COMPARATIVE HISTOLOGICAL STUDY OF RECTUM IN CATTLE, SHEEP AND GOAT

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ABSTRACT

The present study was conducted on 18 non-discript breeds of adult cattle, sheep and goat. Histological findings of rectum considering different features were noted. Four types of layers were present in rectum of all three species. Number of goblet cell was highest in the rectum of sheep and lowest in cattle. In rectum of goat intestinal gland exhibited secreting activity, bleb like appearance in the lumen and mostly serous secreting glands were located at apical end of tunica mucosa. In rectum of sheep mucus secreting glands were densely packed. Tela submucosa was largest in cattle as compared to sheep and goat. Elastic fiber was most prominant in rectum of cattle and least prominant in the sheep and goat.

Key words : Histological, Rectum, Sheep, Goat.

A substantial histological and anatomical studies have been reported on the large intestine of ruminants (Raghvan, 1964; Dellmann and Brown, 1987 ; Ghosh 1998). The literature pertaining to the same considering rectum and comparative features is scanty. Hence the present study was undertken to observe the histology of rectum in these three species.

The rectum of six adult cattle, sheep and goat of local non-discipt breed was collected from local slaughter house. The rectum was brought to the laboratory, cleaned by running tap water and fixed in the 10% formal saline. Rectum of all three species was processed through graded alcohol for dehydration, clearing in xylene and paraffin embedding. The tissue sections of 5 um thickness were obtained by manually operated microtome machine. These sections were stained in following staining methods:

1) Harris’s Haematoxyline and eosin for general histological observations (Mukherjee, 1990)
2) Silver Impregnation Stain method for reticulin (Mukherjee, 1990)
3) Verhoeff’s stain for reticular and elastic fibers (Mukherjee, 1990)
4) Crossman’s modification for mallory’s triple stain for collagen and elastic fiber (Singh and Sulochana, 1978)
5) Masson’s trichrome stain for collagen and muscle fibers (Mukherjee, 1990)
6) Mc’ Manus peridctic Acid shciff’s (PAS) reaction stain for carbohydrate like glycogen, reticulin and mucin (Mukherjee, 1990)

Rectum of cattle sheep and goat revealed tunica mucosa, tela submucosa, tunica muscularis and tunica serosa or adventitia (Plate, 1, 2, 3). The wall of rectum was thicker in all three species. Tunica mucosa comprised the simple columnar epithelium with number of goblet cells interspersed among the tall columnar cells, lamina propria with intestinal glands and lamina muscilaris (Plate, 2). Tunica mucosa also characterized by longitudinal folds with absence of villi. Lamina propria consisted of collagen and elastic fibers with lymphatic nodules in all three species (Plate, 3). Lymphatic nodules in rectum were larger in cattle and smaller in sheep as compared to goat. Intestinal glands were branched, tubular, tortuous lined by tall columnar cells and located mostly at the base region of mucosa in all three species (Plate 2, 3). Fine trabeculae were present in between mucus secreting glands in cattle. There were highest number of goblet cells in sheep and lowest in cattle (Plate, 4). In rectum of goat intestinal gland exhibited secreting activity, bleb like appearance in the lumen and mostly serous secreting glands were located at apical end of tunica mucosa (Plate, 3).
PLATE - 1

Photomicrograph of rectum in cattle
A) Intestinal gland
B) Lamina muscularis
C) Tela submucosa
D) Lamina propria
E) Tunica mucosa
(H & E stain, 100x)

PLATE - 2

Microphotograph showing histological structure of rectum in Sheep.
A) Tunica mucosa
B) Tela submucosa
C) Tunica muscularis
D) Collagen fiber
E) Intestinal glands
(CMMT stain, 100x)
PLATE 3

Microphotograph showing histological structure of rectum in Goat.
A) Lymphatic nodule
B) Lamina muscularis
C) Tela submucosa
D) Tunica serosa
E) Artery
(H & E stain, 100x)

PLATE 4

Photomicrograph showing rectum in sheep.
A) Goblet cells
B) Nucleus
(H & E stain, 400 x)
In rectum of sheep mucus secreting gland were densely packed as compared to cattle (Plate 2). Lamina muscularis of rectum in all three species comprised of inner circular and outer longitudinal layers of smooth muscle. Elastic tissue in this lamina muscularis was most prominent in the rectum of cattle and least prominent in sheep and goat.

The findings of tunica mucosa consisting epithelium with number of goblet cells, lamina propria with tubular, tortuous, branched intestinal glands, lamina muscularis with inner circular and outer longitudinal layer of smooth muscle and longitudinal folds with absence of villi was in close collaboration with Dellmann and Brown (1987), Ramkrishna and Gadre (1998) in ruminants, Ghosh (1998), Raghvan (1964). The present observation of lamina propria that, lymphatic nodules present in cattle were larger than sheep and goat and observation of lamina muscularis with elastic tissue most prominent in the rectum of cattle than sheep and goat in the present study was earlier reported by Dellmann (1993) in ruminants.

Tela submucosa was connective tissue layer that revealed collagen and elastic fiber bundles in all three species (Plate,2). It also consisted of blood vessels and submucosal nerve plexuses. Tela submucosa was largest in cattle as compared to sheep and goat and there were no other histological differences in these three species. The present observation of tela submucosa consisted of connective tissue layer with blood vessels and submucosal nerve plexuses was in close collaboration with previous findings of Dellmann and Brown (1987) in ruminants.

Tunica muscularis was the third layer of rectum which consisted of inner circular and outer longitudinal smooth muscle in all three species (Plate, 2). In rectum of cattle between these two layers outer muscle layer contained more elastic tissue than the inner layer.

Tunica serosa of the rectum was a outermost layer with a loose connective tissue and blood vessels (Plate, 3). There were no findings of histological differences in tunica serosa between cattle, sheep and goat. Histological findings of tunica muscularis with inner circular and outer longitudinal smooth muscles and also the findings of tunica serosa with a loose connective tissue layer in the present study was also previously reported by Dellmann (1993) and Ramkrishna and Gadre (1998) in ruminants.

REFERENCES