

Canine Deciduoma Induced by Intraluminal Insertion of Uterine Grafts

Koichi NOMURA

Laboratory of Veterinary Surgery, Department of Veterinary Science, College of Agriculture, University of Osaka Prefecture,
1-1 Gakuen-cho, Sakai, Osaka 593, Japan

(Received 2 May 1995/Accepted 25 September 1995)

ABSTRACT. This report deals with evaluation of histological characteristics of the canine deciduoma induced by insertion of the uterine grafts as a biological stimulus. Autografts induced severe uterine cystic endometrial hyperplasia, and the grafts were organized by maternal endometrium. On the other hand, allografts induced more severe hyperplasia of the uterine endometrium with stronger inflammation than autografts. Almost all allografts became necrotic and lytic in the uterine lumen. These results suggest that uterine grafts could induce deciduoma and that the maternal endometrium, though under the functional corpora lutea, recognized the uterine grafts to be a stimulant and showed severe cystic endometrial hyperplasia. — **KEY WORDS:** canine deciduoma, cystic endometrial hyperplasia, uterine graft.

J. Vet. Med. Sci. 58(2): 151–155, 1996

In our previous reports [4–8], canine deciduomas were induced by some kinds of artificial stimuli. Their histological findings were characterized by proliferation and dilatation of the endometrial glands. Some histological variations could be recognized among deciduomas depending on the nature of the stimulus [4, 5, 7, 8]. However, all the stimuli having been used were physical. Biological stimuli have not been investigated. In the present study, therefore, uterine auto- or allo-grafts were chosen as a biological stimuli to the uterus.

Fifteen adult mongrel bitches from random sources were used. These bitches were clinically in good health and weighted from 8 to 12 kg. They were divided into three groups and each group consisting of five bitches was then treated with different experimental procedures. Before treatments, these bitches received operation for ligation of the left oviduct and uterine bifurcation to prevent implantation in the left horn. And then, permission behavior for copulation and the vaginal smears were checked every day to determine the first day of diestrus (day 1). At day 12, they were laparotomized again and received the following treatments under general anesthesia.

[Group 1] uterine autografts (2 × 0.3 cm, including whole uterine layers) were prepared from right uterine horn. The grafts were thoroughly washed in an antibiotic solution to prevent infection. These grafts were inserted into the left uterine lumen through a small longitudinal incision and then the incision was closed on the serosa with polyglycolic acid suture. [Group 2] uterine tissues (2 × 0.3 cm) taken from other diestrus bitches were immediately inserted into the left uterine lumen of the experimental bitches in this group in the same way as was done in group 1. [Group 3] 0.5 ml of sterile physiological saline was injected into the left uterine lumen as controls.

All bitches were ovari hysterectomized at day 24. Ovaries and uteri were fixed in 10% neutral buffered formalin and embedded in paraffin routinely. Histological sections were stained with hematoxylin and eosin. The surgeries were performed under a routine aseptic procedure and bitches received the administration of an antibiotic (aminophenyl acetamido penicillanic acid 10 mg/kg/day)

every day until the end of the experiment.

Gross findings: In group 1, some grafts adhered to the endometrium though others did not. The uterus was generally edematous and hypertrophic with no wrinkles. The implanted sites were enlarged just like normal early pregnant uterus. No exudative fluid was observed in the left uterine lumen of all bitches (Fig. 1). In group 2, almost all grafts did not adhere to the host endometrium. The uterus was generally edematous and partially hypertrophic with no wrinkles. Most of the grafts were lytic and fused into black or dark brown sticky contents. After removing the contents from the lumen, many small vesicles of various sizes appeared on the mucosal surface, and the endometrium looked like a cauliflower (Fig. 2). In group 3, the uterus showed a so-called corkscrew appearance. Other findings were the same as those found in the normal diestrus uterus. Though some bitches used were pregnant in the right horn, it might not give effect on the size of left horn. The ovaries of all the bitches contained some mature or premature corpora lutea.

