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Severe Bilateral Testicular Atrophy Among Sahel Goats In Maiduguri, Nigeria

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ABSTRACT

Among 6653 Nigerian Sahel bucks examined over a period of 6 months (March - April, 2007) in the abattoir in Maiduguri, northeastern Nigeria, 5 cases (0.08%) of severe bilateral testicular atrophy were diagnosed. The atrophic testes were shrunken, firm to touch and irregular in shape and the seminiferous tubules were replaced by fibrous connective tissues. This is the first report of the condition in this region.

Key words: Atrophic testis, prevalence, pathology, Sahel goats

INTRODUCTION

Goats are hardy, highly prolific animals (Silanikove, 2000) that are important in the production of meat, milk and skin (Devendra and Mcleroy, 1982; Gall, 1996). Their productivity may be threatened by testicular abnormalities (Radostits *et al*., 1997). There ought to be a healthy reproductive system to achieve high reproductive performance in goats (Smith and Somade, 1994; Radostits *et al*., 1997). Efficient controlled breeding programme for high reproductive performance could be achieved by understanding the factors that influence reproduction in goats (Gordon, 1997). Testicular atrophy, a condition in which the testis reduces in size after attaining mature size, is one of the abnormal conditions of the testis that causes infertility (Fraser, 1971). Abattoir surveys provide reliable information on the prevalence of pathological conditions of the reproductive system (Winter and Dobson, 1992; Alosta *et al*., 1998). Testicular lesions of goats have been reported in West Indies (Fraser, 1971), Australia (Tarigan *et al*., 1990), Ethiopia (Regassa *et al.*, 2003) and Iran (Kafi *et al*., 2007). Recently, unilateral cryptorchidism (Igbokwe *et al*., 2009) was reported among Nigerian Sahel goats. This paper reports on the occurrence of severe bilateral testicular atrophy among the Sahel goats in Maiduguri, Nigeria.

MATERIALS AND METHODS

Testes of Sahel bucks were examined physically at slaughter in the Metropolitan abattoir in Maiduguri, Nigeria, over a period of 6 months (March to August, 2007). The ages of the bucks were estimated by observing their dentition (Chibuzo and Sivachelvan, 1994) and their coat colours were identified by visual examination. The testes were collected at postmortem and examined for gross lesions by visual examination and palpation; after which they were fixed in 10% buffered formalin, and stained with haematoxylin and eosin as described by Drury and Wallington (1976). Prevalence of testicular atrophy was calculated as percentage of occurrence in the population and differences in the prevalences were assessed by chi-square test and Z-test using proportions (Singha, 1992).

RESULTS

Severe testicular atrophy was observed among 5 out of the 6653 male Sahel goats examined with an overall prevalence of 0.08%. The monthly prevalences were 0.00 - 0.16% (Table 1). Age-specific prevalences were 0.00-0.12% with bucks of 1 - 2 years of age having the prevalences of 0.09 - 0.12% (Table 2). Coat colour-specific prevalences were 0.00 - 0.3% with the black and black-and-white bucks having zero prevalence while the other coat colours had prevalences of 0.11 to 0.27% (Table 2). There were no significant ($p>0.05$) variations within the monthly, age-specific and coat colour-specific prevalences.

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Table 1. Prevalence of bilateral testicular atrophy in Sahel bucks at slaughter in Maiduguri

Month	Number of animals	Cases of bilateral testicular atrophy	
		Number	Prevalence (%)
March	592	0	0.00[a]
April	1398	2	0.14[a]
May	1535	1	0.07[a]
June	1268	2	0.16[a]
July	798	0	0.00[a]
August	1062	0	0.00[a]
Total	6653	5	0.08

[a] Percentages with the same superscript are not significantly different (p>0.05)

Table 2. Age-specific and coat colour-specific prevalence of bilateral testicular atrophy among Sahel bucks

