

HISTOMORPHOLOGICAL STUDY OF ABOMASUM IN CATTLE

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ABSTRACT

Histomorphological studies of abomasum was conducted on six normal cattle. Three glandular regions were arranged alternately to each other consisting cardiac, fundic and pyloric glands in respective regions. Secretory cells were seen in the mucosal layer throughout the abomasum. The size of mucosa, submucosa and muscularis were increased in the pyloric region as compared to cardiac and fundic part. The epithelium of abomasum were changed from stratified squamous to tall columnar epithelium.

INTRODUCTION

Cattle is the compound stomach animals belonging to bovidae family. A true stomach has two layers of epithelial linings to form glandular structures (Nickel, 1979). The abomasum prepares feed for digestion by the secretion of gastric juices and also it is similar in structure with fundic stomach of non-ruminants. Literature on histological study of abomasum in cattle is scarcely available. Hence the present investigation was conducted.

MATERIAL AND METHODS

The tissue samples were collected from local abattoir and tissue pieces of 5 mm size were cut and fixed in the formal saline and then dehydrated in graded alcohol, cleared in xylene and embeded in paraffin at 58-60°C. The paraffin blocks were cut in 5 mm thickness on Rotatory Microtome.

The sections were stained for Harris's Haematoxyline and Eosine for routine studies, Silver Impregnation Staining for reticuline, Verhoeff's, Stain for reticular and elastic fibers, Masson's Trichrome Stain for collagen and muscle fibers (Mukharjee, 1990). The micrometry of stained sections was done by the ocular micrometer and data was subjected to statistical analysis (Panse and Sukhatme, 1967).

RESULTS AND DISCUSSION

Histological study of abomasum in cattle revealed four different layers viz., tunica mucosa, tunica submucosa, tunica muscularis

and tunica serosa. The mucosa extended to three regions namely cardiac, fundic and pyloric gland region. The epithelium of abomasum was abruptly changed from stratified squamous to tall columnar at the apex of the mucosal fold in abomasum (Plate 1).

The mucosa in the cardiac region showed the presence of compound, coiled and branched tubular glands known as cardiac glands. These glands were numerous in the circular area around the omasoabomassal opening. Two types of cells namely mucous neck cells and surface mucous cells were present in the neck of cardiac gland. The straight, branched tubular glands were observed in fundic gland region in abomasum of cattle. These glands were present in the neck, base and body. The neck was associated with tubular structure called gastric pits which open for glandular secretion into the abomasum. The mucous neck cells were also associated with fundic gland in mucosa. The acid secreting cells called parietal cells and chief cells were observed in the body and base of the fundic gland. The parietal cells were spherical shape with vesicular nucleus in the centre of the cell. Pyloric glands were coiled, straight and tubular opening into the straight and deep gastric pit (Plate 3). The lamina propria and submucosa were densely packed with collagen, elastic and reticular fibers with numerous blood vessels and capillaries (Plate 2).

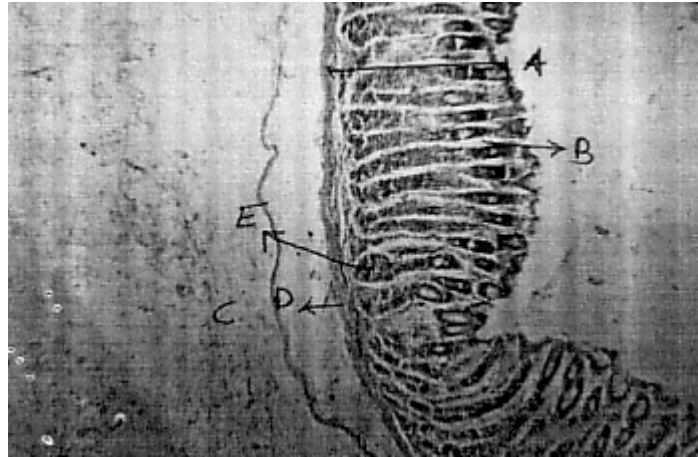


Plate 1. Microphotograph showing histological structure of cardiac gland region in cattle
 A) Mucosa; B) Gastric pit; C) Submucosa; D) Muscularis mucosae; E) Cardiac gland
 (H and E stain - 100x)

