

DEVELOPMENT OF MAMMARY GLANDS AND INFERTILITY IN AN ADULT MALE GOAT

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Infertility is a major problem affecting the reproductive performance of domestic animals. In the male goats, testicular degeneration appears to be a common cause of poor semen quality and infertility (Fraser, 1971; Mathai and Ramachandran, 1978; Refsal *et al.*, 1983). Besides infectious causes, a number of non-infectious agents can cause testicular degeneration in male goats. These include excessive heat or cold, radiation, high frequency ultrasound, nutritional disorders, injuries etc (McEntee, 1990).

In this article, the probable role of abnormally developed mammary glands in causing testicular degeneration and infertility in an adult male goat is described.

CASE HISTORY

A five year old male goat (buck) was presented for the investigation of infertility in the month of June. According to the history told by the owner, the buck had been used for breeding purpose for the last four years. However, during the past two years many females were served by this buck with very poor fertility. In particular, none of the females served by this male goat during the last year conceived, although the goat showed normal libido and mating behaviour.

EXAMINATION AND CLINICAL FINDINGS

The buck appeared in good physical health. On examination, the penis looked normal with no preputial adhesions. The buck had well developed mammary glands on the cranial aspect of the testes (Fig. 1). The mammary glands were hanging half way down to the ground and were so developed that the buck could easily be mistaken for a female goat. The testes did not reveal any significant abnormality on manual palpation.

Ultrasound imaging of the testes was done using a B-mode, real time, portable ultrasound scanner (Concept 2, Dynamic Imaging Limited) fitted with a 7.5 MHz, linear-array transducer designed primarily for intra-rectal use. Before imaging, the scrotal hair were closely clipped and a water soluble lubricating gel (Lubrel, Arnolds Limited) was applied to the skin to ensure good contact between the transducer and the scrotal surface by excluding air (Ahmad *et al.*, 1991). While normal testes of goats are homogeneously and moderately echogenic (Ahmad *et al.*, 1991), the parenchyma of both testes in this buck appeared heterogeneous with many dense hyperechoic areas, some with acoustic shadowing, scattered throughout the testicular parenchyma (Fig. 2). Due to their abundance,



Fig. 1: Showing abnormally developed mammary glands in the buck. Testes are also visible on the caudal aspect of the mammary glands.

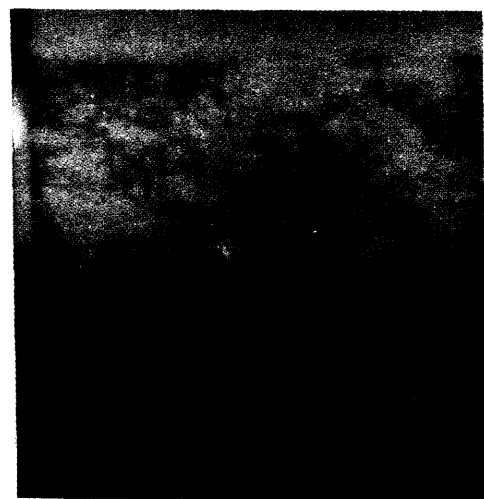


Fig. 2: Longitudinal ultrasonograph of the testis of the infertile buck showing numerous hyperechoic (white) areas within the testicular parenchyma.

the mediastinum testis, which is normally represented by a centrally located hyperechoic line in longitudinal images, could not be identified. These areas were assumed to representing the foci of mineralization within the testicular tissue.

Attempt was made to collect the semen from this buck with the help of an artificial vagina using an ovariectomized oestrogenized doe as a teaser. However, the buck did not show any interest in the teaser. Consequently, semen was collected using an electro-ejaculator. A 2.0 ml clear watery ejaculate was collected which was azoospermic.

DISCUSSION

The mammary glands normally develop in the female under the influence of female sex hormone, estrogens. In the male the mammary glands remain rudimentary. Signs of feminization with enlargement of teats and hyperplasia of mammary glands have been reported in male dogs with sertoli cell tumors, most probably due to increased production of oestrogen (Cotchin, 1960; Dow, 1962; Lindberg *et al.*, 1976). Unfortunately, neither the plasma concentrations of estrogens nor the testicular histology could be studied in this goat. Whether the abnormal development of mammary glands was due to neoplastic-induced hormonal disturbances in this goat, remains unclear. The observations that the goat did not show any interest in the teaser female presented some clue for possible hormonal disturbances. However, the poor libido in this goat might be due to the effect of season, as the goat was examined during the month of June when the libido in the male goats has been shown to be very poor (Ahmad and Noakes, 1995a).

The ultrasound examination of the testes revealed the presence of numerous hyperechoic areas scattered throughout the testicular parenchyma. Previous studies (Ahmad and Noakes, 1995b) have shown that such hyperechoic areas in the testes of goats represent foci of mineralization seen histologically. It appears that constant contact of the testes with the abnormally developed mammary glands resulted in disturbances in the thermo-regulatory mechanism of the testes. This, in

turn, caused testicular degeneration with mineralization, azoospermia and infertility. Azoospermia associated with severe testicular degeneration and mineralization has already been reported in the male goats (Ahmad and Noakes, 1995b).

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