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Arterial Supply to the Stomach of Indigenous Dog (*Canis familiaris*) in Bangladesh

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Abstract: Arterial supply to the stomach of dogs indigenous to Bangladesh was investigated by using latex. The hepatic, left gastric and splenic arteries sent their major branches to the stomach. The cranial and caudal branches of the left gastric artery supplied the lesser curvature of the stomach. The right gastric, and right and left gastroepiploic arteries also sent their branches to both the lesser and greater curvatures. Six or seven short gastric arteries from the splenic artery supplied the greater curvature. Anastomoses between the left and right gastric, between the left and right gastroepiploic, and between short gastric arteries and left gastric arteries were observed.

Key words: arterial supply, indigenous dog, stomach

Indigenous dogs are abundant in Bangladesh, because they are economically less expensive and more resistant to the natural climate than other foreign breeds. Arterial supply to the stomach of dogs varies among each breed [4, 15], as well as among regions. The vascular anatomy of the stomach of various mammals, such as the ox [12], black Bengal goat [9], sheep [11], dog [1, 2, 4], cat [7] and man [8, 18] has been described and wide discrepancies among the species were noticed by many investigators [3, 5, 10, 15]. The variation of the branching pattern of the arterial supply between inbred strains of rabbits has also been reported [3]. The available literature reveals no information regarding the arterial supply to the stomach of indigenous

dogs. Therefore, the present study was undertaken to investigate the arterial supply to the stomach of dogs indigenous to Bangladesh to make available information for livestock researchers and veterinary practitioners.

Eighteen adult, apparently healthy indigenous dogs, local to the Mymensingh district in Bangladesh, were selected for this study (Fig. 1). They were housed in a stainless steel cage (90 × 90 × 90 cm) in the laboratory of Anatomy & Histology, Bangladesh Agricultural University. The animal room was environmentally controlled at 25 ± 2°C and 50 ± 10% relative humidity with 10–15 exchanges of 100% fresh air/h and a 12 hr light and dark cycle. The animals were fed a commer-

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Fig. 1. Indigenous dog (*Canis familiaris*) of Bangladesh.

cially available dry dog food (Standard Animal Food Co., Ltd., Bangladesh) and water *ad libitum*. They were sacrificed by exsanguination from the carotid artery under sodium pentobarbital anesthesia (30 mg/kg b.w.). The vascular system was flushed with physiological saline followed by 10% formalin. The abdominal cavity was opened and latex was injected into the celiac artery. The course of the artery and its finer branches were traced by careful dissection with the help of conventional surgical instruments using a magnifying glass. Diagrams and photographs were made for proper illustration of the results.

As described by many investigators [4, 6, 15, 16], the stomach of indigenous dogs was supplied by 3 major vessels, originating from the unpaired celiac artery. After its divergence from the abdominal aorta, the celiac artery gave off its first branch, the hepatic artery at about 1.5 cm from its origin. Then, the parent trunk continued as a common stem for the left gastric and splenic arteries. The length of the common trunk was 0.7 cm. In most cases (57%), the left gastric artery was the smallest branch, but in some of the animals (43%), it was the second largest branch arising from the celiac artery (Fig. 2).

The left gastric artery divided into cranial and caudal branches of about 1.4 cm from its divergence. At about 0.7 cm from its origin, the cranial branch subdivided into 3 smaller branches. Each of the smaller branches was about 3.5 cm in length and supplied the cardiac end and lesser curvature of the stomach. The caudal branch subdivided into 2 main branches again. One of

Fig. 2. Diagram showing the detailed arterial supply to the stomach. Aa: Abdominal aorta. Ca: Celiac artery. Ha: Hepatic artery. Sa: Splenic artery. LGa: Left gastric artery. RGa: Right gastric artery. GDa: Gastro-duodenal artery. GEa: Gastroepiploic artery. Gc: Greater curvature. Lc: Lesser curvature. Duo: Duodenum. Eso: Esophagus. bsa: Branch of splenic artery. aa: Anastomosing artery. S: Stomach.

the two branches also subdivided into 5 smaller branches and supplied the major part of the lesser curvature and pyloric end of the stomach (Fig. 2).

