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Research article

Histomorphological study of duodenum of goose (Anser anser)

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Abstract

The present work includes anatomical and histological studied of different part of the duodenum in the Goose (Anser anser). It was taken (10) birds were anesthesia and work of a longitudinal incision in the abdomen and the eradication of the gut complete manner and then duodenum measurements, Anatomical study shown duodenum divided into three parts ascending, descending and middle part. Histological study after dyeing in the form of hematoxylin and eosin represent wall of duodenum in all parts consist of four layer tunica mucosa, submucosa, muscularis and serosa. The tunica mucosa of all parts of duodenum was studied with folded villi of different shape and size, which were lined by simple columnar epithelium having more goblet cells in proximal part in contrast middle and distal part. The goblet cells are distributed between enterocytes and secrete mucus that covers the mucosa. The apical part of villi of proximal duodenum were slightly pointed and the basal parts of villi were thicker than middle and distal duodenum that's come from the proximal part of duodenum plays major role in net nutrient absorption Lamina muscularis mucosa is various in thickness in all parts of duodenum and was made up of smooth muscle fibers. Tunica submucosa in duodenum of goose in this study consist of loose connective tissue rich with lymphoid fibers and duodenal glands. The musculosa layer consists of two smooth muscle layers outer longitudinal layer and a thick circular muscle layer that allow mixing and propulsion of the digesta through the intestinal tract

Keywords: Anatomical, Duodenum, Goose, Histological.

Introduction

Goose are waterfowl birds belonging to the tribe Anserini of the family Anatidea (1). These species of birds are from within important domestic birds which featuring by high resistance disease when it breeding in different environmental conditions and also considered friends of farmers compare with the other type of the birds because high fatty liver production in the world (2, 3), and play important role for the controlling the harmful pests of crops (4).The small intestine is a long hollow tube, constant diameter extend in the poultry especially the (goose) from the area of exit from the gizzard to the contact with the large intestines compared with bowel mammals (5). In both mammals and birds small intestine divided in three parts namely duodenum, jejunum and ileum (5, 6). The duodenum easy performance in birds and it contacts with the quadrate and right lobes of the liver and has two ampulla's with constriction between them. It consists the descending and ascending duodenal loops closely covered by mesentery pancreatic duodenal ligament (7). The process of digestion of food and absorption of nutrients

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in the small intestine depend to type and importance of the tissue (6, 8). There are a serous membrane starts from the outside called serosa followed by longitudinal and circular muscle layer and find between these two layers of blood vessels, lymphatic and neurological (8,9,10,11). The presence of villagitis in the intestine play important role in the process of absorption of the food, this part consists of a long body as finger contains a single vertical epithelial layer containing goblet cells (11, 12, 13). In addition to the presence of vertical cells and goblet cells, there are lymphatic vessels and capillaries blood vessels and bundles of muscles, nerves and other cells (14, 15). The present study was conducted to investigate the histomorphological of duodenum in of Goose (Anser anser) to provide base line information

Material and Methods

Ethical approval

The Animal Ethical Committee of Veterinary Medicine College, University of Al-Qadisiyah, Iraq, has approved the present study under permission No: 430

Animal Source

Ten healthy goose were collected from a local commercial market of animals in Baghdad city weight between 2500g and 2000g ageing from 25-35 days from both sex. They were immediately transferred to the veterinary anatomy laboratory in al-qadisiyah University

Experimental Design

Morphometric and morphologic Studies

All goose were used for the morphometric study and each was sedated using chloroform inhalation anesthetic after which they were carefully dissected through mid-ventral incision from the inguinal region to the mandibular. Anatomoto pographic including (30 examples of duodenum) were split into 3groups (five from proximal part, five from middle part and five from distal part) studding (weight, length) of each lobes and recorded.

Statistical Analysis

The recorded weights and lengths were expressed as mean ± standard error of mean (M ± SEM) using statistical package for social sciences (SPSS) version 17.

Histological Studies

After sacrificing the Gosse, they were opened up and tissues were collected from the duodenum. These tissues were immediately labeled and fixed for two days by complete immersion in 10% normal formalin. They were dehydrated through a series of graded alcohol (70%, 80%, 90%, 95% and 100%). They were later cleared in xylene and infiltrated with molten paraffin wax. Sections of 5µ thick were cut from the embedded tissues using disposable microtome. These sections were mounted on grease free clean glass slides and stained at room temperature using haematoxylin and eosin (H&E) for routine histological studies (16).

