Clinical Studies on Bovine Autuminal Conjunctivitis in Japan
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An ocular disease called “doniku” in Japanese dialect meaning “angry flesh” has been recognized with the characteristic signs of edematous swelling of conjunctivae in cattle for a long time in Japan. This disease had been reported from the central to western part of Honshu island of Japan [1–4, 7, 8].

Ago and Nishikiori [1] studied several cases of this disease found in Chugoku district and their diagnosis was hypertrophic conjunctivitis, which was one of enzootic ocular diseases, presumed to be caused by secondary stimulations. Minowa et al. [2] reported that the disease in Niigata prefecture was assumed to be allergic conjunctivitis from their results. The real cause of this disease is not clear, though, fungi seemed to be the most possible factor. Ohishi [4] and Ujiie [7] postulated that the disease might be conjunctivoma caused by unknown bacteria and conjunctivitis caused by stick with rice husks, respectively.

Sonoda [6] named this disease tentatively “autummal conjunctivitis” on the basis of specific seasonal occurrence and clinical signs.

In the present studies, 79 cases of the autumnal conjunctivitis occurring in Okayama prefecture during the period of 1973 to 1985 were examined clinically, parasitologically and histopathologically.

All cases occurred only in fall, from September to November, with the peak in October. The affected cattle were between 7 months and 9 years in age, regardless of breed, sex and months of pregnancy.

In general, the symptoms appeared abruptly without previous notice. They were observed only on one side eye in all cases, and lesions were seen most frequently on the upper eyelids of the right eyes. Major signs of the disease were conjunctivitis with hyperemia, swelling and hypertrophy of the conjunctivae, sclera, cornea and nictitating membrane. Photophobia and lacrimation were also observed. In some cases, the affected conjunctivae swelled so as to cover more than one-third or half of the eye. In the cases with itching, necrosis and erosion were observed on the surface of the affected conjunctiva or cornea by secondary rubbing against some objects such as pillar, water cup, and so on. There was no fever in the disease.

The courses of the disease were very different depending on the severities, the time of the start and methods of the treatments. In our therapeu-

Fig. 1. Ocular sign in a moderate case (left eye). Swelled upper sclera covers more than one third of the eyeball.

Fig. 2. Ocular sign in a severe case (left eye). Markedly swelled conjunctiva covers almost all of the eyeball.
tic treatment, the recovery terms were 38±24 days in the control group without treatment (9 cases), 32±7 days in the group treated with eye-washing and antibiotic ointment (9 cases), 12±8 days in the group treated with scarification of conjunctivae and application or intraconjunctival injection of corticosteroid (23 cases) and 12±6 days in the group treated with surgical resection of protruded conjunctivae (38 cases), respectively. Both treatments used in the last two groups were equally very effective on the disease.

In the smears of their eye discharge, abnormally numerous eosinophils were seen in number, although only few mononuclear cells were observed in those from the normal cattle.

In the bacteriological examinations of the ocular lesions, 5 species of saprophytic bacteria were detected, i.e.; Staphylococcus aureus, S. epidermis, Escherichia coli, Streptococcus agalactiae and Branhamella bovis.

In the hematological examinations, a slight increase of eosinophils in leukocytes (17±10%) was observed. There was no marked change in other items examined.

In the clinicochemical examinations, there was no significant change observed in the items examined.

Parasitological examinations were carried out on the 10 filarial worms obtained by surgical operations of the swelled conjunctivae of 10 out of 38 cases. Intact worms varied within 22-44 mm in the body length. From the body length, development of reproductive organs of both sexes and contents of their uteri of female worms, it was thought that they were all in the stage of the immature (juvenile) adult. By the morphological characteristics of the worms, in particular of their arrangement of papillae at the anterior extremity in both sexes, caudal papillae in male worms and tail end of females with smooth surface, all of specimens examined were identified as Setaria digitata [2]. Having reported S. labiato-papillosa also from cattle in Honshu, present specimens differed from S. labiato-papillosa, with many spines at the tail end of female [5].

Histopathologically, acute changes such as edema, conspicuous eosinophilic infiltration and necrotic patches with cellular debris suggesting worm migration were found in an early period of the conjunctival affection, and later scattered small granuloma around hyalin debris were

Fig. 3. Immature worms of Setaria digitata collected from the lesions of autumnal conjunctivitis. A: Anterior part of female. B: Tail end of male. (Scale 200 μm)

Fig. 4. Linear fresh necrosis formed by worm-boring. The central axis consists of cellular debris. Peripheral edema and eosinophilic infiltration are conspicuous. Fourth day after onset. H.E. ×75.

Fig. 5. A granulomatous nodule is shown, which consists of hyaline bodies, histiocytes, giant-cells and eosinophils. Twelfth day after onset. H.E. ×300.
observed. Rarely, cross sections of apparently intact worm body were observed.

Based on the observations described above, the authors conclude that such curious ocular disease in cattle called autumnal conjunctivitis is caused by migration of immature *Setaria digitata* into conjunctivae, and the characteristic symptoms are due to an allergic reaction of the worms.

REFERENCES


要約

牛の秋期結膜炎に関する臨床学的研究（短報）：大竹修・其田三夫・松川清一郎・福本真一郎・高橋清志・黒沢隆（酪農学園大学獣医学科，家畜内科学教室，*1*家畜病理学教室，*2*家畜寄生虫学教室）——岡山県に発生した秋期結膜炎の79例について臨床学的，寄生虫学的，および病理組織学的に検査した。その結果，本症は*Setaria digitata*の幼若虫が結膜内に進出して，局所性のアレルギー反応を起こすことに起因していることが判明した。治療には局所の乱乱と薬皮質ホルモンの塗抹または同剤の結膜内注射および腫大した病変部の外科的切除が有効であった。