NOTE

Six Cases of Endocardial Disease in the Rat

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Endocardial disease in the rat is characterized by proliferation of undifferentiated mesenchymal cells in the subendocardium without knowledge of disease entity. The disease is not uncommon in aged rats of certain strains such as Wistar and Brown Norway [2, 3]. This brief note describes six cases of this disease encountered among 305 rats.

During the recent 10 years 71 male and 13 female Sprague-Dawley (SD), 110 male and 60 female Wistar and 51 male Donryu rats were purchased at the age of 4 weeks from a commercial breeder (Japan CLEA, Tokyo) and they were subjected to seven experiments and kept through their life span as non-treated controls under a conventional environment. Commercial pellets (Japan CLEA or Oriental Yeast, Tokyo) and water were given *ad libitum*. Spontaneously dead cases were immediately autopsied. Tissues of main organs were fixed in 10% buffered formalin, pH 7.4, and embedded in paraffin. Sections 5 μ m thick were made and stained with hematoxylin and eosin. Sections of heart tissues were also stained with Azan-Mallory, elastica van Gieson, Watanabe's silver and PAS stain. Because sampling was made for other purposes, the valves and atrium were not examined in most cases.

Although no gross abnormalities could be seen in the heart, endocardial lesions were histologically detected in 2 male SD (2/71, 2.8%) and 4 male Wistar (4/110, 3.6%) rats, which were older than 18 months except for one case of 13-month-old SD. Such lesions were not seen in female SD and Wistar nor in male Donryu rats.

As shown in Table 1, in 5 cases, the lesions involved only the left ventricle, while one SD rat aged 33 months had also some lesions in the right ventricle and left atrium. The lesion appeared to occur more frequently and most extensively in the interventricular septum (Fig. 1).

The lesions varied in severity, and mild lesion were less than 50 μ m thick, while the most severe ones were more than 200 μ m thick (Fig. 2). Mild or moderate lesions consisted of a layer of mesenchymal cells proliferating between the endothelium and myocardium. Individual cells had a round or pleomorphic nucleus with dense chromatin and clear cytoplasm with the indistinct outline. Collagen fibers were homogeneously distributed intercellularly and some elastic fibers were seen between lesions and the myocardium (Fig. 4). In more severe lesions showing sometimes a papillary aspect and considerable thick-

Table 1. Pathology of six male cases

Case No.	Strain	Age (Month)	Endocardial Lesion		
			Site*	Severity**	Occurrence
1	SD	13	LV	Severe	Patchy
2	SD	33	LV, RV, LA	Moderate	Patchy
3	Wistar	18	LV	Moderate	Patchy
4	Wistar	23	LV	Moderate	Diffuse
5	Wistar	25	LV	Mild	Patchy
6	Wistar	26	LV	Severe	Patchy

* LV: Left ventricle, RV: Right ventricle, LA: Left atrium.

** Thickness of lesions, Severe; >200 μ m Moderate; 50–200 μ m, Mild; <50 μ m.

ness, the superficial layer consisted of large cells with round or ovoid nuclei and basophilic cytoplasm being different from the deep one, which was characterized by cells with elongated nuclei and intercellular abundant collagen fibers (Fig. 3).

Most lesions were sharply demarcated from the underlying myocardium, whereas some lesions had less distinct margination and extended into the myocardium. Some myocardium left in the lesions showed degenerative changes (Fig. 5).

The present cases of rats with the endocardial disease also had other type of lesions usually expected in older rats [2].

The characteristic histopathological changes as well as age distribution of the present 6 cases were similar to those described by others [1, 2]. Though no sex prevalence was reported [1, 2], any lesions were not detectable in female rats in this study probably due to small number of animals examined.

Either pathogenesis or histogenesis of the endocardial lesion remains unclear. Boorman et al. [1] stated that this type of disease in rats was a specific change representing a reactive process to either meta-

bolic, infectious or immunologic disorders. On the other hand, similar lesions were diagnosed as subendocardial fibrosis [5], fibroma [6] or neurinoma [1, 4]. Additional cases should be accumulated for studying pathogenesis and histogenesis of the endocardial disease.

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EXPLANATION OF FIGURES

- Fig. 1. Papillary process of the endocardium (arrow) in the interventricular septum. HE stain. Bar=2 mm
- Fig. 2. Lesions with different severity. A; Mild, B; Moderate, C; Severe. HE stain. Bar=50 μ m
- Fig. 3. Superficial layer of a severe lesion consisted of large cells with round or ovoid nuclei and basophilic cytoplasm. HE stain. Bar=30 μ m
- Fig. 4. Elastic fibers (arrows) between the endocardial lesion and myocardium. Elastica van Gieson stain. Bar=30 μ m
- Fig. 5. Degenerated myocardial cells (arrows) within a lesion. HE stain. Bar=30 μ m

要 約

ラットのいわゆる Endocardial Disease の6例(短報): 三枝順三・河合清之(労働省産業医学総合研究所)——SD 雄2, Wistar 雄4計6例に endocardial disease を検出した。いずれの症例も13カ月齢以上であった。病巣は主に左心室にみられ、心内膜と心筋の間に間葉系細胞の増殖を呈していた。重篤例では表層部と深部で病巣が異なり、前者は卵円形核と塩基性細胞質を有する大型細胞で構成され、後者は小型細胞からなり細胞間の膠原線維が豊富であった。病理発生および組織発生については今後の研究が必要である。