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Maternal Placenta-like Endometrial Hyperplasia in a Beagle Dog (Canine deciduoma)

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Abstract: Three thumb-sized segmental swellings were found in both uterine horns of a 15 month-old, non-pregnant and non-pseudopregnant female beagle dog. Histopathological examination of the uterus revealed a marked proliferation of the endometrium that was characterized by two distinct parts, an inner tightly-folded banded layer and an outer dilated spongy layer, quite similar to the maternal placenta except for the fetus and chorion in the lumen. Because the plasma level of progesterone was unusually high at autopsy, this hormonal disorder might be related to the pathogenesis of the endometrial hyperplasia in the present case.

Key words: Canine deciduoma, endometrial hyperplasia, progesterone

The proliferation of the endometrium is seen not only in the normal estrous cycle but also in various uterine diseases. The spontaneous or experimentally induced proliferation of decidual tissue has been documented as deciduoma in non-pregnant guinea pigs, rats, rabbits, monkeys and other species [2, 5]. In dogs, it is well known that unusual endometrial hyperplasia occurs in the condition of pseudopregnancy [11] or pyometra [3]. This report documents the histology and hormonal background of a unique case of maternal placenta-like endometrial proliferation found in a non-pregnant, non-pseudopregnant beagle dog.

The animal was a 15-month-old female beagle dog used as a control for a toxicity study, individually

housed in a stainless steel cage, so that there was no chance of pregnancy or decidual proliferation, and the clinical record showed no behavioral or clinical symptoms of pseudopregnancy such as nesting or lactation. At the end of the toxicity study, the dog was sacrificed under pentobarbital anesthesia. At autopsy, enlargement with thumb-sized segmental swellings closely located at three places were found in both uterine horns that contained a small amount of white mucus in the narrowed lumen.

Histopathological examination revealed marked proliferation of the endometrium separated into two distinct layers (Fig. 1). In the inner banded layer, simple columnar epithelium actively proliferated with tight

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Fig. 1. Transverse section of the uterus of a beagle dog. The endometrium proliferates actively and is separated into the inner banded layer (B) and the outer spongy layer (S). Hematoxylin-eosin stain. Bar=1 mm.

folding (Fig. 2). The epithelial cells lining the lumen were pleomorphic, atypical, and showed variable features of mitosis, mucus secretion, degeneration and desquamation to form necrotic syncytium (Fig. 3). In the outer spongy layer, simple columnar epithelium formed numerous spongy-like cysts containing mucus and erythrocytes. The stromal tissue was scarce in both layers. The uterine glands increased and were slightly dilated, and some of them were continued to columnar cells of the outer spongy layer. The myometrium of the uterus was thin and slightly edematous. Both ovaries contained large corpus luteum mostly filled with swollen lipid-laden granulosa cells.

These endometrial structures were not very different from those of the maternal placenta. In the uterus from a pregnant bitch (30 days), gestational development of the functional layer into the inner banded layer (stratum compactum) and outer spongy layer (stratum spongiosum) accompanied with the chorion and fetus

Fig. 2. Higher magnification of a middle part from the inner banded layer of Fig. 1. Simple columnar epithelium proliferates with scarce stromal tissue and has a tightly-folded banded structure. Hematoxylin-eosin stain. Bar=50 μ m.

Fig. 3. Higher magnification of a part of the lining extending to the lumen from the inner banded layer in Fig. 1. The lining epithelial cells are pseudostratified, cuboidal and flattened. The epithelial cells beneath the lumen are pleomorphic, forming necrotic syncytiums composed of swollen cells (arrow). Hematoxylin-eosin stain. Bar=100 μ m.

was clearly seen (Fig. 4). Chorion invasion and necrotic maternal syncytium formation were also observed in the inner stratum compactum.

Plasma levels of estrogen and progesterone were measured by radioimmunoassay in the samples obtained sequentially during the period of the toxicity study. As a result, the plasma concentration of estrogen was more than 100 pg/ml on days 33, 120, 197 and 218 before autopsy but reduced to less than 50 pg/ml at autopsy.

Fig. 4. Transverse section of the uterus of a pregnant (30 days) dog. The maternal placenta is separated into the inner stratum compactum and the outer stratum spongiosum. The fetus and the chorion connected to the stratum compactum are seen in the lumen. Hematoxylin-eosin stain. Bar=1 mm.

The progesterone concentration was less than 1 ng/ml from days 33 to 218 before autopsy, but had increased to more than 90 ng/ml at autopsy. It was therefore considered that the estrogen level was consistently higher than the normal maximum level (40–70 pg/ml) for several months and dropped to the normal level at autopsy, whereas, in contrast, the progesterone level was about two times as high as the maximum values (40–50 ng/ml) reported in pregnant and non-pregnant bitches [1, 4, 9] at autopsy. These hormonal changes may be related to the pathogenesis of the endometrial hyperplasia in the present case.

The abovementioned pathological and hormonal changes were not observed in all animals used in the toxicity study.

Unusual endometrial hyperplasia in dogs occurs in various conditions including pseudopregnancy [6, 8, 10]. As already stated, the present case was not thought to be pseudopregnancy because of the clinical findings. We believed that such highly organized maternal placenta-like endometrial hyperplasia as seen in the present

case is a rare condition.

Since Loeb reported on experimental decíduoma in guinea pigs in 1908 [7], the term “decíduoma” has been used of the histopathological features of decidua-like proliferation in non-pregnant animals of many species, but not commonly in dogs. This is assumed to be due to the species difference in the histological features of the maternal decidua, because the decidual tissues in most experimental animals are characterized by the proliferation of enlarged stromal cells (decidual cells) and abundant stromal tissue whereas those in dogs are composed of columnar uterine gland cells with scarce stromal tissue and decidual cells. Therefore, endometrial hyperplasia due to similar stimuli has been classified under different terms in the dog [8] and rodents [5]. Provided that “decíduoma” occurs in the canine species, its histological features may be similar to those seen in the present case.

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