

## **ABNORMALITIES OF THE ADRENAL GLAND IN BUFFALO COWS**

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### **ABSTRACT**

Adrenal glands of 110 adult female buffaloes were procured from Sadar slaughter house, Mathura. Out of the 110, only 22 cases were found abnormal on gross pathological examination for their weight, shape, size, and appearance. These 22 cases were subjected to histopathological studies. Lesions were found in eight cases, haemorrhage in two cases, congestion in one case, hypoplasia of cortex in three cases, hyperplasia of cortex in one case, and medullary hyperplasia and cysts in one case.

### **INTRODUCTION**

Many of the reproductive disorders in livestock can be attributed to poor managerial, adverse climatic, and nutritional stress factors. The adrenal cortex is known to play an important role in countering the adverse effects of various stresses. The secretion of important reproductive hormones is also influenced by the adrenal cortex. Excessive amount of androgen secretion is responsible for masculinization symptoms in the female. The involvement of adrenal gland is also indicated in nymphomania in cattle (Ottogram, 1949).

The objective of the present investigation was to study the abnormalities of adrenal glands histopathologically. This may ultimately help in establishing linkage of this gland with some of the important reproductive disorders in buffaloes. Moreover, this type of study is not available in buffaloes.

Several authors have stated that adrenal cortex is composed of three different zones. A thin outer zona glomerulosa, a thick middle zona fasciculata, and moderately thick zona reticularis. Yamuchi (1965) stated that the zona fasciculata and

zona reticularis lacked demarcation and together measured  $1437\ \mu$ . Cupps et al. (1954) stated that the cells of zona glomerulosa in normal bulls were columnar with vesicular nuclei and vacuolated cytoplasm, arranged in cords or in cylinders. Cells of zona fasciculata were round with granular cytoplasm, vesicular, nuclei and larger vacuoles.

### **MATERIALS AND METHODS**

Adrenal glands were collected from 110 adult female buffaloes along with their tubular genitalia and other endocrine glands. Antimortem histories were taken before slaughter at Sadar slaughter house, Mathura. The material was collected during the year 1972. After thorough gross pathological observations, only 22 cases out of 110 were subjected to histopathological examination. The tissues were fixed in 10% neutral formalin or in Bouin's fluid. Tissue processing, block making, section cutting and staining (with H and E) were done as per standard techniques adopted for histopathological studies.

### **RESULTS AND DISCUSSION**

Histopathological study of 22 adrenal glands in she buffaloes revealed lesions in eight cases. The distribution for various morbidity conditions were : haemorrhage in two cases, congestion in one case, hypoplastic cortex in three cases, hyperplasia of cortex in one case, and medullary hyperplasia and cysts in one case.

In the two cases of haemorrhage, multiple areas of haemorrhage and telegiectasis about the cortical medullary regions were observed. In the

case of congestion, dark red areas of congestion on the cortico-medullary junction were observed on gross examination. Dilated capillaries in the cortex and medulla were prominent on their junction, enlarged with erythrocytes. The zona reticularis was more severely affected.

In the three cases of hypoplasia of cortex, the glands were pale, firm or oedematous, and smaller to larger in size on gross observations. The zona glomerulosa was about 150  $\mu$  thick, radially arranged, spherical to columnar cells having vesicular nuclei and vacuolated cytoplasm. The zona reticularis and zona fasciculata were not sharply demarcated, both taken together were reduced in thickness (about 600  $\mu$ ), consisting of rounded cells having large round nuclei and large vacuoles in the cytoplasm (Photograph 2). The cells of the adrenal medulla were polygonal with large pale staining nuclei and granular cytoplasm. In one case, in addition to these histopathological observations, there was mild distention of intracellular space. Hyperplasia of the cortex was also observed in one case. In this case, the glands were heavy, enlarged, reddish brown in colour, and soft in consistency. As per gross examination, well defined spherical areas of cellular aggregation in the cortex below capsule were seen (Figures 1 and 2). These areas were composed of elongated polyhedral or columnar cells with large vesicular nuclei and profuse leukocyte infiltration.

Medullary hyperplasia and cysts were observed in one case (Figure 3). The glands were reddish brown in colour and soft in consistency. The medullary regions were prominent with small pinhead-size cysts on gross observations. Small spherical aggregations of polyhedral cells with rounded nuclei and vacuolated cytoplasm forming sharply defined areas were seen. Several small cysts in the medullary zone with a thin fibrous tissue were observed on histopathological examination.

Settergren (1964) mentioned that the width of adrenal cortex decreased in bilateral ovarian hypoplasia. Histopathological changes in the various conditions seen in the adrenal glands, i.e., hypoplasia of cortex, cysts, haemorrhage, congestion and hyperplasia, were the same as described by Niberle (1967) and Jubb and Kennedy (1970) in the cortex of cattle. The reduction in the width of zona glomerulosa and fasciculata may be due to hypopla-

sia of the ovaries as the ovaries in that particular case were hypoplastic and reduced in weight. In another case, it may have been due to pathological involvement of the uterine mucosa and release of hormones in inflammatory conditions of the uterus resulting in chronic endometritis.

Congestion of the adrenal may be due to acute infectious disease or asphyxiation (Jubb and Kennedy, 1970). The formation of cyst in the adrenal gland may be attributed to previous degeneration and liquefaction of some of the tissue in the gland (Jubb and Kennedy, 1970).

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