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MORPHOLOGICAL AND MORPHOMETRICAL STUDIES OF THYMUS IN NON-DESCRIPT PUPPIES

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Thymus is a primary lymphoid organ and well developed in young animals. Thymus is large and most active during neonatal stage (Zdrojewicz *et al*., 2016). It is the modulator of activity of other lymphoid organs, and the knowledge of mechanisms that triggers its development, maturation and involution is vital for understanding the activity of whole lymphoid system (Sikora *et al*., 2002). The information on the morphological studies on thymus gland in puppy is scanty; therefore, the present study was conducted to record the morphological features during neonatal stage.

Present study was conducted on five non-descript puppies (*Canis lupus familiaris*). The puppies were one week old which were killed by some other dog. As the experiment was conducted on dead animals therefore ethical permission was not needed. The dissections were carried out in the Department of Veterinary Anatomy, FVAS, BHU, Barkachha, Mirzapur (India). The puppies were dissected on ventro-median line of cervical and thoracic region. The position, colour, shape, surfaces and borders were observed under naked eye and magnifying lens. The thymus was collected and weight, length, width and thickness measured with the help of a digital weighing balance, scale and thread, digital Vernier calliper, respectively. The data generated were statistically analysed to find mean ± standard error (SE) for each parameter.

The mean length, width, thickness and weight of thymus of 1-week old puppies were 3.16 ± 0.43 (2.0-4.4) cm, 5.14 ± 1.76 (1.20-10.35) mm, 3.75 ± 0.63 (2.30-5.32) mm and 0.886 ± 0.27 (0.48-1.93) g, respectively. Thymus was a lobulated lymphoid organ with high blood vascularity. It was slimy or glassy in appearance and light pink in colour. It had two parts: cervical and thoracic. The cervical part was small and look like nodules/lobules while thoracic part formed the major portion of the organ. Thoracic portion consisted of two surfaces (dorsal and ventral), two borders (left and right) and two extremities (cranial and caudal). Thoracic part was divided by a distinct notch into cranial and caudal parts. The cranial part was present in ventral one-fourth of anterior mediastinum (approx.) and caudal part was in the rest three-fourth of anterior mediastinum (approx.). The caudal portion was tongue-like in appearance. The dorsal surface of thymus was related to the ventral aspect of trachea. The ventral surface was slightly convex and related to the ventral aspect of anterior mediastinum. Cranial extremity was located at the level of thoracic inlet while caudal extremity was related to pericardium of heart. (Fig.1 and 2).

According to Evans and de Lahunta (2013) the thymus of adult dog was light-gray and distinctly lobulated organ with pink tinge in fresh material. It was laterally compressed and laid in the cranial ventral part of thoracic cavity. The organ, relatively large at birth, grew rapidly during the first few postnatal months and reached maximum development before sexual maturity or between the fourth and fifth postnatal months, just before the shedding of deciduous incisor teeth. In adult dog, the thymus was confined to thorax where it occupied the ventral part of cranial mediastinum, stretching from the thoracic inlet to the pericardium on which it was molded. A larger part extended onto the left surface of pericardium than onto the right, which produced a characteristic shadow in dorso-ventral radiographs of young dogs (<1 year old). The thymus consisting of right and left lobes

Fig. 1: Dissected puppy showing trachea (Tr), cervical part of thymus (C), cranial portion of thoracic part of thymus (T1), caudal portion of thoracic part of thymus (T2), heart (H), left lung (L), pericardiaco-phrenic ligament (P) and diaphragm (D).

Fig. 2: Ventral surface of thymus showing cervical part of thymus (C), cranial portion of thoracic part of thymus (Cr), caudal portion of thoracic part of thymus (Cd). Cervical part and distinct different portion of thoracic part of thymus as observed in present study is unique in dog.

was distinctly lobulated and pink when fresh and attained greatest development at about 6 to 8 weeks (Dyce *et al*., 2010). According to Ramayya *et al*. (2008), the thymus of buffalo foetuses consisted of unpaired thoracic and paired cervical and cranial parts. The thoracic part was present in the precardiac mediastinum on the dorsal half of left side and was irregularly quadrilateral in shape. Three distinct parts of thymus were recognized *viz*., unpaired thoracic part, caudally situated paired body (cervical part) and right and left cranial parts from day old kid to 9 mon Surti goats. The cranial parts were not observed from the age of 12 mon onwards. The caudal cervical part of thymus was gradually replaced by adipose tissue between 14 to 48 mon, however, traces of thymus embedded within adipose tissue was observed in cranial mediastinum even at the age of 48 mon. The right limb of cervical thymus was slightly longer than the left limb in postnatal Surti goats. (Chaurasia *et al*., 2019).

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