Abstracts

Subfertility in a mare due to a glass marble

Ava Adamson

College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX, USA

A 20-year Quarter Horse maiden mare was referred to the Veterinary Medical Teaching Hospital in 2019 for breeding management and artificial insemination with cooled semen following an unsuccessful breeding on farm by a nonveterinarian. Upon presentation, the mare was in diestrus with intrauterine free fluid (3.8 x 5.4 cm). Cytologic evaluation and culture of the uterine lavage revealed mucus, bacteria (cocci and rods), neutrophils, refractive granular material; and a pure growth of *Streptococcus equi zooepidemicus* and *Achromobacter xylosoxidans*, both sensitive to ticarcillin/clavulanic acid (Timentin). Treatment included 5 daily intrauterine infusions of Tris-EDTA and Timentin. During those treatments a glass marble was identified ultrasonographically in the cranial cervix and manually removed. Refractive granular material continued to be identified in the lavage fluid and was considered glass fragments from the marble. An endometrial biopsy revealed only slight inflammation and periglandular fibrosis and was categorized as a IIA endometrium. In 2020, the mare was nonpregnant following breeding with cooled semen and was positive for both *S. zooepidemicus and Pseudomonas aeruginosa*. Based on these findings, the owners decided to discontinue breeding the mare. In this case the owners were unaware of the presence of the intrauterine marble that had started to deteriorate, releasing glass fragments that were identified as refractive debris. Clinicians should be aware of the potential for intrauterine foreign bodies causing subfertility. Although glass marbles have been reported to prevent cyclicity in mares,[1] their use can lead to complications such as endometritis and uterine adhesions.[2,3] This case highlighted both the risks of using intrauterine foreign bodies to prevent cyclicity in mares, which can cause infertility, and the misdiagnosis of reproductive problems in horses by untrained personnel.

Keywords: Endometritis, glass marble, uterine infection

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Reduced fertility in domestic female cats using a novel nonsurgical spay technique

Sandra Ayres,[a] May Einfalt,[a] Qiaobing Xu[b]

[a]Department of Comparative Pathobiology, Cummings School of Veterinary Medicine, Tufts University, North Grafton, MA, USA
[b]Department of Biomedical Engineering, Tufts University, Medford, MA, USA

Overpopulation of feral cats is a worldwide problem. Our laboratory has developed a nonsurgical technique to reduce or eliminate fertility in female cats. It consists of a lipid nanoparticle containing a cytotoxin (saporin) guided by an antibody for the antimüllerian hormone receptor 2 (AMHR2). We hypothesized the nanocomplex selectively kills ovarian cells exhibiting AMHR2: granulosa cells, theca interna cells and preantral follicles. A reduction in these cells would compromise estrogen production, reducing estrous behavior, and decreasing preantral follicles available for recruitment. Our aim was to test this hypothesis in a group of 12, 1-year purpose-bred cats evenly allocated into a test group receiving the nanocomplex and a control group receiving sterile saline. Cats were housed in an open colony with free access to food, water and enrichment. Behaviors were observed and noted daily by the PI and students. The nanocomplex was given intramuscularly during a long-day light cycle (10 hours dark/14 hours light) after all cats had been observed exhibiting estrus. Estrus was defined as displays of spontaneous rolling, spontaneous lordosis, and yowling. At the end of the study, all cats were spayed and adopted. Ovarian tissue was processed using H&E and caspase stains. Slides were evaluated by the PI and a blinded observer. Estrous behavior results were surprising, as there were no differences between groups in the number or length of estrous cycles. Histologically the only significant difference was the production of corpora lutea (CLs) by 5 of the 6 control cats compared to 1 of 5 treated cats ($\chi 2$ (1, n = 12) = 5.33, $p < 0.05$) Therefore, it appeared reduction of ovarian cells with receptors for AMH can negatively impact fertility, interfering with ovulation. More research is needed to better understand the role of AMH on ovulation in the cat.

Keywords: Feline, antimüllerian hormone, nonsurgial spay, estrus

Dystocia and cesarian surgery of a calf with schistosomus reflexus

Mitchell Barber,[a] Jamie Stewart[b]

[a]Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
[b]Large Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

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A multiparous crossbred cow presented to the veterinary field service for dystocia. Inspection of the vulva demonstrated 2 protruding extremities, a thoracic limb and a pelvic limb. A potential transverse presentation of the calf was suspected. However, attempts to reposition the calf were unsuccessful. The cow was prepped for cesarian surgery with a standing left-flank approach. Blind exploratory palpation of the abdominal cavity was performed revealing an 'empty' uterine horn, with the calf lodged in the pelvis. Following consultation with the farm manager, the decision was made to continue the surgery. A blind uterine incision was performed within the abdomen with a #20 blade. The calf was removed through the abdominal incision using both traction and transvaginal manipulation. Upon delivery, the calf was noted to have the characteristic spinal inversion and extra-abdominal viscera consistent with schistosomus reflexus (SR). The uterus was torn due to the conformation of the calf and the unconventional techniques required during surgery. Cow was started on an antibiotic protocol but considering the contamination of the abdomen and the tearing of the uterus, the prognosis for survival of the cow was guarded and prognosis for future breeding was poor. Pending cow's survival, culling was recommended. Cow was still in the herd the next breeding season during routine pregnancy checks and was determined to be ~ 45 days pregnant. One month later, the cow was still carrying a viable pregnancy. Due to an increased dystocia risk from potential adhesion formation, the cow was culled. Prevalence of SR in cattle is estimated to range from 0.01 to 1.3%.[1] Currently SR is considered to be a heritable condition, but recent studies have proposed environmental toxins as a predisposing factor.[2] Culling of cows with SR calves is still advised to prevent future dystocia and subsequent SR calves.

Keywords: Beef cattle, dystocia, cesarian surgery, schistosomus reflexus

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Preliminary investigation of liquefaction techniques on voluntarily provided semen samples in the bonobo (*Pan paniscus*)

Theresa Beachler,[a] **Morgan Dziubinski,**[b] **June Olds,**[b] **Olivia Stricklin,**[a] **Sara Skiba**[c]

[a]Department of Veterinary Diagnostic and Production Animal Medicine,
[b]Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Iowa State University, Ames, IA, USA
[c]Ape Cognition and Conservation Initiative, Des Moines, IA, USA

The bonobo (*Pan paniscus*) is an endangered great ape species structured by matriarchal social systems, where transporting male bonobos for breeding purposes introduces logistical, welfare, and financial concerns. Voluntary semen collection provides a favorable alternative; however, bonobo semen is often encased in a thick coagulum, obstructing sperm retrieval. This study aimed to compare 4 processing methods, passive liquefaction, HEPES-balanced salt solution, trypsin enzymatic digestion, and colloidal centrifugation, to determine the most effective approach for sperm recovery. We hypothesized that colloidal centrifugation is the most efficient technique to recover sperm while preserving motility and morphological characteristics. A total of 22 ejaculates from 3 males were split between groups and analyzed for total numbers of sperm, morphology, and subjective total and progressive motility. All data were evaluated using a Kruskal-Wallis test with Dunn's post-hoc test and significance at $p < 0.05$. Passive liquefaction and colloidal centrifugation resulted in the highest subjective mean total (43.3 ± 31.25% and 51.7 ± 32.81%) and progressive motility (35.0 ± 28.28% and 45.8 ± 30.07%), with both exhibiting significantly greater values than HEPES-balanced salt solution (0%). However, no method significantly surpassed the others when comparing total or progressively motile sperm. Passive liquefaction and colloidal centrifugation also produced significantly higher percentages of normal morphology (60.67 ± 9.65% and 58.67 ± 13.97%) compared to group trypsin enzyme digestion (30.5 ± 8.87%). These results suggested that passive liquefaction and colloidal centrifugation may be the most effective processing methods for preserving bonobo sperm motility and morphology.

Keywords: Bonobo, coagulum, colloidal centrifugation, passive liquefaction, semen

Surgical management of congenital urinary outflow obstruction in a goat kid with suspected polled intersex syndrome

McKenzie Bell,[a] **Jessica Rush,**[b] **Hannah Maxwell,**[b] **Jessica Klabnik**[b]

[a]College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA

A 3-week intact male Nigerian Dwarf goat kid presented for lifelong inappropriate urination and progressive stranguria. The owner reported a fluid-filled pouch caudal to the prepuce that released urine when expressed. He typically dribbled urine but had not appeared painful until recently. He otherwise appeared healthy and had a clinically normal twin female. Upon referral, physical examination identified a soft, fluctuant ventral perineal structure. Transabdominal ultrasonography revealed a markedly distended bladder, measuring 8 x 6.5 cm. Preoperative packed cell volume, total solids, blood glucose, and lactate were within reference intervals. Under general anesthesia, exploratory surgery was performed. An incision was made caudal of the fluid-filled pouch and urine was released, revealing tissue consistent with rudimentary female genital epithelium. Catheterization via a tomcat catheter confirmed communication between the pouch and urethra, with the catheter exiting through the penis when directed cranially. Urethral opening appeared to terminate within the caudal pouch. Palpable gonadal structures were suspected but not definitively visualized; gonadectomy was deferred until sexual maturity.[1] Excess tissue was excised and a vulvar-like stoma was created to establish urinary diversion. Postoperative

antimicrobial therapy included intravenous ceftiofur sodium (4.4 mg/kg) for 3 days, followed by 2 days of subcutaneous treatment. Intravenous flunixin meglumine (1.1 mg/kg) was given for 2 days, and oral meloxicam (1 mg/kg) was given once daily for 7 days. Postoperatively, urination from the created stoma was observed and recovery was uneventful. Findings were consistent with a disorder of sexual development. Polled Intersex Syndrome was suspected.[2] Congenital disorders of sexual development in small ruminants are infrequently reported, and early recognition is critical to prevent life threatening obstruction and welfare compromise. In this case, surgical urinary diversion resolved the obstruction and improved the goat's quality of life.

Keywords: Goat, disorder of sexual development, urinary obstruction, polled intersex syndrome

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Persistently elevated testosterone in a bilaterally ovariectomized mare

Megan Bernard, Joan Ayers

Genesee Valley Equine Clinic, Scottsville, NY, USA

Persistently elevated testosterone in the mare is commonly attributed to hormonally active ovarian neoplasms such as granulosa cell tumor (GCT). GCT is the most common ovarian neoplasm, and diagnosis is supported by identification of an abnormal ovary on transrectal palpation, ultrasonography, and hormonal evaluation indicating elevations of antimüllerian hormone (AMH), testosterone, and/or inhibin B.[1] Diagnosis is confirmed by histopathology of the abnormal ovary.[1] Rarely, elevations in sex hormones may arise from an extragonadal source such as the adrenal gland.[2] A 13-year Arabian mare was presented for evaluation of aggressive behavior. Orthopedic examination ruled out musculoskeletal pain. Point of care bloodwork and baseline adrenocorticotropic hormone were normal. Blood was submitted for GCT endocrine panel. Testosterone was elevated (248.6 pg/ml; normal 20-45 pg/ml); AMH (6.3 ng/ml; normal 0.1-6.9 ng/ml) and inhibin B (42.1 pg/ml; normal 60.1-100 pg/ml) were normal. Reproductive ultrasonography was unremarkable. Both ovaries had palpable ovulation fossae and no abnormal follicular or luteal structures. Another GCT panel was submitted 2 months later. Testosterone (458.7 pg/ml) and AMH (7.3 ng/ml) were both elevated, but inhibin B remained normal (42.3 pg/ml). A presumptive diagnosis of GCT was made, and bilateral ovariectomy was performed. Both ovaries were grossly and histologically normal, ruling out GCT. At 2 months postoperatively, testosterone remained elevated (307 pg/ml) but the aggressive behavior was reported to have improved. Persistently elevated testosterone is presumed to originate from the adrenal gland(s) in this patient, as suggested by previous publications.[2] This case demonstrated that extragonadal testosterone production should remain a differential, especially when no ovarian abnormalities are detected on reproductive screening or histopathology. Further, abnormal behavior in the mare is commonly, perhaps erroneously, attributed to endocrinologic abnormalities, as observed in GCT;[3,4] however, the resolution of abnormal behavior suggested that testosterone was not a key factor for behavior changes in this patient.

Keywords: Horse, ovary, testosterone, AMH, adrenal, behavior

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Virilization associated with ovarian hyperandrogenism in a llama

Erik Bielski, Quinlan Harting, Sabrina Hall, Callum Donnelly

Department of Clinical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY, USA

Disorders of sexual development (DSD) occur when the developmental progression from chromosomal sex to gonadal tissue formation and ultimately phenotypic differentiation is disrupted. In camelids, affected animals may present with abnormal reproductive anatomy, endocrine dysfunction, aberrant behaviors, and impaired fertility. A 2-year female llama weighing 122 kg was presented for excessive aggression, mounting behaviors and lack of receptivity to mating. Physical examination revealed ambiguous external genitalia characterized by marked clitoromegaly terminating in a glans-like opening with a central, nonpatent lumen. Baseline testosterone (0.59 ng/ml) exceeded reported concentrations for nonpregnant female camelids and human chorionic gonadotropin (hCG) stimulation resulted in an increase in testosterone 2 hours after hCG to 0.80 ng/ml. Transrectal ultrasonography revealed a complete uterus as well as bilaterally active ovaries. Vaginoscopy revealed a patent vaginal canal, but no defined cervical os was visualized. Laparoscopic ovariectomy was performed. Gross and histological examination of ovarian structures revealed normal ovaries containing primordial through

tertiary follicles, appropriate vasculature, and corpora lutea with no identifiable testicular tissue on examined sections. Four days following ovariectomy, serum testosterone decreased to < 0.01 ng/ml. Cytogenetic analysis of leukocytes and fibroblasts revealed an XX female sex karyotype. A presumptive diagnosis of hyperandrogenemia was made. Resolution of hyperandrogenemia following ovariectomy coupled with a normal female chromosomal composition indicated a primary ovarian steroidogenic dysfunction. This case demonstrated that ovarian androgen production can occur in clinically sufficient amounts to result in behavioral and genital virilization. The absence of identifiable testicular tissue or ovarian neoplasia supports dysregulated ovarian steroidogenesis, resulting in hyperandrogenism. The broad phenotypic presentations of DSDs coupled with the complex genetic composition and reproductive physiology of camelids complicate diagnosis, with evaluation requiring extensive endocrine testing and cytogenetic analysis for confirmation.

Keywords: Virilization, clitoromegaly, ovariectomy, camelid

Hydrops fetalis twins in an ewe with concurrent comorbidities

Riana Bobes,[a] **Jamie Stewart,**[b] **Jessica Cowley**[b]

[a]Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
[b]Large Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

An 8-year Merino ewe was presented to the veterinary teaching hospital for continued recumbency and suspected pregnancy toxemia, internal parasitic overload, and possible polioencephalomalacia. Due to unresponsive pregnancy toxemia, parturition was induced via intramuscular dexamethasone and prostaglandin during field evaluation. The patient was then referred for hospitalization. On presentation, clinical signs included hypothermia, hypoglycemia, and requiring assistance to stand. Due to fetal distress and dam decompensation, the ewe underwent cesarean section. Upon surgical intervention, 2 fetuses were delivered premature and stillborn despite resuscitation efforts. Necropsy revealed tri-cavitary effusion, little to no visceral fat present, and multifocal areas of hemorrhage on myo-, endo-, and pericardium, consistent with the progression of cardiac hemorrhage and heart failure. Hydrops fetalis is a condition in which fluid is accumulated in 1 or more body cavities, edema in the placenta, or subcutaneous edema of the fetus, differentiating from similar diagnosis of hydrops amnion or allantois. This abnormal condition is uncommon, but diagnosed most frequently during early to mid-pregnancy ultrasonographic examinations, and is not commonly recognized in late-pregnant sheep. Causes of hydrops fetalis have been theorized to include elevated umbilical and central venous pressure from rapid anemia in the dam and supraventricular tachycardia in the fetus. If born alive, current treatment modalities for neonates are limited to treatment of anemia, underlying disease, fetal blood transfusion, and centesis of excessive fluid. However, prognosis is poor for survival of the fetus, similar to hydrops amnion or allantois. This case revealed the rare diagnosis of hydrops fetalis in a late-pregnant sheep, likely causing the fetal distress observed at presentation to the hospital, highlighting the need for thorough assessment of the dam and fetus when presented with a systemically ill pregnant ewe.

