

Diagnosing Trichinellosis in Pigs Slaughtered at a Major Abattoir in Lagos State Nigeria

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Abstract: Trichinellosis, an infection caused by the *Trichinella* spp has been known to occur worldwide affecting almost all species of animals including man. It is an emerging or re-emerging disease in developed and developing countries. This survey was conducted to investigate the prevalence of trichinellosis in domestic pigs slaughtered in Lagos, Nigeria. Nine hundred pig sera were collected at slaughter in an abattoir in Lagos state. The sera samples were stored frozen at the parasitology research laboratory of the department of Veterinary Microbiology and Parasitology, University of Ibadan till used. Post mortem examination was also carried out for 350 carcasses of the 900 from which blood samples were collected using standard procedures. 53 out of the 900 samples collected were seropositive for *Trichinella* E/S antigen using ELISA kit. No *Trichinella* cysts were found at postmortem examination. One of the sample positive at serology was negative at postmortem. A total sero-prevalence of 5.89% was obtained, 5.83 % (adults) and 7.65% of growers were positive. There was no serological evidence of trichinellosis in samples (44) collected from weaners. The male pigs had a higher prevalence (6.14%) than the females (5.45%). However, the differences between the ages and the sexes were not statistically significant ($P \leq 0.05$). This study has been able to provide serological evidence of the presence of trichinellosis in this state and thus the need to carry out proper postmortem examination after slaughter. Also, the absence of cyst at postmortem and the presence of antibodies at serology show that postmortem examination is not enough to screen for *Trichinella* in slaughtered food animals hence the need for the establishment of diagnostic laboratories at abattoirs in the country. [UWALAKA EC, ADEDIRAN O A. **Diagnosing Trichinellosis in Pigs Slaughtered at a Major Abattoir in Lagos State Nigeria.** *N Y Sci J* 2014;7(8):11-14]. (ISSN: 1554-0200). <http://www.sciencepub.net/newyork>. 3

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1. Introduction

Trichinella, a tissue-dwelling nematode, is one of the most widespread parasite infecting human and animals all over the world, with the exception of Antarctica, where there is no record of the parasite. It is mostly acquired by eating raw or under-cooked meat or meat products containing encapsulated *Trichinella* larvae (Dupouy-Camet, 2000; Sequeira *et al*, 2000; Pozio and Murrell, 2006; Zimmermann *et al*, 2012). It has an atypical direct life cycle in which muscle larvae are released from infected meat in host species that can accommodate it, develop in the intestine to adult producing pre-encapsulated larvae which migrate to certain muscle sites in the host to complete the life cycle within several weeks (Dupouy-camet, 2000).

The disease, trichinellosis, caused by *Trichinella* spp has been described as an emerging and or re-emerging disease in both the developed and developing countries during the past decades (Pozio, 2001; Shimshony, 2009; Bruschi *et al*, 2012). In humans, the most common source of infection is the infected pork meat (Dupouy-Camet, 2000). The global distribution of *Trichinella*, together with different cultural eating habits, represents the main factor increasing the risk of human infections in developed and developing countries. Major political and economic changes, revolutions and wars can

contribute to an increase in prevalence among the human population (Murrell and Pozio, 2000; Bolpe and Boffi, 2001; Djordjevic *et al*, 2003). Records on domestic trichinellosis in Africa are very limited (Bruschi *et al*, 2012; Hosni *et al*, 2013; Mukratinwa *et al*, 2013). Therefore, this study was conducted to investigate the prevalence of trichinellosis in domestic pigs slaughtered in Lagos, Nigeria.

2. Materials and methods

This study was carried out in Lagos state, Southwestern Nigeria. Lagos State lies on coordinate's 6°35'N 3°45'E. It shares boundaries with Ogun State both in the North and East and is bounded on the west by the Republic of Benin. The abattoir in Lagos state, located at the outskirts of the city, is a major abattoir where pigs are slaughtered. The study was carried out from June to November 2010. Blood samples were collected randomly from slaughtered pigs of different species and allowed to separate to obtain sera. Post mortem examination for *Trichinella* was carried out according to standard procedures. One out of every two or three slaughtered pig carcasses were randomly selected and examined for *Trichinella* cyst. A total of 350 pigs were thus selected for postmortem examination. The procedure was carried out as described by Kazacos *et al.*, 1986 and OIE (2013). Sera were brought to the laboratory

in the department of Veterinary Microbiology and Parasitology, University of Ibadan. They were centrifuged at 1500rpm for 10 minutes and sera were stored frozen at 4°C until use.

The ELISA test was carried out using a commercial kit (Prionics, Netherlands) with *T. spiralis* E/S antigen according to standard procedures. Plates were read at 450nm. The results were calculated as indicated in the manufacturer's protocol.

$$\frac{\text{OD 450nm sample}}{\text{OD 450nm positive control}} \times 100 = X \% \text{ Positivity}$$

Percentage positivity of $\geq 15\%$ is positive.

