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Survey for bovine trichomoniasis in cattle at Slaughter in the Sokoto metropolitan abattoir Sokoto State Nigeria

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Abstract

A survey to determine the prevalence of Bovine Trichomoniasis (BT) was carried out by collecting 400 samples from cattle of various breeds, age-groups and sex slaughtered at the Sokoto metropolitan abattoir from August to December 2009. Samples were collected from the prepuce of 299 males; and from the vagina to the level of the cervix of 101 females. One hundred and sixty-five of these were Red Bororo, 96 were Sokoto Gudali, 31 were White Fulani and 108 were crosses. Across age groups; 3 were prenatal, 22 were <2 year-old, 143 were between ≥2 <3 year-old, 49 between ≥3 <4 year-old, 144 between ≥4 <5 year-old and 39 were >5 year-old. *Tritrichomonas foetus* was not isolated by preparing wet mounts and by inoculating into Trichomonad culture medium representing zero prevalence and suggesting that bovine trichomoniasis is not present in the cattle slaughtered at the Sokoto abattoir within the study period. It is recommended that a similar study be carried out in settled cattle herds especially those with breeding problems to further assess the status of bovine trichomoniasis in the state especially as this will enable the sampling of animals at intervals which is required for determining the true status of the organism.

Keywords: Abattoir, bovine trichomoniasis, Cattle, Sokoto, Nigeria.

Introduction

Trichomoniasis is a disease caused by various species of the Family Trichomonadidae in mammals and birds (Soulsby, 1982). Bovine trichomoniasis is a sexually transmitted host-specific infection (BonDurant, *et. al*., 1993) caused by *Tritrichomonas foetus* (Rhyan, *et al*., 1999), a flagellated protozoan that inhabits the reproductive tract particularly the prepuce and the distal penis in the bull and the vagina and uterus of the cow (Jubb, *et al*., 1985). The organism has been reported to cause diarrhoea in cats (Gookin *et al*., 1999). In addition, the protozoa organism occurs in pigs, horses and deers but pathogenic effects have not been reported (Soulsby, 1982). Transmission is from an infected bull to a susceptible cow or from an infected cow to a susceptible bull during coitus (BonDurant, 1985); and equipment used in the examination of the genitals rarely transmit the disease (Goodger & Skirrow, 1986). Artificial insemination is also a possible mode of transmission (Soulsby, 1982).

The disease is of economic importance (BonDurant, 1985; Skirrow & BonDurant, 1988). It is characterized by infertility, prolonged breeding interval, early embryonic death, occasional late abortions, repeat breeding, delayed return to estrus after mating and pyometra (Skirrow and BonDurant, 1988; BonDurant *et. al*., 1993) leading to decrease reproductive performances (Skirrow and BonDurant, 1988). Bulls are asymptomatic chronic carriers of the organism (Rhyan *et al.,* 1999), and since infection does not affect the fertility of the bull or the viability of their spermatozoa, they are regarded as permanent source of infection (Soulsby, 1982).

The infection is worldwide in distribution (Gookin *et al*., 1999), although the incidence in Africa and Nigeria in particular are not widely reported probably due to the complex nature of diagnosing the disease (Swai *et al*., 2005) or our poor reporting system. Prevalence rates ranging from 7.1 % (Pefanis *et al*., 1988) to 26.4 % in South Africa (Erasmus *et al*., 1989) and 4.6 % in Egypt (Gawade *et al*., 1981) have been reported. In Nigeria, available reports about the disease are few. Apart from Akinboade (1980) and Ayoade *et al*. (1990) who reported a prevalence of 14.9 % and 100 % respectively using direct microscopy, no other report seems to be available about the disease in Nigeria.

There is need to investigate the present status of the disease since Nigeria needs to increase livestock

production to meet with the increasing demand for animal protein by its populace. Information on the current situation of bovine trichomoniasis in Nigeria is lacking. Current knowledge about the disease will give useful information on the disease pattern in Nigeria. The findings from this study will be useful in preventing the disease, as well as formulating policies for future management, thereby improving the economy of the farmer and the nation at large. This study was therefore designed to determine the present status of bovine trichomoniasis in Sokoto, Nigeria.

Materials and Methods

Study Location

The study location was Sokoto, North-West Nigeria located between Latitude 13° and 14° N and between Longitude 5° and 6° E with an average annual temperature of 28.3^{o}C.

Study Design

Cattle slaughtered at the Sokoto abattoir were selected using stratified sampling methods. They were identified according to sex, age and breed. An average of twenty (20) samples were collected per visit between August and December, 2009.

Sample Size

The sample size was calculated using the formula outlined by Mahajan, (1997).

$$N = \frac{Z^2Pq}{L^2}$$

Where: N = sample size

Z = 1.96

P = anticipated prevalence.

q = 1-P

L = Allowance error (5%)

Using a prevalence of 14.9% obtained by Akinboade (1980), our N value is approximately 195. However, 400 samples were taken to increase the possibility of isolating the organism.

Animals

Majority of the cattle of various breeds (eg Sokoto Gudali, Red Bororo and White Fulani) used for this study were those purchased from different parts of the State especially: Tangaza, Achida, Guda, Illela and neighbouring Niger Republic. Majority were not used for breeding after purchase and were sold for slaughter within one month of purchase. At the abattoir, the animals were identified according to age, breed and sex.