Keywords: Ovine, pregnancy toxemia, hydrops fetalis

Uterine leiomyoma leading to vaginal prolapse in a Nigerian Dwarf doe

Hailee Bornmann,[a] **Dane Schwartz,**[b] **Jenna Stockler,**[b] **Katelyn Waters,**[b] **Jessica Rush**[b]

[a]College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA

An 8-year intact Nigerian Dwarf doe weighing 43.6 kg was presented for vaginal prolapse of 10 days duration in October 2025. At the current visit, a 5 x 6 cm structure was protruding from the vulva. On presentation, doe was bright, alert, and responsive with a normal heart rate (56 beats per minute) and respiratory rate (24 breaths per minute). The proximal third of the exteriorized tissue was pink at the base but the distal two-thirds of the tissue was necrotic, gray, and firm. The external urethral orifice was observed within the prolapsed tissue, 2 cm from the vulva. Urination was observed from the exteriorized opening. A complete blood count and biochemistry revealed a moderate left shift neutrophilia, hyperfibrinogenemia, and hyperlactatemia. Transabdominal ultrasonography revealed a 10-cm mass extending from the pelvic canal to the cervix, involving the uterus. Surgical excision of the uterus and associated mass, with repair of the prolapsed tissue was offered. Due to patient prognosis and client constraints, euthanasia was elected. Necropsy findings revealed a grade 4 vaginal prolapse, lymphoplasmacytic and eosinophilic cystitis, and a large uterine mass consistent with leiomyoma. The leiomyoma was partially adhered to the urinary bladder, although the urinary bladder was grossly normal. This case demonstrated a grade 4 vaginal prolapse likely due to straining from an associated uterine mass. Leiomyoma is a common neoplasm of the uterus in goats.[1] Interestingly, the presented case demonstrated a unique presentation for vaginal prolapse, as the patient was not pregnant, highlighting the importance of a thorough history, physical examination, and diagnostic workup. One large study of over 100 goats spanning greater than 20 years had an overrepresentation of Dwarf, Nubian and Saanen goats for the development of neoplasia,[2] likely due to the extended lifespan related to the popularity of these breeds as pet goats.

Keywords: Goat, vaginal prolapse, leiomyoma, uterine mass

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Medical treatment of a feline pyometra leading to successful litters

Natalie Buonaiuto, Aime Johnson

Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA

Vaginal discharge from an intact female could be a life-threatening situation that needs to be further investigated. Queens affected by pyometra are often middle aged and have an onset of clinical signs 4 weeks after the onset of estrus.[1] A 1-year intact female domestic short hair was placed with a male for breeding. About 20 days later, vaginal discharge was noted on examination, and transabdominal ultrasonography was used to confirm pyometra. The patient was treated with subcutaneous enrofloxacin (5 mg/kg) once a day for 14 days and subcutaneous dinoprost tromethamine (0.23 mg/kg) twice a day for 7 days. Antimicrobial therapy was started immediately with the assumption that the likely pathogen is *Escherichia coli*.[2] Antimicrobial therapy should be continued until resolution of vulvar discharge and evacuation of fluid from the uterus.[2] Dinoprost tromethamine is a natural form of $PGF_{2\alpha}$ that lysis corpus luteum allowing for reduction in progesterone concentrations, causing the cervix to relax and increase ecbolic activity allowing drainage of purulent material.[2] It was noted on the following days; the uterus had decreased in size but was still enlarged and thickened so dinoprost tromethamine was continued. The next day, sample was submitted for progesterone and ultrasonography was performed. Progesterone concentrations were 8 ng/ml. Since progesterone concentrations were still increased, dinoprost tromethamine was increased to 3 times a day. Corpora lutea in queens are more resistant than those of female dogs that requires a longer duration to obtain resolution of pyometra.[3] Ultrasonography was performed 5 days later with marked improvement on fluid within the uterus. Dinoprost tromethamine was discontinued with enrofloxacin finishing out its course. A final ultrasonography was conducted; there was no fluid in the uterus. Three months later, the patient was then placed with a male and was successfully bred. Cat went on to have 4 healthy litters with no further incidence of pyometra.

Keywords: Pyometra, feline, transabdominal ultrasonography, corpora lutea, progesterone

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A transcriptomic approach of the placenta during parturition in the dog: preliminary results

Ainslee Garrett,[a] Fernando Biase,[b] Bruce Christensen,[c] Alyssa Shelby,[c] Orsolya Balogh[a]

[a]Department of Small Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA
[b]School of Animal Sciences - Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
[c]Kokopeli Veterinary Center, Sacramento, CA, USA

We hypothesized that global gene expression profiling assist in the overall understanding of the canine placenta's role throughout parturition, and aimed to evaluate changes in gene expression and functional pathways using RNA sequencing from prepartum through second stage labor. Samples were taken from 1 randomly collected placenta per dog during cesarian surgery. Three groups were formed: the planned cesarian surgery (PCS) group had no temperature drop and no signs of first-stage labor (n = 6, serum progesterone, $P_4 \geq 3.45$ ng/ml); the elective cesarian surgery (ECS) group had a temperature drop and/or signs of first-stage labor (n = 6, $P_4 < 1.5$ ng/ml); and the obstructive dystocia (OD) group was in second-stage labor, having strong abdominal contractions (n = 5). Total RNA isolation, DNase treatment, and RNA purification were performed. Differential transcript abundance for contrasts OD versus PCS, ECS versus PCS, and OD versus ECS was determined using False Discovery Rate[1] < 0.1, by both the R package 'edgeR'[2] and Wald test from the R package 'DESeq2'[3] for a gene to be differently expressed (DEG). Enrichment analysis was performed using ShinyGO[4] for the OD versus PCS contrast, and FDR < 0.1 was significant for Kyoto Encyclopedia of Genes and Genomes (KEGG). In the OD versus PCS contrast, 1409 DEG were identified; however, no DEG was there for the remaining contrasts. In the OD group, 102 pathways were inferred to be upregulated, including but not limited to PI3k-Akt and Rap1signaling, cytokine-cytokine receptor interaction, regulation of actin cytoskeleton, platelet activation, and oxytocin signaling. Altogether, KEGG pathways in the OD group appeared to be associated with inflammation, immune cell migration, response to injuries and hemostasis, and oxytocin response, corroborating the expected clinical findings during second-stage labor, such as strong uterine contractions and placental detachment for fetal expulsion.

Keywords: Canine, pregnancy, RNAseq, immune response, inflammation

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Ejaculatory dysfunction associated with cysts in the urogenital fold in a stallion

Abbigayl Chafe,[a] **Charles Love,**[b] **Camilo Hernandez-Aviles**[b]

[a]College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX, USA
[b]Department of Large Animal Clinical Sciences, College of Veterinary Medicine & Biomedical Sciences, Texas A&M University, College Station, TX, USA

Ejaculatory dysfunction (ED) in the stallion is uncommon. Causes range from musculoskeletal, neurological, iatrogenic (e.g. improper artificial vagina preparation), physical blockage of the excurrent ducts (i.e. cysts in the urogenital fold), or a combination.[1] A 22-year Quarter Horse stallion, prior to purchase as a breeding prospect, was determined to have acceptable sperm quality. The stallion was referred by the new owner and veterinarian to the Veterinary Medical Teaching Hospital, Texas A&M University, in March 2021 after multiple unsuccessful semen collections despite imipramine treatment to enhance ejaculation and treatment of stifle/hock lameness (firocoxib, joint injections). Several semen collection attempts on a phantom were unsuccessful despite using various artificial vaginas, combined with hot towel placement at the base of the penis. Subsequently, ejaculation was facilitated after imipramine, GnRH and oxytocin treatment in conjunction with transrectal ampullary massage, prior to allowing the stallion to mount an ovariectomized mare rather than the phantom. All ejaculates (n = 5) contained large amounts of unidentifiable debris and inflammatory cells, but no bacteria. Sperm quality among ejaculates included normal morphology (~ 60% normal) but variable total motility (23-64%), viability (41-66%), and total sperm numbers (2.0-5.0 x 10^9). Transrectal ultrasonography of the internal genitalia identified 2 cysts in the urogenital fold, one closely associated with the seminal colliculus. Prominent hyperechoic reflections, consistent with inspissated sperm, were also identified throughout the glandular region of the ampullae. Both changes have previously been associated with ED in the stallion.[1] This case highlighted a combination of urogenital fold cysts and inspissated sperm in the ampullae associated with ED diagnosed by transrectal examination of the stallion reproductive tract. Furthermore, in this case, ejaculation was enhanced by additional treatments (e.g. mounting mare, imipramine treatment) and treating underlying conditions (e.g. pain) prior to semen collection.

Keywords: Ejaculatory dysfunction, cyst, urogenital fold

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Passive immunization via orogastric plasma administration in neonatal Maine Coon kittens following in utero feline calicivirus exposure

Abby Claytor,[a] **Jamie Douglas**[b]

[a]Port City Animal Hospital, Savannah, GA, USA
[b]Comparative Molecular and Integrative Biology, College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA

A 14-month primiparous Maine Coon queen was presented ~ 4 days prepartum with clinical signs consistent with feline calicivirus (FCV) infection. Clinical signs included pyrexia (39.4°C), mucopurulent nasal discharge, oral ulceration, and hypersalivation. The queen was overdue for core vaccinations. Radiographs confirmed a litter of 6, and transabdominal ultrasonography revealed fetal heart rates consistent with late-term viability. Due to the queen's under-vaccinated status and active infection, there was significant concern that: 1. fetuses had been exposed in utero and 2. the queen's colostrum would lack protective antibodies against the virus. To mitigate this threat, the queen and 2 vaccinated housemates were blood-typed for compatibility (all Type A). Approximately 40 ml of whole blood was collected from each housemate, after which plasma was harvested and stored for neonate treatment. Of the 6 kittens delivered, 4 were stillborn. The 2 viable kittens received thawed donor plasma, split equally and given via orogastric intubation prior to neonatal gut closure. These kittens developed normally without exhibiting signs of FCV. Samples taken during the queen's initial encounter were tested using PCR and confirmed that she presented with an active caliciviral infection. Pooled liver and pooled placental tissues of stillborn fetuses were also FCV-positive. This case underscored the necessity of adequate maternal vaccination of the breeding cat and the efficacy of exogenous plasma treatment as a rescue therapy for at-risk neonates.

Keywords: Calicivirus, passive immunity, vaccination, antibodies, plasma

Cystic endometrial hyperplasia in a Vietnamese potbellied pig

Brooke Colvin,[a] **Jamie Stewart,**[b] **Sophie Bogers,**[b] **Kristin Eden,**[c] **Michael Edwards**[d]

[a]Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA
[b]Large Animal Clinical Sciences,
[c]Biomedical Sciences and Pathobiology,
[d]Veterinary Medicine Teaching Hospital, Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

A 9-year intact Vietnamese potbellied gilt was presented for intermittent mucohemorrhagic vulvar discharge. Physical examination was unremarkable and further diagnostics were pursued. Transabdominal and transrectal ultrasonography revealed multiple small, cystic structures in both horns of the uterus and both ovaries. Two large cystic structures were visualized in the uterus, ~ 6 cm in diameter. Cystic endometrial hyperplasia (CEH) was suspected and an ovariohysterectomy procedure was elected. Prior to the procedure, computed tomography was performed to rule out the possibility of infiltration of surrounding organs. The results revealed that there was no involvement of surrounding organs. However, a diffusely enlarged uterus with multiple fluid-filled structures ranging in size were noticed, as well as mixed soft tissue and fluid attenuating structures that were likely cystic ovaries. Following computed tomography, an ovariohysterectomy

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was performed. Uterus and ovaries were removed surgically and samples were obtained from both uterine horns, ovaries, and cervix and submitted for histopathology. The pig recovered and was discharged from the hospital. Histopathology report identified CEH in both uterine horns, microglandular hyperplasia/microglandular adenosis in the cervix, and multifocal hemorrhagic cystic corpora lutea in both ovaries. It is suspected that 1 or more of these cystic corpora lutea were persistent and led to prolonged progesterone stimulation that likely resulted in the CEH in both uterine horns. It is hypothesized that as age increases in nulliparous miniature pigs, the likelihood of developing hyperplastic and neoplastic uterine lesions also increases. Cystic endometrial hyperplasia prevalence has been reported as high as 75% and can occur alone or with other neoplastic uterine lesions in miniature pigs.[1] Ovariohysterectomy performed before 6 years is recommended for prevention of these uterine lesions.[2] This case highlighted the importance of early intervention by ovariohysterectomy in female miniature pigs.

Keywords: Miniature, pig, uterine, cystic, hyperplasia, ovariohysterectomy

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Bilateral granulosa cell tumor in a goat

Daniela Cortes,[a] Terje Raudsepp,[b] Alan Conley,[c] Maria Ferrer,[a] Robyn Ellerbrock[a]

[a]Department of Large Animal Medicine and Surgery, College of Veterinary Medicine, University of Georgia, Athens, GA, USA
[b]Molecular Cytogenetics Laboratory, Department of Veterinary Integrative Biosciences, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX, USA
[c]Department of Population Health and Reproduction, School of Veterinary Medicine, University of California, Davis, CA, USA

Granulosa cell tumor (GCT) is an ovarian sex cord-stromal tumor arising from functional components of the ovarian follicle and is frequently hormonally active. These tumors commonly produce antimüllerian hormone (AMH), estrogens, androgens, and inhibin, leading to nymphomania, virilism, or inappropriate lactation. Ultrasonographic evaluation typically reveals an enlarged ovary with cystic or solid architecture, while the contralateral ovary is often small and inactive. Although well described in mares and cows, GCTs are uncommonly reported in does. A 2-year nulliparous Nigerian Dwarf doe presented for infertility, recurrent milk production, and persistent male-like behavior. No previous diagnostics or treatments had been performed. Physical examination was unremarkable, with BCS 4.5 out of 5 and buck-like body type. Transrectal ultrasonography revealed a small uterus and an enlarged right ovary (32 x 25 mm) containing > 15 small follicles, while the left ovary was small and inactive. Serum hormone concentrations were: progesterone 0.182 ng/ml, testosterone (T) 28.1 pg/ml, equine-AMH 4.8 x 10^3 pg/ml, and inhibin B (INH-B) 134.2 pg/ml, raising suspicion for a GCT. A right ovariectomy was performed and histopathology confirmed a GCT characterized by cystic follicular structures and nests of neoplastic granulosa cells arranged in cords and trabeculae, without mitotic activity or necrosis. Persistent clinical signs prompted reevaluation 2 months later, revealing enlargement of the left ovary (36 x 28 mm) with cystic changes. Hormone concentrations were: T 18.6 pg/ml, equine-AMH 280 pg/ml, bovine-AMH 156.5 pg/ml, and INH-B 71.1 pg/ml. A second ovariectomy was performed. Recovery was uneventful, with complete resolution of male-like behavior and lactation 2 months after surgery. Karyotype analysis confirmed a 60, XX, *SRY*-negative female. This report expanded the limited literature on GCT in does and underscores the importance of hormonal and ultrasonographic evaluation. Standardized caprine endocrine reference values are needed to strengthen diagnostics and guide clinical decision-making in suspected ovarian neoplasia.

Keywords: Goat, sex cord-stromal tumor, granulosa cell tumor, antimüllerian hormone, inhibin, karyotyping

Abdominal wall hernia in a late-term pregnant Katahdin ewe

John Cox, Dane Schwartz, Breonna Freeman, Jessica Prim, Chance Armstrong, Robert Cole, Katelyn Waters, Ricardo Stockler, Jenna Stockler

College of Veterinary Medicine, Auburn University, Auburn, AL, USA

A 22-month Katahdin ewe weighing 71.8 kg was presented for evaluation of acute onset of severe abdominal distention. This condition was noted by the herd manager during morning feeding. Ewe was ~ 138-146 days of pregnancy, based on breeding dates from natural service. On physical examination, the ewe was quiet, alert, and responsive. Ewe was severely tachycardic (174 beats per minute), tachypneic (60 breaths per minute), normothermic (39.6°C) with pink and moist mucous membranes. Upon visual examination, significant, bilateral, caudoventral abdominal distention, with cranial displacement of the mammary gland, was appreciated. Transabdominal ultrasonography revealed 3 live fetuses, with heartbeats ranging from 150-180 beats per minute with minimal to no fetal gastrointestinal motility or dilation. Ultrasonography findings were consistent with an abdominal wall hernia. Given the advanced stage of pregnancy and degree of abdominal distention, there was concern for worsening of the abdominal hernia and potential compromise of both the dam and fetuses. Ewe received dexamethasone (14 mg) intramuscularly once for fetal maturity and induction of parturition. Initial plans included ewe comfort to maximize fetal maturity and to perform a terminal cesarian surgery 24 hours after presentation. However, due to patient discomfort and worsening abdominal distention, terminal cesarian surgery was performed 6 hours after admission. Three live lambs were delivered. Due to fetal immaturity, all lambs died within 24 hours. A complete laceration of the transversus abdominis, rectus abdominis, and internal abdominal oblique was

discovered on necropsy, confirming an abdominal wall hernia. This case highlighted the rapid progression of abdominal wall herniation in late pregnancy and the guarded prognosis for both the dam and neonates, despite timely intervention to preserve fetal maturity and viability.

