

Congenital Lymphedema in a Calf with Lymph Node Dysplasia or Aplasia

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ABSTRACT. A 9-month-old male Japanese Black calf with subcutaneous edema in mainly both limbs was investigated. Necropsy revealed about 20 l of ascites and severe edema in the large omentum, abomasal folds, conjunctiva and rectum. Only small internal iliac and hepatic lymph nodes were found. Histopathology revealed lymph node dysplasia showing excess trabecular formation, reticular cell proliferation, and obvious dilation of both afferent and efferent lymphatics. These findings suggest that disturbance of lymphatic flow with congenital lymph nodes dysplasia or aplasia resulted in lymphedema in this calf.—**KEY WORDS:** calf, lymph node, lymphedema.

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Lymphedema is defined as swelling of a part of the body due to an increased quantity of lymph as a result of a lymphatic system disorder and is classified as primary or secondary [4]. Primary lymphedema is generally congenital, is due to anomalous development of the lymphatic system and is a condition that has been encountered rarely in cattle [7, 8]. A case of congenital hereditary lymphedema [7] in an Ayrshire calf has been reported. We examined a case of congenital lymphedema with lymph node dysplasia or aplasia in a calf.

A 6-month-old male Japanese Black calf was referred to the Animal Hospital of Miyazaki University for examination of the cause of edema in the subcutis of the hind- and fore-limbs (Fig. 1). Physical examination of the calf at the time of admission revealed subcutaneous edematous swelling, which initially appeared to be restricted to the distal parts of the hind-limbs. Hematological examination revealed normal values of leukocyte and erythrocyte counts and plasma protein levels. The severity of the edema in the limbs became progressively worse and advanced to involve the subcutis in the proximal parts of the limbs, body trunk, fore-limbs and head. The condition of the animal deteriorated progressively until 9 months of age and it could no longer stand on its feet. Therefore it was sacrificed by exsanguination under anesthesia and a necropsy was carried out.

Necropsy revealed severe, symmetrical subcutaneous edema in both hind- and fore-limbs. Subcutaneous edematous thickening accompanied by fibrosis of varying severity was also seen throughout the rest of the body. There was obvious edematous drooping of the brisket and intermandibular tissue, as well as extrusion and eversion of the conjunctiva and rectum with edematous swelling. About 20 l of clear serous fluid was recovered from the abdominal cavity, in which both the omentum and mesentery were also thickened considerably by edema. The abomasal folds were also swollen by edema, whereas the intestinal mucosa looked normal, except for occasional erosions on some Peyer's patches. The thoracic cavity contained little fluid. A little fluid was seen in the pericardial cavity, but there were no lesions in the myocardium and on the heart valves. All efforts to find superficial lymph nodes in the fore- and hind-limb regions were in vain. Any mesenteric, mediastinal and superficial lymph nodes in peritoneal, and thorathic cavity and body

trunk, respectively, were not found except for the internal iliac and hepatic lymph nodes which grossly demonstrated edematous and gelatinous in consistency.

Histopathological examination of 10% (v/v) formalin-fixed tissues using routine procedure revealed dysplastic changes in the lymph nodes, which were more severe in the iliac than the hepatic lymph nodes. These changes included excessive trabecular formation (Fig. 2) in the paracortical and medullary areas, excessive reticular cell proliferation which was so severe that the architecture of the lymph node could not be discerned clearly, and the lymphoid follicular development in the cortex was quite poor and disorganized. Ectasia of both the afferent and efferent lymphatics was apparent (Fig. 3). Accessory node attached to the left iliac node was abnormally developed. The serosa of abdominal organs including the omentum, intestines and mesentery were thickened by edema and lymphangioectasia was observed clearly. The swollen abomasal folds also demonstrated edematous changes with lymphangioectasia in the submucosa. There were no hepatic lesions except for perisinusoidal space dilation and rounding hepatocytes (Fig. 4). There were no lesions in the heart or heart valves and no edema or congestion in the lungs. Unfortunately, there were no chance to examine histopathologically about thymus and tonsil, although hemosiderosis and extramedullary hemopoiesis were seen in the spleen which has red and white pulp with sometimes lymphangioectasia.

Incidental findings included a large number of parasitic nematode larvae in the intestinal submucosa (Fig. 5). Tissue reactions against the parasites included marked mononuclear, eosinophilic and neutrophilic cell infiltration with necrosis.

