SHORT COMMUNICATION

TRYPANOSOMIASIS IN PIGS

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Keywords: trypanosomiasis, pig

A case of trypanosomiasis in pig blood sample was diagnosed by the Veterinary Research Institute (VRI) in December 2013. This is a description of the case whereby two thin blood smears from a private pig farm was submitted for diagnosis and identification of blood protozoa. The sample was subjected to Giemsa staining at 8% and further examined under compound microscope (×100). On examination it was found that the smear showed *Trypanosoma evansi* organisms stained as shown in Figure 1.

In a previous study, VRI received total of 86 whole blood samples from deer, cattle and buffaloes from government farm near Sungai Siput, Perak and 16 whole blood samples from a commercial pig farm in Jalong, Perak (Nurulaini *et al*., 2013). Laboratory diagnosis showed that 13 out of 16 pig blood samples were positive for Trypanosomiasis.

In 1995, an outbreak of pig trypanosomiasis reported due to Trypanosoma evansi characterised by fever, anorexia, emaciation, abortion and death among breeding stock is described. Prior to the investigation 11 sows and one boar were dead and more than 20 sows aborted. Trypanosoma evansi was detected in six pigs at the time of investigation (Arunasalam V *et al*., 1995).

Trypanosoma is a blood protozoon that affects all domestic animals. Species infecting pigs are *T. congolense, T. vivax, T. brucei, T. simiae, T. godfreyi* and *T. suis* with prevalence of *T. simiae* higher than other trypanosome species in pigs (Bristol.ac.uk, 2014). Both domestic and wild pigs can be infected with various species of trypanosomes but the infection infrequently causes disease pathology unless the pigs are infected with *T. simiae* which is highly pathogenic for domestics pigs (Hamill and Kaare *et al*., 2013). Clinical signs of trypanosomiasis in pigs include anemia, fever, lethargy, reduced fertility, enlargement of lymph nodes and acute death. Signs of rapid emaciation, frequent coughing, and diarrhea are seen in piglets. Emaciation and other signs are found in adults.

All mentioned species infecting pigs are salivarian type whereby infective

stages are released in the saliva of vectors. Transmission begins when tsetse flies (*Glossina* sp.) and other biting insects like tabanids ingest trypomastigotes in blood meals taken from infected animal hosts. They transform into procyclic trypomastigotes and multiply by binary fission in the midgut or proboscis of flies. They then leave the midgut or proboscis and transform into epimastigotes. Epimastigotes that reach the fly's salivary glands will continue to multiply and transform into metacyclic form which are infective to the mammalian host. These metacyclic forms are introduced into a new host through the saliva of flies during feeding (Soulsby EJL, 1982).

When a pig is bitten by infected blood sucking flies, metacyclic trypomastigotes are inoculated into the skin of pigs. Following that, host's immune system will respond to infection whereby pyrexia can be observed. Trypanosomes within the host will consume host's plasma glucose, result in hypoglycemia thus infected pigs will be weak, lethargic and emaciated. Trypanosomes also produce metabolites which coat the host's red blood cells and white blood cells. Phagocytosis occurs in which red blood cells and white blood cells are destructed by host macrophages that recognize the coated cells as foreign cells. This leads to anemia, leucopaenia, splenomegally and lymphadenopathy. Trypanosomes in pigs will stimulate vigorous immune response and generates a good antibody response. However, trypanosomes have multiple genes that code for different surface-coat glycoproteins to help them evade host's immune response by mean of antigenic variation thus results in persistence of the organism (Soulsby EJL, 1982).

A presumptive diagnosis is based on clinical findings of anemic animals in an endemic area. Various tests can be done for confirmation diagnosis. The most sensitive rapid method is to examine a wet mount of the buffy coat area of a PCV tube after centrifugation (Wahab *et al*., 2002). Direct wet mount can be done if there is high parasitemia. Thin blood smear with Giemsa stain can also be done to detect trypanosomes in blood as well as to rule out other infections that cause anemia and weight loss (ref.). Serology tests such as