Keywords: Abdominal wall hernia, ewe, cesarian surgery, pregnant

Neuroendocrine suppression of testicular development in neonatal boars with a subcutaneous sex-steroid implant

Laura Crispell,[a] Chloe Solomon,[a] Cheryl Kojima,[b] Xiaocun Sun,[c] Clay Lents,[d] Kellie Fecteau,[e] Brian Whitlock[a]

[a]Department of Large Animal Clinical Sciences, University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA
[b]Department of Animal Science, Herbert College of Agriculture,
[c]Office of Innovative Technologies, University of Tennessee, Knoxville, TN, USA
[d]USDA, ARS, U.S. Meat Animal Research Center, Clay Center, NE, USA
[e]Department of Biomedical and Diagnostic Sciences, University of Tennessee College of Veterinary Medicine, Knoxville, TN, USA

In the swine industry, boars raised for pork production are commonly castrated to ensure consistent pork quality. Without the neonatal 'mini puberty,' sexual development is inhibited. In this study, a validated, commercially available, sex-steroid based cattle growth implant [REVALOR-S implant (6 pellets; 120 mg trenbolone acetate, 24 mg estradiol), Merck Animal Health] was used in neonatal pigs to determine its effects on hypothalamic control of reproduction, specifically the kisspeptin neurons in the arcuate nucleus (ARC). We hypothesized that ARC kisspeptin expression, serum luteinizing hormone (LH), and testicular size decrease by the time the boar pigs were weaned [postnatal day (PND) 24]. Male neonatal pigs were given I of 3 treatments [castrate (n = 7), control (gonadal intact, n = 8), or Implant (gonadal intact + 10 REVALOR-S implant pellets, n = 7)] at PND 3. Body weight was determined weekly, and blood samples were collected on PND 3 and 24. Brain and testes were collected following euthanasia (PND 24). Immunohistochemistry of the ARC was completed to determine kisspeptin expression. Serum samples were quantified with radioimmunoassay to determine LH concentrations. The number of ARC kisspeptin neurons was suppressed in Implant (0.02 ± 0.14 SEM; $p < 0.0001$), while there was no difference between Control (11.85 ± 1.05) and Castrate (13.74 ± 1.10; $p = 0.9996$). There was a decrease in serum LH concentrations from PND 3 (5.72 ± 1.33 ng/ml) to PND 24 (1.32 ± 0.27 ng/ml) in Implant ($p < 0.05$). The ratio of testicular to body mass was decreased in Implant (0.17 ± 0.01 g/kg) compared to Control (0.93 ± 0.07 g/kg; $p < 0.0001$). These results indicated that the REVALOR-S implant suppressed the hypothalamic-pituitary-gonadal axis during the 'mini puberty', suggesting a nonsurgical alternative to castration.

Keywords: Kisspeptin, hormone, castration, swine

Abdominal distension caused by a uterine mass in a Pygmy doe

Ryane Cronk,[a] Jamie Stewart,[b] Jessica Cowley[b]

[a]Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
[b]Large Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA

A 7-year intact Pygmy doe was presented to the Veterinary Teaching Hospital for chronic abdominal distention that had worsened over the past 2-3 weeks. The referring veterinarian noted a fiber bloat, precocious udder, and vaginal discharge. On physical examination, bilateral abdominal distention, clear mucoid vaginal discharge, and a bilaterally enlarged udder were noted. On digital vaginal palpation, an abnormal cervical and vaginal wall were palpated. Based on these findings, transrectal ultrasonography and vaginal endoscopy were performed. A uterine mass was discovered, causing bladder compression. Necrotic tissue was observed in the cervical mass. The abdominal distension is believed to have been a result of a mass effect on the rumen by the neoplasia, leading to decreased emptying time. Due to poor prognosis and unlikely surgical correction, the doe was sent home with supportive care instructions. Pygmy goats have an overrepresentation of uterine tumors; however, not many reports have been conducted on genital tract tumors in does.[1] Clinical signs vary, with hematuria, bloody vaginal discharge, and abdominal straining being the most frequently reported.[1] Abdominal distension was not commonly noted in uterine neoplasia, which draws more attention to the bloat in this case. Late-pregnant animals have been diagnosed with type IV vagal indigestion caused by an enlarged uterus, limiting ruminal outflow.[2] As a result, this leads to overflow of the rumen and abdominal distention. The mass effect observed in the doe in this case acted as a pregnant uterus that caused vagal indigestion. This case provided reasoning for a less reported cause of type IV vagal indigestion in intact female ruminants.

Keywords: Caprine, uterine tumor, abdominal distension, vagal indigestion

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Ejaculatory dysfunction caused by multiple cystic structures in a stallion

Carolina Emparanza, Josefina Ghersa, Claire Card

Deptartment Large Animal Clinical Sciences, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK, Canada

A 17-year Quarter Horse stallion was referred for evaluation of azoospermia. During the previous breeding season, the stallion failed to get mares pregnant despite normal libido. He had difficulty completing ejaculation during semen collection, frequently grunting, stopping thrusting and requiring multiple mounting attempts. Repeated collections by the referring veterinarian yielded ejaculates devoid of sperm; however, alkaline phosphatase concentrations were elevated. Endocrine testing (ACTH, FSH/LH, testosterone resting and after hCG stimulation) was within normal limits. On presentation, physical examination was unremarkable. Total scrotal width was 9.4 cm. Testes were symmetrical with normal consistency and homogeneous echogenicity. Ultrasonography identified cystic structures at the tail of both epididymides and within both ampullae, as well as additional small cystic lesions including a midline cyst and a cyst at the level of the colliculus seminalis. Urethroscopy using standing sedation revealed mild mucosal irritation and a cystic structure approximately 85 cm from the urethral opening. The colliculus seminalis had an abnormal appearance, with multiple cystic structures on its surface. The bulbourethral ducts appeared normal but they were not completely linear. The bladder and urine evaluation were unremarkable. Three semen collections produced variable sperm numbers (1.6-10 x 10^9 total sperm) but consistent poor progressive motility (< 15%) and low percentages of morphologically normal sperm (< 13%), with subsequent dilute and blood-tinged ejaculates. A diagnosis of ejaculation dysfunction caused by multiple cystic structures involving the epididymides, ampullae and colliculus seminalis was established. Findings were consistent with intermittent obstruction leading to sperm accumulation and deterioration in semen quality. This case report suggested that multiple cysts should be considered as an additional differential diagnosis for intermittent azoospermia.

Keywords: Ejaculatory dysfunction, stallion, multiple cyst, azoospermia

Could anaerobic bacteria play a role in endometritis?

Elizabeth Esdaile, Jennifer Hatzel, JoAnne Stokes, Chelsie Burden, Jenny Sones

Equine Reproduction Laboratory, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO, USA

Broodmares with subfertility often have bacterial endometritis, especially *Streptococcus equi* subsp. *zooepidemicus* and *Escherichia coli*. In 2025, an 8-year maiden American Quarter Horse mare presented for oocyte pick up and auto-transfer of an intracytoplasmic sperm injection (ICSI)-produced embryo. An oocyte was recovered from the dominant stimulated follicle, injected with frozen sperm, and the ICSI embryo was transferred. One week later, no vesicle was identified on transrectal ultrasonography, and her uterus was flushed with a physiologic solution. Although no embryonic tissue was recovered, mucopurulent effluent was retrieved. The following day, uterine swabs were collected for cytology and aerobic culture using quad plates (MacConkey, tryptic soy with 5% sheep blood, gram-positive and -negative chromogenic agar) that revealed grade 1 inflammation and *Klebsiella pneumoniae* growth (#1), respectively. Mare was treated with 3 consecutive daily intrauterine gentamicin (1 gram) and sodium bicarbonate (840 mg). Upon return to estrus, trace anechoic uterine fluid was present that yielded *Klebsiella pneumoniae* and *Staphylococcus sp.* growth (#2). The mare was then treated with once-daily intrauterine ciprofloxacin (500 mg). One day after treatment, trace anechoic uterine fluid had grade 3 inflammation and no growth on uterine culture (#3). All 3 uterine swabs were submitted for 16s RNA sequencing; however, the second swab yielded insufficient DNA. Notably, relative abundance of *Porphyromonas*, an anaerobic gram-negative bacterium, increased from the first to third swab (5.7 and 44.6%, respectively). *Porphyromonas* species are associated with endodontic infections and preterm birth in humans, and bovine hoof rot. To the authors' knowledge, this is the first report of *Porphyromonas* detected via sequencing in a clinical case of equine endometritis. Importantly, several *Porphyromonas* species produce collagenases and other extracellular matrix-degrading proteases that could promote histologic changes to the endometrium of mares. Ongoing research includes anaerobic culture of *Porphyromonas* and collagenase activity in the endometrium of mares.

Keywords: Equine, microbiome, uterus, 16s

Utilizing intraluminal CXCL-8 for prediction of equine uterine inflammation

Carleigh Fedorka,[a] Javier Funes,[b] Patricio Razquin,[b] Debra Roussel,[b] Genevieve Denison,[a] Chelsie Burden,[b] Jenn Hatzel,[b] Jenny Sones,[b] Patrick McCue[b]

[a]Department of Animal Sciences,
[b]Department of Clinical Sciences, Colorado State University, Fort Collins, CO, USA

Equine uterine inflammation is commonly evaluated using transrectal ultrasonography, endometrial cytology and assessment of intraluminal fluid; however, these methods vary in sensitivity and clinical interpretation. Multiplex immunoassays now allow quantification of cytokines within the uterine lumen, yet their diagnostic utility remains incompletely defined. Chemokine ligand (CXCL)-8, a potent neutrophil chemoattractant during post breeding inflammation, may serve as a biologically relevant biomarker of uterine inflammatory status. Therefore, we assessed the relationship between intraluminal CXCL-8 concentrations and established clinical indicators of uterine inflammation in mares. Six mares were artificially inseminated across 3 estrous cycles (n = 18). Inflammatory responses were assessed at 6 and 24 hours after insemination via ultrasonographic assessment of uterine fluid, neutrophil quantification using endometrial cytobrush and low-volume uterine lavage, and circulating serum cytokine concentrations. Intraluminal CXCL-8 was quantified within low-volume lavage (500 ml lactated Ringer's solution) using an equine-specific multiplex immunoassay. Relationships between CXCL-8 and inflammatory endpoints were evaluated using linear regression, and diagnostic performance was assessed using receiver operating characteristic (ROC) curve analysis. Luminal CXCL-8 concentrations were positively correlated with neutrophil counts obtained via low volume lavage (R^2 = 0.66; $p < 0.001$) and cytobrush (R^2 = 0.37; $p < 0.001$). A weaker but significant association was observed between CXCL-8 and uterine fluid retention

(R^2 = 0.15; p = 0.02). No relationship was detected between luminal CXCL-8 and circulating serum concentrations (R^2 = 0.005; p = 0.69), supporting the localized nature of post-breeding uterine inflammation. ROC analysis yielded an area under the curve of 0.73 ± 0.08. At a cut-off value of 75 pg/ml, luminal CXCL-8 demonstrated high specificity (96%) with moderate sensitivity (65%) for detecting uterine inflammation. Collectively, these findings indicated that luminal CXCL-8, as measured by an equine-specific multiplex immunoassay, is a highly specific biomarker of uterine inflammation and may complement existing diagnostic approaches in equine reproduction.

Keywords: Persistent breeding-induced endometritis, CXCL8, uterine inflammation

Management of chronic balanoposthitis in a 6-year neutered male dog

Barbara Follett, Orsolya Balogh

Department of Small Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA

Balanoposthitis is a disorder of the canine penis and prepuce that can be challenging to manage in general practice and may require referral. Balanoposthitis is described as inflammation of the glans penis and preputial mucosa, frequently involving bacterial infection and secondary to atopic dermatitis (AD). A 6-year neutered male mixed-breed dog with a history of poorly controlled AD was referred to the theriogenology service for chronic preputial discharge of 3 years' duration. The condition had been managed with dilute iodine flushes and empirical oral antibiotics that caused no long-term and complete resolution. The dog was recently prescribed a 21-day estriol taper, penile lubrication 2-3 times daily for dryness, and probiotics. Three months later, the dog returned to the theriogenology service for worsening preputial discharge. Exam revealed copious discolored, malodorous exudate around the bulbus glandis and distal glans, with mild penile hyperemia and preputial/penile dryness. Preputial cytology demonstrated marked inflammation characterized by many degenerate neutrophils, with substantial rod and cocci bacteria. Notably, 100% epithelial cells were superficial, consistent with estrogen influence secondary to prior estriol treatment. Aerobic culture of the penis/prepuce identified 3+ *Pseudomonas aeruginosa* and *Escherichia coli*, both multi-resistant but sensitive to gentamicin. The preputial cavity was thoroughly flushed with sterile saline. Then, treatment involved 0.8 ml gentamicin 100 mg/ml (~ 6 mg/kg) solution in 2-5 ml of sodium bicarbonate 8.4% solution and 2-5 ml of sodium chloride 0.9% solution to be applied to the prepuce for 10 minutes once daily for 5 days. One week after therapy, examination revealed a grossly normal penis/prepuce. Preputial cytology had 10-20% superficial epithelial cells, 80-90% intermediate and parabasal cells, moderate nondegenerate neutrophils, and sporadic cocci bacteria. Clinical signs resolved and follow-up as needed was recommended. This case highlighted the importance of cytologic monitoring and culture-directed local treatment in achieving positive outcomes while promoting antimicrobial stewardship in refractory canine balanoposthitis.

Keywords: Dog, prepuce, balanoposthitis, chronic, treatment, antibiotics

A novel treatment for seminal vesiculitis in a Connemara stallion

Hannah-Olivia Foster,[a] Allan Gunn,[a,b] Alex Wittorff[a]

[a]Veterinary Clinical Centre, Charles Sturt University, Wagga Wagga, Australia
[b]UC Davis School of Vet Med, Davis, CA, USA

A 19-year, Connemara stallion, was presented for intermittent lethargy and pyospermia during routine semen collection. Ultrasonographic examination revealed thickened seminal vesicles, and *Streptococcus equi* subsp. *zooepidemicus*, sensitive to ceftiofur, was cultured from the ejaculate gel fraction. On day 1 of treatment, urethroscopy was performed, revealing marked hyperemic urethral mucosa with fibrin and mucus. Endoscopic catheterization and flushing of thick purulent material from each seminal vesicle were performed using 120 ml sterile saline. To decrease the likelihood of the presence of biofilm, 60 ml of 3.3% N-acetylcysteine was infused into each seminal vesicle 24 hours prior to antimicrobial treatment. On day 2 of treatment, the stallion was pyrexic and lethargic, with a stress leukogram and elevated serum amyloid A. Lavage of the seminal vesicles was again performed prior to infusing 1-gram ceftiofur into each vesicle. Nonsteroidal anti-inflammatories were given for 3 days, and oral trimethoprim-sulfadiazine (30 mg/kg) twice daily was commenced and continued until cessation of treatment. To prolong antimicrobial concentrations within the vesicles, alleviating daily urethroscopy, a reverse thermodynamic poloxamer gel (BOVA) was chosen as transport medium for delivery of the antimicrobial. On Day 3, this was utilized in a preparation consisting of 1 gram ceftiofur in 30 ml gel. The gel was formulated at 5°C and stored with the endoscopic catheters at this temperature until the time of infusion. Solidification of the warming gel was visualized via video-endoscope. Infusion was repeated on day 8 with 2 grams ceftiofur in 70 ml gel solution instilled into each vesicle. A grossly normal ejaculate was collected via artificial vagina on day 15 with morphologically normal sperm, degenerate inflammatory cells, and a moderate mixed bacterial growth. Gel usage minimized the number of procedures performed while resolving the seminal vesiculitis, demonstrated by resolution of mucosal hyperemia, normal ejaculate findings and mixed culture.

Keywords: Seminal vesiculitis, reverse thermodynamic poloxamer gel

An unusual case of hydroallantois associated with fungal placentitis in a mare

Aubrey Frazior,[a] Ashley Rothrock,[b] Camilo Hernández-Avilés,[a] Charles Love[a]

[a]Department of Large Animal Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX, USA
[b]Crockett Veterinary Hospital, Crockett, TX, USA

Hydroallantois and placentitis are rare conditions in pregnant mares that often cause abortion and are rarely associated.[1] A 7-month pregnant, 10-year Quarter Horse mare presented to a referring veterinarian (rDVM) on December 13, 2025, with

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signs of mild colic and vaginal discharge. A normal pregnancy had been previously identified on May 31, 2025. Transrectal examination by the rDVM identified a 'tight' fluid-filled uterus extending above the pelvic brim. Transabdominal ultrasonography identified a deceased fetus, thickened chorioallantois (CA) and amnion, and hyperechoic allantoic fluid. Intravenous fluids and dexamethasone (30 ml) were given prior to removal of any uterine contents, which was initiated by a small puncture of the CA to allow for controlled drainage. A foul-smelling discolored allantoic fluid was drained. The mare remained stable through the process and passed an intact placenta (5.5 kg) and a hairless, female fetus (7.5 kg) that were submitted to Texas A&M Large Animal Teaching Hospital for necropsy. Gross and histopathologic evaluation of the CA and amnion were consistent with hydroallantois.[2] Cytological evaluation identified fungal hyphae at 5 sites in the gravid uterine horn that grossly resembled fungal placentitis and was confirmed histologically. Despite the lack of other inflammatory or infectious changes in the fetus and placenta, fungal placentitis and hydroallantois remain potential causes of fetal death. Hydroallantois is primarily caused by dysfunction of the CA modifying transplacental exchange, vascular permeability, and gene expression.[2] It is typically diagnosed later in pregnancy, with mares presenting with a grossly distended abdomen, live fetus, and large, tense uterus, and is rarely associated with infectious processes.[1] Highlighting another unique aspect of this case, fungal components were reported in only 15% of placentitis cases.[3] Despite being infrequent conditions, both fungal placentitis and hydroallantois should be considered by general practitioners and theriogenologists as important causes of abortions in mares.

