

Cystic ovarian degeneration in buffaloes

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ABSTRACT

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For the present study, 425 genitalia of non-descript buffalo cows aged 4 to 10 years with no breeding history were procured from the animals slaughtered in and around Tirupati. Cystic ovarian degeneration (COD) which includes follicular cyst (5.41%), luteal cyst (0.47%) & cystic corpus luteum (0.71%) was observed in 28 (6.59 %) genitalia. Sixteen genitalia (3.76%) showed mixed pathological conditions such as chronic endometritis with follicular cysts (3.29%) and chronic endometritis with luteal cysts (0.47%).

Keywords: Cystic corpus luteum, cystic, degeneration, follicular cyst, luteal cyst, ovary.

INTRODUCTION

Indian buffaloes contribute about 62.98 per cent of the world buffalo milk production and 49.24 per cent of the total milk produced in the country⁵. As animal breeding is the foundation of the livestock industry, scientific breeding of buffaloes for evolving superior breeds brought the problem of infertility to the forefront. COD is one among them. So, the present study was made to identify the incidence and gross & histopathological changes in buffalo genitalia affected with COD.

MATERIALS AND METHODS

The investigation included 425 genitalia of non-descript buffalo cows aged 4 to 10 years with no breeding history. The buffaloes were slaughtered in & around Tirupati for meat purpose during the early morning hours and organs were removed to the laboratory immediately in a plastic bag for investigation. Examination was carried out within four hours after slaughter. Post-mortem examination of the genital system of buffaloes was done and macroscopic characteristics of the genital system were studied. The ovaries were examined whole and by making incisions lateral and parallel to the ovarian midline. Representative samples of tissues were collected and fixed in 10 per cent formal saline. The tissues were processed by paraffin embedding technique. Sections of 5-6 micron thickness were made and stained by

routine Haematoxylin and Eosin technique⁸. Azan's Trichrome method was also employed as a special stain.

RESULTS AND DISCUSSION

Follicular cysts: The high incidence of follicular cysts were observed in 23 genitalia (5.41%)^{1,10,12,13}. The right and left ovaries were affected in 13 and five cases respectively. Right ovaries were found much affected than left ovaries⁷. Five genitalia showed the lesions bilaterally (Fig.1). Grossly the cysts were soft, thin walled, fluctuating and measured about 20 to 34 mm in diameter. The cyst cavity was unilocular mostly and multilocular in few cases with varying quantities of pale yellow clear fluid. The lining of the cysts was smooth and basal portions occasionally had a thin circumscribed area of some yellowish lutein tissue. Grossly, swelling of the vagina, clitoris and vulva was seen in the reproductive tract. The ovarian bursa or ventricle was larger than normal.

Histopathology: Absence of granulosa cell layer, cumulus oophorus, ovum and germinal epithelium were the characteristic histopathological features of follicular cyst in the present study^{4,9} (Fig. 2). In some follicular cysts, scanty portions of the granulosa cells could be found in the basal portions of the cysts and some times appeared luteinized. The outer thecal wall contained concentrically arranged dense bands of fibrous tissue. The cortical portion of the ovary

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was considerably reduced and showed a few atretic follicles. The medulla was compressed and distorted. Microscopically, follicular cysts with chronic endometritis was observed in 14 cases. These changes might be due to long-continued action of estrogen from the cystic ovaries¹¹.

Luteal cysts: Luteal cysts were observed in two right ovaries (0.47%)^{1,12}. The affected ovaries were large, round and partially thick walled and measured about 26 to 28 mm in diameter. The cysts had a narrow internal lining of yellowish-brown luteal tissue and contents were opalescent, light yellow and gelatinous.

Histopathology: The cyst wall comprised of three layers surrounding the central cavity which contained homogenous eosinophilic contents. The inner layer consisted of a thin band of loose connective tissue separating the adjacent luteal tissue from the cystic contents. The middle layer had varying thickness of luteal tissue. The luteal cells were large and highly irregular in shape with vacuolated cytoplasm. The nucleus was vesicular. The outer wall contained concentrically arranged dense bands of connective tissue^{4,9} (Fig.3). Luteal cyst was accompanied with chronic endometritis in two genitalia. The follicular and luteal cysts were the anovulatory cysts and the basic cause for these cystic conditions was conjectured to failure of the hypophysis to release sufficient amount of luteinizing hormone to produce ovulation and proper development of the corpus luteum¹¹.

Cystic corpus luteum: Low incidence of cystic corpus luteum was observed in 3 cases (0.71%)^{2,4,10,15}. The right ovary was affected in two cases while the left ovary was in one case. These ovulatory cysts were normal in size, shape and color with cavities from 5 mm to 11 mm in diameter having a small quantity of straw colored fluid of thick consistency. A thick fibrous capsule separated the structure from the surrounding stroma. The inner lining appeared yellowish grey to dark grey and was smooth (Fig.4).

