An 18-year-old 17.96-kg (39.51-lb) female Vietnamese potbellied pig was evaluated because of a 1-month history of anorexia, diarrhea, and signs of depression.

Clinical and Gross Findings

On physical examination, the pig was tachypneic and had signs of depression. Abdominal palpation revealed an intra-abdominal mass. Results of hematologic evaluation (CBC) and serum biochemical analysis were within reference limits. A 12-cm-diameter, well-demarcated mass in the caudal aspect of the abdominal cavity was detected via abdominal radiography and ultrasonography. The mass contained multiple cystic areas and displaced the intestines cranially, but its precise location could not be determined.

Surgical exploration was elected; the mass was found to be located in the uterine body and was excised by complete ovariohysterectomy. No extraterine masses were found. During recovery from anesthesia, the pig was in shock and developed an episode of seizures and vomited. Following supportive care, the pig developed harsh lung sounds, went into cardiac arrest, and died the next morning despite attempted resuscitation.

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The uterus and ovaries were submitted to the diagnostic laboratory for gross and histologic evaluation. Necropsy was not permitted. On gross examination, the tissues removed during ovariohysterectomy weighed 2.1 kg (4.6 lb; Figure 1). The uterine body mass (maximal dimension, 17 cm) was composed of lobules of firm, tan tissue separated by fibrous septa and bordered externally by the compressed outer layer of the myometrium (black arrows). The endometrium (top) is thin and dark pink, with scattered translucent cysts (white arrow). The left ovary (arrowhead) is unremarkable. Bar = 3 cm.

Formulate differential diagnoses from the history, clinical findings, and Figure 1—then turn the page →

Figure 1—Photographs of an abdominal mass located in the uterus of an 18-year-old Vietnamese potbellied pig that was evaluated because of a 1-month history of anorexia, diarrhea, and signs of depression. A—The tissues removed during ovariohysterectomy weighed 2.1 kg (4.6 lb), and the maximal dimension of the uterine body mass was 17 cm. B—On cross section, notice the well-demarcated mural mass composed of lobules of tan tissue separated by fibrous septa and bordered externally by the compressed outer layer of the myometrium (black arrows). The endometrium (top) is thin and dark pink, with scattered translucent cysts (white arrow). The left ovary (arrowhead) is unremarkable. Bar = 3 cm.
Histopathologic Findings

The mass was in the myometrium but mostly well demarcated from the outer muscle layer and composed of dense intersecting bundles of spindle-shaped cells (Figure 2). The neoplastic cells had indistinct cell borders, a round to oval nucleus, moderate variation in nuclear diameter, stippled chromatin, 1 to 2 small nucleoli, only 1 mitotic figure in > 50 hpf (400X), and a moderate amount of eosinophilic cytoplasm. The scanty fibrous stroma, stained blue with Masson trichrome, had scattered eosinophils. Scattered through the neoplasm were a few areas of hemorrhage and lytic necrosis. The immunohistochemical expression of α-smooth muscle actin and of desmin in the neoplastic cells was similar to that in smooth muscle cells of adjacent nonneoplastic myometrium.

The endometrium was not invaded by the neoplasm but was lightly infiltrated by lymphocytes and eosinophils and had atrophied glands, periglandular fibrosis, and few scattered cystic glands. Follicles in various developmental stages and corpora lutea were detected in the ovaries.

Morphologic Diagnosis and Case Summary

Morphologic diagnosis and case summary: myometrial leiomyoma in a Vietnamese potbellied pig.

Discussion

Uterine smooth muscle neoplasms are uncommon in most domestic mammals, but a high prevalence in potbellied pigs has been identified in the past 10 years. Because these pet pigs may be bred rarely or never and have a typical life span of 10 to 15 years, continuous long-term ovarian cycling may predispose them to estrogen-responsive neoplasms. The first detailed description of porcine uterine leiomyoma involved 2 Vietnamese potbellied pigs.1 In a subsequent retrospective study,2 17 of 24 female potbellied pigs at least 5 years of age had uterine neoplasia. Eleven of the uterine tumors were classified as leiomyoma, and 3 were classified as leiomyosarcoma. Most affected pigs also had endometrial cysts. The authors proposed uterine leiomyomas (fibroids) in potbellied pigs as a potential model of leiomyomas in women. In another study,3 the uterus from each of 32 miniature pet pigs that underwent ovariohysterectomy at 4 months to 19 years of age was sub-

Figure 2—Photomicrographs of sections of the myometrial tumor in Figure 1. A—Notice that the mass (upper right) is well demarcated from the outer smooth muscle layer of the myometrium. H&E stain; bar = 500 µm. B—The myometrial mass is composed of dense intersecting bundles of spindle-shaped cells. The neoplastic cells have indistinct cell borders, a round to oval nucleus, moderate variation in nuclear diameter, stippled chromatin, 1 to 2 small nucleoli, and a moderate amount of eosinophilic cytoplasm. H&E stain; bar = 50 µm. C—Neoplastic cells of the myometrial mass have diffuse strong cytoplasmic expression of the muscle marker desmin. Immunohistochemical staining with diaminobenzidine chromogen and hematoxylin counterstain; bar = 50 µm.
mitted for gross and histologic evaluation. Fourteen pigs (5 to 19 years of age) had smooth muscle tumors in the uterus or broad ligament. Leiomyoma was diagnosed in 9 pigs and leiomyosarcoma was diagnosed in 7 pigs. Two pigs had both leiomyoma and leiomyosarcoma. Neoplastic cells in the leiomyomas and in the leiomyosarcomas had strong expressions of estrogen receptors and progesterone receptors.

In the case described in the present report, positive results for immunohistochemical muscle markers helped to rule out a nerve sheath tumor or fibroblastic tumor, but the distinction between benign and malignant uterine smooth muscle tumors can be problematic. The tumor in this pig was originally classified as a well-differentiated leiomyosarcoma on the basis of the cellular density, hemorrhage, focal lytic necrosis, and at least 1 mitotic figure/50 hpfs. However, increased cell density and up to 5 mitotic figures/10 hpfs are features of the cellular variant of human myometrial leiomyoma. Coagulative tumor cell necrosis is considered the most reliable criterion of malignancy in human myometrial smooth muscle neoplasms but must be distinguished from the hyalinized tissue of ischemia noted in some leiomyomas. In pigs, uterine leiomyomas have been reported to have variable cellular density and a mitotic index up to 2 mitotic figures/10 hpfs, whereas myometrial tumors classified as leiomyosarcoma have been reported to have a mitotic index > 5 mitotic figures/10 hpfs and be associated, at least in some cases, with metastasis. Necropsy was not performed in the pig of this report; however, metastatic disease was not detected by means of abdominal imaging or during exploratory surgery.

Leiomyomas are not subclassified in veterinary medicine. However, on the basis of the diagnostic criteria for human myometrial tumors and reported features of myometrial tumors in potbellied or miniature pigs, the increased cell density of the myometrial leiomyoma in the pig of this report—plus the absence of coagulative necrosis of neoplastic cells and mitotic index < 1 mitotic figure/10 hpfs—is reminiscent of the cellular variant of human myometrial leiomyoma. Because of the tendency of female pet pigs to develop neoplastic uterine lesions as they age, even though most masses are benign, ovariohysterectomy at an early age should be considered to decrease the prevalence of this neoplasm.

References