Keywords: Equine, fetal abortion, hydroallantois, fungal placentitis

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Trueperella pyogenes in balanoposthitis of a Boer buck

Breonna Freeman, Dane Schwartz, Katelyn Waters, Andy Bennett, Jessica Klabnik

College of Veterinary Medicine, Auburn University, Auburn, AL, USA

Ulcerative posthitis, commonly known as pizzle rot, is classically caused by *Corynebacterium renale* in small ruminants. However, in cases refractory to treatment, culture and sensitivity may be warranted. A 3-year, 118.2 kg, Boer buck was presented for penile edema and reluctance to breed by live cover or collect using an artificial vagina. The buck had a history of a high protein diet, abnormal smegma, malodorous preputial discharge, and an erythematous and swollen sheath of ~ 1 year duration. Owner reported decreased sperm motility and increased time to conception, with mostly singleton pregnancies. Historic complaints were treated with flunixin meglumine and antibiotics, most recently tulathromycin, without symptom resolution. On physical examination, the buck was bright, alert, and responsive with unremarkable temperature, heart rate, and respiratory rate. Bilateral harsh respiratory sounds were auscultated with mildly increased effort. BCS was 4/5 with a FAMACHA score of 3. Examination of the reproductive tract revealed pain on palpation of the prepuce, erythema of the penis and prepuce, a malodorous discharge, and thick, white smegma within the prepuce and surrounding the penis. Urination was observed with normal stream and appropriate posture. Free-catch urine produced a mixed culture with heavy growth of *Trueperella pyogenes* and a gram-negative rod noted to resemble an environmental organism, with no evidence of mycoplasma. A yellow-tinged ejaculate cultured heavy growth of *Trueperella pyogenes*. The patient was hospitalized and started on ceftiofur sodium, meloxicam, and twice-daily preputial lavage with dilute betadine solution. The patient improved while hospitalized, was discharged, and tulathromycin was given by the owner, based on culture/sensitivity results. Diet changes were recommended to include lower protein. This case highlighted use of culture and sensitivity to diagnose atypical bacteria implicated in balanoposthitis, with apparent impact on fertility, that presumably progressed from ulcerative posthitis.

Keywords: Pizzle rot, *Trueperella pyogenes*, goat, balanoposthititis

Three-month yeast probiotic supplementation enhances key sperm quality indicators in breeding dogs

Virginie Gaillard,[a] Lotte Spanoghe,[b] Florin Posastiuc,[b] Guillaume Domain,[b] Joke Lannoo,[b] Penelope Banchi,[b] Jérémy Laxalde,[a] Franck Péron,[a] Ann Van Soom[b]

[a]Royal Canin Research Center, Aimargues, France
[b]Department of Internal Medicine, Reproduction and Population Medicine, Faculty of Veterinary Medicine, Ghent University, Merelbeke, Belgium

Sperm quality is essential for reproductive success in breeding dogs. Recent studies in other species suggest that the gut–testis axis could influence sperm function, yet evidence in dogs is limited. We hypothesized that a 90-day supplementation with the yeast probiotic *Saccharomyces boulardii* (SB) improves fresh semen quality compared to placebo. Thirty-seven purebred male dogs were enrolled in a double-blind, randomized, placebo-controlled trial and daily supplemented with SB (9.45 x 10^8 CFU/day) or placebo (maltodextrin), with no modification of their current diet. Fresh semen was collected at baseline and after 90 days. Semen quality (CASA motility and kinematics, morphology, plasma membrane integrity, mitochondrial membrane potential [MMP], DNA integrity) was assessed and gut and semen microbiota alpha diversity were evaluated by 16S rRNA sequencing. Changes from baseline to end-point were analyzed using a linear mixed-model (fixed effects: Supplementation, Time) with significance set at $p < 0.05$. After 90 days of supplementation, MMP significantly increased with SB (+ 8.2%), reflecting higher energy production, with a

significant improvement in several motility parameters (total motility +5.7%, amplitude of lateral head displacement +11.4%, average path velocity +6.1% and curvilinear velocity +8.6). DNA integrity was significantly increased in SB supplemented (+1.1%). Trends toward reductions in head (–36%) and tail (–12%) abnormalities were also observed in SB supplemented dogs. However, no significant effects were detected on gut or semen microbiota; this likely reflected high inter-individual microbiota variability and heterogeneous diets across dogs, factors known to mask subtle treatment effects. In conclusion, a 90-day SB supplementation significantly improved multiple fresh semen quality parameters (including motility, velocity, MMP and DNA integrity) while gut and semen microbiota were not detectably changed. SB appeared to be a promising nutritional strategy to enhance semen quality in breeding dogs.

Keywords: Dog, sperm quality, probiotic, motility, mitochondrial membrane potential, DNA integrity

Use of fluorescein sodium dye to diagnose rectovaginal fistula in a barren Thoroughbred

Ainslee Garrett,[a] **Maria Schnobrich**[b]

[a]University of Kentucky, Lexington, KY, USA
[b]Rood and Riddle Equine Hospital, Lexington, KY, USA

A 13-year Thoroughbred mare was presented for reproductive evaluation after 2 years barren, with recurring endometritis. The referring veterinarian noted audible vulvar aspiration of air and vestibular contamination. At evaluation, the mare was in good condition and overall health. Breeding soundness evaluation revealed a sunken anus and poor perineal conformation with a dorsal commissure sutured (Caslick) 3 cm below the pelvic brim. Transrectal palpation and ultrasonography of the reproductive tract revealed small, inactive ovaries, a flaccid uterus with no edema or fluid. Despite significant vestibular fecal contamination noted on endoscopic and visual assessment of the vestibule, a fistula or defect could not be identified as a source of contamination. Due to suspicion of a rectovaginal fistula, 60 ml sterile saline with 2 fluorescein sodium dye ophthalmic strips (soaked for 5 minutes) was infused into the rectum. Immediately, bright yellow fluid exited the vulva. Further evaluation of the dorsal vestibular wall revealed a small opening and when pressure was put on the rectal floor with fluid, there was a fluid discharge from the vulva. A small diverticulum was palpable immediately inside the rectum at the 6 o'clock position, consistent with where fluid was passing. Based on this, a diagnosis of a third-degree rectovaginal fistula was made and surgical repair performed.[1] Three weeks following surgery, the mare was evaluated and no longer had air in the vagina, nor vestibular contamination. The use of a fluorescein stain to diagnose rectovaginal fistulae in women has been reported. To our knowledge, this is the first description of using fluorescein stain to diagnose rectovaginal fistula in the mare.

Keywords: Fluorescein sodium dye, rectovaginal fistula

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Equine uterine fluid extracellular vesicles contain arachidonic acid and phospholipase A_2

Josefina Ghersa,[a] **Marilyn Mullan-Fraser,**[a] **Carolina Emparanza,**[a] **Nesma Yousif,**[b] **Daniel MacPhee,**[c] **Claire Card**[a]

[a]Deptartment Large Animal Clinical Sciences, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK, Canada
[b]Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PE, Canada
[c]Department Veterinary Biomedical Sciences, Western College of Veterinary Medicine, University of Saskatchewan, Saskatoon, SK, Canada

Endometrial and trophoblastic synthesis of prostaglandins (PG) relies on phospholipase A_2 ($cPLA_2$) and arachidonic acid (AA) but the role of extracellular vesicles (EV) is unknown. We hypothesized that uterine fluid EV PG-related cargo is affected by pregnancy and day (D) after ovulation. Our objective was to use targeted metabolomics to compare uterine fluid EV cargo in pregnant and nonpregnant mares at 2 time points. Uterine fluid from diestrus (n = 5) and pregnant (n = 5) mares on D10 and D14 after ovulation was collected transcervically, by infusing 100-200 ml of phosphate buffered saline into the uterus, massaging the uterus transrectally, giving intravenous oxytocin (20 IU) and recovering the fluid into sterile tubes. Uterine fluid was then centrifuged, filtered, supernatant processed to isolate EV using ExoEasy kits, and EV were stored at -80°C. Isolation of EV was confirmed by transmission electron microscopy, Nano Tracker imaging and immunoblot analysis for EV markers (Hsp70, Hsp90, Tsg101). Protein content of EV was determined using a Bradford assay. Targeted metabolomics of EV was performed for AA, PGE_1, PGE_2, and $PGF_{2\alpha}$. The presence of $cPLA_2$ was also assessed by immunoblot. Data were examined for normality. The abundance intensity of AA and PG/µg EV protein was compared using Kruskal Wallis at $p < 0.05$. Targeted metabolomics on uterine-fluid EV samples that had only AA, with concentrations ranging from 0.79 to 51.69 pg/µg EV protein. Uterine fluid-derived EV from pregnant and nonpregnant mares contained $cPLA_2$. The lack of a day or group effect on uterine EV $cPLA_2$, AA, and PG suggested the conceptus contribution of these metabolomic products in the uterine fluid was limited. In conclusion, uterine-fluid EV carried both a rate-limiting enzyme $cPLA_2$ and rate-limiting substrate AA (key components of endometrial and trophoblastic PG synthesis).

Keywords: Equine, extracellular vesicles, endometrium, uterus, phospholipase A_2

Evaluation of andrological development and the impact of hemicastration timing in crossbred Angus bulls from prepuberty to sexual maturity

Mateo Ginestet,[a] **Chance Armstrong,**[b] **Kiliane Gassipard,**[a] **Jessica Rush,**[b] **Katelyn Waters,**[b] **Jenna Bayne,**[b] **Jessica Klabnik**[b]

[a]L'Ecole Nationale Vétérinaire de Toulouse, Toulouse, France
[b]College of Veterinary Medicine, Auburn University, Auburn, AL, USA

Andrological development is a key determinant of bull reproductive potential. Existing reference thresholds were developed 40-50 years ago. Modern beef genetics, nutrition, and production demand updated longitudinal benchmarks. This study characterized reproductive development benchmarks in crossbred Angus bulls that included intact controls, hemicastrated prepubertally, and hemicastrated immediately after puberty. We hypothesized hemicastration results in faster testis growth but similar age at sexual maturity. Crossbred *Bos taurus* bulls underwent weekly breeding soundness examinations from 7-17 months of age and were randomized to: prepubertal hemicastration (n = 8); peripubertal hemicastration (n = 7), performed immediately after first pubertal ejaculation; or intact controls (n = 8). Assessments included body weight and body condition score, scrotal circumference (SC), testicular volume, computer-assisted sperm analysis, and sperm morphology. Puberty was considered ≥ 10% total sperm motility; sexual maturity as ≥ 60% total motility and ≥ 70% normal morphology. Descriptive statistics, Pearson correlation coefficients, and linear regression modeling were conducted with significance at $p \leq 0.05$. In controls, puberty occurred at 357 ± 13 days and sexual maturity at 427 ± 14 days. Scrotal circumference had sigmoid growth (32.0 ± 1.5 cm at puberty to 35.0 ± 1.0 cm at maturity) whereas testicular volume increased linearly (682 ± 188 cm^3 at puberty to 863 ± 159 cm^3 at maturity). Prepubertal cumulative SC was negatively correlated with maturity age ($r = -0.71$, $p = 0.047$). Hemicastration did not alter age at either puberty or sexual maturity nor semen quality versus controls ($p > 0.05$). Prepubertal hemicastration induced superior compensatory hypertrophy versus peripubertal timing (remaining testis length growth 0.33 ± 0.13 mm/week faster, $p = 0.01$). Preliminary outcomes suggested that prepubertal SC predicted maturation rate, testicular volume reflected changes in spermatogenesis, and prepubertal hemicastration affected testicular plasticity. Contemporary crossbred bulls had similar or later puberty, similar or reduced interval from puberty to sexual maturity, and larger testes than historical published norms.

Keywords: Bull, andrology, development, hemicastration

Ascending prostatitis secondary to urethral urolithiasis in a neutered male dog

Alysa Giudici-Newsted, Mariana Diel de Amorim, Christopher Tollefson

Department of Clinical Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY, USA

A 1-year neutered male English Bulldog was presented to Cornell University Hospital for Animal's Emergency Service for vomiting, lethargy, stranguria and urinary obstruction. Eight months prior to presentation, the patient underwent urethral resection and anastomosis, urethropexy, and prescrotal castration for recurrent urethral prolapse. On presentation, severe azotemia, hyperkalemia, metabolic acidosis and marked urinary bladder distension were identified. Abdominal imaging demonstrated cystolithiasis and obstructive urethrolithiasis within the penile urethra, diffuse prostatomegaly, bilateral renomegaly with echogenic pyelectasia and perivesicular peritoneal effusion. Following urinary decompression, rapid improvement in azotemia supported a diagnosis of postrenal acute kidney injury. The presence of bilateral echogenic pylectasia and renomegaly raised concern for concurrent ascending pyelonephritis. Cytology of peritoneal fluid and ultrasound-guided prostatic aspirate revealed suppurative inflammation with intracellular and extracellular cocci, supporting septic peritonitis and prostatitis. Urine culture yielded *Staphylococcus pseudintermedius* susceptible to amoxicillin-clavulanate. Prostatitis is uncommon in neutered male dogs due to androgen-dependent prostatic involution.[1] In this case, the distal urethral obstruction likely resulted in prolonged urinary retention, increased intravesicular pressure, and impaired prostatic ductal drainage, facilitating ascending bacterial lower urinary tract infection. Surgical management included cystotomy, urethroscopy, and Tru-Cut prostatic biopsy, followed by repeat cystotomy and urethroscopy for persistent urolithiasis. The patient recovered without perioperative complications and was discharged with antimicrobial and supportive therapy pending histopathology, culture, and urolith analysis. This case documented ascending septic prostatitis as a sequela of distal urethral obstruction in a castrated male dog and underscored the importance of considering prostatic infection in neutered patients presenting with obstructive urolithiasis and systemic illness.

Keywords: Prostatitis, prostatomegaly, cystolithiasis, urethral obstruction, septic inflammation

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Intravesical migration of a controlled internal drug release device resulting in postrenal azotemia in a doe

Daniel Gomes, Patricia Xavier, Catarina Barros, Robyn Ellerbrock, Maria Ferrer

Department of Large Animal Medicine and Surgery, College of Veterinary Medicine, University of Georgia, Athens, GA, USA

A 4-year La Mancha doe was presented to the University of Georgia Veterinary Teaching Hospital on October 5, 2025, for acute onset inappetence, stranguria, and lethargy following attempted repositioning of a controlled internal drug release (CIDR) device placed 3 days earlier for estrus synchronization. Transabdominal ultrasonography performed by the owner identified a hyperechoic structure within a fluid-filled cavity in the caudal abdomen. On admission, the doe was quiet but responsive, with decreased ruminal motility, mild tachycardia,

tachypnea, and marked discomfort on vaginal examination. Serum biochemistry revealed severe azotemia (serum creatinine 10.4 mg/dl; serum urea nitrogen > 100 mg/dl), consistent with acute renal injury. Transabdominal ultrasonography demonstrated a distended and turgid urinary bladder (8-9 cm diameter) containing a hyperechoic Y-shaped intraluminal structure, along with mild bilateral nephromegaly, supporting a diagnosis of postrenal urinary obstruction. Vaginoscopy revealed marked vaginal irritation and a trauma in the external urethral orifice. The doe was stabilized with intravenous fluid therapy and urinary catheterization for immediate bladder decompression, followed by exploratory laparotomy and cystotomy. A CIDR device was identified within the urinary bladder, confirming inadvertent urethral placement with subsequent intravesical migration. Intraoperative findings included a flaccid bladder with focal full-thickness necrosis. The device was removed, and the bladder was surgically repaired. Despite surgery and postoperative intensive medical management, the doe demonstrated persistent azotemia and progressive clinical deterioration, complicated by signs of systemic infection, development of abdominal effusion, urinary tract infection, and concurrent gastrointestinal parasitism. Due to poor prognosis, euthanasia was elected. This case described a rare life-threatening iatrogenic complication of CIDR placement in small ruminants. It highlighted the potential for urethral misplacement and intravesical migration, secondary postrenal azotemia and irreversible urinary tract damage. Proper placement technique, early recognition of complications and rapid intervention are critical to improving outcomes.

