The squamous cell carcinoma component of these two malignant thymomas arose from neoplastic thymic epithelial cells that had formed tubules and cysts. The malignant cells arose from thymic epithelium that was part of the tumor and not from epithelia of branchial cysts of the mediastinum or from the commonly acquired nonneoplastic cysts of thymic involution.

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References

Testicular Epidermoid Cyst and Penile Squamous Cell Carcinoma in a Dog

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Key words: Dogs; epidermoid cyst; penis; squamous cell carcinoma; testis.

Epidermoid cyst of the testis is an uncommon benign germ cell tumor that accounts for about 1% of human testicular neoplasms.1'2 Whereas testicular neoplasms are common in dogs, epidermoid cysts have not been previously described in dogs or other domestic animals. Squamous cell carcinoma of the penis also occurs in dogs, but it is uncommon.3 We report the first case of testicular epidermoid cyst and a concurrent penile squamous cell carcinoma in a dog.

A 9-year-old male Shetland Sheepdog was found to have an extensive and slightly elevated papillomatous lesion on the surface of the penile glans. In addition, there was a discrete, nontender, small mass in the upper pole of the right testis. The left testis was normal when palpated. A penile amputation and urethrostomy were performed. The testicular lesion was thought to be either a metastasis from the penile tumor or a primary germ cell tumor, and, consequently, an orchiectomy was performed.

Grossly, the upper pole of the testis contained a round to oval, 3 x 3 x 4-mm well-encapsulated cyst that contained keratinaceous material (Fig. 1). Histologically, the cyst was lined by keratinizing stratified squamous epithelium and contained keratin and amorphous cellular debris (Fig. 2). No adnexal structures were present in the wall of the cyst, nor were other germ cell tumor types (Fig. 3). The surrounding parenchyma was unremarkable and had normal spermatogenesis. The rete testis and Leydig cells were also normal. The pathologic diagnosis was epidermoid cyst. The penile tumor was an invasive, well-differentiated squamous cell carcinoma composed of large pleomorphic cells with intercellular bridges and keratin pearls. Mitotic figures were frequent (Fig. 4). The post-operative course was uneventful, and 9 months after surgery the dog had no signs of recurrence or metastasis.

In 1940, Ewing1 reported two cases of squamous epithelial "rests" in the human testis. In 1942, Dockerty and Priestly clarified this lesion when they described an "undoubtedly benign, pure epidermoid cyst completely encased within the body of an otherwise normal testis. "2 Since then, approximately 190 cases of testicular epidermoid cysts have been reported in human beings.3,4 There was no reported case of testicular epidermoid cyst in dogs or other domestic animals.

In domestic animals, it is critical that the term testicular "epidermoid cyst" be precisely defined because the term has been incorrectly used to describe another entity, the dermoid
Fig. 1. Right testis; Shetland Sheepdog. The lesion (arrow) is located entirely within the testis and is filled with keratinized debris. Bar = 5 mm.

cyst." Testicular teratomas are germ cell tumors that are composed of tissue elements from more than one germ cell layer. Mostofi has defined the testicular dermoid cyst as a cystic teratomatous lesion, the wall of which is lined by teratomatous keratinizing, stratified squamous epithelium and also contains skin appendages." On the other hand, the widely accepted criteria for the teratomatous epidermoid cyst of testis were proposed in 1969 by Price and consist of (1) a cyst located within the parenchyma of the testis, (2) a cyst whose lumen contains keratinaceous material, (3) the wall of the cyst is composed of fibrous tissue with a complete or incomplete lining of squamous epithelium, and (4) other teratomatous elements including adnexal structures, such as sebaceous glands or hair follicles, are completely absent within the cyst wall or adjacent parenchyma of the testis. The last two criteria differentiate a simple epidermoid cyst from a mature teratoma, which frequently contains keratin cysts. Any epidermoid cyst with associated skin appendages should be classified as a dermoid cyst." In summary, teratomatous simple epidermoid cyst constitutes a select subgroup of teratomas similar to dermoid cysts but lacks all tissue elements except for keratinizing stratified squamous epithelium. An alternate proposal that epidermoid cyst represents squamous metaplasia of rete testis or seminiferous tubules has not been accepted. Indeed, squamous metaplasia has never been reported in these sites. There are no recorded cases of metastases from either dermoid cyst or epidermoid cyst of the testis.

It has been reported in human beings that testicular epidermoid cysts are often located adjacent to a testicular scar. This is significant because a testicular scar could be evidence of a so-called "burned-out" testis tumor and might represent involution or a healed area of necrosis in a preexisting germ cell tumor. Indeed, there are examples in the literature of metastases arising apparently from "burned-out" testicular tumors. Clearly, it is critical to perform careful pathologic examination of the entire testis. We examined a large number of tissue sections of the testis, and there was no evidence of testicular scar or other germ cell tumor elements.

In human beings, the age range of testicular epidermoid cysts is from 3 to 77 years, with most lesions occurring be-

Fig. 2. Right testis; Shetland Sheepdog. Testicular cyst filled with keratin and amorphous cellular debris (arrow), lined by thin stratified squamous epithelium, and surrounded by testicular tissue with normal spermatogenesis, HE. Bar = 100 μm.

Fig. 3. Right testis; Shetland Sheepdog. The testicular lesion is lined by a keratinizing stratified squamous epithelium and a surrounding fibrous tissue. HE. Bar = 50 μm.

Fig. 4. Glans penis; Shetland Sheepdog. Note the typical squamous cell carcinoma. HE. Bar = 50 μm.
tween the second and fourth decades. Testicular epidermoid cysts are rare in young children. In our case, the dog was relatively old.

Penile squamous cell carcinoma is uncommon in domestic animals. It occurs most frequently in the horse, but also is observed in the dog and the bull. In dogs, squamous cell carcinoma has been associated with papilloma virus. Metastatic penile squamous cell carcinoma to the testis has been reported in human beings. In the current case, there is no clinical or pathologic evidence of metastatic disease. In summary, we report the first case of testicular epidermoid cyst in a dog, in addition to a concurrent penile squamous cell carcinoma. We believe that the lesions represent two distinct processes.

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Predominance of BoCD8-positive T Lymphocytes in Vascular Lesions in a 1-Year-old Cow with Concurrent Malignant Catarrhal Fever and Bovine Viral Diarrhea Virus Infection

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Key words: BoCD8 T lymphocytes; malignant cattarhal fever; vasculitis.

Malignant cattarhal fever (MCF) is a pansystemic disease of cattle in which a pathognomonic lesion is severe lymphocytic vasculitis. An alcelaphine herpes virus (AHV-1) has been implicated as the etiologic agent in the wildebeest-associated African form of MCF. Although the etiology of sheep-associated MCF that occurs in the United States has not been determined, experimental transmission of the condition has been accomplished with transfer of leukocytes from affected animals, and bovine herpes virus (BHV)-4, strain DN599, has been identified in cattle with MCF in Europe and North America. A major unresolved issue in this condition is the pathogenesis of the vascular lesions and, relatedly, the phenotype(s) of the mononuclear leukocytes in affected vessels. We report that the major infiltrating cells in vascular lesions in a case of naturally occurring MCF were BoCD8-positive T lymphocytes and macrophages.

A 1-year-old Hereford heifer was presented to the Wyoming State Veterinary Diagnostic Laboratory (Laramie, WY) in moribund condition. The animal had diarrhea and was emaciated. This was the only animal so affected in the herd,