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STUDY OF MORPHOLOGY AND MORFOMETRY

OF KINTAMANI DOG'S DUODENUM

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ABSTRACT

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The Kintamani dog is a native dog from Bali that has an attractive and a gorgeous appearance. The aim of this research was to know the morphology and morphometry of kintamani dog's duodenum. This study was used five females kintamani dog. The observation of histologic morphology was used a binocular light microscope with 100x, 200x, and 400x magnification. The results showed that the length of duodenum are 16.2 ± 1.3 cm, and the

width of duodenum are 3.1 ± 0.1 cm. The duodenal histological structure is composed of four layers namely tunica mucosa, submucosa, muscularis, and serosa, respectively. The thickness of the mucosal tunica is 1364.584 ± 255,504 μm, the submucosal tunica is 360.136 ± 188.283 μm, the muscularis tunica is 689.178 ± 267.228 μm, and the serous tunica: 25.888 ± 11.93 μm.

Keywords: kintamani dog; histology; morphology; morphometry; duodenum

INTRODUCTION

Dogs are one of the animals that can life side by side with humans. Nowadays, dogs have been different from their wild ancestors, becoming animal figures with various features, especially on sight, hearing, and smell (Budiana, 2006). Indonesia has a race dog that became the only dog of the original race of Indonesia that is the kintamani dog. This dog is a local highland dog, living in the vicinity of Sukawana Village, Kintamani District, Bangli Regency, Bali Province, and in history, this dog is called gembrong dog

(Puja, 2007). Kintamani dogs are now increasingly interested because dogs kintamani is the only original dog Indonesia that has an attractive appearance (Gunawan et al., 2012).

The number of dog kintamani enthusiasts is not matched by the many studies of dog kintamani. Where each dog race has different characteristics. Studies on the structure of anatomy and duodenal morphometry in kintamani dog have not been reported at this time.

Therefore, it is necessary to do research about it. Preliminary data or information on the structure of duodenal morphologycan be used as a reference for subsequent research such as pathology, immunology, physiology, preclinics, and Subsequent clinics

MATERIALS AND METHODS

This study used a sample of duodenum from kintamani dog. Samples were taken from female kintamani dog during the depopulation program in Sukawana Village. Samples taken from 5 kintamani dogs..

Observation of the anatomical structure was done by direct observation of the duodenum in the abdominal cavity. The observed variables are weight, length, lumen diameter. Measurements were made using the fabric meter and the digital thrust term based on the variables to be observed. Histology preparation was made by referring to the method used by Luna (1968). The staining procedure of HE refers to the Kiernan

method (2010).Observations of histological structures were performed in five field of view using a light microscope with 100X, 200X and 400X

objective lens enlargement (Suwiti *et al.*, 2015). Histologic image variables observed included duodenal components and layers.Measurements were performed under a microscope using 100X, 200X and 400X objective lens enlargements using a *Calzeiss teaching micro*scope.

Data Collecting Method

The data was collected from the observation of anatomy and histology. Anatomical data obtained from morphological observations and measurements of length and width by opening the duodenum and then measured using a cloth meter. Histologic data were obtained from morphological observation and measurement of mucosal, submucosal, muscularis, and serousine tunica thickness using calzeiss teaching microscope.The data were obtained first, then analyzed. The observations of the morphometry of the anatomical and histological structures were analyzed descriptively qualitatively, while the length, width, and thickness were descriptively quantitative.

RESUL TS Morphology of the Duodenum

The results of morphological observations made on the duodenum

of female dog kintamani anatomically obtained the result that the

duodenum runs caudally and transversely through the coxae tuber,

forming a U-shaped spin.

The morphological observations performed on the female

duodenum of female kintamani dog histologically contain 4

layers

in the duodenum, respectively the tunica layer of mucosa,

submucosa, muscularis and serosa. Then some components are

found such as villi, epithelium, goblet cell, crypt lieberkuhn,

mucosal muscularis, lamina propria, brunerry gland, circular

muscular, longitudinal muscularis, and nerves.

