar septa with severe congestion and pneumonia (H&E).



The liver showed hepatitis and congestion with focal vacuolation of hepatocytes (Figure 10).

Figure 10. Photomicrograph shows fatty degeneration of the hepatocytes (green arrows) and sinusoid congestion (yellow arrow) (H&E).

Additionally, the heart was congested with cytoplasmic vacuolation of the cardiomyocytes, congestion and degeneration of the seminiferous

epithelium with the presence of mononuclear cells in the testes (Figure 11).

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Figure 11. Photomicrograph shows severe congestion of blood vessels in between the tubules and degeneration of the eminiferous epithelium of the testicle (H&E).

Furthermore, there was a diffused deposition of amyloid in the glomerulus with tubular degeneration and congestion in the medulla and cortex of the kidneys. Lymphoid depletion with neutrophilic infiltration of the spleen was also observed.

The isolation and identification of bacteria revealed that there were numerous growths of *Streptococcus agalactiae* from all samples such as the heart, liver, lungs, spleen, kidney, and testes. Moreover, there was moderate growth of *Staphylococcus aureus* from the jellylike substance and few growths of *Klebsiella pneumonia* from all organs sampled.

DISCUSSION

Septicaemia

Septicemia is the clinical term for blood poisoning by bacteria and represents the most extreme response to an infection. In this case, histopathology revealed generalised congestion of all organs and inflammation with the presence of inflammatory cells in organs, which are the typical lesions indicating septicaemia in animals. Furthermore, these pathological changes were supported by the bacteriology findings.

Epidemiologically, all species, ages, and sex are susceptible to septicaemia. Poor husbandry with particular emphasis on water quality and inadequate housing sanitation is a highrisk factor for bacterial infection leading to septicaemia. Pathophysiologically, bacteria can invade the body by breaching the physical barrier in several ways. This includes abrasion which entails the removal of the antimicrobial mucous layer on the skin, or through the failure of the immune system due to chronic stress induced by poor husbandry. Under such conditions, the wound on the scrotum may be the portal for the entrance of the bacteria responsible for the infection in the rabbit leading to septicaemia.

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In this case, the most highly isolated organism was *Streptococcus agalactiae* (*S. agalactiae*) which reported significant growth from all organ samples. *S. agalactiae* or *Group B streptococcus* GBS) triggers the immunologic response of the host once it penetrates cellular barriers and reaches the bloodstream or deeper tissues (Syuhaidah Abdullah *et al.*; 2013, Guo *et al.*, 2014).

S. agalactiae are common asymptomatic colonisers in healthy individuals. However, the bacteria may initiate severe disease in a suboptimal host as observed in this case report. The rabbit was already in pain due to inflamed and enlarged testicles, hence, increasing the likelihood of infection by the opportunistic bacteria to multiply and penetrate the organs.

Hydrocele

There are two types of hydrocele which are communicating and non-communicating hydrocele. Communicating hydrocele means the fluid originates from the peritoneal cavity. In non-communicating hydrocele cases, the fluid arises from the mesothelial lining of the tunica vaginalis (Wallace & Amaya, 2011). Hence, the present case was considered a noncommunicating hydrocele because during the postmortem, there was no fistula or evidence to support that the fluid originated from the peritoneal cavity. Although hydrocele cases are rarely reported in rabbits, the possibility cannot be completely ruled out. Hydroceles may be idiopathic but may also result from trauma, tumour, infection, or testicular torsion (Wallace & Amaya, 2011). As in the present case, the cause of hydrocele may be due to traumatic injury of the scrotum.

Treatment and Prevention

Two major conditions need to be treated in the present case, which is the infection and the hydroceles. The hydrocele, in this case, was believed to be the result of traumatic scrotum injury. Thus, it is important to properly treat the wounds to prevent the development of a more severe condition. The initial wound treatment entailed superficial wound dressing. However, a different management plan might need to be considered to prevent future similar cases. For instance, antibiotic therapy needs to be promptly administered at the early stage of the infection. Prudent selection and use of antibiotics are vital in treating sepsis in rabbits. Enterotoxaemia may ensue from the improper use of antibiotics in these animals.

In this case study, enrofloxacin was the treatment choice since it is approved for prolonged use in rabbits (Varga, 2013). The drug was administered for three days during the first round of treatment, nevertheless, a longer antibiotic regime (i.e., 5 to 7 days) is recommended and the safety has been proven in rabbits. Another important aspect is the care and husbandry of the rabbit. In order to minimise the risk of bacterial infection, rabbits with wounds should be kept clean at all times. Sclerotherapy using either 2.5, 5 or 10% solution of tetracycline injection into vaginal cavity has been reported in treating hydrocele in humans, however to date, such treatment has not been documented in rabbits. Keeping rabbits in a safe and clean environment would be the best method of preventing the occurrence of hydrocele.

CONCLUSION

The clinical signs supported by postmortem, histology and bacteriology findings revealed

that this is a case of septicemia caused by a local infection on the scrotal skin, concurrent with bilateral hydrocele. To prevent future recurrence, improving husbandry practices, minimising stress factors to the animals, and choosing the right and effective treatment are very important. The grave prognosis could be the result of inappropriate and late treatment.

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