

Research Note

**A Case of *Balantidium coli* Infection Found in
Swine Lymphoma**

KIYOSHI NAKAUCHI AND HIROMI NAKAJIMA

(Accepted for publication; July 17, 1991)

Key words: *Balantidium coli*, lymphoma, pig

Balantidium coli, found commonly in the large intestine of pigs in Japan is usually non-pathogenic (Nakauchi, 1990). The parasite is usually observed in the lumen of large intestine without any adverse reaction. However, the parasite occasionally invades the intestinal mucosa and causes balantidial dysentery (Flynn, 1973; Levine, 1973). A majority of *B. coli* infection has been characterized by ulcers in the large intestine (Koppisch and Wilking, 1947; Strong, 1904). The present paper reports a rare case of *B. coli* found in swine lymphoma by pathological examination.

An apparently healthy 2-year-old Landrace female pig slaughtered in Ibaraki Prefecture was found to have enlarge jejunal lymph node and a large tumour mass in the jejunum. The tumour mass on the serosa penetrated into the lumen of the intestine through the mucosal epithelium. Jejunal lymph node and the tumour mass were slightly fused with each other. The tumour was firm and grayish white in color (Fig. 1).

Histological preparations were obtained by routine procedures; i.e., the tissues were fixed in 10% (V/V) formalin, embedded in paraffin, sectioned, and stained with hematoxylin and eosin (HE). Microscopically, the original architecture of the jejunal lymph node was effaced by the neoplastic cells except for slightly invaded capsule. In large tumour located in the jejunum,

the normal architecture was completely destroyed by neoplastic growth. These involved tissues showed a diffuse growth pattern with sporadic macrophage infiltration. The neoplastic cells were characterized as lymphoid cells. The cells were variable in size, from medium to large and has scanty cytoplasm. The centrally placed nuclei were generally round or oval with moderately clumped chromatin. Those cells were not recognized in other organs. Mitotic cells were sometimes observed. The rounded organisms with a kidney-shaped blue-staining nucleus in the central part of the pink-staining cytoplasm, were frequently found in the large tumour located in the jejunum (Figs. 2, 3). From the morphological characteristics, this relatively large single-cell organism was identified as *B. coli* (Flynn, 1973; Levine, 1973). This parasite was not detected in other organs, including the normal portion of the intestine.

In pigs, abdominal lymphoma occurs primarily in the mesenteric lymph nodes or intestinal tract and peritoneal wall (Moulton and Dungworth, 1978; Nakajima *et al.*, 1989). In the present case the lymphoma could be classified as the abdominal type of jejunal lymph node origin.

The mechanisms by which the parasites enter the intestinal mucosa are even less clear, though the parasite produces hyaluronidase-like substance which helps in their penetration of the intestine by dissolving the ground substance between the cells. (Tempelis and Lysenko, 1957). Brown and Neva (1983) suggested that invasion

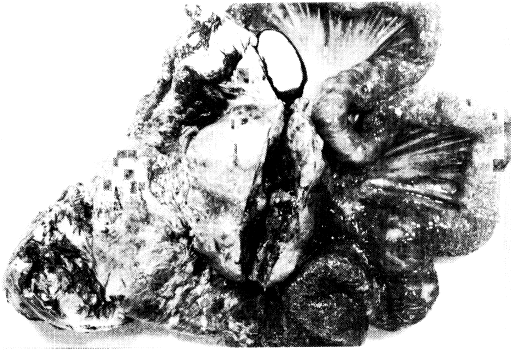


Fig. 1 Enlarged jejunal lymph node and large tumour mass in the jejunum.

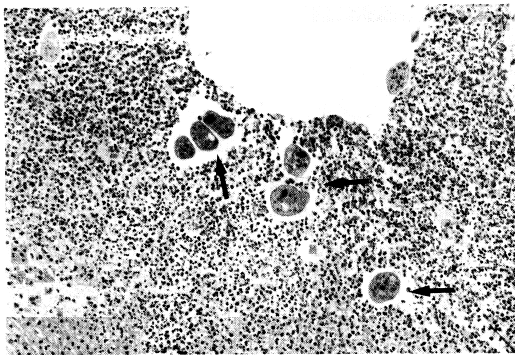


Fig. 2 Light micrograph of lymphoma in the jejunum containing numerous parasites (arrows).
HE stain. $\times 120$

