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Original Research

An Abattoir-Based Study on Serodiagnosis of Swine Brucellosis in Makurdi, Benue State, North-Central Nigeria

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Abstract

An abattoir serological survey of brucellosis in pigs was conducted in Makurdi, Benue State North Central Nigeria between October and November 2011. Blood-sera were collected from a total of 281 slaughtered pigs and their ages and sex were recorded. The sera were tested for brucellosis using the Rose Bengal Plate Test (RBPT). A total of 86 of the 281 (30.60%) pigs were serologically positive. The prevalence of positive pigs based on sex was 31.20% and 30.13% for male and female pigs, respectively. The age prevalence was 30.10% and 32.00% for young and adult pigs, respectively. There was no statistically significant association ($p>0.05$) between positivity of reactor pigs and their sex or age. This study concluded that brucellosis is a problem in the swine industry. Consequently, strict sanitary measures and control of swine brucellosis is urgently warranted to avoid spread of infection through pigs' populations and their contacted persons as well as pork consumers.

Keywords: Brucellosis; swine; abattoir; Rose Bengal Plate Test; Benue State; Nigeria

Introduction

There is an increasing report from swine farmers in Nigeria, of losses due to abortion and infertility among their herds (Onunkwo *et al*., 2011). Brucellosis is a major cause of abortion and infertility among pigs and an emerging zoonosis worldwide (Corbel, 1997; Mantur and Amarnath, 2008; Seleem *et al*., 2010; Munoz *et al*., 2012). Swine brucellosis is characterized by abortion, orchitis, still birth, birth of weak piglets, epididymitis, hygroma, infertility, spondylitis of especially the lumbar and sacral regions, with occasional paralysis of the hind limbs and rarely arthritis in swine (Megid *et al*., 2010; Onunkwo *et al*., 2011; Praud *et al*., 2012). Transmission of *Brucella* in swine occurs via consumption of birth/or abortion products, uterine discharges or feed contaminated by such products (Kebede *et al*., 2008). Coital transmission has also been reported (European Food Safety Authority, 2009). Majority of infected pigs were reported to recover within six months but many remain permanently infected (OIE, 2009). Although, none of the serological tests has been shown to be reliable in routine brucellosis diagnosis in individual pigs, the Rose Bengal Plate test (RBPT), complement fixation test (CFT) and fluorescence polarisation assay (FPA) are the prescribed tests for international trade purposes (OIE, 2009). Despite the control and preventive measures instituted against the disease, it has continued to persist with increasing cases of outbreak (World Health Organization, 2005). Benue State also accounts for a large portion (20%) of the total pig population in Nigeria (Resource Inventory and Management Report, 1993). The present study was designed to determine the status of brucellosis among pigs slaughtered in Makurdi (Wurukum) abattoir, Benue State North central Nigeria.

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Materials and methods

Study Area and Population

The study was carried out in the Makurdi pig abattoir located in Wurkum in the Benue State, capital North central Nigeria. The State accounts for a large portion (20%) of the total pig population in Nigeria (Resource Inventory and Management Report, 1993).

Sample Collection and Processing

Blood samples from slaughtered pigs were collected and their sera were separated and stored in the refrigerator at -20°C until used for the serological test.

Reagents for Serological Test

Brucella antigen along with positive and negative control sera were obtained from Veterinary Laboratory Agency (VLA), Surrey, United Kingdom.

Serological Test: The Rose Bengal plate test

Rose Bengal plate test was carried out based on the method described by Alton *et al*. (1975) and recommended by the OIE (2009).

Data Analyses

Data obtained were summarized into tables and percentages. Data on age and sex distribution of the pigs sampled and the reactor status for *Brucella* agglutinins were statistically analyzed using Chi square (SPSS Ver. 17). Values of $P < 0.05$ were considered statistically significant.

Results

The overall prevalence of brucellosis, the sex and age distribution of reactors status of the slaughtered pigs sampled are listed on Table 1. Out of a total of 281 pigs sampled, 86 (30.60%) were serologically positive reactors for *Brucella* agglutinins.

Thirty nine (31.20%) out of the 125 males tested and 47 (30.13%) out of the 156 females tested were positive reactors for *Brucella* agglutinins. Statistically, there was no significant association ($p=0.8464$; $p>0.05$) between presence for *Brucella* agglutinins and sex of the sampled pigs (Table 1). Sixty two (30.10%) out of the 206 tested young pigs and 24 (32.00%) out of the 75 tested adult pigs were positive reactors for *Brucella* agglutinins. There was no statistically significant difference ($p=0.7595$; $p>0.05$) between presence for *Brucella* agglutinins and ages of the sampled pigs (Table 1).

Discussion

Pigs infected with *Brucella* have been reported to remain so for life and continue to shed the organism (Lucero *et al*., 2005; OIE, 2009; Godfroid *et al*., 2010). Therefore, it is likely that the positive reactors to *Brucella* agglutinins are still infected and may be shedding the organism and contaminating the environment. Thus, they may serve as a potential source of infection for other pigs, livestock and humans. The prevalence of 30.60% of positive reactors obtained in this study was higher than that reported by Cadmus *et al*. (2006) and Onunkwo *et al*. (2011) in Ibadan and South East Nigeria respectively. This finding is an indication that cases of porcine brucellosis is on the rise in the swine population. It also asserts to the report that brucellosis is endemic among the livestock population in Nigeria. The higher prevalence in this study gives an indication of the status of brucellosis in the swine population. Pigs slaughtered in Makurdi come from within the State and neighbouring pig producing States such as Nassarawa, Kaduna and Plateau States. The unrestricted move-

Table 1. Sex and age distribution of the tested slaughtered pigs and the prevalence of *Brucella* antibodies

Variables	Total number tested	Number positive (%)	*P value*
Sex			
Males	125	39 (31.20)	*0.8464*
Females	156	47 (30.13)	
Age			
Young (<1 yr)	206	62 (30.10)	*0.7595*
Adult (≥1 yr)	75	24 (32.00)	
Total	281	86 (30.60)	

ment and trade of pigs across the country together with the unrestricted importation of unscreened (against brucellosis) pigs into the country may result in a rapid spread of the disease.

The absence of statistically significant association in the prevalence of *Brucella* agglutinins and sex of pigs as well as the age of the pigs supports the assertion that males and females, young and adults under exposure to similar potential risk factors are susceptible to brucellosis (Wang *et al*., 2012). However, there was a higher prevalence of positive reactors among the younger pigs (<1yr). This contrast the report of Megid *et al*. (2010) who stated that brucellosis is more common among adult pigs. The likely reason for the higher prevalence may be that some of the young pigs have maternal antibodies to the organism resulting in cross-reaction with the *Brucella* antigen. It may also be because a high number of younger pigs were tested compared to adults.

Brucella produces a debilitating chronic disease in human characterized by headache, intermittent fever, night chills and sweating, joint pain, joint swelling, general body malaise or backache (Sauret and Vilissova, 2002; Akhvleiani *et al*., 2010; Eales *et al*., 2010) which mimics the clinical signs of other endemic diseases such as malaria and typhoid. Butchers and meat sellers are constantly exposed to the body fluids and tissue of slaughtered animals without the appropriate personal protective gears (Ngbede *et al*., 2012) and this practice could result in infection of the workers. In conclusion, the present study has indicated that brucellosis may a major problem in swine industry. Consequently, strict sanitary hygienic measures and control of swine brucellosis is urgently warranted to avoid spread of infection through pigs' populations and their contacted persons as well as pork consumers.

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