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The Detection of Brucellosis in Pigs in Malaysia

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Abstract: A study was conducted to detect Brucellosis in pigs using the *Brucella abortus* Complement Fixation Test (CFT). Out of a total sample of 552 pigs 3 (0.54%) were positive for Brucellosis. This result has epidemiological implications for the transmission of brucellosis in Malaysia and beyond due to the interaction of pigs with other animals and the human population.

INTRODUCTION

Brucellosis is an old zoonotic disease dating back to over 1600 years BC caused by Brucella species which are gram negative organisms that affect man, all domestic animals and some wild animals and marine mammals with a worldwide distribution but endemic in many developing countries such as Malaysia (Seleem *et al*., 2010). It is one of the 175 infectious diseases characterized as zoonoses and the commonest zoonotic disease with >500,000 new cases reported annually worldwide (Pappas *et al*., 2006, 2008). There are 8 species of Brucella recognized that affect terrestrial animals which include: *B. abortus*, *B. melitensis*, *B. suis*, *B. neotomae*, *B. canis*, *B. ovis*, *B. microti* and *B. inopinata* (Verger *et al*., 1987; Scholz *et al*., 2008, 2010). There are 2 others that affect marine mammals and they are: *B. ceti* and *B. pinnipedialis* (Foster *et al*., 2007). It is mostly an occupational hazard among farmers and animal workers (Pappas *et al*., 2008). The organism is present in the blood, milk and tissues of infected animals. Humans usually acquire the infection through ingestion of the organism in milk or by contamination of mucous membrane and abraded skin. Infection has also been reported through aerosols. Humans usually get the infection from animals and human to human transmission is rare but has been reported (Perkins *et al*., 2010). The organism has been found to penetrate intact skin can live in w ater for a 100 days and in soil for 30 days (Ahmad *et al*., 1999). Humans can be infected mainly with *B. abortus*, *B. melitensis* and *B. suis*. In recent times, Brucellosis acquired from Pigs is becoming an increasing threat with increase in hunting of wild pigs and the interaction between wild and domesticated animals (Pappas, 2010). Little is known about Brucellosis in Pigs in Malaysia and until recent times there has been a dearth of literature on the exact situation of Brucellosis in Malaysia (Bahaman and Bejo, 2007; Al-Garadi *et al*.,

2011). This study was conducted to detect Brucellosis in Pigs from Perak State of Malaysia and elucidate the epidemiological implications to livestock and human health.

MATERIALS AND METHODS

About 10 mL of blood was collected using plain Vacutainer tubes and needles directly from the ear vein of 552 Pigs from Perak state of Malaysia. Serum was harvested from the blood and the *Brucella abortus* complement fixation test was carried out on the samples at the Veterinary Research Institute Ipoh, Malaysia according to the method of Alton *et al*. (1988).

RESULTS AND DISCUSSION

Out of 552 samples taken from Pigs 3 (0.54%) were found to be positive using the *Brucella abortus* CFT. The serodiagnosis rate of Brucellosis in pigs in Malaysia though low is of epidemiological significance with the increasing interaction between wild and domesticated animals and humans and animals. Wild boars hunting are increasingly becoming popular in Asia and around the world and this are opening new dimensions of exposures to the risk of infection with Brucellosis from wild boars which are known reservoirs of the infection (Pappas *et al*., 2006; Pappas, 2010). Similar studies had been carried out in dogs by random sampling in Malaysia by Khairani-Bejo *et al*. (2006) but no sera were found positive using the Rose Bengal Plate test.

Positive pigs and farms are a threat to human health as humans could get infected through the animals. The reactor rate of Brucellosis in humans are known to vary from one place to another due to multiple factors such as degree of exposure to the infected animals, management systems of animals, prevalence rate in the animals in the location and the degree of disease endemicity (Pappas *et al*., 2006; Mantecon *et al*., 2008; Seleem *et al*., 2010) but this has not been studied in Malaysia yet (Bahaman *et al*., 2007). Brucellosis is a common worldwide zoonosis that is endemic in many developing countries as well as industrialized ones. Individuals get infected with Brucellae in many ways such as through infected foetuses, reproductive discharges, drinking infected milk and even through aerosols (Pappas *et al*., 2006). Risk factors for brucellosis include: Contact with infected animals, contact with aborted foetuses, consumption of raw milk, slaughtering animals at home, being in a family with someone having brucellosis, owning an animal farm and living in a rural area (Ahmad *et al*., 1999; Al-Majali and Shorman, 2009; Earhart *et al*., 2009).

Brucella suis was the first biological agent to be made into a biological weapon and to be extensively produced by the United States in 1952 before later abandoning the program and getting rid of it. *Brucella* species are rated B on the list of potential biological weapons by the Centre for Disease Control, Atlanta, USA. (Moran, 2002). Because of this and the numerous economic losses and public health hazards that this disease is capable of causing there should be more concerted efforts at eradicating the infection in pigs as well as other animals.

In Malaysia, Brucella was first isolated from cattle in 1950 (Joseph, 1971) and the control of the disease has been through an eradication policy that aims at culling all infected sheep and goats which was established by the government in 1978 and fully took off with the implementation of the compensation scheme in 1982 but little or no attention is paid to the control in pigs which are known to be reservoirs of this and many other zoonotically important diseases (Bahaman and Bejo, 2007). To control the disease in humans it must first be controlled in the animals. There is at present no vaccine to control the infection in humans and no extensive use of vaccines in pigs (Godfroid *et al*., 2011; Perkins *et al*., 2010). Therefore, treatment in humans is based on antibiotic therapy that last weeks while the patient suffers and sometimes there is misdiagnosis due to similar symptoms to typhoid fever, malaria and other fever-like infections in developing countries (Seleem *et al*., 2010).

To control brucellosis in Malaysia as elsewhere, a good epidemiological knowledge of the infection is important. The sylvatic and domestic cycle of the organism has to come under constant surveillance because many wild reservoirs of the organism such as lions, elephants, wild pigs and primates exist and from time to time interact with the human and domestic animal population. Eliminating where possible, contact with wild life or minimizing it is important in the control of Brucellosis. Many countries due to the socioeconomic status of the farmers and the government cannot afford eradication policies of test and slaughter but can begin somewhere.

The use of vaccination programs to control the spread of the infection is usually advised. Brucella Rev 1 vaccine, RB51 and *Brucella abortus* strain 19 vaccines are common choices for vaccination in animals. Rev 1 is usually used against *Brucella melitensis* while the other 2 are for control of mainly bovine brucellosis (Seleem *et al*., 2010). The best control methods may depend on the country and the approach chosen to control the infection but care must be taken not to underestimate the potentials of the spread of the infection in the population and the changing patterns of pathogenicity of the causative organisms (Blasco *et al*., 2011).

CONCLUSION

The successful detection of Brucellosis from pigs in Malaysia using the *Brucella abortus* CFT which is the confirmatory test for brucellosis in animals recommended by the Food and Agriculture Organization (FAO) and the Office of International Epizootics (OIE) has emphasized the need for greater sero-surveillance among all species of livestock and the wild life. More measures must be taken to protect the pigs as well as the general public.

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