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BILATERAL ORACHIDECTOMY IN WEST AFRICAN DWARF BUCKS: EFFECTS ON SERUM CHOLESTEROL LEVELS

A.K. OLAIFA[1], S.K. ONWUKA[2*], M.O. OYEYEMI[1] AND O.A. UTHO[1]

Faculty of Veterinary Medicine, University of Ibadan, Ibadan, Nigeria.

Target Audience: Animal health care providers, livestock farmers and researchers, dieticians and nutritionists, general public

ABSTRACT

The serum cholesterol levels in seven sexually matured West African Dwarf bucks were monitored for seven weeks following bilateral orchidectomy.

The mean levels fell in the first 2 weeks but later rose albeit, unevenly from a value of 57.14 ± 6.54 mg/100ml to 102.00 ± 6.21 mg/100ml in the 7th week. The variations were found to be significant (P<0.05) both within the post-orchidectomy weekly means and between these and the pre-orchidectomy level. These findings are discussed with regards to their implications for the eating habits of Nigerians who usually show a preference for dishes with goat meat.

Key Words: Bucks, Orchidectomy Serum, and Cholesterol

DESCRIPTION OF PROBLEM

According to Okali and Upton (1) there is a potential market for increased small ruminant production in Nigeria. Small ruminants are usually the preferred sacrificial animals for many religious festivals in the country. At other non-festival times those Nigerians who can afford it also tend to feed on a delicious gastronomic delicacy of goat meat recipe called "ngwongwo" or "pepper-soup". Furthermore, there is need for every Nigerian to increase their daily intake of protein from animal sources which at the current level of 21.3g/capita/day is way below the UN/FAO recommended 35gm/capita/day (2,3).

We had reported previously (4) on the on-going efforts to ensure this increased livestock, and especially small ruminant, production. Such farm practices as buck castration, novel to these climes, may become increasingly attractive to farmers in the rush up to meet increased production by improving genetic database.

Castration or orchidectomy is the functional incapacitation of the testes either through surgical removal or occlusion of the vas deferentia. With the testes removed a major source of removal of cholesterol from the blood would be blocked (2,6).

It was therefore thought necessary to find out exactly how this would occur in practice especially in the light of the fact that the main aim of castration

*Author for Correspondence

could, in addition to genetic control, be to hasten the attainment of market weight. This could mean that Nigerians would be eating goat meat with elevated plasma cholesterol levels, which is not good for their health (7). This study was therefore undertaken to elucidate how exactly orchidectomy would effect the serum cholesterol levels in the West African Dwarf goat.

MATERIALS AND METHODS

Seven sexually matured bucks, average age 14 months, were purchased from a local goat market at Bodija Market, Ibadan. They were acclimatised to the experimental conditions in the pens of the Goat Unit of the Teaching and Research Farm of the University of Ibadan. They were treated for endo- and ectoparasites with Banminth R (Pfizer Nigeria brand of Morantel tartarate) 2ml/3kg body weight and Cydectin R (Bayer Germany) 1ml/50kg body weight. The goats had unlimited access to pasture in the fenced paddocks of the Unit during the day. This daytime grazing was supplemented at night with a concentrate ration containing 12% crude protein (8). Drinking water was supplied *ad. libitum* And the pens, water and feeding troughs were cleaned every morning. This regime was maintained throughout the period of the study.

Collection and Analyses of Blood Samples

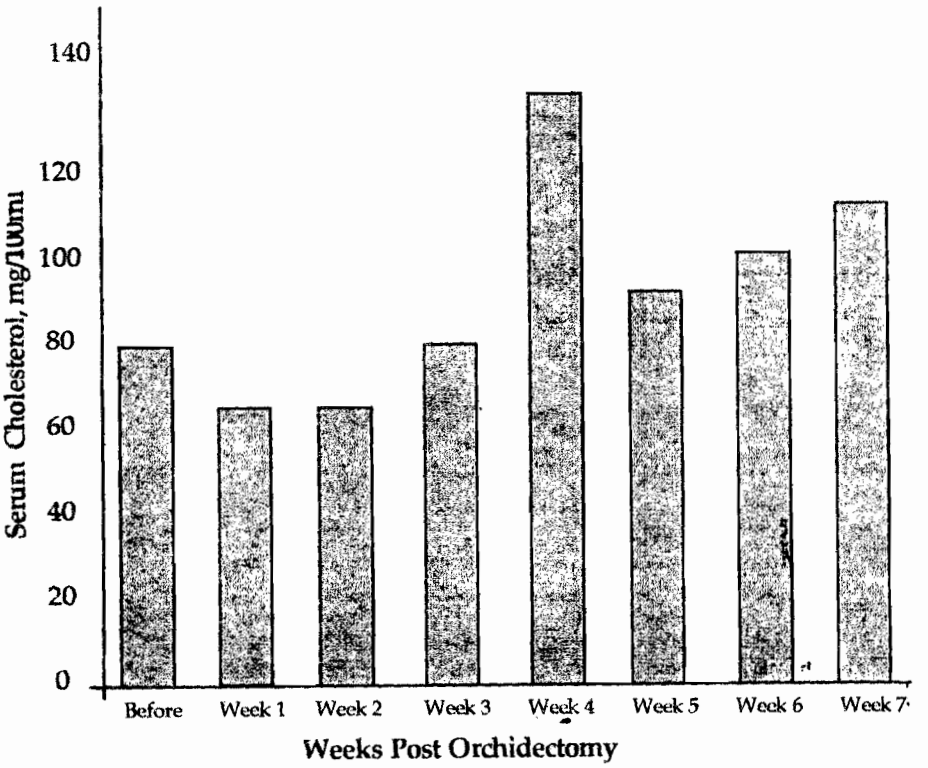
The acclimatization process lasted for two weeks. Thereafter 5ml of blood were taken from each buck by jugular venipuncture. These initial samples put in labelled Bijoux bottles, served as the control or pre-orchidectomy samples. Three days later the bucks were orchidectomised as previously described (7). Briefly, the scrotal area was disinfected with methylated spirit swabs and desensitized by local infiltration with 5ml of 2% lignocaine hydrochloride, an aliquot of which was injected into the substance of the testicles. The latter were removed by open surgery through the scrotal wall, haemostasis being ensured with appropriate ligation of the important blood vessels. The scrotal wound was closed and the wound managed post-operatively with antibiotics and clean environment using new straw beddings everyday.