Culture Medium and Preparation

Oxoid Trichomonas medium from Oxoid Limited, Basingstoke Hampshire England was purchased from South Africa and prepared at the Microbiology and Parasitology laboratory, Usmanu Danfodiyo University Teaching Hospital (UDUTH). Following the manufacturer's instruction, 37.5g of trichomonas medium was dissolved in 1 litre of distilled water in a conical flask and boiled to dissolve completely. It was then sterilized by autoclaving at 121^{0}C for 15 minutes after which the medium was cooled to 50^{0}C. One hundred millilitres (100 mls) of bovine serum was thawed and inactivated by holding in a water bath at 56^{0}C for 30 minutes. The inactivated serum was gradually added to the medium by the side of the conical flask to avoid fuming and agitation, then gently mixed together. Three millilitres (3 mls) of 1 g/10 mls chloramphenicol was added to suppress bacterial growth. Ten millilitres (10 mls) of the medium was then dispensed into Universal bottles and kept at 4^{0}C until ready for use. It was thawed to room temperature about one hour (1hr) before sample collection.

Sample Collection and Handling

The sheath scrapping method was used as described previously (BonDurant, 1985; Rae & Crews, 2006) to collect preputial samples. Immediately after slaughter, a sterile artificial insemination pipette attached by means of a short silicon tubing to a 20 mls syringe was inserted into the prepuce to the level of the fornix in the male. The pipette was used to scrap the prepuce back and forth vigorously across the epithelium for about 30 to 45 times while suction was applied with the syringe to withdraw the smegma. Part of the smegma was directly inoculated into the prepared Trichomonas culture media in Universal bottle and the remaining part in the pipette placed in ice-packed flask.

In the female, a sterile artificial insemination pipette attached by means of a short silicon tubing to a 20 mls syringe was inserted into the vagina. The pipette was used to scrap the vagina to the level of the cervix back and forth vigorously for about 30 to 45 times to withdraw cervico-vagina mucous, part of it was directly inserted into a Trichomonas culture media and the remaining part in the pipette placed in ice-packed flask and transported to the laboratory.

Sample Analysis

The inoculated culture media were transported within one hour of sample collection to the Theriogenology Laboratory, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto, Nigeria and incubated at 37^{0}C. Wet mounts were made daily by pipetting from the bottom of the sample on a clean, grease-free glass microscope slide and observed under the microscope at x 10 and x 40 magnifications respectively. Wet mounts were also made from the initial remaining part placed on ice-packed. The detection of the organism was by observing rolling jerky motility as described by BonDurant (1985). The contents of the Universal bottles were discarded after 7 days.

Statistical Analysis

Data generated were collated and analyzed using percentages and frequency descriptive statistics as described by Gomez & Gomez (1984).

Results

The result is presented in Table 1. *Tritrichomonas foetus* was not isolated from any of these samples collected by direct wet mount and by inoculating into Trichomonad culture medium representing a zero prevalence of Bovine trichomoniasis in Sokoto, Nigeria within the study period.

Table 1: Survey for bovine trichomoniasis at the Sokoto metropolitan abattoir

		No. Sampled	Wet mount	Culture	Prevalence %
Breed	White Fulani	31	0	0	0.00
	Sokoto Gudali	96	0	0	0.00
	Red Bororo	165	0	0	0.00
	Crosses	108	0	0	0.00
Sex	Female	101	0	0	0.00
	Male	299	0	0	0.00
Age-group	Pre-natal	3	0	0	0.00
	< 2 yrs	22	0	0	0.00
	2 ⩾ <3 yrs	143	0	0	0.00
	3 ⩾ <4 yrs	49	0	0	0.00
	4 ⩾ <5 yrs	144	0	0	0.00
	> 5 yrs	39	0	0	0.00

Discussion

This is the first study on bovine trichomoniasis in the Northern part of Nigeria based on available literature. The study found a zero prevalence (0%) of the disease. This is consistent with the reports of Klastrup & Halliwell (1977) in Malawi and Swai *et al*. (2005) in Tanzania. However, the results of this study disagrees with earlier reports about the disease in the southern parts of Nigeria, where Akinboade (1980) reported a prevalence of 14.9 % from a similar abattoir survey of trade cattle involving white Fulani, Sokoto gudali, Keteku and Red Bororo obtained from various parts of northern Nigeria and transported to the southern part of the country. From settled herds, a prevalence of 71% and 100% have been reported in the southern parts of Nigeria by Akinboade (1980) and Ayoade *et al*. (1990) respectively. The zero prevalence recorded in this study may be attributed to the fact that the disease may not exist in Sokoto and environs or probably it exists but in very low undetectable levels that requires herd survey. The diagnostic sensitivity of direct microscopy is generally low as non-detection of the organism may give a false negative result (Ribiero, 1999). BonDurant (1985) had recommended a sexual rest period of 1-2 weeks for bulls before sampling to enable a build up of the organism in the preputial and penile epithelium. In addition, sampling is often repeated at least thrice to obtain a reliable trichomoniasis status of a bull (Irons *et al*., 2002). These steps do enhance the diagnosis of the disease, but this was not done in this study because the research had no control over the sampled animals. There is also a possibility of spontaneous recovery from the disease as previously reported (Irons *et al*., 2004).

The indiscriminate use of drugs may be another possible reason why the organism was not detected in this study. Most farmers in the rural areas where these animals were reared often use drugs without prescription. It is also possible that the animals sampled have developed resistance to bovine trichomoniasis over a long period of time leading to the zero prevalence obtained in this study. This study shows that bovine trichomoniasis may not be present or present in a very low undetectable number in cattle brought for slaughter at the Sokoto abattoir within the study period suggesting that Sokoto and environs may be free of bovine trichomoniasis.

Considering the economic importance of the disease and earlier reports about the disease in southern Nigeria, it is recommended that a similar study be carried out in settled herds within Sokoto-Nigeria to further confirm the status of the disease. Secondly, experimental infection of our indigenous breeds of cattle is required to determine their immune level to the disease. Apart from these, samples from bulls used to mount cows with reports of early embryonic death and abortion as well as repeat breeder should be collected and cultured.

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