Keywords: Goat, CIDR, azotemia, estrus synchronization, assisted reproductive technology

Effect of intrauterine ozone therapy on the postbreeding inflammatory response in mares

Alexandra Grillos, Marco Coutinho da Silva, Mauria Watts, Erin Runcan

Department of Veterinary Clinical Sciences, The Ohio State University College of Veterinary Medicine, Columbus, OH, USA

Mares susceptible to persistent breeding induced endometritis (PBIE) have increased endometrial expression of proinflammatory cytokines and decreased antiinflammatory cytokines after breeding, compared to resistant mares. Ozone gas has decreased endometrial inflammation after insemination with fresh semen. Our specific aims were to determine the effects of postbreeding uterine insufflation with ozone or oxygen (control) on: 1. presence and severity of inflammation assessed by endometrial cytology; and 2. endometrial mRNA expression of proinflammatory (IL-1β, IL-6, IL-8, and TNF-α) and antiinflammatory (IL-4 and IL-10) cytokines. We hypothesized that intrauterine ozone 6 hours post-breeding with frozen-thawed semen reduces endometrial inflammation. Twelve cycling mares with negative uterine culture and cytology were randomly allotted between treatment groups. During estrus, mares were inseminated with frozen-thawed semen and received either intrauterine insufflation with oxygen (1.0 l for 5 minutes) or ozone (50 ug/ml, 1.5 l for 5 minutes) at 6 hours postbreeding. Endometrial biopsy was collected 24 hours postbreeding, and endometrial cytologies were collected at 24, 48, and 72 hours postbreeding. Mares crossed over to the alternative treatment following a 21 day wash-out period. Severity of cytological inflammation was compared by Fisher's exact test, and data for gene expression was analyzed by a Wilcoxon matched-pairs signed rank test, with significance set to $p < 0.05$. Endometrial cytology revealed a similar percentage of inflammatory cells between ozone and oxygen treatments. Biopsies were analyzed by RT-qPCR for IL-1β, IL-6, IL-8, TNF-α, IL-4 and IL-10. Only endometrial mRNA expression of IL-10 was significantly decreased in mares treated with ozone compared to oxygen. Endometrial mRNA expression was similar between groups for all other cytokines. These findings contradicted our hypothesis, suggesting a possible suppression of the antiinflammatory cytokine response with ozone therapy compared to oxygen.

Keywords: Ozone, oxygen, endometritis, mare, cytokine

Effect of routine postfoaling treatment with mycobacterium cell wall fraction on pregnancy rates in mares

Sabrina Hall, Scott Bailey

Cornell University College of Veterinary Medicine, Ithaca, NY, USA

Postpartum fertility is a critical factor to the equine industry as delayed conception increases production costs and reduces lifetime offspring. Mycobacterium cell wall fraction (MCWF) has enhanced uterine bacterial clearance and modulates the uterine immune responses in mares.[1] Therefore, it was hypothesized that 2 intravenous doses of MCWF given within 8 days postpartum improve first-cycle and seasonal pregnancy rates compared to standard interventions alone. Foaling Thoroughbred mares (n =154) were enrolled during a single breeding season into treatment (n = 85) and control groups (n = 69), based on assigned nursery barn location. Reproductive history had no bearing on group allocation. Mares in the treatment group were given 2 intravenous doses of MCWF: on the day of foaling and 8 days postpartum. Control mares did not receive MCWF. All mares were bred by live cover on the 30-day postpartum estrus and were managed according to standard farm protocols. First-cycle pregnancy rate, per-cycle pregnancy rate, and seasonal pregnancy rate were compared between groups using a Chi-square test ($p < 0.05$). First-cycle pregnancy rates did not differ ($p = 0.94$) between treatment and control groups (60 versus 59%), nor did ($p = 0.1$) per-cycle pregnancy rate (60 versus 51%). However, the seasonal pregnancy rate was greater ($p = 0.015$) in treated mares (93 versus 80%). Despite a lack of differences in individual-cycle outcomes, the improved seasonal pregnancy rate in treated mares suggested a cumulative effect on fertility associated with postpartum MCWF treatment. These mixed findings partially supported the hypothesis that treatment with MCWF improves fertility rates over a breeding season; however, no improvement was observed for first-cycle pregnancy rates in mares treated with MCWF.

Keywords: Immunomodulator, fertility, mare, mycobacterium cell wall fraction

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Mammary adenocarcinoma in a male guinea pig: diagnostic approach, surgical management and outcome

Taylor Hopkins, Seth Oster, Larrisa Castro, Jey Koehler, Brad Matz, Carlos Lopes, Emily Kennedy, Jessica Klabnik

College of Veterinary Medicine, Auburn University, Auburn, AL, USA

Mammary gland neoplasia is a common condition in guinea pigs (*Cavia porcellus*), with up to 75% of tumors reported as malignant. The objective of this case report was to describe the diagnostic steps, surgical treatment, and clinical outcome of a 4-year intact male guinea pig evaluated for a mammary mass. The animal was presented with a 3-day history of abnormal posture. Physical examination findings included normal cardiopulmonary parameters, appropriate gut sounds, and a body condition score of 4 out of 5. A firm, cutaneous, left inguinal mass measuring ~ 2 × 3 × 3 mm was present. Fine-needle aspiration of the mass was performed; however, cytology was nondiagnostic. Preoperative assessment consisted of sedated radiographs and transabdominal ultrasonography. Radiographic evaluation was consistent with a soft tissue opaque inguinal mass, mineral debris within the urinary bladder, and bilateral coxofemoral and stifle osteoarthrosis. An additional nodule in the caudal abdomen, identified via ultrasonography, was unable to be aspirated. The patient underwent marginal excision of the mass under general anesthesia, and histopathology confirmed mammary adenocarcinoma. Microscopic tumor cells extended beyond the surgical margins. Adjuvant radiation therapy was recommended. A palliative protocol was selected to limit anesthetic events and reduce potential gastrointestinal complications. Treatment consisted of 4 Gy delivered 10 times on a Monday–Wednesday–Friday schedule using 6 MeV energy, with a 1-cm bolus to reduce dose to deeper structures. The animal completed radiation therapy without complications and there is no evidence of disease at the time of writing (9 months after initial diagnosis). Surgical excision combined with adjuvant radiation therapy can potentially provide clinical benefit in cases where complete excision is not achievable.

Keywords: Guinea pig, mammary, adenocarcinoma, radiation, marginal excision

Epididymal adenomatous hyperplasia: is there a relationship with testicular disease?

Bonnie Howard,[a] Jamie Douglas,[b] Chelsey Yob,[c] Anneke Moresco,[c] Dalen Agnew[c]

[a]Lyman Briggs College,
[b]Comparative Molecular and Integrative Biology, College of Veterinary Medicine,
[c]College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA

Pathology of the epididymis is a critical determinant of male fertility, with lesions typically arising from inflammatory, degenerative, or neoplastic processes. In humans, hyperplasia of the epididymis is correlated with testicular disease. Pathologic change in the canine epididymis, however, remains understudied. Since epididymal integrity is essential for sperm maturation and reproductive success, a comprehensive characterization of canine epididymal hyperplasia is warranted. Our study aimed to investigate and characterize the occurrence of epididymal hyperplasia encountered in the dog. We hypothesized that the presence of epididymal hyperplasia correlates with the presence of testicular disease. Epididymal samples were collected from dogs with suspected testicular disease (n = 81) and from shelter dogs undergoing routine castration (n = 30). Tissues were stored in formalin pending further analysis, to include trimming, paraffin embedding, and hematoxylin and eosin staining. Corresponding slides were evaluated under light microscopy for presence or absence of epididymal hyperplasia. A rubric was generated to grade epididymal hyperplasia encountered (0 = absent; 1 = mild, local change in 1-2 tubules; 2 = moderate, more than 2 tubules affected up to 50% of tubules; 3 = severe, widespread change in greater than 50% of tubules visualized). Epididymal scores were analyzed utilizing a Student's *t*-test (absent versus present; $p < 0.05$). Results of this study revealed that epididymal hyperplasia was encountered in dogs more commonly than expected. Future research should be performed to determine the etiology and pathogenesis of epididymal hyperplasia and its effects on fertility in the stud dog.

Keywords: Epididymis, hyperplasia, testis, infertility, canine

Clinical uterine leiomyosarcoma in an adult female Boer goat

Edward Hunda,[a] Patricia Xavier,[b] Robyn Ellerbrock,[b] Orlaith O' Scanaill,[b] Amanda Blubaugh,[c] Lilian Oliveira[c]

[a]Department of Large Animal Medicine and Surgery,
[b]Department of Large Animal Medicine, College of Veterinary Medicine, University of Georgia, Athens, GA, USA
[c]Department of Pathology, University of Georgia, Athens, GA, USA

A 9-year intact Anglo-Nubian doe was presented for lethargy, stranguria, and vaginal discharge. Initial on farm evaluation revealed tachycardia (162 beats per minute), pale mucous membranes, prolonged capillary refill time, and frequent unsuccessful attempts to urinate. A large volume of thick, white mucoid vaginal discharge was noted. On admission, the doe was febrile, tachycardic, and lethargic. Clinicopathologic findings included leukocytosis ($18.1 \times 10^3/\mu l$) with neutrophilia, hyperlactatemia (6.0 mmol/l), and metabolic acidosis. Doe had a history of kidding, but it had been years since her last pregnancy. Vaginal examination was completed using endoscopy and revealed copious thick, white, mucoid discharge (> 20 ml) in the cranial vagina. The vaginal epithelium was thickened, irritated, and ulcerated in punctate areas. Abdominal ultrasonography diagnosed a mass that was ~ 15 cm contiguous with the uterus. Euthanasia was elected and necropsy revealed a large, firm, multilobulated mass (28 x 23 x 14 cm) that encased the uterine body, cervix and right uterine horn, with displacement to surrounding viscera. The mass contained cavitated regions filled with fetid purulent material. Both horns were distended with purulent exudate, consistent with pyometra; however, no communication was identified between the uterine lumen and the uterine mass. Aerobic culture yielded heavy growth of *Proteus mirabilis* and light to moderate growth *of Escherichia coli* and alpha-hemolytic

Streptococcus spp. Histopathology revealed cystic endometrial hyperplasia, and the uterus lumen was full of debris, neutrophils and bacterial mats. The mass was largely composed of mesenchymal stem cells that multi-nucleation arranged in a herringbone pattern, consistent with uterine leiomyosarcoma, with multifocal necrosis. Additional findings included cystitis, pulmonary edema, mild pericardial effusion, and incidental valvular endocardiosis. The uterine leiomyosarcoma was considered the primary lesion, with secondary pyometra contributing to systemic inflammatory compromise. Cystitis was attributed to urinary outflow obstruction from mass effect.

Keywords: Goat, uterine leiomyosarcoma, pyometra, stranguria, uterine mass

Management and outcomes of dystocia in cattle in hospital and field settings: a retrospective study

Haylee Hutchins, Robyn Ellerbrock, Maria Ferrer, Daniela Cortes

University of Georgia College of Veterinary Medicine
Department of Large Animal Medicine, Athens, GA, USA

Dystocia, defined as difficult or prolonged parturition, is a significant cause of perinatal morbidity and mortality in cattle, representing major economic and welfare concerns in beef and dairy operations. Dystocia is associated with stillbirth, retained fetal membranes, metritis, impaired fertility, and culling, underscoring the importance of timely management. This retrospective study aimed to evaluate management and outcomes of bovine dystocia in hospital versus field settings. We hypothesized that management setting influences intervention type and clinical outcomes. Medical records from 180 bovine dystocia cases (2017-2026) were reviewed. Data included parity, setting, fetal viability and disposition, intervention, cause of dystocia, and dam and offspring survival. Descriptive statistics, Chi-square tests, and univariate logistic regression were performed. Most dams were multiparous (54.4%) with a median age of 3 years (IQR 2-5). Most dystocias were fetal in origin (82.2%), in anterior presentation (60.6%), and primarily managed in the field (66.1%). Although most offspring were nonviable at presentation (68.3%), dam survival at discharge was high (83.9%). Intervention type differed significantly between hospital (vaginal delivery 36.1%, fetotomy 13.1%, cesarian surgery 45.9%) and field settings (vaginal delivery 47.9%, fetotomy 26.9%, cesarian surgery 17.6%) ($p = 0.0007$). The cause of dystocia, fetal viability, and dam and offspring survival did not differ between settings. Hospital cases had higher odds of a live fetus at presentation (OR = 1.39) and similar odds of dam survival (OR = 0.93) compared to field cases. Fetal viability at presentation was positively correlated with dam survival (OR = 0.09, 95% CI 0.01-0.70, $p = 0.021$), whereas setting, cause of dystocia, intervention type, and fetal presentation were not. Although we hypothesized that management setting influences clinical outcomes, dam survival was comparable between settings, despite differences in intervention strategies. Fetal viability at presentation was the strongest prognostic indicator for dam survival, likely due to shorter duration of dystocia, underscoring the importance of timely clinical decision-making.

Keywords: Bovine, dystocia, fetal viability, dam survival, field versus hospital setting

Congenital megaesophagus in a 3-week miniature Dachshund neonate

Dani Ingalls,[a] Teresa Southard,[b] Santiago Diab,[b] Gabriela Sousa,[c] Orsolya Balogh,[c] Julie Cecere[c]

[a]Virginia Maryland College of Veterinary Medicine, Blacksburg, VA, USA
[b]Biomedical Sciences and Pathobiology, Virginia-Maryland College of Veterinary Medicine, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA
[c]Department of Small Animal Clinical Sciences, Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA

A 3-week 0.77 kg male Miniature Dachshund was presented to the Veterinary Teaching Hospital for labored breathing and lethargy. On examination, the pup had increased respiratory efforts, shallow breathing, and moderate regurgitation with repeated swallow attempts. It was elected to perform an esophagram. A dilated esophagus was appreciated with reduced primary and absent secondary esophageal contractions. A diagnosis of congenital megaesophagus with secondary aspiration pneumonia was made, and the owner elected humane euthanasia due to the poor prognosis and quality of life concerns. At necropsy, there was no evidence of a vascular ring anomaly, though congenital myasthenia gravis could not be ruled out. Previously, 3 pups from the same litter had died and were submitted to necropsy: 1 stillborn, diagnosed with anasarca and 2 (1-day old) female pups, that had died while gasping for air during nursing. These pups had 3-4 mm defects in the aborad esophagus with thick white liquid accumulation, presumably milk, in the pleural cavity and focal aggregates of degenerate neutrophils with fibrillar eosinophilic material adjacent to the esophageal wall on histopathology, consistent with a traumatic event. Congenital megaesophagus was suspected also in these pups, with the esophageal rupture likely due to severe dilatation as no tube feeding by the owners was reported. Furthermore, the owner reported the maternal grandfather produced 4 known cases of congenital megaesophagus. Congenital megaesophagus has been reported in Miniature Dachshunds, though esophageal perforations have not reported.[1] In German Shepherds, congenital megaesophagus has been identified as a sex-linked trait, with males at an increased risk, though similar genomic sequencing studies have not been performed in Miniature Dachshunds.[2] This case highlighted the importance of a thorough familial history and megaesophagus as a clinical consideration leading to aspiration pneumonia.

Keywords: Canine, neonate, congenital megaesophagus, esophageal perforation

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Efficacy and side effects of intrauterine treatment of sodium cloprostenol for early pregnancy termination in donkeys (*Equus asinus*)

Ashley Jeppesen,[a] Pavly Fayek,[a] Cyrus Salvani,[a] Haley Hitson,[a] Alexis Brady,[a] Maurice Matthew,[a] Igor Canisso,[b] Marco Alvarenga,[c] Don Bergfelt,[d] Lorenzo Segabinazzi[a]

[a]School of Veterinary Medicine, Ross University, Basseterre, Saint Kitts and Nevis
[b]University of Illinois, Urbana, IL, USA
[c]Department of Veterinary Surgery and Animal Reproduction, School of Veterinary Medicine and Animal Science, UNESP, Botucatu, Brazil
[d]Lincoln Memorial University, Orange Park, FL, USA

Protocols for pregnancy termination in donkeys are largely extrapolated from equine guidelines, despite limited species-specific evidence. Therefore, the objective of this study was to assess an alternative method for early pregnancy termination in donkeys. Thirty-two jennies at 16-21 days of pregnancy were assigned to the following treatments: Standard (ST), injection of 250 µg of sodium cloprostenol (SC), intramuscular (n = 12); intrauterine (UT), intrauterine infusion of 250 µg of SC diluted in 8 ml of LRS (n = 11); and control, intrauterine infusion of 8 ml of LRS (n = 9). Blood sampling and EQUUS-DONKEY-FAP-welfare assessments were performed every 15 minutes for 90 minutes; blood samples continued for 12 hours, then daily for 8 days, with ultrasonographic evaluations. Plasma progesterone and prostaglandin $F_{2\alpha}$ metabolite (PGFM) concentrations were analyzed using commercial enzyme immunoassay kits. Pregnancy termination occurred in all jennies in ST (12 of 12) and UT (11 of 11) groups, with 1 loss in controls (1 of 9; $p < 0.03$). Day of embryo loss (ST, 4.66 ± 0.70 days; UT, 3.30 ± 0.65 days; $p = 0.164$) and interval to subsequent ovulation (ST, 11.5 ± 6.2 days; UT, 11.8 ± 6.6 days; $p = 0.87$) did not differ between ST and UT. Controls had larger corpora lutea and higher plasma progesterone than ST and UT from days 1-8 after treatment ($p < 0.0001$), while ST and UT were similar. Plasma PGFM increased markedly in ST at 90 minutes and remaining elevated up to 72 hours, whereas UT had intermediate concentrations, higher than controls ($p < 0.05$). Welfare effects varied by group and time ($p = 0.0057$), with ST inducing earlier and more intense transient adverse effects, whereas UT produced minimal and stable welfare responses. In conclusion, intrauterine prostaglandin effectively induced pregnancy termination in donkeys while reducing treatment-associated side effects compared to systemic therapy.