Results

The small intestine long tube begins at the pylorus and terminates at the junction of colon and the mesentery, its distinguished into (3) chief parts, the duodenum, jejunum and ileum suspend cecum. The duodenum is the first part of small intestine elongated in shape, pink in color consist of three parts descending part (D1) ,middle part D2 and ascending part (D3) Figure (1,2) the mean total length of duodenum (56) cm, weight (35) gm and width (2,2) mm . The pancreas lies between the arms of the loop and

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attached to each arm of the duodenum actually holds the two arms together Figure (3), the mean total length of descending part (D1) (15.2±0.01) cm, weight (25.4±0.02) gm and width (0.3±0.02)cm Table (1) while the mean total length ascending part (25±0.01) cm, weight (20±0.02) gm and width (0.3±0.02) cm Table(1) the caudal ending of the duodenum terminate at the ileocecal-colic junction. Histological study appear the wall of duodenum in all parts consist of four layer tunica mucosa, submucosa, muscularis and serosa Figure (4). Tunica mucosa was consisted of three layers the lamina mucosa lined by simple columnar epithelia, lamina propria and lamina muscularis Figure (5). The tunica mucosa of all parts of duodenum was studied with folded villi of different shape and size which were lined by simple columnar epithelium having more goblet cells in proximal part in contrast middle and distal part Figure (6).The goblet cells are distributed between enterocytes and secrete mucus that covers the mucosa .The apical part of villi of proximal duodenum were slightly pointed and the basal parts of villi were thicker than middle and distal duodenum that's come from the proximal part of duodenum plays major role in net nutrient absorption. The lamina propria had loose connective tissue with few lymphoid cells in proximal duodenum in contrast the middle and distal duodenum. The duodenal gland of goose in this study extend occasionally in the lamina propria in first, second and third parts along with in submucosa of all duodenal parts Figure(7). The Paneth cells located in the base of the crypts of Lieberkühn but not found in villi. lamina muscularis mucosa is various in thickness in all parts of duodenum and was made up of smooth muscle fibers .Tunica submucosa in duodenum of goose in this study consist of loose connective tissue rich with lymphoid fibers and duodenal glands. The musculosa layer consists of two smooth muscle layer Souter longitudinal layer and a thick circular muscle layer that allow mixing and propulsion of the digesta through the intestinal tract Figure (8). The serosa is cover of flattened simple squamous epithelium.

Table (1): measurements parameters of the descending part (D1) and ascending part (D1) of duodenum

Parameters	Descending part (D1) M± SE	Ascending part (D1) M± SE
Length (cm)	15.2±0.01	25±0.01
Width (cm)	0.3±0.02	0.3± 0.02
Wight(gm)	25.4±0.02	20±0.02

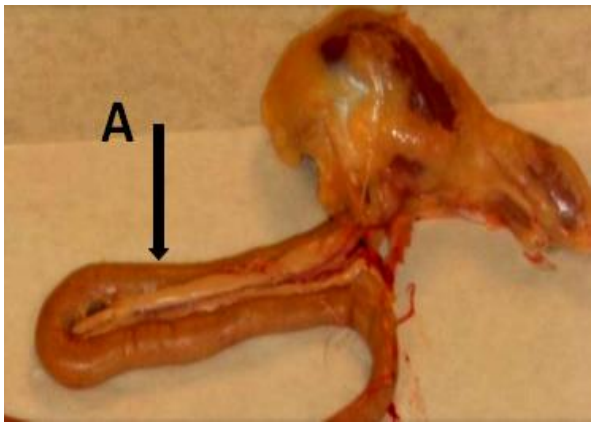

Figure (1): Photograph section anatomical position, Shape and color duodenum

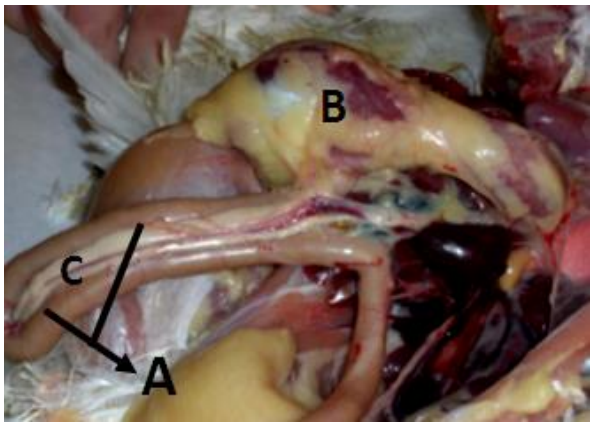

Figure (2): Photograph section ventral view position
A- Duodenum, B- Gizzard, C- Pancreas