Lymphedema with lymph node aplasia or dysplasia is a relatively rare disease in calves [4], although it is well known to be the cause of generalized edema in newborn calves [2, 7] and other animals [1, 3, 5, 6]. In calves, congenital lymphedema has been explained as a hereditary condition controlled by a single autosomal recessive gene [2]. It is also considered to be a hereditary problem in dogs and pigs, but in these animals its expressivity appears to be variable [4]. It is, however, difficult to assert with any certainty that the present calf has an inherited disorder, as complete pedigree data was lacking. After finding this case, no other calves with lymphedema were

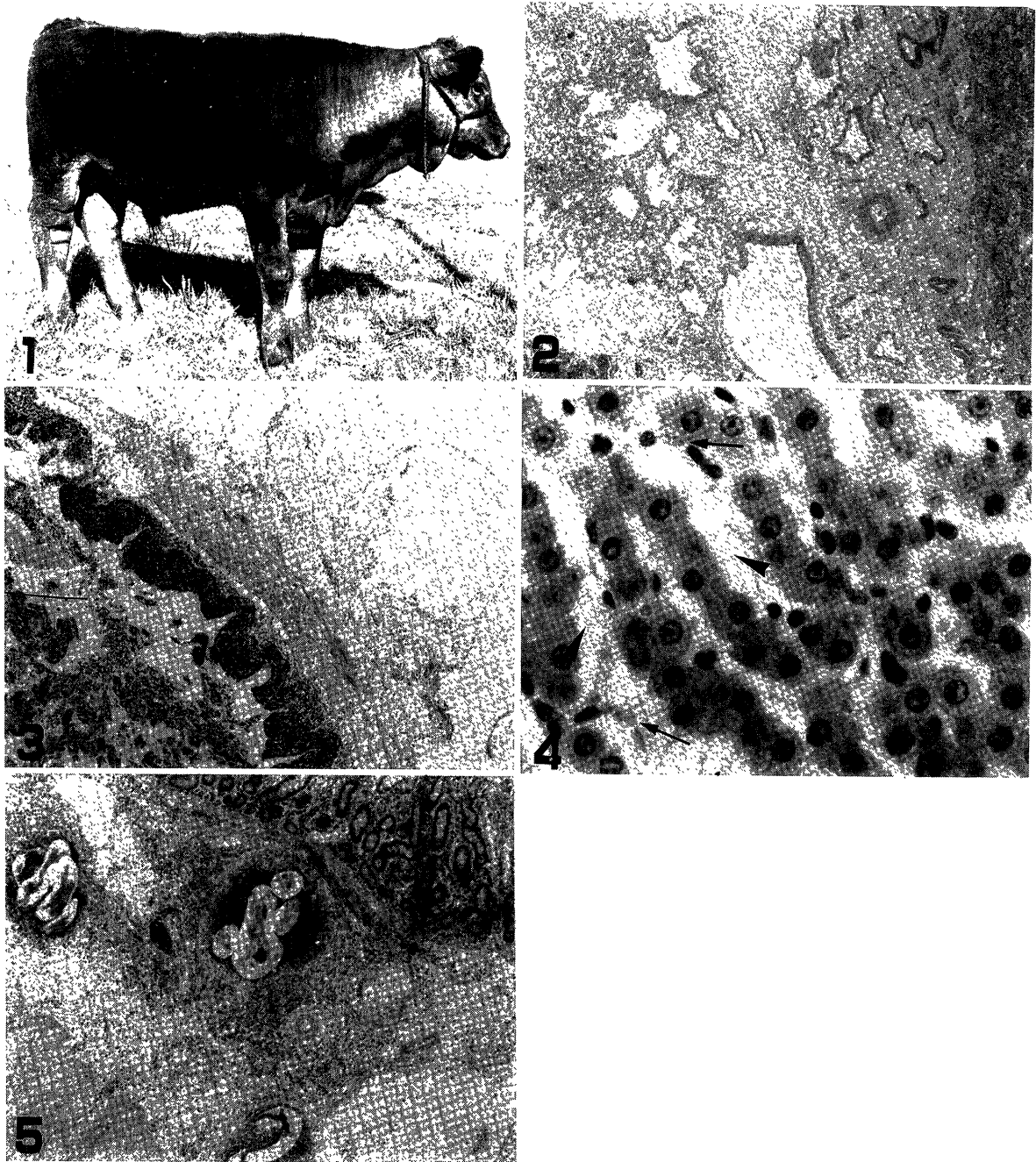


Fig. 1. Edematous swelling of the limbs, especially the distal parts of the hind-limbs.

Fig. 2. Iliac lymph node with excessive trabecular formation in the medullary areas. H&E stain. $\times 100$.

Fig. 3. Iliac lymph node with dilated efferent lymphatics H&E stain. $\times 40$.

Fig. 4. Dilation of the perisinusoidal space (arrows) in the liver with round hepatocytes. Arrowheads indicate compressed sinusoid containing erythrocytes by the dilated perisinusoidal spaces. H&E stain. $\times 400$.

Fig. 5. Nematode larvae with inflammatory cell infiltration of mononuclear cells, eosinophils and neutrophils in the intestinal submucosa. H&E stain. $\times 40$.

found in the area where it was born. Furthermore, the lymphedema in this animal appeared to have developed gradually, which may suggest the lesion have been located in the lymphatic system. Furthermore, the dilatation of both afferent and efferent lymphatics would appear to indicate partial obstruction in the preceding and succeed-

ing lymph nodes that were drained by the same lymphatics. The lymphedema in the present case may have developed as a result of lymphatic flow disturbance with lymph node dysplasia or aplasia. This, therefore, appears to be the first report of congenital lymphedema in the Japanese Black cow.

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