REPRODUCTIVE EFFECT OF EXPERIMENTAL *FASCIOLA GIGANTICA* INFECTION ON THIRD TRIMESTER PREGNANT EWES

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ABSTRACT

The effect of experimental *Fasciola gigantica* infection on pregnant ewes at third trimester of pregnancy was investigated using twelve non-pregnant ewes aged between 10-12months old belonging to the Reproduction unit of the National Animal Production Research Institute (NAPRI), Shika, Zaria. The ewes were synchronized using injectable PGF2α (Lutalyse, 10mg/ewe) at the dose rate of 5mg/ml and bred naturally with two rams. Pregnancy was confirmed by progesterone levels of 0.5-1.0ng/ml after breeding and non-return to estrus 22 days post-breeding. The experimental animals were divided into two treatments (infected and control) of six animals, with two replicates per treatment and each replicate made up of three animals each. Weekly measurement of progesterone levels were carried out for a period of 7 weeks during the third trimester period of pregnancy. Six ewes in the infected group were each infected orally with 500 *Fasciola gigantica* metacercariae at day 100. One of the infected ewes had a sharp drop in progesterone level (0.4ng/ml) from week 19 of pregnancy and had a still birth at week 21 of pregnancy. Out of the 5 ewes infected, 4 lambed while one (20%) had a still birth. It is concluded that Fasciola infection has adverse effect on pregnant ewes at third trimester of pregnancy. It is recommended that sheep of reproductive age should be routinely dewormed and managed under control grazing to avoid reproductive wastages.

Keywords: Experimental infection, *Fasciola gigantica*, pregnant ewes, Third trimester, Still birth.

INTRODUCTION

Livestock plays a very important role in Nigeria's agriculture, contributing about 12.7% of the total agricultural Gross domestic product (CBN, 1999). In Nigeria, even though the production of mutton has doubled from 1995 to 2004, large numbers of live cattle, sheep and goats as well as various milk products are still being imported to a value of US$ 250 million as at 2003 (FAO, 2005).

Fasciolosis is a parasitic disease of mostly ruminants which has a worldwide distribution and it causes significant morbidity, mortality, liver damage, reproductive inefficiency and loss of weight (Nonga *et al.*, 2009). These parasitic agents exert negative influence on sheep and other farm animals in various ways. Animals may succumb as a result of heavy parasitic infection especially in circumstances where infections is accompanied by malnutrition and general poor management. In Nigeria, several of the studies conducted on fasciolosis are data based obtained mostly from slaughter houses (Okoli*et al.*, 2002). However, reproductive effects of Fasciola sp. in ruminants has been conducted in which there was reduced conception and pregnancy rates, reduced pubertal development, extended lambing interval, reduced weight and number of weaned offspring per ewe (Mage *et al.*, 1989; Njau*et al.*, 1991). There is paucity of information on the effect of *Fasciola* infection on pregnancy in ruminants in Nigeria (Chiezey *et al.*, 2013).Therefore, this study seeks to assess the effects of experimental *Fasciola gigantica* infection on third trimester of pregnancy in ewes.

MATERIALS AND METHODS

Experimental Animals

Twelve (12) non-pregnant ewes aged between 10-12months old belonging to the Reproduction unit of the National Animal Production Research Institute (NAPRI), Shika, Zaria were used.

Isolation and Preservation of the Parasites for Experimental Infection

Fasciola gigantica metacercariae were obtained from naturally infected *Lymnae anatalensis* snails collected from Ahmadu Bello University, Main Campus dam and a small stream behind Bassawa Army Barrack in Zaria. The snails were

taken to Helminthology Research Laboratory of the Department of Veterinary Parasitology and Entomology, Ahmadu Bello University, Zaria.*Fasciola gigantica* metacercariae were processed as described by Adama *et al.* (2013).

