Journal of Wildlife and Parks, 30: 81-84 (2015)

SEPTICEMIA IN BAMBOO RAT (*Rhizomys sumatrensis)* CAUSED BY *Escherichia coli*

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Received (05-Jun-15); Accepted (17-Jun-15); Available online (21-October-15)

Citation: Siti Aminah, Y., Simaa, N.A., Hartini, I., Noor Azleen, M.K., Norsyamimi, R., Donny, Y., Sivananthan, E. & Masnim, A. (2015). Septicemia in bamboo rat (*Rhizomys sumatrensis*) caused by *Escherichia coli*. *Journal of Wildlife and Parks*, **30**: 81-84.

This paper presents a case report on septicemia caused by *Escherichia coli* (Family Enterobacteriacea) in a large bamboo rat (*Rhizomys sumatrensis*). *R. sumatrensis* is a species of rodent belonging to the Family Spalacidae. This is a widespread species occurring in China (Yunnan), Myanmar, Vietnam, Cambodia, Thailand, Malay Peninsula and Indonesia (Sumatra) (Musser & Carleton, 2005; Smith & Xie, 2008). This nocturnal species (Smith & Xie, 2008) is found in secondary forests where it feeds on bamboo roots, cultivated tapioca and sugar cane (Corbet & Hill, 1992). *E. coli* is a gram-negative, facultatively anaerobic, rod-shaped bacterium, and are about 2.0 micrometres (μm) long and 0.25–1.0 μm in diameter. Septicemia is a systemic disease associated with the presence, multiplication and persistence of pathogenic microorganism and their toxin in the blood. Septicaemia due to *E. coli* infection usually involves endotoxin production, inflammation, peritonitis and sepsis in animals (Parker & Watkins, 2001).

On the 3rd of March 2014, a bamboo rat was sent to the Department of Wildlife and National Parks (DWNP) Gemas, Negeri Sembilan by a civilian showing clinical signs of dullness, depression and having inappetance but no external wounds as shown in Figure 1(a). Unfortunately, the animal was found dead the following day. The carcass was necropsied for evidence of cause of death.

The necropsy revealed that the bamboo rat had generalised haemorrhages at the trachea [Figure 1(b)]. The liver and lung also had generalised congestion as shown in Figure 1(c) and Figure 1(d), respectively. The kidney showed loss of demarcation between the cortex and medulla region [Figure 1(e)] while the intestine was empty and filled with gas [Figure 1(f)] which is indicative that the animal had inappetance. The tentative diagnosis at post mortem was septicaemia. Lung, liver, kidney, spleen and intestine samples were sent for histopathology. Except for the intestine sample, the same set of samples were also sent for bacterial culture. The differential diagnoses includes septicaemia, severe malnutrition (chronic starvation) and heat stroke.