Keywords: Prostaglandin $F_{2\alpha}$, luteolysis, equine, dinoprost tromethamine

Temporal variations in udder, metabolic, and milk biomarkers in ewes before parturition

Esteban Arrieta, Nicole Sugai, Jamie Stewart

Production Management Medicine, Virginia-Maryland College of Veterinary Medicine, Blacksburg, VA, USA

The objective of this study was to assess changes in udder development, metabolic, and milk biomarkers during the prepartum period in late-pregnant ewes. We hypothesized that udder development, metabolic indicators, and milk biomarkers differ across prepartum windows as ewes approach parturition. Twenty ewes from a research herd were synchronized, ram-bred, and confirmed pregnant for natural lambing. Udder assessments and blood and milk samples were collected weekly, beginning 3 weeks before the expected lambing date. Because ewes lambed earlier or later than predicted, observations were reorganized into 3 biologically relevant prepartum windows (≥ 10 days, n = 10; 5-9 days, n = 16; and 0-4 days, n = 10). Biomarkers were analyzed using linear mixed-effects models, with ewe as a random effect and litter (singleton vs multiple) included as a controlled confounder, and group differences were evaluated using estimated marginal means with multiple-comparison adjustment. Several biomarkers differed across prepartum windows, reflecting coordinated metabolic and mammary changes as ewes approached lambing. Visual udder score increased toward parturition ($p = 0.012$), and ketone concentrations rose progressively closer to lambing ($p = 0.004$). Milk conductivity ($p = 0.002$), temperature-corrected conductivity ($p = 0.001$), and temperature-corrected pH ($p = 0.001$) were highest in the final window, consistent with ionic shifts associated with colostrum formation. Blood potassium concentrations declined as lambing approached ($p = 0.018$), while sodium ($p = 0.043$) and glucose ($p = 0.049$) had significant overall variation across windows; however, adjusted pairwise differences were not significant. The BUN/creatinine ratio increased near parturition ($p = 0.024$), suggesting altered protein metabolism. Glucose ($p = 0.053$) and BUN ($p = 0.054$) also demonstrated borderline global associations with days prepartum, but pairwise were not significant. These findings demonstrated a coordinated, multi-system physiological progression as ewes approach parturition, highlighting distinct biomarker patterns across late-pregnancy lambing windows.

Keywords: Ewe, lambing, milk pH, milk conductivity

Diarrhea associated with supplemental feeding and *Clostridia perfringens* in a Great Dane litter with neonatal leukemoid response

Audrey Kelleman, Anum Ahmed

Department of Large Animal Clinical Sciences, College of Veterinary Medicine, University of Florida, Gainesville, FL, USA

Six surviving 18-day Great Dane pups of a litter of 8 were presented with a several days history of diarrhea and intermittent vomiting. One pup was recently deceased. Whelping, with 1 stillborn pup, but otherwise uneventful, was reported. Pups were of 1.6-1.8 kg, responsive, but quiet, dehydrated, with weak suckle and with varying degrees of watery diarrhea, some containing moderate frank blood. Pooled fecal specimen was submitted for fecal culture and diarrhea PCR panel (IDEXX), while direct smear revealed motile rods and flotation did not contain parasite ova or coccidia. Some neonates had additional diagnostics, where parvovirus and giardia snap tests (IDEXX) were negative and aerobic and anaerobic blood cultures, complete blood counts, and chemistry specimens were obtained. While awaiting diagnostics, both aggressive supportive, empirical antibacterial, anthelmintic multimodal outpatient and inpatient critical care resulted in some individual improvements, but not resolution of diarrhea. Four days after presentation, PCR was positive with high levels of *Clostridia perfringens* alpha toxin gene. Metronidazole therapy resolved the diarrhea in the 3 surviving pups. Furthermore, blood cultures were negative, and fecal culture was negative for *Salmonella*, *Yersinia*, and *Campylobacter*. Serial examinations

identified profound leukocytosis to 167.89 K/µl with neutrophilia to 153.1 K/µl and hypoproteinemia to < 2 g/dl and anemia with hematocrit to 17%. Tests for canine leukocyte adhesion deficiency and hepatozoon infection were negative. Upon questioning, supplementation with pup milk replacer and pasteurized goat milk, from commercial source, was noted. Milk replacer had been reconstituted in a reused goat milk plastic jug, that had been washed but not sterilized. A specimen for milk culture of both unopened, but expired goat milk, and reconstituted milk replacer contained heavy bacterial spoilage overgrowth, and likely contributed to the enteric disease or dysbiosis. *Clostridium perfringens* was not identified.

Keywords: Canine, neonate, diarrhea, *Clostridium perfringens*, leukemoid response, dysbiosis

Urogenital problems in military working dogs, 2018-2025

Marc Knobbe,[a] **Sara Mullaney**[b]

[a]Defense Health Agency, Directorate for Public Health, Falls Church, VA, USA
[b]United States Military Academy, Department of Chemical and Biological Science and Engineering, West Point, NY, USA

Urogenital disorders are common in military working dogs (MWDs), yet population-based epidemiologic data are lacking. A centralized electronic health record (EHR) master problem list (MPL) logs care for all MWDs globally, but combines structured and unstructured entries, creating challenges for data extraction. The aims were to describe urogenital problem burden using rule-based text classification and identify potential risk factors. We hypothesized urogenital prevalence varies by age, breed, geographic region and kennel location. MPL entries from 2018 to 2025 were extracted using regular-expression pattern matching and categorized into 8 nonmutually exclusive urogenital subcategories. Annual census data provided population denominators. Modified Poisson regression with robust standard errors evaluated associations with age, breed, service branch, region, kennel location, certification status and veterinary facility. After excluding surgical, preventive, and nonclinical entries, 37,798 clinical entries from 4,727 unique dogs were analyzed; 3,478 (73.6%) were male. There were 2,123 urogenital MPL entries from 1,242 male dogs (83.2%). Annual prevalence for any urogenital condition ranged 8.1-22 per 100 male dogs. The most common subcategories were scrotal (38.8%), urinary (19.4%), prostatic (17.6%), and renal (13.5%). Annual incidence remained stable across all subcategories ($p > 0.05$). Scrotal dermatitis had significant seasonal variation, peaking in January relative to September (incidence rate ratio = 7.06; 95% CI: 4.05-12.34). Age was the strongest associated variable; dogs > 8 years had nearly 7-fold higher adjusted prostatic prevalence than dogs < 2 years (prevalence ratio = 6.87; 95% CI: 3.15-15.00). Belgian Malinois had higher scrotal prevalence than German Shepherd Dogs. The hypothesis was partially supported: age, breed and kennel location were significantly associated with urogenital prevalence whereas geographic region and certification type were not. This is the first population-based epidemiologic study of urogenital problems in MWDs, demonstrating a scalable EHR-based surveillance framework for disease monitoring when standardized diagnostic coding is inconsistently applied.

Keywords: Military working dog, epidemiology, electronic health record, text data mining, disease surveillance

Surviving the sunset(s): spectrum-of-care management of closed-cervix pyometra complicated by reversible acute kidney injury treated via ovariohysterectomy in a Yorkshire Terrier

Marc Knobbe

Veterinary Emergency Group, Washington, DC, USA

A 6-year nulliparous intact female Yorkshire Terrier weighing 4.2 kg was presented for an owner-reported 8-day progressive anorexia, gait abnormality, and lethargy without observed vulvar discharge. Last estrus was ~ 55-60 days prior. Physical examination revealed moderate-to-severe dehydration (8-10%), hypothermia (35.3 °C), tachycardia, weak pulses, no cardiac murmur, and marked abdominal distension. Abdominal ultrasonography identified bilateral, severely distended, fluid-filled uterine horns with echogenic content consistent with closed-cervix pyometra without peritoneal effusion. Point-of-care diagnostics revealed lactate of 1.6 mmol/l and packed cell volume (PCV) of 30%. Complete blood count revealed leukocytosis with left shift and thrombocytopenia. Serum biochemistry demonstrated marked azotemia (blood urea nitrogen 92-98 mg/dl; creatinine 6.1 mg/dl), severe hyperphosphatemia (> 16 mg/dl), and hypoalbuminemia. Urinalysis revealed isosthenuria (urine specific gravity 1.012), consistent with impaired renal concentrating ability. The patient was classified as American Society of Anesthesiologists (ASA) IV-E.[1] Preoperative stabilization included warmed, intravenous crystalloid resuscitation, hydromorphone analgesia, and maropitant. Following propofol induction and isoflurane maintenance, ovariohysterectomy was performed without uterine rupture or spillage. The excised uterus weighed 0.42 kg (10% body weight). Postoperatively, mean arterial pressure normalized (98 mmHg), lactate was 1.7 mmol/l, and PCV declined to 22%, consistent with crystalloid hemodilution. Financial constraints precluded hospitalization; therefore, the patient was discharged with oral amoxicillin-clavulanate, gabapentin, cisapride, and owner-administered subcutaneous fluid therapy. Rechecks demonstrated progressive renal recovery: creatinine decreased to 5.3 mg/dl and phosphorus to 14.6 mg/dl by 72 hours. At 17-day reexamination, creatinine and phosphorus had normalized completely and PCV recovered to 28%. Acute kidney injury severity was attributed to prerenal hypoperfusion from dehydration and early sepsis in a young patient without comorbidities, favoring a reversible etiology over intrinsic renal damage. This case illustrated a spectrum-of-care approach to closed-cervix pyometra complicated by severe acute kidney injury; prompt surgical resolution of the pyometra followed by owner-administered therapy achieved complete AKI reversal when financial constraints prevented hospitalization.

Keywords: Canine pyometra, canine acute kidney injury, spectrum of care

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Failure to thrive and death due to *Streptococcus canis* infection in a neonatal dog

Michelle Kutzler

College of Veterinary Medicine, University of Minnesota, St. Paul, MN, USA

A litter of 5 pups was born to a 4-year female miniature Dachshund that had previously delivered and weaned a litter 2 years ago. The pups were similar in size at birth (mean ± SD birth weight of the litter was 172.4 ± 38.3 grams). All of the pups gained 10-15% of their body weight daily, with the exception of 1 male that continued to nurse vigorously but failed to gain weight. At 12 days of age (the day of presentation), all of the littermates had doubled their birth weight (384.3 ± 72.9 grams) but this pup remained at the same weight since birth (131 grams). Other than being noticeably thinner and weaker than the other pups, there were no abnormalities present on physical examination. Due to the small patient size, only a 0.2 ml blood sample could be obtained. Blood glucose concentrations, hematocrit and total protein concentrations were 110 mg/dl, 34%, and 3.8 g/dl (which is within normal limits for a dog of this age).[1] Over the next day, the pup lost the suckle reflex and died. Rule-outs for the pup's failure to thrive included congenital defects, bacterial and/or viral infections. A complete postmortem examination was performed. Gross abnormalities were present on the kidneys (small and irregularly shaped), liver (multiple pale foci), and lungs (small and hemorrhagic). Histologically, the kidneys had multifocal, moderate, neutrophilic tubulitis with intralesional casts, the liver had multifocal, suppurative hepatitis with severe canalicular distension, and the lungs had multifocal, mild alveolar histiocytosis. Bacterial culture from the liver and lungs revealed a pure growth of *Streptococcus canis* a common opportunistic pathogen that can cause neonatal death in dogs.[2] This case is important to applied theriogenology because it illustrated the significance of working up canine neonatal losses so that breeders can implement preventative measures.

Keywords: Failure to thrive, *Streptococcus canis*, septicemia, neonate, dog

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Uterine inertia secondary to uterine rupture in a pregnant dog

Michelle Kutzler

College of Veterinary Medicine, University of Minnesota, St. Paul, MN, USA

A 4-year female Dachshund was presented in late pregnancy because of presumptive uterine inertia. The dog's rectal temperature had decreased > 1°C 2 days previously, but had returned to normal the day of presentation (38.3°C) without any preparturient behaviors. Other than having a large, distended abdomen, no other abnormalities were present on physical examination. A transabdominal ultrasonographic examination was performed to assess fetal viability. A significant amount of anechoic free abdominal fluid was visible adjacent to the left uterus horn. Two fetuses in the left uterine horn were deceased and the heart rates of the remaining fetuses ranged from 75-150 beats per minute. Due to the fetal bradycardia, it was decided to immediately perform a cesarian surgery. In preparation for anesthesia, a complete blood cell count and serum chemistry was performed. In addition to a mild mature neutrophilia (18,420 cells/µl) and leukocytosis (20,770 cells/µl), serum AST (151 u/l (normal range: 0-60 u/l)) and total bilirubin (1.0 mg/dl (normal range: 0-0.5 mg/dl)) were both moderately elevated. A cephalic catheter was placed, and the dog was pre-oxygenated while the ventral abdomen was clipped and prepped for surgery. Anesthesia was induced with intravenous propofol and maintained with sevoflurane. A 10-cm ventral midline skin incision was extended into the peritoneal cavity. Dark green-black fluid surrounded the uterus and a large tear extended along the length of the left uterine horn. The fetuses in the right uterine horn and uterine body were delivered but resuscitation efforts failed. Due to the extensive uterine tear and resulting peritoneal contamination, a hysterectomy was performed, followed by copious peritoneal lavage. At 3 weeks after surgery, the dog recovered uneventfully and the laboratory parameters had returned to normal. This case is important to applied theriogenology because it illustrated an unusual presentation of uterine inertia secondary to uterine rupture in pregnant dog.

Keywords: Uterine rupture, uterine inertia, fetal bradycardia, extrauterine fetus

Ejaculatory dysfunction in a stallion associated with dynamic nasopharyngeal collapse

Charles Lee, Camilo Hérnandez-Avilés, Charles Love

Department of Large Animal Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, TX, USA

Dynamic nasopharyngeal collapse (NPC) affects up to 27% of racehorses presenting for poor performance and is associated with hyperkalemic periodic paralysis.[1,2] However, the role of NPC in stallion ejaculatory dysfunction is uncommon.[3] A 5-year, Halter Quarter Horse stallion, was presented to the Texas A&M University Veterinary Medical Teaching Hospital (VMTH) for behavior evaluation and semen collection following chronic ejaculatory dysfunction. Prior to admission, 9 semen collection attempts were performed at the farm, yielding 1 partial ejaculate that was inseminated and resulted in 1 pregnancy. Upon presentation to the VMTH, the stallion demonstrated good libido and a consistent ability to mount the phantom, producing 1 complete and 1 'partial' ejaculate. During and after the collection process, the stallion exhibited labored breathing, suggesting a potential respiratory compromise. Standing endoscopy identified pronounced nasopharyngeal collapse when the head was flexed. The stallion underwent a CT scan, which revealed nasopharyngeal dorsal

thickening and asymmetrical thickening of the longus capitis muscles. These anatomical changes were thought to result from an underlying neuromuscular dysfunction that leads to significant airway narrowing upon collapse of the stylopharyngeus muscles during inspiration, when the stylopharyngeus is flexed during breeding.[4,5] Oral firocoxib (0.1 mg/kg) given once daily for 4 weeks was prescribed prior to a follow-up examination. Although inflammation decreased on endoscopy, 2 semen collection attempts were unsuccessful. The owner elected to castrate the stallion, and epididymal sperm were harvested and cryopreserved. This case highlighted an unusual cause of ejaculatory dysfunction (i.e. NPC), which, although common in racehorses, is less observed in horses of other breeds (e.g. Quarter Horses). Practitioners and theriogenologists may consider NPC as a nonreproductive cause of ejaculatory dysfunction in stallions.