Duodenal morphomet

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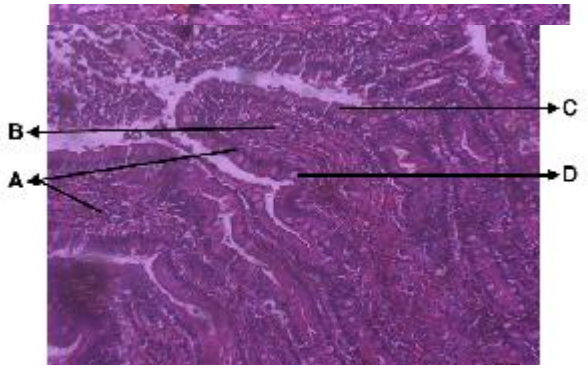
Table.1 Length and Wide Mean of the Kintamani Dog Duodenum Means ± Standard Deviation (cm)

length	16.2 ± 1.3 **Wide** 3.1 ± 0.1

Table.2 Mean of Thickness of Mucosal Layer, Submucosa, Muscularis, and Serosa

Mucosa	**Sub mucosa**	**Muscularis**	**Serosa**
Rata-rata ± Standard Deviation (mm)	1364.584 ± 255.504	360.136 ± 188.283	689.178 ± 267.228 25.888 ± 11.93



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Picture 1. Tunica Mucousa (HE) (200X)A: Villi, B: Lamina Propria, C:

Epitel, D: Goblet cell

Picture 3. Histologi Duodenum (HE) (200X) F: Tunica Mucousa, G: Tunica Submucousa, H: Tunica Muscularis

I : Lamina Muscularis

Picture 5. Tunica Muscoularis (HE) (200X), K: Blood vessel

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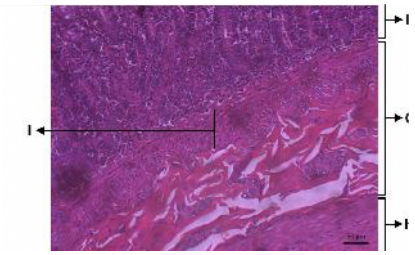
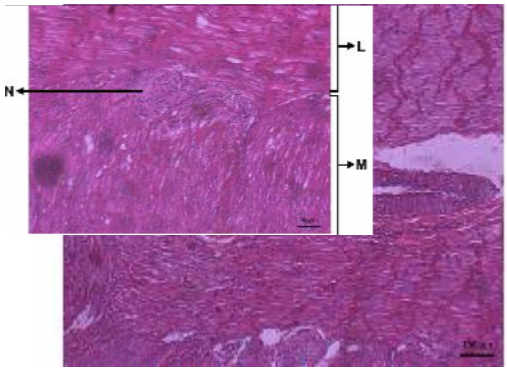
Picture 2. Tunica Mucousa (HE) (200X) E: Crypt Lieberkuhn



(HE) (200X) L: Muscularis sirculair, M: Longitudinal, N: Nerve.

Picture 4. Tunica Submucousa (HE) (200X), J: Kelenjar Sekresi



Picture 6.a Tunica Muscoularis Muscularis

DISCUSSION

The results showed that the morphology of the female duodenal anatomy of female kintamani dogs runs caudally and transversely through the coxae tuber, forming a U-shaped spin, as well as that of Evans (1993). The cranial part of the duodenum is on the right dorsal, and opposite to the ninth intercoste space, then the duodenum extends along the right abdominal wall to the fourth and sixth lumbar. In this section the dorsal duodenal wall corresponds to the pancreas, the ventral is associated with the jejunum, and medial corresponds to the colon and cecum, and the duodenum extends cranial to the midline of the body between the colon and the mesenteric root (Dyce, 2010).

The results showed that the histology structure of female dog duodenum kintamani composed by four layers, tunika mukosa, submucosa, muscularis and serosa. The tunica mucosa is the innermost part of the duodenum layer. Many of the glands that secrete mucus into the lumen to lubricate the intestinal wall protect against frictional cyme. The mucosal tunica is composed of the three layers, the lamina mucosa, propria, and

