A clinical, sonographic, histopathological and hormonal evaluation of a buck with gynaecomastia and galactorrhea

Avaliação clínica, ultrassonográfica, histopatológica e hormonal de um bode com ginecomastia e galactorréia

Michelle S. Araujo*, Marianne C. Dias, Ana Paula Bertoni, Leonardo D. da Costa, Nereu C. Prestes

Faculdade de Medicina Veterinária e Zootecnia, Universidade Estadual Paulista, Campus Botucatu, São Paulo, Brasil.

Summary: A Saanem buck with gynaecomastia and galactorrhea was examined. Limited mobility, a low body score, normodipsia, normorexia, normoquezia and normouria were observed upon general clinical examination. The breasts showed an excessive increase in size, consistent floating and a translucent watery discharge after milking. Sonographic examinations of the breasts and testes were performed, showing no alteration in testes and rounded areas with mixed echogenicity and hyperechoic walls in breasts. Histopathological evaluation diagnosed moderate testicular degeneration and breast cystic hyperplasia. Blood samples were collected to measure the levels of estradiol and testosterone by chemiluminescence method, and for karyotyping analysis. Bilateral mastectomy and orchiectomy were performed. Because this disease presents many cases lacking a clear etiology, it is necessary to conduct further studies to avoid the occurrence of the disease.

Keywords: goats, hormone levels, mammary hyperplasia, mastectomy

Introduction

Gynaecomastia associated with galactorrhea is defined as a benign development of the mammary glands in males with concomitant production of milk. In goats, it is a rare, anomalous occurrence with a reported production of up to 1 liter of milk per day (Basrur and Basrur, 2004, Wang et al., 2009).

This disease has been observed in fertile males and hermaphroditic animals. Its suggested causes include chromosomal abnormalities, familial predispositions, hormonal changes and mechanical effects (Wooldridge et al., 1999). The genetic background and environmental factors that lead to the occurrence of gynaecomastia in goats have not been determined (Wang et al., 2009).

This report aims to assist the diagnosis and the understanding of the etiology of gynaecomastia associated with galactorrhea in a Saanen buck, as the few cases previously reported in the literature are not sufficient to clarify the etiology of this disease.

Case Report

A five-year-old Saanen buck was brought to the Veterinary Hospital of the Faculty of Veterinary Medicine and Animal Science at UNESP – Botucatu. Approximately two years prior to its arrival at the hospital, the animal began to show a progressive increase in the size of the mammary glands, accompanied by milk production. The owner reported an initial increase in the size of the right udder followed by an increase in the size of the left udder. The buck belonged to the owner’s breeding stock and showed normal sexual activity despite breast enlargement, producing offspring during the previous breeding season.

Limited mobility due to breast enlargement, a low body score, normodipsia, normorexia, normoquezia and normouria were observed upon general clinical examination. The breasts showed an excessive increase in size, consistent floating and a translucent watery discharge after milking. Upon examination of the genital tract, both testicles were mobile, atrophied, symmetric, ovoid, vertical, flaccid in consistency and showed no painful sensitivity to palpation. No alterations were observed in

*Correspondência: msa.vet@hotmail.com
the penis, prepuce or epididymis. Attempt was made to perform semen collection, but the animal showed no libido and for this reason no semen was collected.

Sonographic examinations of the breasts and testes were performed (Figure 1). Blood samples were collected to measure the levels of estradiol, testosterone and for karyotyping analysis. After surgery, the teats and testes were submitted for histopathologic examination.

![Ultrasound images of the teats and testes.](image1)

**Figure 1** - Ultrasound images of the teats and testes. (A) Rounded areas with mixed echogenicity and hyperechoic walls distributed throughout the breast parenchyma. (B) Testis with mixed parenchymal echogenicity and homogeneous echotexture without neoplastic masses or other changes of note.

![Photomicrographs of the mammary glands and testis.](image2)

**Figure 2.** Photomicrographs of the mammary glands (A and B), testis (C and D) and epididymis (E) stained with hematoxylin-eosin (HE). (A) Hyperplasia of the glandular epithelium is noted, with an eosinophilic substance and a homogeneous appearance within a few lactiferous tubules, showing lactational activity. (B) Multiple cystic formations lined with hyperplastic acini and fibrous connective tissue. (C) Interstitial fibrosis and atrophy of the germinal epithelium from the seminiferous tubules.

Mastectomy and bilateral orchiectomy were performed. Anesthesia was induced with xylazine (Sedomin®, 0.1 mg/kg, Protécnica Produtos Agropecuários Ltda, São Paulo, Brazil) and epidural lidocaine (Xylestesin®-2%, Cristália Produtos Químicos Farmacêuticos Ltda, São Paulo, Brazil). Cold water was applied to each teat twice a day for 30 minutes until surgery.

Blood samples were collected to measure the levels of estradiol (54.2 ng/mL) and testosterone (57.1 mg/dL) by chemiluminescence method, and for karyotyping analysis.