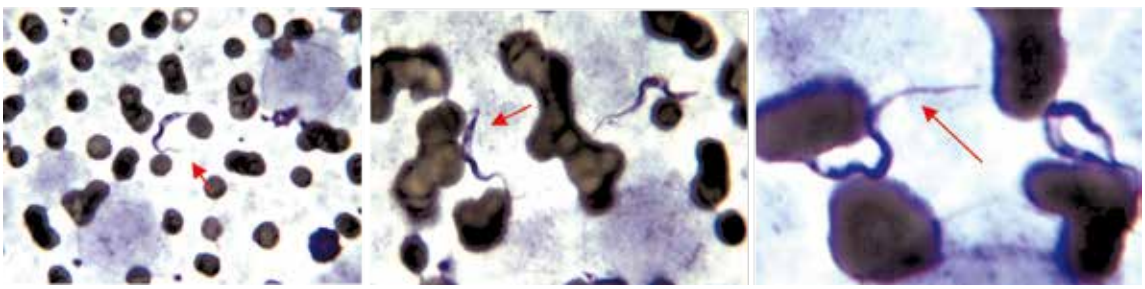

Figure 1: *Trypanosoma evansi* in pig blood (photo by Premaalatha B).

ELISA (Chandrawathani *et al*., 1998) and CATT (Wahab *et al*., 2012) to measure antibody against trypanosomes are more suitable for herd and areas screening rather than for individual diagnosis. Molecular techniques for trypanosome detection and differentiation have been developed, but they are not generally available for routine field use (Cheah *et al*., 1999).

In conclusion, domestic pigs may act as a significant reservoir for animal trypanosomiasis. Some species identified in pigs like *T. brucei* are zoonotic and is of public health concern. Trypanosomiasis can be treated using medication such as Berenil/Suramin or Trypamidium (Cheah *et al*., 1997). Animals that showed clinical symptoms need to be treated with antibiotic, antistress medication and supportive treatment such as vitamins and supplements. Farm hygiene, application of insecticide and fogging to minimize biting flies and routine screening of the herd to detect subclinical trypanosomiasis are vital to control the spread of infection which has major impacts on animal health, pig production and human public health to other animals and human.

REFERENCE

1. Cheah TS, Sani RA, Chandrawathani P, Sansul Bahari and Dahlan I (1999). Epidemiology of *T. evansi* infection in crossbred dairy cattle in Malaysia. *Trop. Ani. Hlth &Prod.* **31**:25-31
2. Wahab AR, Zary S, Cheah TS and Chandrawathani P (2002). An assessment of the prevalence of *Trypanosoma evansi* in cattle from some farms in Perak, P. Malaysia, using the QBC technique. *Jurnal Biosains* **13**(1):
3. Nurulaini R, Premaalatha B, Zaini CM, Adnan M, Chandrawathani P, Fazly Ann ZA, Ernie Aryanti A and Ramlan M (2013). Trypanosomiasis outbreak in Deer, Cattle, Buffaloes and Pigs in Perak. *Malaysian Journal of Veterinary Research*, Vol. **4** No.1 January 2013.
4. Arunasalam V, Chandrawathani P and Sivanandan S (1995). An Outbreak of *Trypanosoma evansi* infection in pigs. *J. Vet. Malaysia* (1995) **7**(2):71-73
5. Wahab A Rahman, Samatha Fong, Chandrawathani P, Nurulaini R, Zaini CM and Premaalatha B (2012). Comparative seroprevalences of bovine trypanosomiasis and anaplasmosis in five states of Malaysia. *Tropical Biomedicine* **29**(1): 65–70 (2012)
6. Bristol.ac.uk. 2014. Bristol University, School of Biological Sciences, *The elusive Trypanosoma suis*. [online] Available at: http://www.bristol.ac.uk/biology/research/plant/parasitology/research/suis.html [Accessed: 17 Jan 2014].
7. CDC.gov. 2014. *CDC – African Trypanosomiasis – Biology*. [online] Available at: http://www.cdc.gov/parasites/sleepingsickness/biology.html [Accessed: 17 Jan 2014].
8. Hamill LC, Kaare MT, Welburn SC and Picozzi K (2013). Domestic pigs as potential reservoirs of human and animal trypanosomiasis in Northern Tanzania. *Parasites \& Vectors*, **6** (1), p322.
9. Merck manuals.com. 2014. *Trypanosomiasis: Blood Parasites: Merck Veterinary Manual*. [online] Available at: http://www.merckmanuals.com/vet/circulatory_system/blood_parasites/trypanosomiasis.html [Accessed: 17 Jan 2014].
10. Soulsby EJL (1982). *Helminths, Arthropods and Protozoa of Domesticated Animals*, 7th edition. Baillière Tindall. London.