Estrus synchronization

The ewes were synchronized using injectable PGF2α (lutalyse, 10mg/ewe) at the dose rate of 5mg/ml and bred naturally with 2 rams. Pregnancy was confirmed by progesterone level of 0.5-1.0ng/ml after breeding and non-return to estrus 22days post – breeding (Oyedipe *et al.*, 1986). Twelve (12) of the ewes became pregnant and did not return to estrus 22days post-breeding. The experimental animals were divided into two treatments (infected and control) of six animals, with two replicates per treatment and each replicate made up of three animals each. Weekly measurement of progesterone levels were carried out for a period of 7 weeks during the third trimester period of pregnancy

Experimental Infection of Ewes

Each of the ewes in the infected group was inoculated orally with 500 *Fasciola gigantica* metacercariae as described by Adama *et al.* (2013); while the ewes in the control group were each given same volume of distilled water. Ewes in the infected group were infected at day 100 of pregnancy.

Post-Infection Monitoring

Progesterone Assay

Assay for progesterone levels in the infected and control ewes was done using the radioimmunoassay (RIA) technique described by Oyedipe *et al.* (1986). This technique allows for rapid measurement of large numbers of serum samples containing low concentrations of hormones.

Haematological parameters

Haematological parameter (Eosinophil count) was determined using Kits manufactured by (Bayer Chemistry Analyzer plus, Germany).

Statistical analysis

The data were subjected to statistical analysis using t-test and it was processed using Statistical Analysis System (SAS, 2002). The parameters of the infected group were compared with those of the controls. Data was expressed as mean± standard error of mean. Values ($P<0.05$) were considered significant at 95% confidence interval.

RESULTS AND DISCUSSION

For infected ewes (Fig 1) the respective mean progesterone values of the infected group were significantly ($P<0.05$) lower than those of the control throughout the period of the experiment (Fig 1). One of the infected ewes (infected ewe 1) had a sharp drop in progesterone from week 5 of infection (i.e. week 19 of pregnancy), and had a stillbirth at week 21 of pregnancy (Fig 2). This is consistent with the findings of Thorburn (1991) who reported that under disease or stress, there is elevation of the level of fetal corticosteroid produced from the fetal adrenal gland which stimulates the synthesis and release of PGF2α by the maternal cotyledons and later by the myometrium. The PGF2α now shuts down on progesterone level and then promotes uterine contraction resulting in stillbirth. The second infected ewe (infected ewe 2) similarly had a sharp drop in progesterone level from week 5. However, the level picked up at week 6 and it eventually lambed successfully. Possible overwhelming presence of flukes as indicated by eosinophilia which peaked at week 5 among the infected ewes as indicated in (Fig 2), might be the cause of the low progesterone level. This is consistent with the report of Chauvin *et al.* (2001), involving sheep infected with 150 metacercariae in which eosinophil concentration were increased by two weeks post-infection and were significantly higher by 6 weeks ($P<0.05$), showing a correlation between eosinophilia and the rate of intensity of the fluke burden. It was viewed that the damage to the liver tissue increased the auto immune response of the host and directs eosinophils to the site of infection. It is concluded from the current study, that Yankasa ewes in the third trimester of pregnancy have demonstrated a relatively low resistance to *Fasciola gigantica* infection as seen even with infection using 500 metacercariae and that the infected group had significantly ($P<0.05$) lower levels of progesterone when compared to their controls with a resultant stillbirth involving one of the infected animal.

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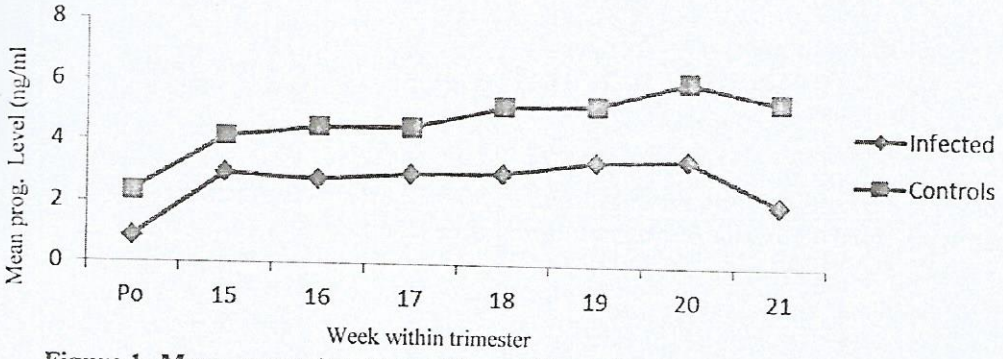

Figure 1: Mean progesterone profiles of *Fasciola gigantica*-infected and control groups of third trimester Yankasa ewes.