**Discussion**

An ultrasound examination of the testes showed mixed echogenicity in the parenchyma, a normal epididymis, spermatic cord, and pampiniform plexus and a homogeneous echotexture without masses suggestive of neoplasia or other noteworthy changes (Figure 1). An ultrasound examination of the breasts showed rounded areas with mixed echogenicity and hyperechoic walls distributed throughout the breast parenchyma without masses suggestive of neoplasia (Figure 1). Mastectomy with orchiectomy was chosen as the best procedure for the welfare of the animal and because of the probable genetic etiology of the disease and risk of possible transmission to offspring (Pilo et al., 2011).

The surgical flap related to the udder measured approximately 20 cm in diameter, showed consistent floating and was covered with hairy skin. When it was cut, approximately 400 ml of yellow translucent liquid flowed from the incision. The inner surface of the gland was smooth, soft and brownish, showing cystic spaces of varying sizes. The microscopic examination of a skin fragment of the hyperplastic mammary gland revealed a secretory epithelium arranged in tubules and ducts with cystic dilatation. Discrete intratubular eosinophilic material was sometimes noted. The diagnosis was breast cystic hyperplasia of endocrine etiology (Figure 2).

Gynaecomastia with galactorrhea due to mammary adenocarcinoma and accompanied by normal sexual activity with offspring production has been reported in goats. Hereditary predisposition or hormonal dysfunction have been hypothesized as causes of the disorder (Jassim and Khamas, 1997; Wooldridge et al., 1999). In the present case, breast cystic hyperplasia was diagnosed based on a histological examination and from the endocrine etiology, but neoplasms were not present in this region.

The surgical flaps related to the testes measured 11.0 x 6.5 x 3.5 cm and 10.5 x 6.2 x 3.5 cm. The cuts showed an orange, flabby and irregular surface. A microscopic examination (Figure 2) of a fragment of testis showed vacuolation in the seminiferous tubules and nuclear pyknosis of the diffuse cells of the germinal epithelium with an absence of spermatogenesis. Mild fibrosis and multifocal hyperplasia of the interstitial Leydig cells were observed in the interstitium. The epididymal ducts contained no sperm, and moderate testicular degeneration was diagnosed (Figure 2). Because no neoplastic masses were found on ultrasound and
histopathological examination of the breasts and testes, gynaecomastia due to neoplasms in these organs was excluded.

Gynaecomastia does not appear to affect fertility, libido, ejaculation or the parameters of sexual performance in goats. However, inflammation and breast enlargement can impair the sexual performance of the animal (Toniollo et al., 2010). A high testicular temperature causes the seminiferous epithelial cells to increase their metabolism and oxygen demand. However, testicular blood flow is limited and fails to meet this demand, leading to hypoxia, the production of reactive oxygen species and the deterioration of semen quality, predisposing the subject to degeneration of the germinal epithelium (Setchell, 1998). Therefore, the increased temperature of the breasts due to the inflammatory process and their proximity to the testes may have contributed to the occurrence of testicular degeneration and reduced libido.

In a study by Pilo et al., (2011), blood samples were collected for the measurement of estrogen, testosterone and prolactin by chemiluminescence method from a five-year-old Saanen buck that presented unilateral gynaecomastia and galactorrhea and from a four-year-old mixed-breed (Saanen X Comosciata) buck with bilateral gynaecomastia and galactorrhea. Blood samples were also collected from four normal males and eight normal females to facilitate comparative analyses of any hormonal changes. The values of estrogen and testosterone levels that we obtained (54.2 ng/mL and 57.1 mg/dL, respectively) were different from those obtained from animals with gynaecomastia in this previous study but were similar to the values obtained from one female (58.7 ng/mL and 54.1 mg/dL, respectively). However, it has been shown that goats exhibit substantial individual variation in serum testosterone values (Lofstedt et al., 1994).

In ruminants, growth hormone plays a greater role than prolactin as a factor in the hormonal control of milk production (Flint and Knight, 1997). In goats, prolactin levels may be increased in animals with gynaecomastia and are one of the indicators used in the diagnosis of this disease (Janett et al., 1996). Unfortunately, it was not possible to quantify prolactin and other hormones associated with lactation due to the lack of availability of laboratory facilities in our region.

Although the genetic alterations may be correlated to caprine gynaecomastia, it is not fully recognized so far. Although genetic alterations may be related to the occurrence of caprine gynaecomastia, it is not yet fully elucidated so far. A buck with active gynaecomastia already demonstrated mosaicism (X/XY) which causes variable deletions of chromosome Y (Rieck et al., 1975; Jaszczak et al., 2010). Unfortunately, contamination of the blood sample to perform karyotyping analysis of the buck from this study precluded the examination.

Conclusions

In the case reported in this study, a clinical examination, an ultrasound and histopathological analysis and hormonal measurements allowed a diagnosis of gynaecomastia associated with galactorrhea in the buck, but it was not possible to determine the etiology of this disease. In accordance with the histopathological evaluation, it is believed that, in this case, the disease was most likely of endocrine origin. Because this disease presents many cases without a clear etiology, often due to the impossibility of conducting examinations, it is necessary to conduct further studies to avoid the occurrence of this disease.

Bibliography