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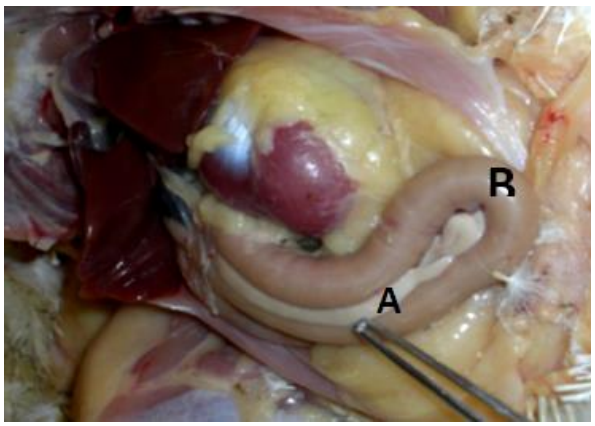

Figure (3): Photograph section ventral view position
A- Pancreas, B- Duodenum

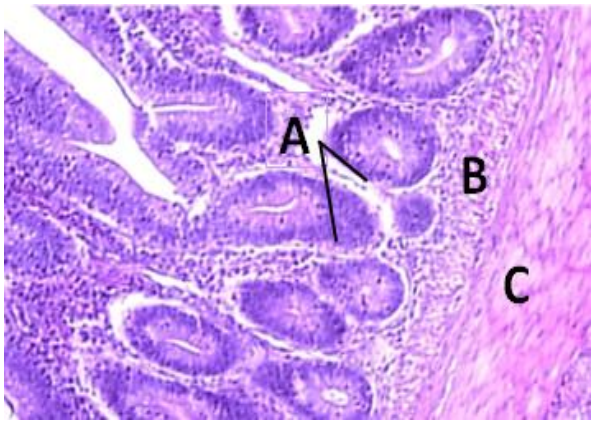

Figure (4): Transvers section of descending duodenum (H& E) 100X
A-Mucosa, B-Submucosa, C- Muscularis, D-Serosa

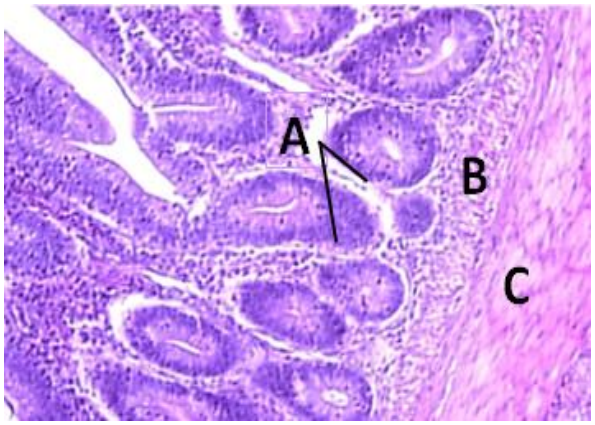

Figure (5): Transvers section of descending duodenum show tunica mucosa (H& E) 400X
A-Simple columnar epithelia, B-Lamina propria, C- Muscularis mucosa

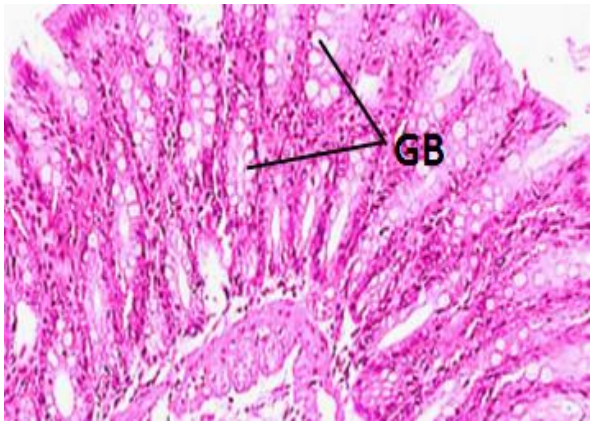

Figure (6): Transvers section of descending duodenum show mucosa (H& E) 400X
Goblet cells (GB)

