NOTE

The Occurrence of Scrapie of Sheep in Japan

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ABSTRACT. The first occurrence of scrapie of sheep in Japan was noted. Three Suffolk-breed ewes, which clinically showed gradual weakness, severe emaciation, pruritus, ataxia and extensive loss of wool, were histopathologically examined. The characteristic lesions such as vacuolation of nerve cells and development of spongy state of gray matter were observed in the midbrain, pons, medulla oblongata and spinal cord. The present histological features of the lesions in the central nervous system were very analogous to those so far reported on scrapie of sheep.—Key words: scrapie, sheep.


Scrapie is a fatal, slowly progressive neurological disease that occurs in sheep and rarely in goats. The disease has long been known in Western Europe. The disease has recently spread to many countries, especially Canada and the United States in proportion to the increase in the international movement of sheep [1, 2, 3]. In Japan, however, no occurrence of this disease has been recorded, although many sheep have been imported from the foreign countries. This note reports the first occurrence of scrapie of sheep in Japan.

Three affected ewes examined were 3-year-old Suffolk born at a stock farm in Hokkaido in 1978. Their grandparents were imported from Canada in 1974. These ewes showed common clinical signs such as gradual weakness, severe emaciation, pruritus and ataxia. The extensive loss of wool caused by scraping or nibbling was also found on the nasal bridge, shoulders, chest wall, abdominal region, rump and extremities.

The animals were subjected to necropsy immediately after death (Nos. 1 and 2) or sacrificed under euthanasia (No. 3). Tissue blocks were collected from the central nervous system (CNS) and visceral organs, fixed in 10% formalin solution and embedded in paraffin. Histological sections were prepared from the CNS and main visceral organs, and stained with hematoxylin and eosin (HE). Serial sections of the CNS were also stained with luxol fast blue (LFB), periodic acid-Schiff (PAS) and by modified Nissl’s method.

At necropsy, the encapsulated abscesses (2–5 cm in diameter) due to systemic bacterial infection were observed to scatter in the liver, lungs, pulmonary lymph nodes (No. 1) and posterior mesenteric lymph nodes (No. 3). However, no significant gross lesions, except a slight edema of the leptomeninges (Nos. 1 and 2), were detected in the CNS.

Histopathologically, the characteristic lesions were observed only in the gray matter of the midbrain, pons, medulla oblongata and spinal cord other than above-mentioned abscesses in many organs. The lesions in the CNS consisted mainly of cytoplasmic vacuolation of nerve cells (Fig. 1) and a spongy state formation of gray matter (Fig. 2). The cytoplasmic vacuoles (varied in diameter) of nerve cells were single or multiple (Figs. 3,
4, 5 and 6), and pushed Nissl substance and nucleus to one side. The nerve cell having a very large vacuole in the cytoplasm showed extensive ballooning of the cell body (Fig. 7). As shown in Figs. 3–6, most of the vacuoles were empty and their boundary was very clear. Some of them contained eosinophilic and PAS-negative globular substance (Fig. 8). A large number of nerve cells showed cytoplasmic swelling and chromatolysis and had eosinophilic granules in the cytoplasm (Fig. 6). The spongy state formation of gray matter were often developed in the area where neuronal vacuolation was prominent. These lesions were most frequently found in many nerve nuclei of the medulla oblongata and pons. Reactive changes such as neuronophagia, perivascular cuffing of mononuclear cells and astrogliosis were not obvious. Demyelination was not observed in sections stained with LFB. The cerebral cortex and cerebellum remained almost unchanged.

The characteristic histological lesions in the brain of scrapie-affected sheep have been reported to consist of cytoplasmic vacuolation of nerve cells and development of spongy state of the gray matter in the midbrain, pons, medulla oblongata and spinal cord [1, 2, 4]. The histological features and distribution of the lesions in the CNS of the present cases were analogous to those so far reported on scrapie of sheep. Astrogliosis, perivascular lymphocytic infiltration and neuronophagia observed in scrapie [5, 6] were not obvious in the present cases. However, these reactive changes were not always observed in this disease [2]. Besides, the characteristic clinical signs of our cases were sufficient to confirm the diagnosis [3].

Scrapie is a slow transmissible disease and appears to have a prolonged incubation period (one to five years) in nature [1, 3]. The ewes examined were all born in Japan and affected at the age of three years. However, their
Figs. 3-6. Single or multiple cytoplasmic vacuole formation in nerve cell in the medulla oblongata. Arrow in Fig. 6 shows eosinophilic granules in the cytoplasm. HE, ×400.

Fig. 7. Extensive ballooning of the cell body of a nerve cell. HE, ×400.

Fig. 8. Eosinophilic globular substance in a large cytoplasmic vacuole of a nerve cell. HE, ×400.

grandparents from Canada were kept with them for a long time. There is, therefore, a possibility that the ewes were infected not only by contact with their grandparents but
also through vertical transmission from their parents.

REFERENCES


要約

日本におけるヒツジスケリーの発生（短報）：谷山弘行・一条 茂・小野 賢（帯広畜産大学家畜病理学教室，p家畜内科学教室）——日本においてはヒツジのスケリーの発生はこれまで報告されていないが，著者らは1982年，激しい搔痒，脱毛，運動失調，強度の栄養不良を示した3頭のヒツジを病理組織学的に検索する機会を得た。その結果，中枢神経系とくに中脳，橋，延髄ならびに脊髄に認められた神経細胞の空胞変性と灰白質の海綿状態を主徴とする組織像は過去に報告されてきたヒツジのスケリーのそれに一致するものであった。