PEER REVIEWED

Case Report – Uterine Leiomyosarcoma in a Beef Cow

Roberto O. Torres-Diaz, *DVM*; **David P. Gnad,** *DVM, MS, DABVP*; **Paul H. Walz,** *DVM, MS, PhD, DACVIM*; **Peter J. Chenoweth,** *BVSc, PhD, DACT*
Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506

Abstract

A 13-year-old, 1562 lb (710 kg) Aberdeen Angus embryo donor cow was presented to the Kansas State University Veterinary Medical Teaching Hospital with a two year history of a slow-growing, uterine mass. Tentative diagnosis of a smooth muscle tumor was made by exploratory laparotomy and uterine biopsy. Surgical excision was considered, but not conducted due to tumor size and location. The cow was euthanized and ova harvested for *in vitro* fertilization. Laboratory examination indicated that three good quality ova were collected. Definitive diagnosis following post-mortem examination was uterine leiomyosarcoma.

Résumé

Une vache donneuse d'embryons de race Aberdeen-Angus, pesant 710 kg (1562 lbs) et âgée de 13 ans, a été admise au centre hospitalier universitaire vétérinaire de l'université d'état du Kansas avec une protubérance utérine grossissant lentement depuis deux ans. Un diagnostic initial de tumeur du tissu musculaire lisse a été fait suite à une laparotomie exploratoire et une biopsie utérine. L'excision chirurgicale a été considérée mais n'a pas été tentée en raison de la taille de la tumeur et de sa localisation. La vache a été euthanasiée et les ovules ont été recueillis pour la fertilisation *in vitro*. L'examen au laboratoire a révélé la présence de trois ovules de bonne qualité. Le diagnostic final suite à l'examen post-mortem était un léiomyosarcome utérin.

Introduction

Uterine tumors are rare in cattle.[3,9,11,12] The most common tumor in the uterus of the cow is carcinoma, followed by smooth muscle tumors (leiomyomas and leiomyosarcomas).[1,3,5] Lymphosarcoma of the uterine wall has also been reported as a common site for this multicentric neoplasm.[3] Smooth muscle tumors are not associated with infertility unless they are large enough to physically impair reproduction.[2,3,4] The tumor in this case was first detected two years before apparently affecting reproduction. Leiomyosarcomas of the uterus do not usually grow rapidly in cattle, with the mean age of appearance between 11-15 years.[6] They have not been directly associated with fatalities.[6] Affected cows are likely culled for other reasons before adverse effects on reproduction are noted or fatalities have occurred. If the tumors are small enough and located at the tip of the uterine horn, surgical removal can be attempted and prognosis for future reproduction could be favorable.

History

A 13-year-old, 1562 lb (710 kg) Aberdeen Angus embryo donor cow was admitted to the Kansas State University Veterinary Medical Teaching Hospital due to inability to produce embryos following superovulation. The referring veterinarian reported finding a one-inch (2-3 cm), single mass located between the bifurcation of the uterine horns and the medial dorsal aspect of the left uterine horn two years prior to admission. At that time, the referring veterinarian suspected the mass represented an old injury due to either artificial insemination or an embryo transfer catheter. To rule out lymphosarcoma, the cow was tested for bovine leukemia virus by agar gel immunodiffusion (AGID). Results were negative. The test was repeated two and five months after the initial test and remained negative. A year and a half later, the referring veterinarian estimated the mass was approximately five inches (12 cm) in diameter, although excellent quality embryos were still being collected, resulting in good conception rates. Six months later, the mass was approximately 12 inches (30 cm) in diameter. The cow was not responding favorably to the superovulation protocol, and no embryos were collected after that time. The cow had an excellent appetite with no external clinical signs of disease.

Clinical Findings

Physical examination revealed that the cow had a body condition score of 8 (scale 1-9) with no external signs of illness. She had an excellent appetite, normal urination and normal bowel movements. Lung and heart sounds were normal on auscultation. Heart rate, temperature, respiratory rate, rumen motility and external lymph nodes were also within normal parameters. The uterus could not be retracted on rectal palpation. A basketball sized, solid mass within the uterus was easily palpable just cranial to the cervix. The right ovary contained a fluid-filled structure that resembled a 25 to 30 mm follicular cyst, while the left ovary presented no palpable structures. The sub-lumbar and iliac lymph nodes were normal size and consistency. No other abnormalities were found during transrectal examination. Following physical examination, differential diagnoses for the uterine mass included uterine leiomyoma, leiomyosarcoma, abscess formation, adenocarcinoma and lymphosarcoma.

Diagnostic and laboratory findings

The location and history of the mass warranted ultrasonographic evaluation. A transrectal ultrasonographic evaluation of the mass was performed, using a 5 MHz linear transducer. Examination revealed a large, non-homogeneous mixed hyperechoic and hypoechoic mass within the base of the left horn and body of the uterus.

It was determined that an exploratory laparotomy and subsequent histological examination of tissue sections of the mass were needed to obtain a definitive diagnosis. An exploratory laparotomy was done, utilizing a standing right paralumbar approach under local anesthesia, because it provided adequate visualization of the mass without the risks and complications of general anesthesia. The exploratory laparotomy confirmed a 16-inch (40 cm), slightly firm, circular mass within the ventral base of the left uterine horn and uterine body. There appeared to be a 28-mm follicular cyst on the right ovary. A biopsy of the mass was performed using a six-inch (15 cm), 10-gauge Tru-Cut[a] biopsy needle with a 20 mm specimen notch. Histopathology results were inconclusive, although suggestive of a smooth muscle tumor.