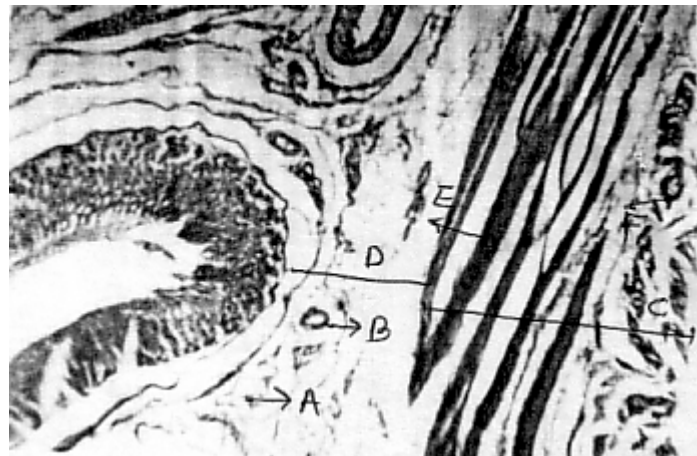


Plate 2. Microphotograph showing histological structure of fundic gland region in cattle
 A) Collagen fibres; B) Blood vessels; C) Tunica muscularis; D) Submucosa;
 E) Longitudinal muscle fibre; F) Inner circular muscle fibres
 (CMMT - 100x)

Malik and Premprakash (1977) reported that the epithelium changes abruptly from stratified squamous to simple tall columnar at the apex of the mucosal folds in ox and buffalo. Similar observations have been recorded by Dellmann and Brown (1987) in ruminants. Surface epithelium revealed the

simple columnar cells with striated border. Similar to the observations of Hill (1951) in goat.

Parietal cells were observed in two forms of mature and immature type with vesicular nucleus placed at centre. Corresponding findings of Chandramouly and

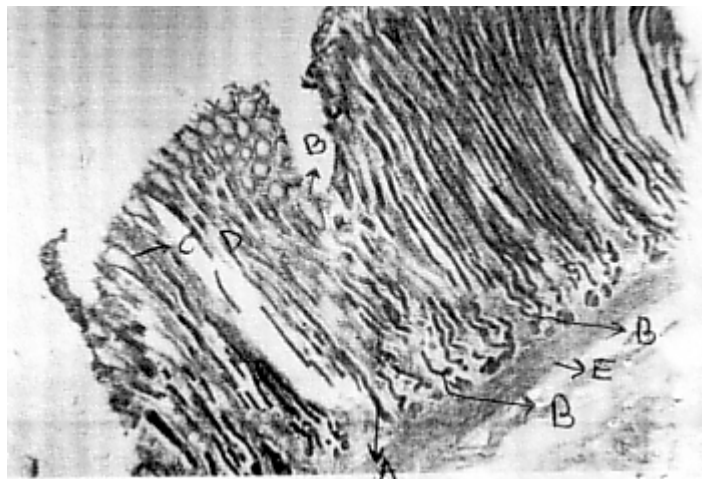


Plate 3. Microphotograph showing histological structure of pyloric gland region in cattle
A) Pyloric gland; B) Gastric pit; C) Lamina propria; D) Muscularis mucosae
(H and E stain - 100x)

Rao (1984) in buffaloes and those of Bensley (1928) in ruminants.

The felt work of collagen, elastic and reticular fibers were observed in the lamina propria and submucosa of abomasum in cattle (Plate 2) in confirmation of the findings of Shama *et al.* (2001) in Yak, Zebu and Mithun and those of Kawaguchi *et al.* (1989) in bovines.

The observations in the present study on histoarchitecture of abomasum in cattle were similar to those reported by Dellmann and Brown (1987) in ruminants, Kapp (1967) in Bovines, Deficre *et al.* (1977) in cattle, Kressin and Sommer (1996) in cow and Prakash and Chandra (2001) in goats.

The micrometrical data of the glandular layer in the present study revealed

that the mean size of epithelium measured from 1.44 ± 0.33 to 3.22 ± 0.07 μm and the length of gastric pits were ranged from 41.40 ± 0.86 to 60.48 ± 1.42 μm .

The average thickness of tunica mucosa was noted between 48.44 ± 1.01 to 51.23 ± 1.01 and submucosa was between 45.78 ± 0.95 to 44.24 ± 0.92 in the abomasum of cattle. This micrometrical data showed that the gradual increase in size of mucosa, submucosa and muscularis from cardiac region to the pyloric region of abomasum.

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