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Unilateral testicular atrophy and epididymal lithiasis in a Gramasree rooster#

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Abstract

Testicular atrophy is a condition impairing the reproductive health of male chicken. Lithiasis or stone formation in testicles or epididymis adds to the gravity of the problem. The present study describes a case of unilateral testicular atrophy with epididymal lithiasis in a one-year-old male Gramasree cock. The carcass, was brought to the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, for postmortem examination. The lesions were recorded and tissues for histopathology were collected in 10% neutral buffered formalin, sectioned, and stained using routine hematoxylin and eosin staining procedure. Grossly, there was diffused congestion of the testicular tunic with atrophy of right testis. The epididymis was congested with multifocal white spots. Histologically, seminiferous tubules were severely degenerated. The efferent ductules of epididymis were dilated with basophilic amorphous and granular liths in multiple locations. Sperm stasis was evident in a few ductules and rete testes. The lith formation might have caused sperm stasis and degeneration and atrophy of the testis.

Keywords: Gramasree cock, *epididymal lithiasis, testicular atrophy, sperm stasis*

The intensive poultry farming is a rapidly growing sector in India. India now ranks third in egg production and fifth in poultry meat production in the world. Still, the per capita availability of eggs in India is only 91 per year which is far behind the ICMR recommended availablity of 180 eggs

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per year. Backyard poultry farming in Kerala is a promising area to enhance the availability of eggs at local level. The reproductive health of chickens is very important in egg production as well as breeding in both intensive and backyard sector of poultry farming. It is estimated that an adult male bird is responsible for production of 1900 fertile eggs per year (Lagares *et al*., 2017) when considering 1:10 male female ratio. Hence, the health of male reproductive organs is also equally important for improved breeding efficiency. But the affections of male reproductive health are largely neglected in the poultry sector and reports of their affections are scarce, especially from Kerala. The present study intents to give pathological description of testicular atrophy with epididymal stone formation in a Gramasree rooster.

The carcass of a one-year-old Gramasree rooster was submitted for postmortem at the Department of Veterinary Pathology, College of Veterinary and Animal Sciences, Pookode, Wayanad, Kerala. Detailed post mortem examination of the bird was conducted, gross lesions recorded and samples for histological examination were collected in 10 percent neutral buffered formalin (NBF). Histopathological samples were processed by paraffin embedding and sectioned at 5 µm thickness followed by staining with the routine hematoxylin and eosin (H&E) method (Suvarna *et al*., 2018). Special staining with Dahl's stain (Alizarin Red) for calcium was performed as per the protocol described by Luna (1968). Tissue samples were collected for molecular diagnosis and stored under $^{-}$20 ºC till use. Nested reverse transcription – polymerase chain reaction (RT-PCR) for detection of infectious bronchitis virus (IBV) was performed as per protocol of Farsang *et al*. (2002).

Grossly there was diffused congestion of testicular tunic. Right testis was moderately atrophied and the left testis was apparently normal. Epididymis was severely congested with multifocal white spots (Fig.1). Grittiness could be felt on cutting the white spot areas. Histopathologically the diameter of seminiferous tubular lumen was reduced. There were severe degenerative changes such as disorganized and sloughed spermatogenic column disrupting the lumen (Fig.2) and presence of spermatid giant cells. Some of the tubules contained only single layer of germ cells. The efferent ductules of epididymis were dilated and folds were damaged or absent in the affected tubules. Basophilic amorphous and granular material was observed in multiple efferent ductules and sperm stasis was evident in a few (Fig.3 and Fig.4). The occurrence of epididymal lithiasis was reported earlier by Janssen *et al*. (2000); Mahecha *et al*. (2002); Lagares *et al*. (2017). Testicular atrophy associated with epididymal lithiasis was reported by Janssen *et al*. (2000). The gross lesions of testicle in the present study was similar to the observations of Lagares *et al*. (2017) in a 50 week old broiler rooster. Janssen *et al*. (2000) observed smooth, round, fluid

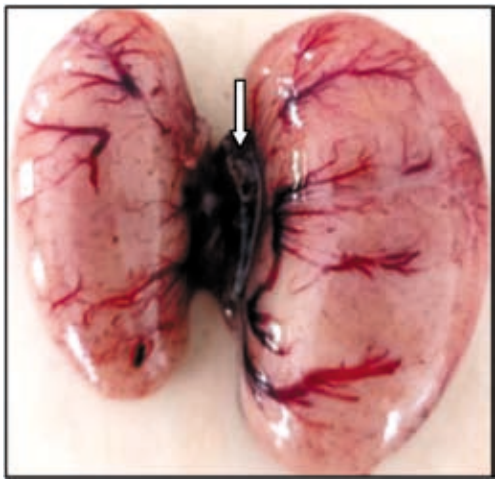

Fig. 1. Unilateral testicular atrophy, diffusely congested testicular tunic and epididymis. Multifocal white spots representing lith in the epididymis (arrow)