At about 8.5 cm from the divergence, the hepatic artery gave off the right gastric and the gastroduodenal arteries. At the pylorus, the right gastric artery gave off 5 or 6 branches and supplied the pyloric end of the stomach. Then, it also gave off 10–12 smaller branches to the lesser curvature and anastomosed with the terminal branches of the left gastric artery. The gastroduodenal artery in its short course gave off the right gastroepiploic artery. The right gastroepiploic artery supplied the caudal portion of the stomach along the greater curvature. The terminal branches of the right gastroepiploic artery were anastomosed with the left gastroepiploic arteries from the splenic artery along the greater curvature.

The splenic artery originated from the celiac artery as a common trunk with the left gastric artery. After a short course, it divided into proximal and distal branches. The proximal branch coursed towards the dorsal extremity of the spleen and divided into 13 small branches. Seven of these branches entered the splenic

Fig. 3. Diagram showing branching pattern of the splenic artery. Aa: Abdominal aorta. Ca: Celiac artery. Ha: Hepatic artery. LGa: Left gastric artery. P: Proximal branch of the splenic artery. D: Distal branch of the splenic artery. SGa: Short gastric artery. Sa: Splenic artery. De: Dorsal extremity. Ve: Ventral extremity. H: Hilus of the spleen. Lc: Lesser curvature of the stomach. Gc: Greater curvature of the stomach. aa: Anastomosing artery. Eso: Esophagus. Duo: Duodenum. S: Stomach. Sp: Spleen.

parenchyma, while the rest supplied the greater curvature. In the vicinity of the hilus of the spleen, the distal branch divided into 10 small branches. Among these, 7 short gastric branches supplied the greater curvature through the gastrosplenic ligament. The main trunk of the distal branch continued as the left gastroepiploic artery. Interanastomoses among the short gastric branches of the splenic artery, and the anastomoses between the branches from the left gastroepiploic artery and those of the left gastric arteries were also observed (Figs. 2, 3).

In most mammals, the unpaired celiac artery gives rise to three major vessels, the left gastric, hepatic and splenic arteries, and all the branches play an important role in supplying blood to the stomach of dogs [1, 2, 4, 6]. The branching pattern of the celiac artery for the stomach in dogs has been described variously by investigators [13, 15, 16]. Three separated vessels originated from the celiac artery were found in 63% of cases, while the gastrosplenic trunk was found in 37% [15, 18]. Thamm [17] did not find three separated vessels. A variable branching pattern of the celiac artery for the stomach in dogs was also reported by Schmidt [15].

The left gastric artery has been found double and when single, it arises as a common trunk with the splenic artery from the celiac artery [4]. In this study, the left gastric artery was observed double in 3 dogs (17%), while in the rest (83%), it originated as a common trunk with the splenic artery. The latter finding was in good agreement with Evans [4].

Schmidt [15] reported that the origin of the right gastric artery in dogs varied among breeds. Namely, in 52% of 51 dogs, the right gastric artery originated from one of the branches of the hepatic artery, while in 39%, it originated from the gastroduodenal trunk, and in 7.8%, it was not observed. In our present investigation, the right gastric artery originated from the proper hepatic artery in 14 (77%) of 18 dogs, while in 23%, it originated from the gastroduodenal artery.

Interanastomoses between the left and right gastric arteries, and between the left gastric arteries and the short gastric branches from the splenic artery were similar to the findings of Anam *et al.* [2], and Evans [4].

It is suggested here that the variation of the branching pattern of the arteries supplying the stomach of indigenous dogs may relate to some genetic, and breed differences. The increased vascularity of the stomach may be due to increased functional and nutritional requirements of the stomach.

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