Histopathology: The wall of the cystic corpus luteum varied in thickness and always had three layers. The central cavity was surrounded by lining of loose connective tissue. The middle layer

had varying thickness of lutein tissue. The lutein cells were small polyhedral with eosinophilic cytoplasm and prominent nucleus which was centrally placed. The stroma varied considerably in between lutein cells. The outer layer was composed of concentrically arranged bands of connective tissue^{4,9}. The other follicles present in these ovaries were small and showed varying degrees of atresia. Cystic corpus luteum is an ovulatory cyst. Unless the cystic corpora lutea did not produce adequate progesterone, a cystic corpus luteum could be regarded as non-pathological¹¹.

Chronic endometritis: It was observed in 14 (3.29 %) cases coexisting with COD. In some genitalia, the uterus appeared harder and the endometrium was pale and dry. The cotyledons were small with dirty grayish appearance.

Histopathology: Sub-epithelial fibrotic changes and infiltration of lymphocytes were the predominant lesions noticed in all cases. Glandular cystic hyperplasia was observed in two cases¹¹. Inflammatory cell foci around the endometrial glands constituted the significant lesion of chronic endometritis. In some areas, the secretory epithelium was totally destroyed and replaced by fibrous tissue leaving only the masses of infiltrating cells to mark the gland sites³. One to five layers of periglandular fibrosis consisting of closely packed, concentrically arranged and spindle-shaped cells with cylindrical nuclei were observed in most of the affected cases (Fig.5). In two cases, the fibrous tissue surrounded the uterine glands to form a nest. Cystic dilatation of uterine glands having low cuboidal to flattened epithelium was observed in three cases. Hyalinization of blood vessels with narrow lumen were also observed in one case. Although inflammation and fibrosis were detrimental to normal function of the endometrium, the cellular infiltrate might be cleared, whereas the fibrosis would persist which would make nidation and survival of embryo impossible. In addition, periglandular fibrosis and cystic dilatation of the glands revealed the greater duration of the condition and might be the result of prolonged severe uterine infection with COD¹⁴. COD, dystocia, retained placenta and postpartum uterine infections may result in inflammatory

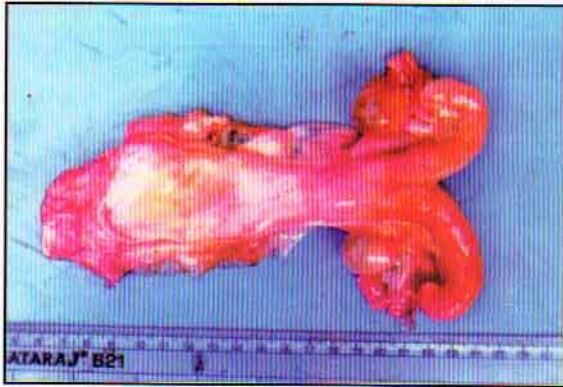


Fig. 1: Follicular cyst: note the genitalia showing bilateral follicular cystic ovaries.



Fig. 4: Cystic corpus luteum: note the right ovary showing yellowish grey cystic corpus luteum with straw colored fluid.



Fig. 2: Follicular cyst: absence of granulosa cell layer by leaving the membrana propria to line the antrum without cumulus oophorus and ovum - H & E x 70.

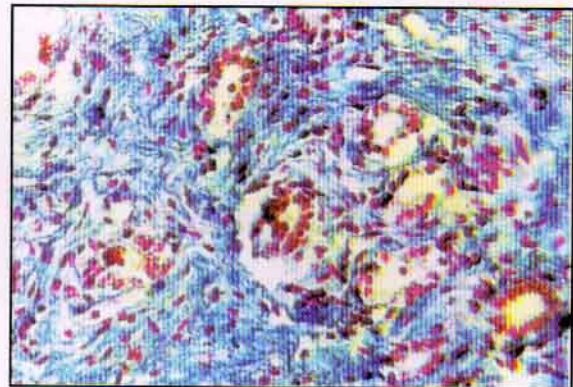


Fig. 5: Chronic endometritis: concentrically arranged periglandular fibrosis with spindle - shaped cells - Azan's Trichrome x 280.

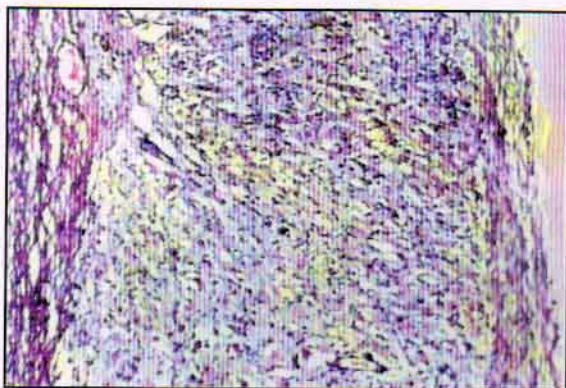


Fig. 3: Luteal cyst: Homogenous eosinophilic contents in the cavity. Cystic wall comprised of inner layer with thin bands of loose connective tissue, middle layer of luteal cells with vacuolated cytoplasm and the outer layer with dense bands of connective tissue - H & E x 70.

reactions, periglandular fibrosis and alterations of the uterine glands and vessels. These changes probably have a more important role in bovine infertility. When an unfavourable uterine environment with endometritis is present, embryo mortality occurs most often either at the time when the morula reaches the uterus at 7 days after conception or at the time of placentation i.e., 35 to 45 days after conception⁶.

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