Gross and Micro-Anatomy of the Spleen of Adult Indigenous Fowl of Assam

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ABSTRACT

The present investigation was conducted on spleen of apparently healthy ten adult indigenous fowl of Assam, irrespective of sex. The spleen was located on the right side close to the junction of pro-ventriculus and gizzard. It was reddish brown and slightly elongated and ovoid. The capsule was thick without distinct trabeculae. The parenchyma revealed intermingling of red and white pulps with a framework of reticular fibres. The white pulp was diffusely scattered throughout especially around the arterial branches. The red pulp was made up of loose spongy tissue arranged in anastomosing cellular cords of mainly reticular cells surrounded by venous sinuses. Macrophages, lymphocytes and erythrocytes were also observed. The venous sinuses were irregular passages within the red pulp lined by flattened and elongated endothelial cells. Sheathed arteries were also found in the red pulp.

Key words: Gross anatomy, Indigenous fowl, Spleen

The indigenous fowl of Assam has the capacity to adapt themselves in the local climatic conditions and are highly resistant to diseases. The avian spleen is the principal organ of systemic immunity and its importance in disease resistance is presumably accentuated by the scarcity of avian lymph nodes (John, 1994). The anatomical investigation on the spleen of indigenous fowl of Assam could not be found in the available literature. Hence, the present study was undertaken to elucidate the gross anatomy and histomorphology of the spleen of adult indigenous fowl of Assam.

MATERIALS AND METHODS

The spleen collected from apparently healthy ten adult indigenous fowl of Assam, irrespective of sex, slaughtered for commercial purpose in the local market of Khanapara, Guwahati were utilized for present investigation. The body weight of all the birds was recorded before slaughtering. The topographical position of the spleen was recorded in situ. The gross anatomical features, weight and diameter of the collected spleens were also recorded. Small pieces of tissue from all the spleens were fixed in 10% neutral buffered formalin and processed for paraffin sectioning at 5 μ thickness and stained with the methods as per Luna (1972).

Micrometrical measurement for the thickness of the capsule of the spleen was recorded at ten different fields on hematoxylin and eosin stained sections with the help of computer software. The biometrical and micrometrical data were statistically analyzed as per the methods of Snedecor and Cochran (1994) by using computer software.

RESULTS AND DISCUSSION

The spleen of adult indigenous fowl of Assam was close to the right side near the junction of pro-ventriculus and gizzard. Its colour was reddish brown and the shape was found to be slightly elongated and ovoid with the hilus on the medial elongated surface (Fig. 1). However, most of the authors (Hodges, 1974; Nickel et al., 1979; Akter et al., 2006) described the fowl spleen as rounded structure. The mean weight of the spleen body weight was found to be 3.16±0.07 g which was 0.18±0.00% of mean body weight. Hodges (1974) recorded the weight of spleen of fowl as 2.65 g (2.00% of the body weight) at 10 weeks of age. However, Uddin et al. (2011) recorded the average spleen weight of male as 3.75±0.96 g and that of female as 2.67±0.82 g in native chicken of Bangladesh. The mean longitudinal, vertical and transverse diameters of the spleen of adult indigenous fowl of Assam were found to be 1.67±0.10 cm, 1.22±0.11 cm and 0.95±0.11 cm, respectively with the average diameter of

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1.28±0.08 cm. A slightly higher diameter of the spleen of fowl was recorded as 2.00 cm by Hodges (1974).

The capsule of the spleen of adult indigenous fowl of Assam was thick (Fig. 2). The mean thickness was 35.08±0.63 μ. Thick splenic capsule was also recorded in fowl (Hodges, 1974), Japanese quail (Venkatesan et al., 2005) and broiler chicken (Akter et al., 2006). The capsule was externally limited by a flattened layer of peritoneal mesothelium (Fig. 2) as described in fowl (Hodges, 1974). The outer zone of the capsule was composed of collagen fibres with a few elastic fibres accounting about one third of the total thickness. The inner zone was composed mainly of reticular, elastic and fine collagen fibres and smooth muscles. This zone comprised of about two third of the total thickness of the capsule as reported earlier (Hodges, 1974). Distinct trabeculae from the capsule entering the splenic parenchyma could not be observed in the present study.

The parenchyma revealed intermingling of red and white pulps without sharp distinction as occurred in mammalian spleen (Figs. 3, 4). The framework of the parenchyma of the spleen was consisted of reticular fibres which were particularly dense around the arteries of the white pulp as also mentioned by Hodges (1974) and Akter et al. (2006). The white pulp was diffusely scattered throughout, locating predominantly around the arterial branches. It was composed primarily of small lymphocytes along with reticular cells, granulocytes, erythrocytes and contained sheathed arteries (Fig. 3) and occasional lymphatic nodules. The sheathed arteries were in fact...
penicilliform capillaries lined by endothelial cells and surrounded by ellipsoid or Schweigger-Seidal sheath as reported earlier in chicken (Olah and Glick, 1982). The germinal centres of the lymphatic nodules were located at the beginning of the central artery of the white pulp surrounded by perilatorial lymphatic sheath (PALS). No histologically identifiable marginal zone was observed which was in agreement with Olah and Glick (1982). The red pulp was made up of loose spongy tissue arranged in anastomosing cellular cords of mainly reticular cells along with macrophages, lymphocytes and erythrocytes being surrounded by venous sinuses (Fig. 4) as observed by Hodges (1974) in fowl and Venkatesan et al. (2005) in Japanese quail. The venous sinuses were irregular passages within the red pulp lined by flattened and elongated endothelial cells. Hodges (1974) recorded similar findings in the spleen of fowl and described the elongated cells as littoral cells. Sheathed arteries were also found in the red pulp leading to the belief that the ellipsoidal sheath and its surrounding macrophages might be functionally equivalent to the mammalian marginal zone as opined by Venkatesan et al., (2005) in Japanese quail.

REFERENCES