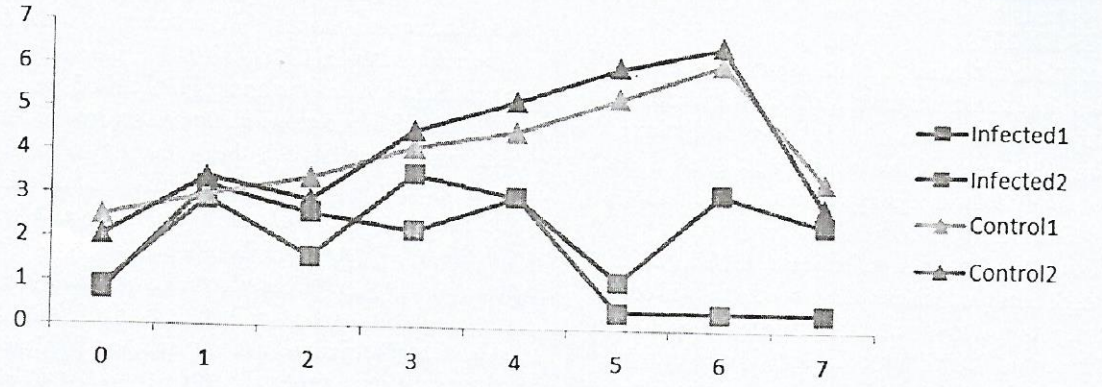

Figure 2: Progesterone profile obtained from two each of third trimester - infected Yankasa ewes and control.

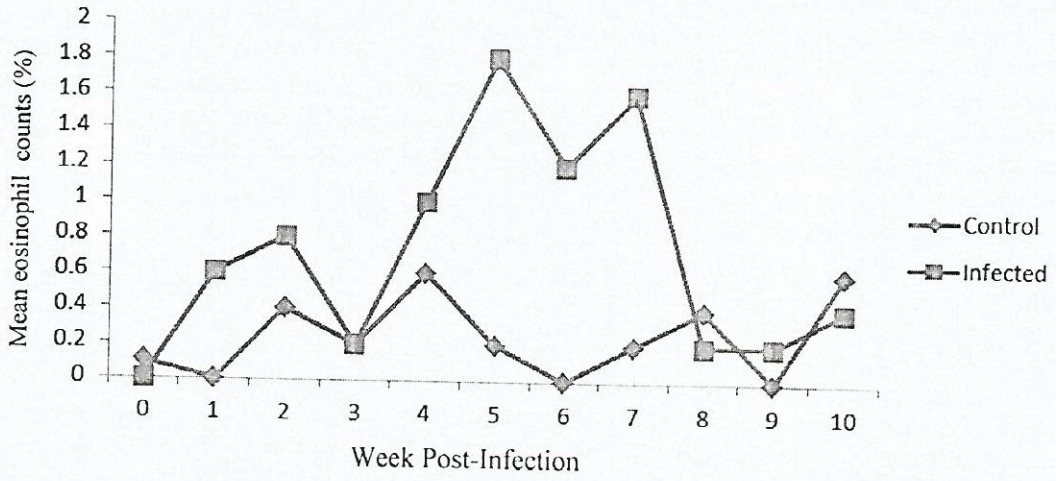

Figure 3: Mean eosinophil counts of Yankasa ewes infected with 500 *Fasciola gigantica* metacercariae at third trimester of pregnancy and their controls.