Histological findings: In group 1, the uterus showed marked endometrial hyperplasia with cystic glandular proliferation (Fig. 3). The inserted autografts adhered to the host mucosa at the serosa and the endometrial surface of the grafts freely faced to the host endometrium without adhesion. At the adhered part, the graft tissue merged gradually into host tissue. The surface of the graft was covered with newly formed host endometrial epithelium, and the stroma of the graft was entirely transformed to host fibrous tissue with newly proliferated small vessels which invaded from the host endometrium. Few neutrophils, lymphocytes and plasma cells could be seen in the grafts. The uterine gland epithelium of the host endometrium which attached to the grafts were occasionally hyperplastic and formed syncytium (Fig. 4). On the contrary, host endometrium which did not directly touch to the graft was also hyperplastic but cystic glandular proliferation was not marked (Fig. 5). Endometrial stroma were edematous and stromal cells were not hyperplastic. In group 2, most of the uterine allografts were degenerated and lytic and some of them were floating in the viscous fluid in the lumen. The

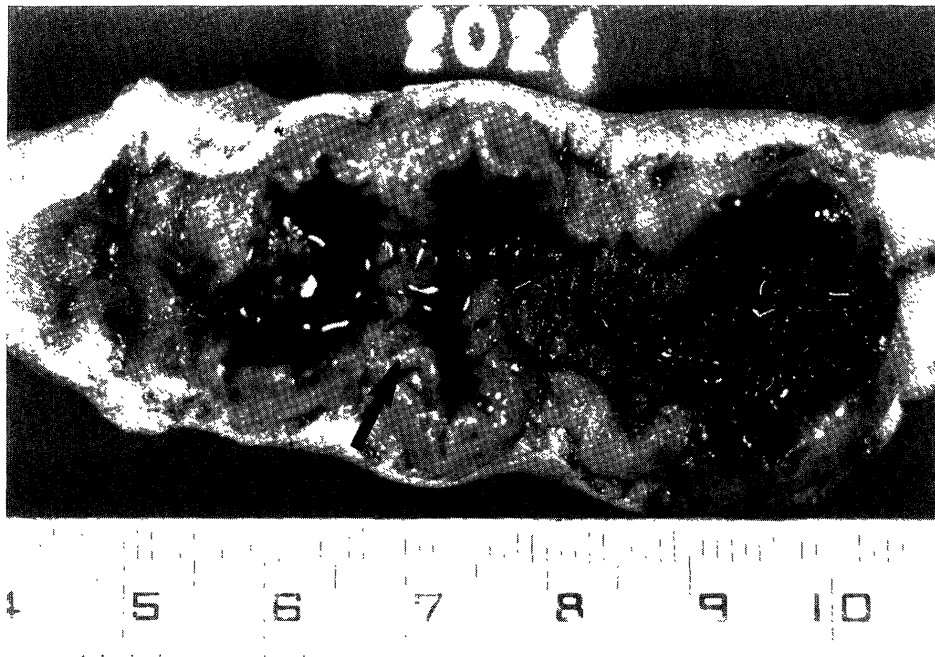


Fig. 1. Left uterine horn inserted autografts (group 1) had some masses adhered to the endometrium and no liquid state contents in the lumen. Mucosa is hypertrophic and belting tissue folds which looked like a zonary placenta can be traced (arrow).