	Number of animals	Cases of bilateral testicular atrophy	
		Number	Prevalence (%)
Age (year)			
1.0-1.5	2419	3	0.12[a]
>1.5-2.0	2214	2	0.09[a]
>2.0-2.5	1421	0	0.00[a]
>2.5-3.0	414	0	0.00[a]
>3.0-3.5	188	0	0.00[a]
Coat colour:			
White	1868	1	0.06[a]
Brown	710	1	0.05[a]
Black	437	0	0.00[a]
White-and-black	2001	0	0.00[a]
White-and-brown	880	1	0.11[a]
Black-and-brown	392	1	0.26[a]
Multiple/mixed	365	1	0.27[a]

[a] Percentages with the same superscript are not significantly different (p>0.05)

Grossly, atrophic testes were firm to touch, shrunken, contracted, and irregular in shape and the epididymes were prominent with no reduction in size (Fig. 1). Microscopically, the atrophic testis was fibrous with granulation containing numerous capillaries and no seminiferous tubule was present (Fig. 2).

DISCUSSION

Testicular atrophy, a major cause of male infertility, presents as reduced testicular size with altered testicular shape (Fraser, 1971). The morphology of the atrophic testis in Nigerian Sahel goat was typical and represented the most severe form of the condition in which all the seminiferous tubules had been replaced by fibrous connective tissues. Such a fibrous atrophy would be a consequence of chronic testicular degeneration or chronic orchitis (Acland, 1995), and specific causative factors that might be involved had not been investigated. Necrosis of seminiferous tubules that precedes the atrophic fibrosis may be caused by fever, heat in the scrotal environment, severe malnutrition, endocrine imbalance, drug and plant toxicities, impairment of sperm flow or spermatic blood circulation, Burdizzo castration or infections (Acland, 1995). Furthermore, testicular hypoplasia occurring when the testis fails to reach its mature size may predispose the animal to testicular degeneration and eventual atrophy. The atrophic testis arising from degeneration caused by hypoplasia is associated with epididymes that are smaller than normal (Foster, 2007). In the present cases, testicular hypoplasia was precluded as an antecedent to the atrophy since the epididymes of the atrophic testes were not smaller than normal. The testicular damage leading to the atrophy did not seem to have affected the epididymes at the outset.

Fig. 1. Atrophic testes of a Nigerian Sahel goat appearing smaller, shrunken and irregular in shape with prominent epididymes

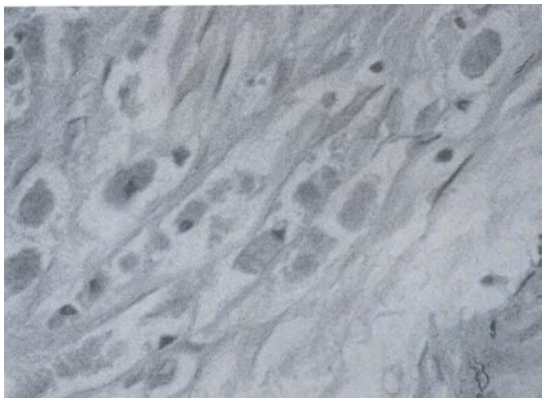

Fig 2. Section of atrophic testis showing granulation tissue containing numerous capillaries and no seminiferous tubules (H & E, ×400).

In the unilateral cryptorchidism reported by Igbokwe *et al*. (2009), one of the testes failed to be positioned normally in the scrotum whereas in testicular atrophy as in the one seen in this study, the testes have descended normally into the scrotum and reached normal size but shrunk to smaller size (Acland , 1995). The present study of testicular atrophy and the report of Igbokwe *et al*. (2009) on unilateral cryptorchidism may suggest that testicular abnormalities of different types exist among Sahel bucks reared in north eastern Nigeria.

The condition of testicular atrophy in this study had a low prevalence and occurred in young adults (< 2 years old). The age-specific prevalence suggested that the instigating factor(s) for the condition had an onset at the early adult age. By the time the bucks were older, no cases were seen, perhaps due to culling at early adulthood; and moreover, old age as a cause of the atrophy might not be implicated in these cases. The low prevalence of testicular atrophy seen in this study may suggest that Burdizzo castration of bucks that causes atrophy of testes might not be a common practice in this environ since castration of ruminant livestock was reported to be rare in the sub-Saharan Africa (Blench, 1999; Turkson, 2008).

It is concluded that severe bilateral testicular atrophy occurred among the Sahel goats at a very low prevalence.

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