Keywords: Halter stallion, ejaculatory dysfunction, nasopharyngeal collapse

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Holding canine cumulus-oocyte complexes overnight at room temperature did not cause oocyte chromatin degeneration

Jose Len,[a] Adriana Carlo,[a] Shebl Salem,[a] Chin-Chi Liu,[b] Sara Bucher[a]

[a]Department of Veterinary Clinical Sciences,
[b]Office of Research and Graduate Education, School of Veterinary Medicine, Louisiana State University, Baton Rouge, LA, USA

The objective of the study was to evaluate whether holding canine cumulus-oocyte complexes (COCs) overnight at room temperature in a commercial embryo holding medium will cause them to degenerate. We hypothesized that canine COCs stored at room temperature overnight in a commercial embryo holding medium preserve their chromatin. Reproductive tracts from spayed female dogs at random stage of their estrous cycle were recovered. Ovaries were dissected from the tracts, washed in warm PBS (x3) and placed in a petri dish containing warm M199-Hepes medium. Ovaries were sliced with a scalpel blade and grade I COCs collected. Harvested COCs were pooled and randomly allocated into: Control group (CON), COCs were immediately denuded and stained with DAPI to assess for the presence of chromatin under a confocal microscope; EmCare group, COCs were placed in embryo holding medium and held overnight at room temperature in the dark; and IVM group, COCs were cultured in M199 + 10% FCS + 5 µg/ml FSH + 40 ng/ml P_4 + 1 µl/ml ITS + 10 µl/ml Anti-Anti at 38.5°C for 24 hours in a 5% CO_2/90% N_2 in air atmosphere. After holding or IVM, COCs were denuded and the presence of chromatin assessed as in CON group. The interaction of treatment and day on the odds ratio of the presence or absence of chromatin was assessed using a binomial logistic regression, with significance at $p < 0.05$. The odds of an oocyte having chromatin after being held in EmCare overnight was not different compared to CON (OR = 0.66). Oocytes in the IVM group had an ~ 76% and 84% reduction in the odds of having chromatin compared to CON (OR = 0.04) and EmCare (OR = 0.06) respectively. We concluded that the chromatin of canine oocytes from COCs held overnight at room temperature in an embryo holding media did not degenerate.

Keywords: Cumulus-oocyte complex, canine, holding, chromatin

Double vagina in a maiden female dog

Jamie Libow, Rachael Willis, Sabrina Cousseau, Jennine Lection

Department of Clinical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA

A 2-year maiden female Norwich Terrier was presented to the North Carolina State University Theriogenology Service for breeding management, with transcervical insemination of shipped cooled semen. Vaginal cytology samples and serum progesterone concentrations were obtained every other day for breeding timing. Dog was bred once on day 3 postLH, due to an impending ice storm. Placement of a vaginal shunt prior to insertion of the rigid endoscope was unsuccessful. A digital vaginal exam was performed to determine why the shunt would not pass and revealed the presence of a stricture at the vestibulovaginal junction. The owner elected to proceed with breeding, despite this abnormality. During insertion of a rigid endoscope to facilitate transcervical insemination, a bifurcated vagina was discovered. The left side was explored that led to a blind end, while the right side led to the cervix. Dog was successfully inseminated, though it was unknown at the time whether other congenital anomalies of the cranial reproductive tract were also present. One month after breeding, pregnancy evaluation via transabdominal ultrasonography was performed; dog was not pregnant. Double vagina is a rare congenital abnormality that has been reported in humans, dogs, and other species. It can be accompanied by other urogenital malformations or occur independently. Therefore, reports of concomitant successful pregnancies are also rare. The heritability of this defect is unknown.

Keywords: Transcervical insemination, congenital abnormality, double vagina

Conservative medical management of septic peritonitis secondary to uterine rupture and retained fetal membranes in a mare

Molly Lobel, Daniela Cortes, Daniel Gomes, Robyn Ellerbrock, John Peroni, Kelsey Hart, Maria Ferrer

Department of Large Animal Medicine, College of Veterinary Medicine, University of Georgia, Athens, GA, USA

Uterine rupture most often occurs during dystocia when excessive traction is applied against a distended uterine wall. Mares typically present 1-3 days postpartum with depression, fever, tachycardia and abdominal pain. Abdominocentesis confirms peritonitis whereas transrectal palpation and ultrasonography may allow definitive diagnosis, depending on rupture location and uterine size. Exploratory laparotomy with surgical repair is the treatment of choice for optimal survival and fertility. A 5-year multiparous Quarter Horse recipient mare was presented with retained fetal membranes 9 hours after an owner-assisted vaginal delivery. Physical examination and hematology were unremarkable. Distention of the chorioallantoic cavity and infusion of umbilical cord vessels were required to promote placental passage. After removal, the mare developed fasciculations, fever, tachycardia, and pale mucous membranes. No full-thickness uterine tears were palpated on reproductive examination. However, a tear could not be excluded, due to uterine size. Serial transabdominal ultrasonography over the next 24 hours revealed increased hyperechoic free fluid, and abdominocentesis yielded cloudy serosanguinous fluid with septic neutrophilic inflammation and intracellular and extracellular bacteria. Repeat hematology had severe leukopenia with neutropenia and lymphopenia, supporting diagnoses of uterine rupture and secondary septic peritonitis. Treatment included fluid therapy, oxytocin, broad-spectrum antimicrobials, flunixin meglumine, and polymyxin B. Uterine lavage was delayed 48 hours, and an abdominal drain was placed, as surgery was declined, recovering abundant hemorrhagic fluid. Daily transrectal ultrasonography and sterile saline uterine lavages were performed, with concurrent medical management and intraabdominal lavage. The mare improved and was discharged after 11 days. This case demonstrated the severity of uterine rupture and its systemic consequences, while highlighting that aggressive medical management can result in a favorable clinical outcome when surgical intervention is declined. Recognition of nonsurgical management strategies is critical, emphasizing the importance of early diagnosis, intensive puerperal care and close reproductive monitoring to improve survival following uterine rupture.

Keywords: Mare, uterine rupture, retained placenta, septic peritonitis, medical management

Multiple primary neoplasms of distinct histologic types reported in terrier mix dog

Katelyn Lundquist,[a] Erin Chamorro,[a] Maninder Sandey,[b] Scarlett Sumner,[a] Robyn Wilborn,[a]

[a]Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]Department of Pathobiology, College of Veterinary Medicine, Auburn University, Auburn, AL, USA

A 14-year intact male terrier mixed-breed dog was presented for asymmetric, testicular enlargement present from 6-12 months prior to presentation and noted to be growing in size. Reproductive examination revealed a diffusely enlarged left testis painful upon palpation and scrotal ulceration. The right testis and epididymis palpated normally in size and consistency, and digital palpation per rectum revealed a normal prostate. *Brucella canis* was ruled out by serologic testing. Urinalysis did not reveal any clinically significant abnormalities. Due to clinical presentation, bilateral castration with scrotal ablation was recommended. On thoracic radiographs, no evidence of metastatic disease was noticed, with no radiographic contraindications to anesthesia. Upon castration, left testis, associated testicular mass, right testis, and scrotum were submitted as samples for diagnosis. Histopathologic report revealed the following: diffuse type seminoma of the left testis, subcutaneous mast cell tumor within the scrotum, and interstitial (Leydig) cell tumor of the right testis. Additionally, diffuse germ cell atrophy with tubular degeneration and hypospermatogenesis was described within the right testis, consistent with testicular degeneration. Testicular tumors are the most common type of reproductive neoplasia in male dogs. The most common types of testicular neoplasia in the male dog include seminomas, interstitial (Leydig) cell tumors, and sustentacular (Sertoli) cell tumors. Bilateral castration is generally recommended as the treatment of choice. Although a singular tumor type is more common, 1 or more tumor types may be present in 1 or both testes, with most being malignant and metastasis uncommon.

Keywords: Testes, seminoma, Leydig cell, scrotum, neoplasia

Antibiotics reshape fungal biogeography across the equine reproductive tract

Humberto Magalhaes, Igor Canisso

Department of Veterinary Clinical Medicine, University of Illinois, Urbana, IL, Champaign, IL, USA

Postmating antibiotic use may influence fungal communities across reproductive body sites, yet longitudinal mycobiome dynamics in mares remain poorly characterized. This study evaluated how treatment, drug class, body site, and time shape fungal diversity and community structure using Internal Transcribed Spacer sequencing. We hypothesized that semen exposure and antimicrobial treatment induce transient but site-specific shifts in fungal diversity without producing uniform compositional changes across body-sites. A total of 1,152 samples collected from uterine, vaginal, clitoral, rectal, and semen sites were analyzed across multiple time points (0, 4 hours-PB, 4 days, 6 days, 14 days). Treatments included lactated Ringer's solution (control), amikacin, ceftiofur, and ticarcillin. Relative abundance data were evaluated using nonparametric tests. Alpha diversity differences across Treatment × Sample Type were assessed using Kruskal–Wallis and Wilcoxon tests. Beta diversity was evaluated using Bray–Curtis PCoA and PERMANOVA, with blocking for individual horse and pool effects. All alpha-diversity metrics differed significantly among groups, indicating strong body-site and treatment effects on fungal richness and evenness. Compositional profiles were dominated by *Ascomycota*, particularly *Eurotiomycetes* and *Saccharomycetes*, with *Aspergillus, Malassezia*, and *Cladosporium* frequently detected across sites. Semen and rectal samples displayed distinct fungal signatures compared to reproductive tract swabs. PERMANOVA demonstrated

significant effects of Sample Type (R^2 = 0.145, p = 0.001), Treatment (R^2 = 0.010, p = 0.001), Time (p = 0.006), and their interactions, indicating dynamic ecological restructuring following exposure to semen and antimicrobial treatments. Drug-specific analyses further revealed significant compositional differences among lactated Ringer's, amikacin, ceftiofur, and ticarcillin groups (R^2 = 0.037, p = 0.001), although temporal effects remained modest relative to body-site variation. In conclusion, the equine reproductive mycobiome is strongly structured by anatomical location and semen exposure, with antibiotics inducing measurable but transient shifts in fungal diversity and composition, highlighting the ecological complexity of cross-site microbial interactions in mares.

Keywords: Mycobiome, internal transcribed spacer, fungal signatures

Effects of postmating intrauterine ticarcillin-clavulanate on uterine inflammation, microbiome dynamics, resistome profiles, and fertility in mares

Humberto Magalhaes, Igor Canisso

Department of Veterinary Clinical Medicine, University of Illinois, Urbana, IL, Champaign, IL, USA

Postmating intrauterine antibiotics are widely used in Thoroughbred mares to prevent endometritis, despite concerns regarding antimicrobial resistance. This study evaluated whether ticarcillin-clavulanate infusions alter uterine inflammation, microbial diversity, antimicrobial resistance genes (ARG), and fertility outcomes in mares. We hypothesized that treatment does not improve fertility but could induce transient microbiome and resistome shifts. Thirty estrous cycles from 15 mares were assigned to control and ticarcillin-clavulanate cycles (n = 15). Infusions were given every 24 hours, beginning 4 hours postmating. Uterine cytology, culture, ultrasonographic assessment of uterine fluid, and 16S rRNA sequencing were performed at premating, 4 hours, 3 days, 5 days, and 15 days, with pregnancy diagnosis on day 15. Mixed-effects models evaluated clinical outcomes, Bray-Curtis PERMANOVA assessed beta diversity, DESeq2 tested differential abundance, and ARG profiles were analyzed using χ^2 or Fisher's exact tests ($p < 0.05$). Ticarcillin-clavulanate did not reduce uterine inflammation or improve fertility. Neutrophil counts were unchanged, whereas uterine fluid increased with treatment and time (p = 0.015; $p < 0.0001$). Severe cytology scores rose transiently at 4 hours postmating, without a treatment effect. Pregnancy rates did not differ between treated (33.3%) and control (46.7%) mares. Alpha diversity differed by treatment for richness metrics and phylogenetic diversity ($p \leq 0.022$), and time postmating significantly structured diversity. Beta diversity differed by treatment and time (PERMANOVA, p = 0.001). Differential abundance analysis identified a transient increase in Streptococcaceae at 4-6 days that resolved by day 14. ARG profiles had time-dependent shifts (tetO, aph) but no overall enrichment relative to controls when all time points were pooled. In conclusion, postmating intrauterine ticarcillin-clavulanate failed to improve fertility or reduce uterine inflammation and induced only transient microbial and resistome changes, supporting more judicious antibiotic use in equine reproductive management.

Keywords: Ticarcillin-clavulanate, microbiome, resistome, mares

Semen-driven microbial succession defines early postbreeding uterine ecology

Humberto Magalhaes, Igor Canisso

Department of Veterinary Clinical Medicine, University of Illinois, Urbana, IL, Champaign, IL, USA

Semen deposition represents a major ecological perturbation to the equine uterus, yet its immediate influence on microbial community structure remains poorly defined. We investigated whether breeding alone reshapes the uterine microbiome within hours, independent of antimicrobial treatment. We hypothesized that semen exposure induces rapid compositional turnover without major changes in overall diversity. Uterine swabs from 50 mares, randomly assigned to breed with 1 of 4 stallions, were analyzed using 16S rRNA sequencing at prebreeding (0 hours) and 4 hours postbreeding. Because semen microbiomes differed significantly among stallions (PERMANOVA, p = 0.001), stallion identity was incorporated as a random factor to account for donor-specific effects. Alpha diversity metrics were evaluated using generalized linear models controlling for mare and stallion, whereas Bray-Curtis dissimilarity and PERMANOVA assessed temporal shifts in community composition. Differential abundance was analyzed at the family level using negative binomial models. Despite strong interstallion variation, semen exposure induced consistent microbial restructuring across mares. Alpha diversity remained largely stable, with no significant differences in richness or phylogenetic diversity between pre and postbreeding samples, indicating that early microbial responses were not driven by an expansion in community size. In contrast, beta diversity differed significantly within 4 hours (PERMANOVA, p = 0.018), demonstrating rapid ecological turnover following breeding. Differential abundance analysis identified transient enrichment of specific taxa, including Streptococcaceae, suggesting early ecological redistribution associated with semen exposure. Antimicrobial resistance gene profiles had minimal temporal change, supporting the interpretation that short-term microbiome shifts primarily reflect community reorganization rather than selective pressure. Together, these findings identified semen as an immediate ecological driver of uterine microbiome dynamics, promoting rapid compositional change without increasing diversity and highlighting early postbreeding microbial succession as a potential mediator of reproductive physiology.

Keywords: Semen, microbiome, antimicrobial resistance, alpha diversity, beta diversity

Clomiphene citrate treatment in an American Miniature Horse stallion

Hannah Maxwell,[a] Candace Lyman,[b] Hayley Moore,[a] Aime Johnson,[a] Robyn Wilborn,[a] Jessica Klabnik[a]

[a]Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]Equine Medical Associates, PSC, Lexington, KY, USA

Persistently poor semen quality in stallions is a frustrating and common complaint, supporting development of novel therapies. An 18-year American Miniature Horse stallion

was presented with a 5+ year history of oligoasthenoteratozoospermia. Following 1 week of sexual rest, 2 ejaculates were collected 1 hour apart. Second ejaculate contained 2.43 x 10^9 total sperm with 20% total sperm motility, 10% progressive motility and 17% normal morphology. Defects included abnormal midpieces (43%) and abnormal heads (23%). A week later, on October 6, intravenous clomiphene citrate (CC) (0.6 mg/kg) was given once daily for 20 days, followed by 45 days of oral dosing. Semen was collected 1-3 times weekly for the duration of treatment. Semen parameters remained similar throughout treatment, with an average of 2.16 x 10^9 total sperm (1.08-3.38 x 10^9), 24% total sperm motility (15-30), 12% progressive motility (8-28%) and 16% normal morphology (10-24%). Morphologic defects were also comparable, with an average of 52% abnormal midpieces and 34% abnormal heads. Testosterone (pg/ml; stallion reference interval 170-1,900) was measured via hCG stimulation utilizing morning samples obtained prior to initiation of the regimen (pre: 468.5, post: 1,423.8), halfway through treatment on November 4 (pre: 913.2, post: 2,278.5), and the day after the last dose of CC on December 11 (pre: 775.3, post: 2,052.3). Although semen quality remained unchanged for the observed treatment duration, serum testosterone increased at a time of year when a decline is expected. In men, CC is prescribed for idiopathic infertility and increases sperm concentration and motility, as well as testosterone concentration.[1] By blocking estrogen's negative feedback at the level of the pituitary and hypothalamus, CC indirectly enhances LH and FSH secretion, thereby increasing testosterone production and spermatogenesis.[1] This case report is the first to investigate the potential to develop a CC treatment protocol for subfertile stallions.