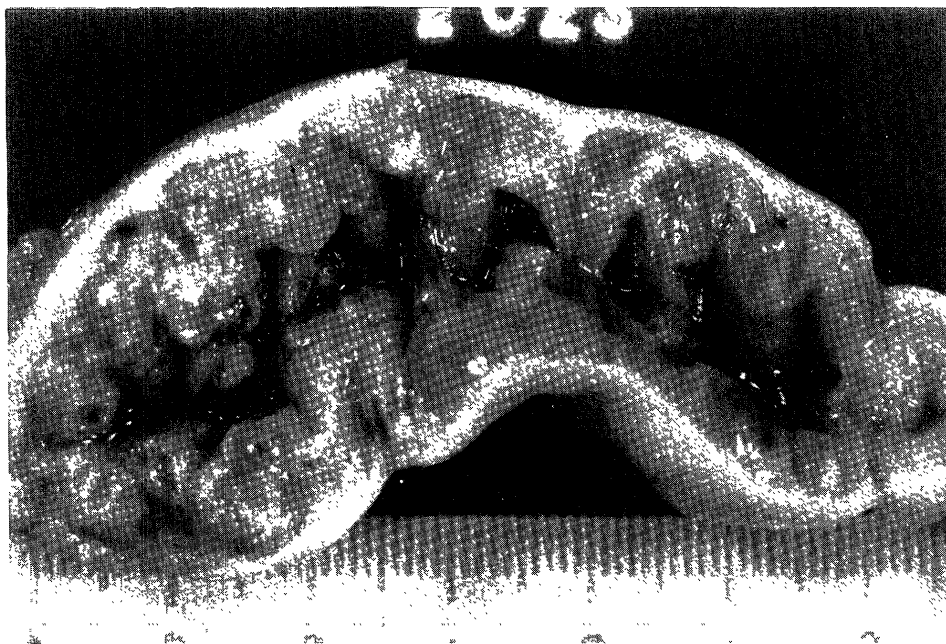


Fig. 2. The left horn in group 2 inserted allografts shows stronger hyperplasia than those of group 1. Small vesicles and sticky content were seen in the lumen. No mass of a graft was seen.

histological changes of the uterus were similar to that observed in group 1, but cystic glandular hyperplasia was more marked. This structure was so-called "Swiss cheese endometrium" (Fig. 6). In one case, adhesion of allografts to the host endometrium was seen. Severe inflammation consisting mainly of the neutrophils was observed in the

endometrium at the border between the grafts and host, showing a stage toward graft lysis. The uterus in group 3 showed the same features as seen in normal diestrous uterus. Ovaries of all the bitches examined were normal and contained several mature corpora lutea.

Normal dog placenta is composed of proliferated uterine

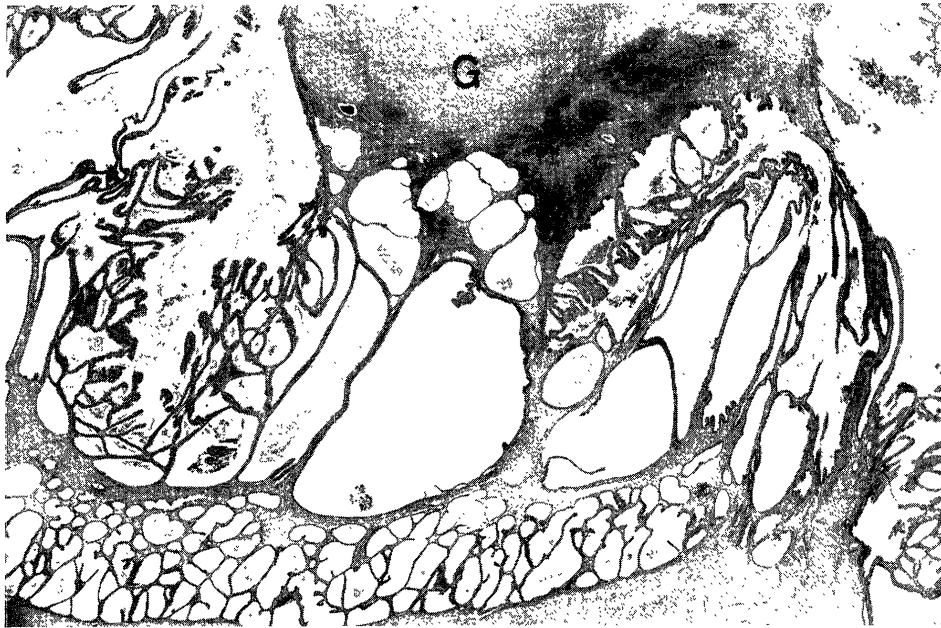


Fig. 3. Histological picture of the portion where the auto-graft adhered to the host mucosa, showing glandular hyperplasia. The glands are arranged regularly. G: grafts. HE stain $\times 13$.