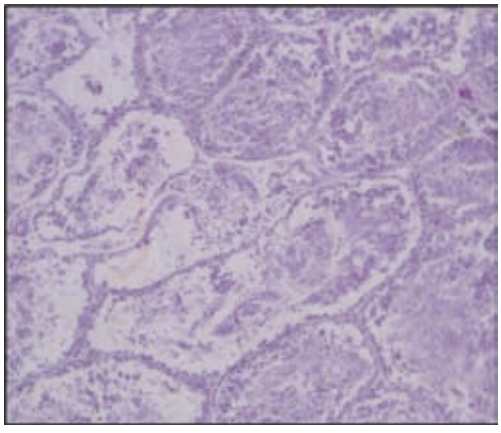

Fig. 2. Degenerated seminiferous tubules without germ cell column and atrophied tubules with only single layer of germ cell column (H&E x 400)

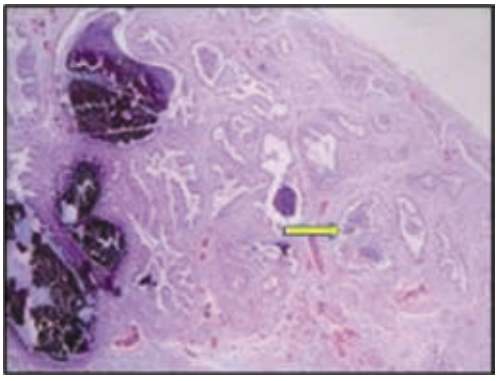

Fig. 3. Basophilic amorphous granular liths in multiple efferent ductules and sperm stasis in dilated rete testis (arrow) (H&E x 100)

filled cysts containing solid, irregularly shaped, yellow-green stones in roosters at 26 weeks of age. In all these studies they have observed mononuclear cell infiltration which could not be detected in the present study. Red staining of the stones with Dahl's stain (Alizarin Red S) revealed that the stone was primarly formed of calcium (Fig.5) which was consistent with the findings of Janssen *et al*. (2000) who performed chemical examination of the testicular stones and and identified that the stones in the rooster testicles were mainly composed of calcium.

Boltz *et al*. (2004) opined that chronic inflammation due to either infectious or non infectious etiology can result in epididdymal stone formation. Furhter, in an experimental study by Boltz *et al*. (2006) epididymal lithiasis was observed in roosters that received either live attenuated or killed vaccines for infectious bronchitis virus (IBV) and caused reduction in fertility. Coinfection of IBV and avian metapneumo virus have also resulted in stone formation (Villarreal *et al*., 2007). In the present study infectious bronchitis virus could not be detected and the bird was not vaccinated against IBV. The exact mechanism of devlopment of lithiasis in the present case could not be elucidated. But the present study revealed that stone formation in the epididymis and resultant testicular atrophy in roosters could be neglected during routine post mortem examination but has deliterious effect on male fertility. Hence, caution must be taken for checking the reporductive tract of male birds during postmortem inorder to manage the flock infertility problems.

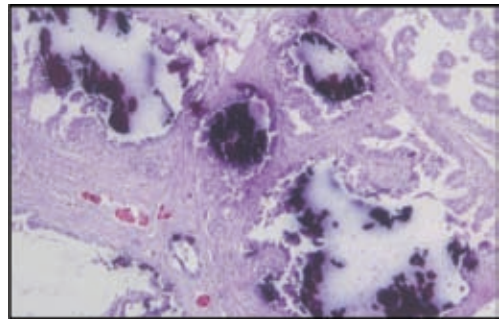

Fig. 4. Epididymal lithiasis with structural damage in dilated efferent ductules (H&E x 400)

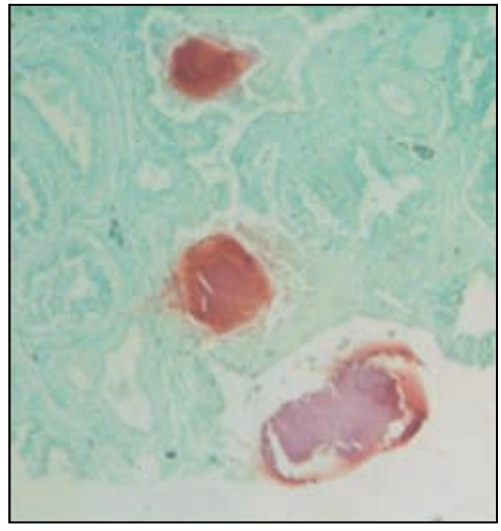

Fig. 5. Epididymal calcium stones (in red colour) inside the efferent ductules (Alizarin Red x 100)

Summary

The study indicate the presence of epididymal lithiasis in roosters that has deleterious effect on the testicles and male fertility. Ascertaining the testicular problems during routine postmortem examination will help in diagnosing male infertility problems in chicken.

Conflict of interest

The authors declare that they have no conflict of interest.

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