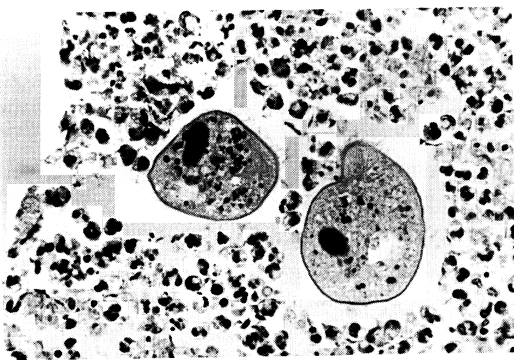


Fig. 3 *Balantidium coli* in the lymphoma showing its characteristic morphological features, rounded body and kidney-shaped nucleus at the central part of cytoplasm.
HE stain. $\times 480$

of this parasite is effected by the cytolytic enzyme and mechanical penetration, such as rotary boring action. Balantidia invade chiefly the colon and appendix, and rarely extend to the lower segment of the ileum (Areal and Koppisch, 1956; Koppisch and Wilking, 1947). Within the tissues, the balantidia multiply and produce ulcers or sub-surface abscesses in the mucous or submucous coats (Beaver *et al.*, 1984). Once *B.coli* establishes in man, it burrow into the wall of the large intestine, and produce flask-shaped ulcers of a few millimeters in diameter (Strong, 1904; Koppisch and Wilking, 1947). The ulcers sometimes extend down to the muscularis mucosae, with lymphocytic infiltration and occasional coagulation necrosis and hemorrhage (Levine, 1973). The parasites often occur in groups in the tissues, the capillaries, lymphatics or regional lymph nodes (Flynn, 1973). On the other hand, it has been reported that the early stages of inflammation consist of zones of hyperemia with or without extravasation of blood cells (Walker, 1913). Foci of vascular congestion and dilatation with perivascular lymphocytic infiltrates and eosinophils are also seen (Walker, 1913). In rare instances, *B.coli* invades peritoneum, urinary tract and vagina, though the extraintestinal infection is secondary to colonic balantidiosis (Beaver *et al.*, 1984). In the present case, no balantidial ulcer in the intestine, nor any inflammatory reaction around the parasite were observed. Furthermore, except for the lymphoma in the small intestine no *B.coli* was detected in other organs. It is uncertain what sort of trigger induced the ectopic parasitism of *B.coli* in the lymphoma in the present case. There are, however, no report to data on the *B.coli* in lymphoma, and thus the present case represents a very rare observation.

References

- 1) Areal, V. M. and Koppisch, E. (1956): Balantidiosis. A review and report cases. *Am. J. Pathol.*, 32, 1089-1115.
- 2) Beaver, P. C., Jung, R. C. and Cupp, E. W. (1984): *Clinical Parasitology*, 9th ed., Lea & Febiger, Philadelphia, 213-217.
- 3) Brown, H. W. and Neva, F. A. (1983): *Basic Clinical*

- Parasitology, 5th ed., A.C.C., Connecticut, 40–43.
- 4) Flynn, R. J. (1973): Parasites of Laboratory Animals, 1st ed., Iowa State Univ. Press, Ames, Iowa, 114–119.
 - 5) Koppisch, E. and Wilking, V. N. (1947): Balantidial dysentery – 4 cases with post-mortem study. Puerto Rico J. Public Health Trop. Med., 23, 185–206.
 - 6) Levine, N. D. (1973): Protozoan Parasites of Domestic Animals and of Man, 2nd ed., Burgess Publ. Co., Minneapolis, 369–373.
 - 7) Moulton, J. E. and Dungworth, D. L. (1978): Tumors of the lymphoid and hemopoietic tissues. In Tumors in Domestic Animals, 2nd ed., Univ. Calif. Press, Berkeley and Los Angeles, 150–204.
 - 8) Nakajima, H., Mabara, S., Ishino, S. and Kadota, K. (1989): Malignant lymphomas of follicular centre cell origin in 14 pigs. J. Vet. Med. A., 36, 621–630.
 - 9) Nakauchi, K. (1990): A survey on the prevalence rate of *Balantidium coli* in pigs in Japan. Jpn. J. Parasitol., 39, 351–355.
 - 10) Strong, R. P. (1904): Clinical and pathological significance of *Balantidium coli*. Repts. Bur. of Govt. Lab. Manila, 26, 1–77.
 - 11) Tempelis, C. H. and Lysenko, M. G. (1957): The production of hyaluronidase by *Balantidium coli*. Exp. Parasitol., 6, 31–36.
 - 12) Walker, E. L. (1913): Experimental balantidiasis. Philippine J. Sci., 8, 333–347.