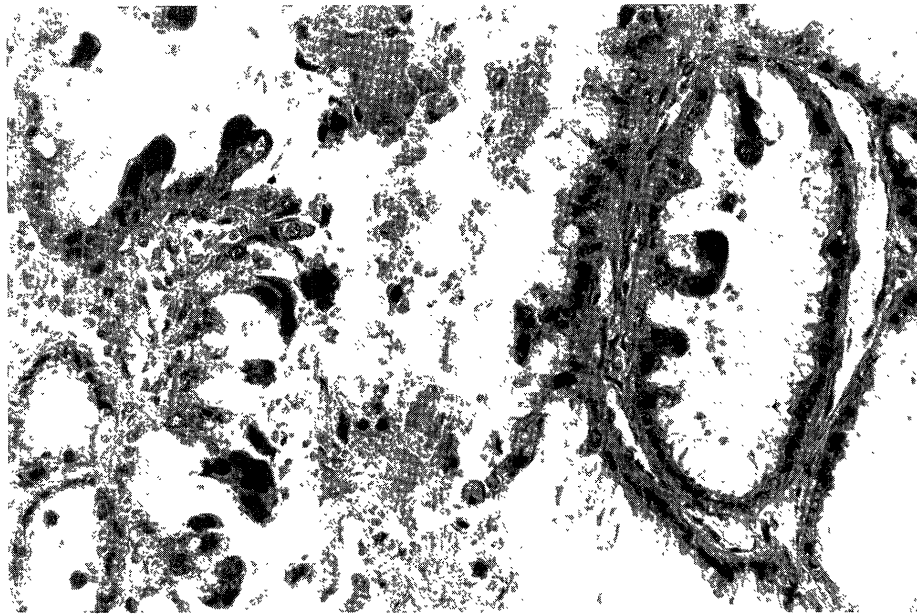


Fig. 4. Higher magnification of the glands in the hypertrophied host endometrium near the grafts. Active secretion or desquamation of the epithelia can be seen in the lumen. The tip of the tissue from glandular epithelia forms many syncytia suggesting formation of a necrotic zone in the normal placentation. HE stain. $\times 200$.

glands [1–3]. Histological changes of canine deciduoma were also characterized by the proliferation of the uterine glands [6]. Canine deciduoma was induced by various types of stimuli but all having been used were physical. In this study, we used biological stimuli of uterine grafts from her own or foreign uterine horns. Histological findings were especially proliferation and glandular syncytial formation.

From the results, uterine graft especially autograft was considered to be one of the most preferable method for examining implantational endometrium.

The auto- and allografts could be regarded physically as same but biologically different especially immunologically. Both auto- and allografts were attacked with foreign body reaction by the host. However, the reactions were different



Fig. 5 Higher magnification of the endometrium faced to the opposite side of the adhered grafts, showing no cystic dilatation of the gland. Epithelial hyperplasia is seen at the crypts or glandular lumina. HE stain. $\times 200$.



Fig. 6. Histological picture of the endometrium in Fig. 2. More marked cystic endometrial hyperplasia with irregularity than that in group 1 (Fig. 3.). HE stain. $\times 15$.

between the two groups. Intensity and regularity of the glandular hyperplasia and the severity of the inflammation of allografted uterus was more severe than that of autografted uterus. The difference of the strength of the foreign body reactions may suggest they are caused by immunological properties between allo- and auto-uterine grafts.

Comparing with the stimuli used in our previous experiments [4-8], the stimulus by uterine autografts would be the most suitable model for investigating canine deciduoma in relation to normal decidual reaction of the early placentation.

REFERENCES

1. Amoroso, E. C. 1952. pp. 138–159. *In*: Marshall's Physiology of Reproduction, vol. 2, 3rd ed. (Parkes, A. S. ed.), Longmans Green and Co., London, New York, Toronto.
2. Amoroso, E. C. 1952. pp. 211–242. *In*: Marshall's Physiology of Reproduction, vol. 2, 3rd ed. (Parkes, A. S. ed.), Longmans Green and Co., London, New York, Toronto.
3. Barrau, M. D., Abel, J. H., Torbit, C. A., and Tietz, W. J. 1975. *Am. J. Anat.* 143: 115–130.
4. Nomura, K. 1982. *Jpn. J. Vet. Sci.* 45: 237–240.
5. Nomura, K., Kawasoe, K., and Shimada, Y. 1990. *Jpn. J. Vet. Sci.* 52: 979–983.
6. Nomura, K. 1994. *J. Vet. Med. Sci.* 56: 365–369.
7. Nomura, K. 1995. *J. Vet. Med. Sci.* 57: 9–16.
8. Nomura, K. 1995. *J. Vet. Med. Sci.* 57: 71–74.