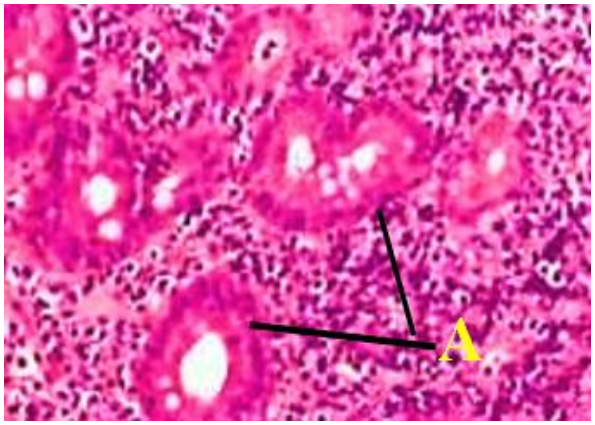

Figure (7): Transvers section of ascending duodenum show amina propria (H& E) 400X
A- Duodenal gland

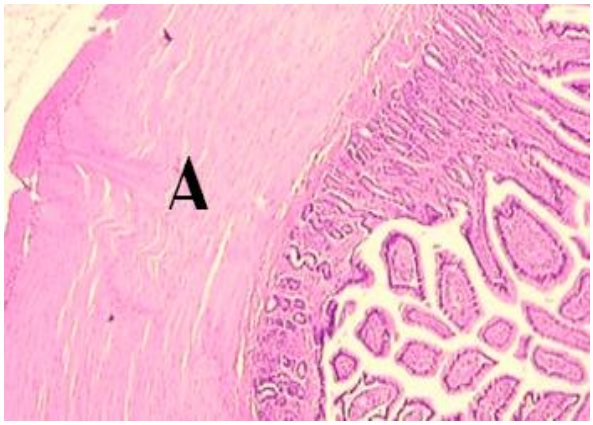

Figure (8): Transvers section of ascending duodenum show musculosa layer (H&E) 400X
A- Smooth muscles fiber

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Discussion

The anatomical study represent the duodenum longest part of intestine begins at the end of ventriculus and forms an elongated 2 loop, therefore the duodenum is have 3 parts descending part ,middle part and ascending part .longest the duodenum come from nature the food in duke its eat different type of food as well as digestive and absorption operation need long time in gut. This finding agree with (3) The pancreas lies between the arms of the loop and being attached to each arm of the duodenum actually holds the two arms together. The results of the histological study presented the wall of duodenum in all parts consist of four tunica mucosa, submucosa, muscularis and serosa same finding were agree with (5) in chicken, (13) in mammalian .The tunica mucosa was of consisted three layers the lamina mucosa lined by simple columnar epithelia, lamina propria and lamina muscular is (16,17,18). The tunica mucosa of all parts of duodenum was studded with folded villi of different shape and size which were lined by simple columnar epithelium having more goblet cells in proximal part in contrast middle and distal Partthat's disagree with (19,20). The goblet cells are distributed between enterocytes and secrete mucus that covers the mucosa. The apical part of villi of proximal duodenum were slightly pointed and the basal parts of villi were thicker than middle and distal part of duodenum that's come from the proximal part of duodenum plays major role in absorption of nutrient this the present observations are consistence with those observations of (21,22).The lamina propria had loose connective tissue with few lymphoid cells in proximal duodenum in contrast the middle and distal duodenum like result of (23). The duodenal gland of goose in this study extend occasionally in the lamina propria in first, second and third parts along with in submucosa of all duodenal parts this finding agree with (24).and disagree with (25). Lamina muscularis mucosa is various in thickness in all parts of duodenum and was made up of smooth muscle fibers. Tunica submucosa in duodenum of duke in this study consist of loose connective tissue rich with lymphoid fibers and duodenal glands.

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