muscularis as reported by William *et al*. (2012) and Althnaian *et al*. (2013). The epithelium found in the duodenum of the kintamani dog is the simplek columner epithelium. Lamina mucosa is composed from simplex epidermis epithelium. In the mucosal tunica there are villi in the duodenum. Villi serves to expand the absorption surface. The cells found in the epithelium are the "absorptive cell" column cells. Goblet cells are scattered among villian and crypto columnar cells. Lamina propria occupies most of the mucosal tunica. Lamina propria is expanded through the villi core, consisting of loose connective tissue forming the tunic skeleton of mucosa, blood vessels, lymph vessels and smooth muscle (Althnaian *et al*., 2013). Lamina propria contains elastic fibers, leucocytes, and smooth muscle of solitary walking from the mucosal muscularis to the ends of the villus (Suwiti, 2012). The cells found in the lamina propria are goblet cells, crypt lieberkuhn, as well as those reported by William *et al*. (2012). Goblet cells or usually called bowl cells are located between absorbent cells and attached to the juxta-luminal

junctional complex, the basal polar region narrows and buffers the basophilic core and cytoplasm (Suwiti, 2012).

Lamina muscularis is a layer of smooth muscle that separates the tunica mukosa with submucosal tunica (Althnaian *et al*., 2013). In the submucosal tunica layer is found bramner gland and secretion unit. In the muscularis tunica layer there are two layers of longitudinal and circular muscularis, then there are blood vessels and nerves, the muscularis tunica layer which contains smooth muscle tissue. Muscles will contract in the presence of chyme and encourage it, this is reinforced by William *et al*. (2012). Serosa is the outermost layer of the duodenum that acts as the outer skin of the intestine. Serous membranes made of simple squamous epithelium provide smooth and smooth surfaces to prevent friction between the duodenum and surrounding organs. Serousos also secrete serous fluids to further reduce friction and keep the duodenum. The serous layer of tunica consists of a loose connective tissue that continues with mesentery (Dellman and Brown, 1987).

Duodenal morphometry

Based on the results of the length of the female kintamani duodenum length is 16.2 ± 1.3 cm is fairly short compared to the length of dog duodenum reported by Evans. (1993) which has a length of 25 cm. The width of kintamani dog duodenum is 3.1 ± 0.1 cm.

Based on the measurement of the duodenal layer of dog kintamani the thickness of the tunica mucosa is 1.364.5 ± 255.5 mm where the thickness of the mucosal tunica in female kintamani dog is thinner than the tunica mukuosa in dogs reported by Roux. (2015) which has a thickness of 3.54 ± 0.74 mm (3.540 mm). The thickness of the beagle's mucosal tunica tunnels is 3.613.0 ± 170.6 mm (Conto et al., 2014), indicating that the mucosal tunic of the kintamani dog is thinner than that of a beagle. The submissive submissive film thickness of the kintamani dog is 360.1 ± 188.2 mm where the submissive tunica thickness of the

kintamani dog is thicker than the submucosal tunica in dogs reported by Roux (2015) having a thickness of 0.26 ± 0.08 mm (260 mm).

The thickness of the submucosal tunic of the beagle is 227.0 ± 16.8 mm (Conto et al., 2014), indicating that the thickness of the submucosal tunica of the kintamani dog is thicker than that of the beagle. The thickness of the muskularis tunnel of kintamani dogs is 689.1 ± 267.2 mm where the thickness of muskularis tunica in female kintamani dog is thinner than that of the dog muscularis reported by Roux (2015) which has a thickness of 1.04 ± 0.35 mm (1.004 mm). The thickness of the beagle muskularis tunica's tunic is 1,168.3 ± 100.1mm (Conto et al., 2014), it indicates that the thickness of the muskularis of the kintamani dog is thinner than that of the beagle. The thickness of the serous tunic is 25.8 ± 11.9 mm where the thickness of the serous tunica in female kintamni dog is thicker than that of serosa tunica in dogs reported by Roux (2015) having a thickness of 0.02 ± 0.01 mm (20 mm).

CONCLUSION

The duodenum of kintamani dog morphologically anatomically run caudally and transversally through tuber coxae, forming a U-shaped spin. Histological morphology is composed by 4 layers of the tunica layer

mukosa, submucosa, muskularis and serosa respectively. Morphometry anatomy of duodenum length is 16.2 ± 1.3 cm and the width is 3.1 ± 0.1 cm. The histological morphometry of the tunica mukosa is 1364.584 ± 255,504 mm, tunica submucosa is 360.136 ± 188.283 mm, tunica muscularis 6is 89.178 ± 267.228 mm, and serosa tunica is 25.888 ± 11.93 mm.

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