Hassall's Corpuscles Assessment in Dog

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Abstract

Hassall's corpuscles are particular structures, very polymorphic, present in the medulla of the thymic lobules. The aim of this study is to morphostructurally assess Hassall's corpuscles in dogs. The thymus from 5 deceased dogs (different noninfectious diseases) was histologically processed. After examination of the sections, there were on average 3-4 Hassall's corpuscles highlighted in the medulla of the thymic lobules. Most of the Hassall's corpuscles are relatively small, polymorphic and nonkeratinized.

Keywords: dog, Hassall's corpuscle, thymus,

INTRODUCTION

Hassall's corpuscles are present in the medullary zone of the thymic lobules. Their size ranges between 10 and 1000 μm (Bodey, 1977; Bodey and Hadjioloff, 1977) and they are highly polymorphic. Arthur Hill Hassall was the first one to describe these structures in 1846 in humans (Hassall, 1846). Ever since, they were and still are the subject of numerous studies. Nowadays, many data regarding their structure and size are available. Many information about Hassall's corpuscles are known, but there are also a lot of questions regarding their function. Hassall's corpuscles are scarce and relatively small in mice (Clark, 1963) and rats (Harland, 1940). Large Hassall's corpuscles and relatively numerous are found in: Guinea pig (Kohnen and Weiss, 1964), bovine (Rotaru, 1977), nutria (Miclăuș *et al.*, 2009) and lamb (Rus *et al.*, 2014).

AIMS AND OBJECTIVES

This study aims to assess, quantitatively and morphostructurally, Hassall's corpuscles in dog.

MATERIALS AND METHODS

We harvested thymus samples during necropsy of 5 deceased dogs (different noninfectious causes of death) with an age between 2 and 3 months.

The fragments were fixed in Stieve's solution, embedded in paraffin and we subsequently sectioned the samples at a 5 μm thickness and stained them with Goldner's trichrome method.

RESULTS AND DISCUSSION

After examination of the sections, we observed the fact that in the medulla of the thymic lobules there are 3 to 4 (Fig. 1), fairly polymorphic, Hassall's corpuscles present. Most of them (95%) have a diameter up to 50 μm and only some (approximately 5%) have a diameter between 50 and 75 μm . We noticed the presence of Hassall's corpuscles formed out of a few epithelioreticular cells (Fig. 2) to corpuscles with a more complex structure (Fig. 3), which seem to be the result of small corpuscles fusion. Most of the cells present different degeneration degrees, many presenting ballooning degeneration. Approximately 10% of the corpuscles present the typical „onion-like” structure after section (Fig. 4). There are also a few cavitary corpuscles (approximately 5%), but the spaces inside them are small and do not contain cellular debris or degenerated proteic fragments. Very seldom, we observed cells which present some small keratohyalin granules in their cytoplasm, in the structure of the Hassall's corpuscles examined. There was no obvious tendency of keratinization

Fig. 1. Medulla of the thymic lobule (Goldner's trichrome stain)

Fig. 3. Compound Hassall's corpuscles (Goldner's trichrome stain)

Fig. 2. Small Hassall's corpuscles (Goldner's trichrome stain)

Fig. 4. Typical Hassall's corpuscle (Goldner's trichrome stain)

of the cell. Hassall's corpuscles in dog are similar regarding their frequency, structure and sizes to the ones described in mice and rats (Harland, 1940; Clark, 1963) and highly differ from the ones described in ruminants, nutrias and Guinea pigs (Kohnen and Weiss, 1964; Rotaru, 1977; Miclăuș *et al.*, 2009; Rus *et al.*, 2014).

CONCLUSION

In the thymic lobules in dog there are on average 3-4 relatively small, polymorphic and nonkeratinized Hassall's corpuscles. The dog thymus highly resembles the mouse and rat one, regarding the frequency, size and Hassall's corpuscles structure.

Black arrow – cortex of the lobule; red arrow – medulla of the lobule ;blue arrow –Hassall's corpuscles

REFERENCES

1. Bodey B, Hadjioloff AI (1977). Thymus development, structure and function. *Nature (Bulgaria)* 26:11-19.
2. Bodey B (1977). Histomorphology and histochemistry of the human thymus during its prenatal ontogenesis. Dissertation, Inst Morphol, Bulg Acad Sci, Sofia, Bulgaria, 1-360.
3. Clark S L Jr (1963). The thymus in mice of strain 129/J studied with electron microscope. *Am J Anat* 112:1-34.
4. Harland M (1940). Early histogenesis of the thymus in the white rat. *Anat Rec* 77:247-271
5. Hassall AH (1846). *The Microscopic Anatomy of the Human Body in Health and Disease*, London.
6. Kohnen P, Weiss L (1964). An Electron Microscopic Study of thymic Corpuscles in the Guinea Pig and the Mouse. *Anat Rec* 148:29-57.
7. Miclăuș V, Petrescu-Mag I V, Rus V, Cadar D, Oana L, Ober C (2009). Frequency and polymorphism of Hassall's corpuscles in normal thymus of nutria (*Myocastor coypus*). *AACL Bioflux* 2(2):121-131.
8. Rotaru O (1977). Aspecte morfologice normale și patologice ale timusului la bovine. Teza de doctorat, F.M.V. Cluj-Napoca.
9. Rus V, Gal A, Ruxanda F, Bosca B, Nadas G, Ratiu C, Miclaus V (2014). Morphostructural Characterization of Hassall's Corpuscles in Lamb. *Bulletin of University of Agricultural Sciences and Veterinary Medicine, Cluj-Napoca, Veterinary Medicine* 71(2):389-394.