The process of trichinostomy using the compression method as described by OIE (2013) was used during the postmortem examination. Small samples from the different muscles were incised and examined and some part was observed under the microscope. 350 out of the 900 pigs sampled for sera was examined for the presence of *Trichinella* larvae.

Statistical analysis of the influence of age and sex was carried out using 1-way ANOVA and Student's t-test. $P=0.05$.

3. Results

No cysts were found at postmortem. At serology, an overall prevalence of 5.89% was obtained from the 900 samples with fifty-three (53) being positive. The percentage positivity per animal ranged from 21.52% to 100.85%. One sample (15.09%) of the positive samples had very high titre with percentage positivity of 100.85%. Growers had a higher number of positives (7.65%) compared to adults (5.83%) and weaners (0.00%) as shown in Table 1. Males had a higher prevalence (6.14%) compared to females (5.89%) as shown in table 1. However, the differences in the above parameters were not statistically significant ($P \leq 0.05$). Also, even though all the 350 samples examined at postmortem were negative, one of them was positive at serology while the remaining 349 were negative at serology.

Table 1: Prevalence of *Trichinella* antibodies in pigs in Lagos state

Category	No. of samples	No. of positive samples (%)	No. of negative samples (%)
Sex			
Male	570	35 (6.14)	535 (93.86)
Female	330	18 (5.45)	312 (94.55)
Total	900	53 (5.89)	847 (94.11)
Age group			
Adult	686	40 (5.83)	646 (94.17)
Growers	170	13 (7.65)	157 (92.35)
Weaners	44	0 (0.00)	44 (100)
Total	900	53 (5.89)	847 (94.1)

4. Discussion

The first record of prevalence of trichinellosis in southwestern Nigeria was in Ibadan using pepsin digestion method (Akinboade *et al*, 1984). Adediran and Uwalaka (2012) also studied the seroprevalence of trichinellosis in Ibadan using ELISA. *Trichinella* spp was reported in a study on gastrointestinal helminths of black rats (*Rattus rattus*) (Mafiana *et al* 1997). A high sensitivity and specificity of ELISA for detecting infection made it the choice diagnostic tool for this study (Gamble *et al*, 2004; Santosh *et al*, 2008; OIE, 2013). Pigs harbouring as few as one larva/100 g of tissue have been detected by ELISA (Nöckler *et al*, 2000; OIE, 2013). The specificity of ELISA for *Trichinella* infection is directly linked to the type and quality of the antigen employed in the test. The Excretory-Secretory antigens, the type provided in the kit from Prionics Lelystad B.

V. Netherlands, currently provide the most specific and economical source (Nöckler *et al*, 2000; OIE, 2013). The prevalence rate of 5.89% in this study was similar to 5.21% reported by Akinboade *et al*, (1984) and 5.7% reported by Hosni *et al* (2013) in Libya. Wang and Cui (2001) reported a prevalence ranging from 0.09% to 29.63% in China while Liu and Boiureau (2002) reported a prevalence of 0.021-7.3% in North America. Our result was however lower than that reported in Argentina, Ecuador and Oyo state, Nigeria respectively (Adediran and Uwalaka, 2012, Larreu *et al*, 2004; Cha'vez-Larrea *et al*, 2005). However, prevalence of trichinellosis as reported by La Rosa *et al* (1998) in Argentina; Gamble (2000) in Ecuador and Sapkota *et al* (2006) in Nepal were lower. The relatively low prevalence in Lagos as compared to that reported in Ibadan (Adediran and Uwalaka, 2012) could be as a result of good

management practices as was seen with the negative result reported by Vassilev (1999) in commercial piggeries in Zimbabwe.

The high titre obtained in eight of the positive samples is most probably an indication of current infection in the pigs. This is obvious by the sample that was negative at post mortem but positive for infection by ELISA.

Generally, growers were seen to be the most infected group which is at variance with some reports by Akinboade *et al* (1984); Adediran and Uwalaka (2012) and Larrieu *et al* (2004) which stated that adults had higher prevalence of trichinellosis. The difference in prevalence between the two age groups was however not statistically significant, thus, implying that age may not be a factor in prevalence. Males were also found to be more seroprevalent than females. This corroborates the findings of Akinboade *et al* (1984); Adediran and Uwalaka (2012) and Larrieu *et al* (2004). The highly inquisitive nature of male animals could have predisposed them to infection but the difference in the prevalence between the sexes was not significant. A serological evidence of the presence of *Trichinella* infection in pigs in Lagos has been provided by this study which is probably the first to investigate the seroprevalence of trichinellosis in Lagos state. This result is highly significant because Lagos is a city that is commercially important and a socio-cultural melting pot for various nationals hence different cultural eating habits have been adopted and this is one of the identified risk factors for *Trichinella* infection (Pozio, 2007). An effective system of surveillance and control is therefore essential at the abattoirs to make meat inspection easier and more thorough. From the results obtained it is our recommendation that a small laboratory should also be established at slaughter houses for improved diagnosis of trichinellosis in pigs.

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