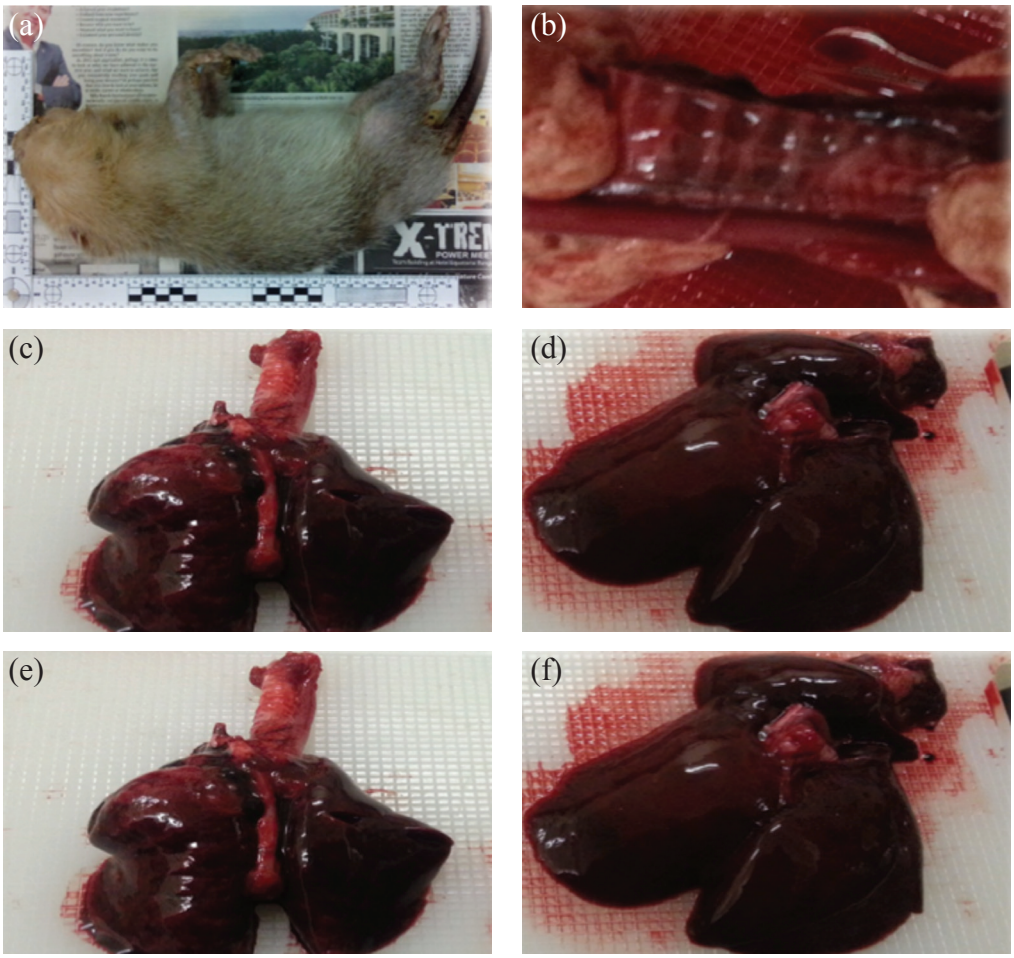

Figure 1 Figures showing the specimen and necropsy on the various organs. (a) Figure showing no external wound on the carcass, (b) haemorrhages of trachea, (c) congestion of lung, which was friable but firm at the boundaries of lung lobe, (d) generalised congestion of liver, (e) loss of demarcation between cortex and medulla region of kidney, (f) empty and gas filled intestine.

Bacterial culture from the sample of lung and kidney revealed presence of *E.coli* (*2+)*. *E.coli* also was successfully isolated from bacterial culture of liver (3+) and spleen (4+) respectively. The presence of *E.coli*, and its severity in all organs is shown in Table 2; is suggestive of septicaemia in this case. Histology of the lung, liver, kidney and spleen showed severe generalised congestion. This is indicative of severe septicaemia which causes pooling of blood in all organs and thus, less blood returns to heart leading to shock and causing circulatory and respiratory failure.

Table 1 Gross post mortem findings of the organs from post mortem and the bacteriology results.

No.	Organ	Morphological findings	*E.coli* isolated
1	Trachea	Haemorrhagic tracheitis	Sampel was not sent for isolation
2	Lung	Pulmonary congestion	2+
3	Liver	Hepatic congestion	3+
4	Kidney	Renal congestion	2+
5	Spleen	Spleenic congestion	4+

The intestine was denuded of epithelium with focal infiltration of inflammatory cells, mostly neutrophil and lymphocytes. The cause of death could be due to stress factors, leading to lowered level of immunity causing bacterial overgrowth. This can lead to bacterial infection and septicaemia, causing pooling of blood in all organs. Thus, less blood returns to the heart leading to shock and causing circulatory and respiratory failure.

E.coli is common in wildlife but well tolerated such that it does not cause harm to the animal. In this case, an imbalance occurred, probably due to stress that was caused by the handling or restraining of the animal as well as transportation of the animal. This probably caused immunosuppression, which in turn causes bacterial overgrowth and bacterial infection leading to septicaemia (presence of bacteria and toxin in blood vessel). Septicemia will cause degenerative changes of epithelium which will lead to accumulation of platelets at the degenerated area, leading to blood clot that will cause thrombosis. The presence of thrombus will cause blockage of the blood flow to vital organs that will lead to generalised congestion. Generalised congestion will cause pooling of blood and less blood returns to vital organ and will lead to vital organ failure that eventually lead to death in this case.

It is suggested that, as a control and preventive measure, captured animals must be provided with anti-stress at pre- and post-transportation. Care must be exercised during restraining and handling. Furthermore, monitoring of appetite, bowel and urination of the animal should be done continuously. Animals should be isolated in a proper quarantine area to prevent infections spreading as it could harbor dangerous pathogens.

In conclusion, the presence of *E. coli* was secondary to generalised immunosuppression of the animal. Other than that, management of animal pre- and post-transportation is important to minimise stress to the animal. Educating officers and public on awareness and proper handling of wildlife animals is also essential.

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