Case management

The value of the cow was based primarily on her ability to produce viable embryos. It was determined that surgical removal of the mass was a poor option because the tumor appeared to be within the uterine body. If the tumor was within one uterine horn only, surgical removal of the affected horn and ipsilateral ovary would have been recommended. There was also increased risk of surgical complications due to the extremely large size of the cow and location of the tumor within the pelvic canal. The owner was offered two options: euthanasia, followed by an attempt to retrieve ovarian ova, or salvage slaughter. The owner chose to euthanaize the cow, followed by ovarian ova retrieval. The cow was administered intramuscular injections of follicle stimulating hormone (FSH), 20 units twice daily for two days, in an attempt to stimulate maturation of multiple ova. The cow was euthanized 12 hours after receiving the last dose of FSH. The ovaries were harvested for *in vitro* fertilization of the ova. Laboratory examination indicated that three good quality ova were collected.

Necropsy confirmed a well-defined mass within the uterine wall (Figure 1). Histological evaluation of the mass revealed a uterine leiomyosarcoma within the tunica muscularis at the dorsal aspect of the base of the left uterine horn and uterine body. Ischemic necrosis was histologically apparent within the tumor. No evidence of metastases were found.

Discussion

Uterine neoplasm appears to be rare in cattle.[3,9,11,12] A survey by Monlux,[6] evaluating 30 uterine tumors in cattle, found 26 carcinomas and four smooth muscle tumors. Also, Garcia-Iglesias[3] evaluated 1489 bovine uteri and found six tumors: three carcinomas and three smooth muscle tumors. In this survey, age range of the animals that had smooth muscle tumors was 11- 15

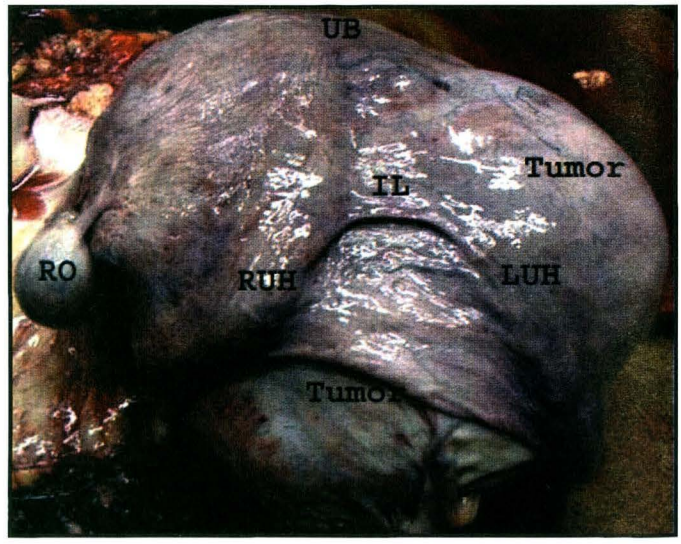

Figure 1. This picture shows the uterus of the cow after necropsy: right ovary containing a 28mm follicular cyst (RO); right uterine horn (RUH); intercornual ligament (IL); left uterine horn (LUH); uterine body (UB): leiomyosarcoma (Tumor).

years, and age range of cows with carcinomas was 5-10 years. Leiomyomas arising from smooth muscle cells of the myometrium have been described in most domesticated animals, although their malignant counterparts, leiomyosarcomas, have been infrequently described.[7,8] Smooth muscle tumors have been reported to have little influence on fertility.[2,3,4] In this case, the tumor did have a negative impact on fertility, possibly due to the age of the animal. Cows in commercial beef herds may not be kept in production long enough for a smooth muscle tumor to develop to a size that impacts fertility. There are no reports on the mechanism by which smooth muscle tumors influence fertility. We speculate that decreased fertility may be due to mechanical obstruction of ova or sperm cell movement, decreased blood flow to the uterus, or ischemia of the uterus and/or ovarian structures. In this case, ischemia within the tumor was evident (Figure 2).

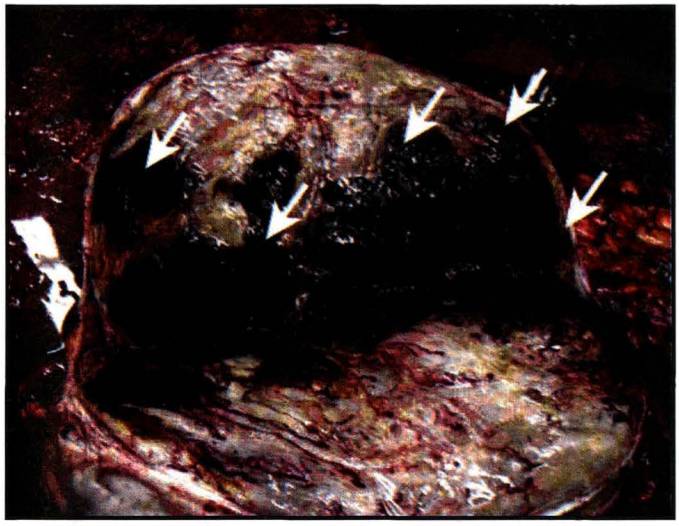

Figure 2. A cross-section of the uterine leiomyosarcoma. White arrows indicate areas of necrosis within the tumor.

Conclusion

Uterine leiomyosarcoma caused infertility in this cow. Surgical excision was considered, but not chosen due to location and size of the tumor. The owner elected ovarian ova retrieval following euthanasia versus salvage slaughter. Three ova were collected following euthanasia. This case may help practitioners develop diagnostic and treatment approaches for cows with smooth muscle tumors.

Footnote

[a]Tru-Cut biopsy needle, 10 gauge, 15 cm in length and a 20 mm specimen notch, Allegiance Healthcare Corporation, MacGaw Park, IL.

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