Following the orchidectomy 5ml of blood were taken from the jugular vein of each animal on a weekly basis for the next seven weeks. These blood samples were processed in the same way as the control samples. They were allowed to clot and the resultant serum was decanted and used for cholesterol determination. This latter process was done according to the Ferro-Ham method as described by Coles (10). The weekly means of the data obtained for the cholesterol determination were subjected to statistical analysis using the analysis of Variance and Student t-tests at the 9% confidence level.

RESULTS AND DISCUSSION

The mean values obtained have been presented as figure 1. There was an initial drop from the 77.00 ± 18.16 mg/100ml pre-orchidectomy level to

Fig. 1 Histogram Showing Serum Cholesterol Levels in West Africa Dwarf bucks Before And After Bilateral Orchidectomy



57.14 + 6.84 mg/100ml in the second post-orchidectomy week. The mean level rose steadily albeit, unevenly, for the next 5 weeks to 102.00 + 6.21 mg/100ml.

The statistical system analyses revealed that the means varied significantly from one another whether when compared within the post-orchidectomy samples or between these and those of the post-orchidectomy samples ($P<0.05$)

Cholesterol is the best known of the sterols. It is present in all tissues of animal origin but scanty in fats from plants (11). It gets into the body mainly through food although there is also some biosynthesis in the liver. In the body it is transported through the blood in association with either high or low density lipoprotein-the so-called good and bad cholesterol. It serves as variety of functions including cell membrane stability and integrity and testicular testosterone biosynthesis (12, 13).

The level of cholesterol in the blood which seem to be critical for developing atherosclerosis and coronary heart disease is said to be affected by a variety of factors. These factors include, *inter alia*, diet, exercise and disease state (14, 15, 16, 17, 18). While Igbokwe *et al.* (16) found no significant changes in the plasma cholesterol levels of goats infected with *Trypanosoma brucei* Agbedana *et al.* (14, 15) noted that malaria infestation could delay the onset coronary heart problems in malnourished patients. Similarly, Kampl *et al.* (17) noted that a number of conditions, such as mastitis, associated with the productive state affected the plasma cholesterol levels in diary cows.

We found from this study that bilateral orchidectomy increases significantly in serum cholesterol level in West African dwarf bucks. The reason could be that in removing the testes, a major avenue for depletion of cholesterol levels in the blood was blocked. As indicated earlier the testes use blood borne cholesterol as a precursor for the biosynthesis of the androgynous hormone testosterone. Since the diet of the animals were not altered from the controls any cholesterol from dietary origin and that synthesized by the liver would literally pile up in blood of such castrates, making their meat a potential source of danger to consumers (3). In this scenario orchidectomy which is a farming practice designed to, among other things, fatten the animal for the market, becomes objectionable. More recently however, Lemonick and Park (19) reviewing the dietary implications of the scientific evidence regarding cholesterol and coronary heart disease urged a midway approach moderation in dietary matters.

The authors would not on the basis of the findings of this study urge or advise avoidance of goat meat "ngwo-ngwo" or "pepper-soup" from carcass of castrated bucks. Rather we would advise moderation on the part of those that can afford to and usually do binge on it.

CONCLUSION AND APPLICATION

From this study we conclude as follows:

That in addition to its usefulness for the genuine regulation and the control of the animal orchidectomy (castration) also leads to increase in the blood cholesterol level of the castrates.

That consumers of the meat products of such castrates should exercise caution and moderation in view of the proven links between recipes with high cholesterol content and coronary heart disease in human.

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