Keywords: Stallion, clomiphene citrate, semen, testosterone, infertility

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Influence of maternal adiposity and habitual physical activity on ultrasonographic conceptus measurements in dogs: preliminary data

Samantha McCarter, Julie Cecere, Stephen Werre, Orsolya Balogh

Virginia Maryland College of Veterinary Medicine, Blacksburg, VA, USA

Obesity has been a potential cause of excessive fetal growth in women, although exercise during pregnancy may mitigate that effect. The effects of adiposity and physical activity on canine conceptus growth are unknown. Our aim was to compare conceptus growth in female dogs of varying body condition scores (BCS) while also monitoring physical activity. Sixteen client-owned healthy, medium to large-breed, 2-5 years, lean (LE; BCS: 4-5 out of 9; n = 10) and overweight (OW; BCS: 6-7 out of 9; n = 6) female dogs were enrolled. Habitual physical activity (Barkpoints) was monitored with a collar-mounted FitBark 2 triaxial activity tracking device from breeding through parturition. Reproductive ultrasonography was performed at 21, 28, 42 and 56 days (d) after ovulation where inner chorionic cavity diameter (ICCD) and biparietal diameter (BPD) were measured on at least 2 conceptuses. ICCD average daily growth rate between d21 and d28 (ICCD mm), BPD average daily growth rate between days 42 and 56 (BPD mm), and percent average daily growth of ICCD (ICCD%) and BPD (BPD%) were calculated and analyzed using ANCOVA mixed models. Fixed effects were BCS group, average Barkpoints during the first 4 weeks after ovulation, and litter size; significance was set at $p < 0.05$. Litter size ranged from 3-11 (mean 8.3). ICCD mm, ICCD%, BPD mm, and BPD% were unaffected by maternal BCS, Barkpoints and litter size. In conclusion, overweight maternal condition and early pregnancy physical activity had no effect on conceptus growth rate. Larger studies, preferentially with the same breed, are needed to confirm these findings.

Keywords: Canine, obesity, pregnancy, physical activity, ultrasonography, fetal growth

Bilateral epididymal obstruction in a Thoroughbred breeding stallion associated with suspected idiopathic systemic granulomatous disease

Brittany Middlebrooks,[a] Melissa Swan,[b] Barry David,[a] Michael Spirito,[a] Matthew Coleridge,[a] Karen Wolfsdorf[a]

[a]Hagyard Equine Medical Institute, Lexington, KY, USA
[b]Veterinary Diagnostic Lab, University of Kentucky, Lexington, KY, USA

Diseases of the epididymides in the stallion are rare and may be congenital or acquired. Acquired disorders are more common and include epididymitis, sperm granulomas, and neoplasia. Evaluation generally consists of palpation and ultrasonography, semen evaluation, and histopathology following castration. A 12-year Thoroughbred breeding stallion was presented in March 2025 for 3 weeks of progressive limb, ventral abdomen, and scrotal edema and weight loss. Bloodwork was indicative of systemic inflammation, characterized by neutrophilia and elevated serum amyloid A. Initial semen evaluation revealed 51.5 x 10^6 sperm with 0% total motility and 0% viability. Morphology revealed 15% normal sperm with numerous detached heads and increased round cells. Infectious disease testing, including Equine Arteritis Virus isolation, was negative. Skin biopsy identified nodular granulomatous dermatitis with vasculitis, suspicious of idiopathic systemic granulomatous disease (ISGD). In April 2025, total sperm output declined to less than 10 x 10^6 sperm across 2 ejaculates, 1 hour apart, with persistent 0% total motility. By October 2025, the stallion's systemic condition had markedly improved; however, both epidydimal heads and bodies were enlarged and firm. Endocrine testing (testosterone, luteinizing hormone, inhibin B, and antimüllerian hormone) was within normal limits and did not support primary testicular dysfunction. In January 2026, 5 ejaculates yielded 10-20 x 10^6 sperm per collection with 0% motility and viability. Ultrasonography demonstrated hyperechoic and hypoechoic lesions within the head and body of the epididymides. Castration was elected. Histopathology confirmed chronic

bilateral sperm granulomas characterized by sperm extravasation, granulomatous inflammation, and dense fibrosis resulting in epididymal obstruction. The seminiferous tubules largely maintained spermiogenesis and bacterial cultures were negative. In stallions, ISGD may result in progressive, likely irreversible bilateral epididymal obstruction, despite preserved endocrine function and improvement in systemic clinical signs. To the authors' knowledge, this is the only reported case of suspected ISGD involving the epididymides of a stallion.

Keywords: Stallion, epididymides, idiopathic systemic granulomatous disease, obstruction

Intraabdominal cervical tear resulting in peritonitis in a mare

Brittany Middlebrooks, Nimet Browne, Russell Freeland, Laurel Caldwell, Sydney Hughes, Jeremy Shaba, Karen Wolfsdorf

Hagyard Equine Medical Institute, Lexington, KY, USA

Cervical lacerations in mares are most commonly associated with dystocia and are typically retroperitoneal, resulting in minimal hemorrhage and limited systemic compromise. A 5-year Thoroughbred mare was bred on second estrous cycle after foaling. Following postbreeding uterine lavage, fresh blood was observed in the effluent; the procedure was discontinued, and intramuscular oxytocin was given. No pregnancy was achieved. The mare's uterus was subsequently cultured 24 hours after intrauterine infusion with N-acetylcysteine; no aerobic bacterial growth was identified, and the mare was bred on the same cycle. Following postbreeding uterine lavage and intrauterine infusion with Tricide® and ampicillin, blood was observed on the sterile sleeve. Manual vaginal examination revealed no trauma in the vestibule or vagina, although a region of the cervix was suspicious for a defect. No pregnancy was achieved, and the mare was not rebred. A manual, diestral cervical examination was unremarkable. At the following estrus, a low-volume uterine lavage was performed for culture and cytology. Several hours later, the mare developed signs of colic and hemorrhagic vulvar discharge. Clinical examination revealed tachycardia and mild tachypnea. Transabdominal ultrasonography identified free abdominal fluid, consistent with hemorrhage or exudate. Referral evaluation and manual cervical examination identified a 4-cm, full-thickness ventral cervical tear communicating with the abdominal cavity. The mare was stabilized with intravenous fluids, antifibrinolytics, Yunnan Baiyao, systemic antibiotics, and antiinflammatories. Endoscopic examination confirmed exposure of the urinary bladder through the defect. Surgical repair using a double-layer closure technique was performed. This case is unique for the intraabdominal location and severity of the tear, with identification only in estrus. The temporal association with routine uterine lavage emphasized that clinically significant cervical trauma may occur in the absence of dystocia. Careful cervical evaluation during both estrus and diestrus is warranted when unexplained hemorrhage is encountered, to prevent systemic compromise and reproductive inefficiency.

Keywords: Cervix, tear, repair, intraabdominal, peritonitis

Right kidney aplasia and left kidney dysplasia in an aborted Thoroughbred fetus

Sanaa Miller,[a] Heidi Twist,[b] Cara Linse,[b] Jordan Kiviniemi-Moore,[b] Maria Schnobrich[b]

[a]The Ohio State University, Columbus, OH, USA
[b]Rood and Riddle Equine Hospital, Lexington, KY, USA

A 13-year multiparous Thoroughbred mare aborted on day 198 of pregnancy. Transrectal ultrasonographic evaluations of the pregnancy at 14, 16, 28, 42, 60, 90, 120 and 150 days of pregnancy were normal. The abortus was submitted for necropsy. Gross evaluation revealed an 8.6 kg female fetus in good body condition, with fetal membranes weighing 4.5 kg. The left kidney was enlarged (11 x 13 x 6 cm) and multilobulated. The right kidney was absent. Cut samples of the kidney had a discernable medulla and cortex with 1-2 mm, pale tan nodules throughout. Histopathology of the lobules had discernable cortical and medullary architecture, with normal glomeruli number, distribution, and morphology. Tubules were markedly dilated and contained eosinophilic proteinaceous debris. The umbilical cord was 80 cm long, with several 360 degree turns, with blanched strictures separated by thickened congested regions. Allantoic vessels had intimal mineralization with frequent mineral deposits in the vascular lumen. Pooled fetal and placental tissue samples were negative for polymerase chain reaction detection of equine herpesvirus type 1 (EHV-1) and Leptospira spp, and EHV-1 fluorescent antibody test. Fetal blood was negative for microscopic agglutination test for *Leptospira* serovars Pomona and Grippotyphosa. Renal dysplasia is an uncommon but well documented congenital, nonhereditary disease of horses.[1] Given the severe pathology of the left kidney and the absence of the right kidney, it is likely the foal would have suffered from renal insufficiency and this, in addition to the possible umbilical cord pathology, was the cause of abortion. To our knowledge, this is the first case of renal aplasia and dysplasia in an aborted fetus reported in horses.

Keywords: Abortion, renal aplasia, congenital defect, umbilical cord

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Diaphragmatic hernia in a Quarter Horse mare after dystocia

Kayleigh Moore,[a] Sandra Yucupicio,[a] Amanda Chagas,[a] Ahmed Mosallam,[a] Lorenzo Segabinazzi,[b] Salman Waqas,[c] Saeed Lariab,[a] Michela Ciccarelli[a]

[a]Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA, USA
[b]School of Veterinary Medicine, Ross University Basseterre, Saint Kitts and Nevis
[c]Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA, USA

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An 11-year Quarter Horse mare was presented for 1-hour dystocia and abortion on day 273 of pregnancy following embryo transfer. Umbilical cord torsion was identified as the cause. The fetal maldisposition was corrected and assisted vaginal delivery was performed, followed by uterine lavage and supportive care including intravenous fluids, broad-spectrum antimicrobials, antiinflammatories, and analgesics. Entire fetal membranes was extracted with the foal, and no lesions were palpated in the uterus, cervix, or vagina. Hospitalization was recommended to monitor for complete recovery. Over the subsequent 5 days, the mare was bright, alert and responsive. However, mare was only eating small amounts, had mild intermittent tachycardia, and coughing during walks. Hematologic abnormalities included neutropenia and mild elevations in hepatocellular and muscle enzymes consistent with recent parturition. Ultrasonography was performed to investigate the cause of coughing and other clinical signs. Mild pleural effusion and B-lines were identified bilaterally, as well as intestinal loops within the thoracic cavity, consistent with a diaphragmatic hernia. Thoracic radiographs confirmed the diagnosis. Surgical repair was discussed with the owner but they declined, and euthanasia was elected. Necropsy revealed a 35-cm diaphragmatic tear, with the entire stomach in the thoracic cavity. Diaphragmatic hernia is an uncommon but recognized sequela of trauma and of conditions that markedly increase intra-abdominal pressure, such as dystocia and parturition.[1,2] Clinical presentation may be inconsistent, with delayed onset of colic or respiratory abnormalities.[3] Advancements in surgical techniques, including the use of prosthetic mesh, have improved prognosis compared to historical reports.[4,5] This case illustrated the importance of considering diaphragmatic hernia as a potential complication following dystocia, even in horses that appear clinically stable. Early identification through thoracic imaging is critical to give owners the opportunity to pursue surgical correction, as the prognosis may be favorable with timely intervention.

Keywords: Equine, dystocia, diaphragmatic hernia, thoracic ultrasonogrpahy, obstetrics

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Implantation of prosthetic testes to improve perineal conformation in a mare

Christina Mozeika,[a] Lauren Pasch[b]

[a]College of Veterinary Medicine, Michigan State University, East Lansing, MI, USA
[b]Rhinebeck Equine, Rhinebeck, NY, USA

An 11-year multiparous barren Thoroughbred mare with evidence of vulvar and vestibular trauma was presented for breeding management. Multiple previous aggressive Caslick procedures resulted in poor apposition of the dorsal vulvar labia, compromising the barrier to the internal reproductive tract. Transrectal ultrasonographic imaging of the uterus was prohibited by intraluminal air throughout the uterus, and the mare was hyperreactive to vulvar manipulation. Previous management attempts included multiple Caslick procedures and subcutaneous vulvar 2.5% polyacrylamide hydrogel (ArthramidVet) injection, with limited and short-term success. A single testicular prostheses (NeuticlesUltraPlus® with ScarRetard®; CTI Neuticles) 2.75 inches long and bisected length-wise, was implanted into the subcutaneous space at the abaxial edge of the vulvar labia, using standing sedation and local anesthetic. An incision was made at the junction of the ventral and middle thirds of the labia. Blunt dissection was directed dorsally to establish a pocket for implantation. Following implantation of the prosthetic, the skin was closed primarily with absorbable monofilament suture; this resulted in immediate apposition of the labia. The procedure was well-tolerated by the mare. The mare was examined weekly; a Caslick was placed and healing of the implantation sites was closely monitored. Although the implant sites developed abscesses and were eventually expelled, their presence resulted in stress relaxation and fibrosis of the labia, effectively serving as tissue expanders that allowed adequate apposition and complete healing of the vulvar lips. This case describes the use of perivulvar prosthetic implants that ultimately failed but served to expand the tissue of the vulva. A disadvantage of this technique is the expected contamination of the surgical site due to the proximity to the anus. Additionally, testicular implants may be cost prohibitive for clients. Potential long-term effects on the character of vulvar tissue have yet to be evaluated.

Keywords: Mare, vulva, Caslicks, prosthesis, pregnancy

A retrospective study of canine nonreproductive cancers associated with neutering status

Natthapong Norkaew,[a] Siyuan Lau,[a] Pornpat Pattana,[a] Pawat Charoenrat,[a] Anijjaya Prempet,[a] Patharakrit Teewasutrakul,[b] Tossaporn Pawjinda,[b] Vachira Hunprasit,[c] Sroisuda Chotimanukul[d]

[a]6th Year Undergraduate Veterinary Student,
[b]Small Animal Teaching Hospital,
[c]Department of Veterinary Medicine,
[d]Department of Obstetrics, Gynaecology and Reproduction,
Faculty of Veterinary Science, Chulalongkorn University, Bangkok, Thailand

Gonadectomy is widely performed in dogs for population control and health management; however, its association with nonreproductive cancers remains controversial. This study aimed to determine the prevalence of selected nonreproductive cancers in dogs and to evaluate demographic risk factors, including neutering status. Medical records of dogs presented to the Small Animal Teaching Hospital, Chulalongkorn University, between 1 January and 31 December 2024 were retrospectively reviewed. Dogs aged > 1 year diagnosed with lymphoma, mast cell tumor (MCT), hemangiosarcoma (HSA), osteosarcoma (OSA), or transitional cell carcinoma (TCC) were included. Data collected comprised age, sex, breed, neutering status, and age at neutering. Statistical analyses were performed using logistic regression and analysis of variance, with statistical significance defined as $p < 0.05$. Among 4,706 dogs, 65 (1.38%) were diagnosed with nonreproductive cancers. MCT was the most common diagnosis (50.77%), followed by HSA (21.54%), TCC (13.85%), OSA (9.23%), and lymphoma (4.61%). Most affected dogs were ≥ 9 years (mean age 10.28 ± 3.62 years), male, purebred, and neutered. Age was the strongest risk factor. Dogs aged 4-8 years and ≥ 9 years had significantly higher odds of cancer compared to dogs aged 1-3 years (OR = 4.38 and 107.17, respectively). Neutered dogs had higher overall odds of nonreproductive cancers than intact dogs (OR = 1.87). Cancer-specific analyses had markedly increased risks of MCT and TCC in dogs aged ≥ 9 years. Male sex and neutering were associated with increased risk of HSA; however, the mean interval between neutering and HSA diagnosis was 9.2 years, suggesting neutering alone may not be the primary causal factor. These findings indicated age as the principal determinant of nonreproductive cancer risk, whereas neutering status and other demographic variables demonstrated cancer type-specific associations. Large-scale prospective studies assessing age at neutering are warranted to clarify and strengthen evidence-based clinical decision-making.

Keywords: Age, dogs, neutering, nonreproductive cancer, risk assessment

Luteoma in an Irish Sport Horse mare

Rachael O'Connell,[a] James Nutt,[b] Lauren Pasch[a]

[a]Rhinebeck Equine, Rhinebeck, NY, USA
[b]The Equine Clinic of Saratoga, Saratoga Springs, NY, USA

A 12-year Irish Sport Horse mare was presented for a reproductive evaluation due to a 15-month history of behavioral changes, including increased vocalization and aggressive outbursts. Historically, the mare had been diagnosed with Equine Gastric Ulcer Syndrome and sleep deprivation secondary to anxiety and environmental stress. The mare's reproductive tract had been previously evaluated on 3 prior occasions in 2024 and 2025; in 2 instances the left ovary was noted to be abnormal in its size and consistency. Bloodwork was submitted twice, 2-months apart, for a granulosa cell tumor (GCT) panel and all values were within normal limits. On presentation in Fall 2025, transrectal ultrasonography and palpation confirmed that both ovaries were freely moveable and non-painful with multiple small follicles present. Significant uterine edema was present at this time, despite daily oral altrenogest treatment. The left ovary contained small string-of-pearl appearing structures, consistent with germinal epithelial inclusion cysts. The echotexture and consistency of the left ovary at this time was subjectively abnormal. Repeat GCT panel had a high-normal inhibin B (63.8 pg/ml) with a normal testosterone and antimüllerian hormone. Based on the abnormal appearance of the left ovary and the unknown etiology of the behavioral changes, a unilateral left ovariectomy was performed laparoscopically in early November, using standing sedation, without complication. On gross examination, the ovary was normal in contour and size. Microscopic examination confirmed epithelial inclusion cysts (an incidental finding). There was an ~ 0.5 x 0.1 cm unencapsulated proliferation of polygonal cells arranged in nests, separated by a scant collagenous stroma, consistent with the diagnosis of luteoma. The mare's objectionable behavior resolved following surgery. Equine luteomas are rare neoplasms with few reported and published cases; gross and clinical findings are generally nonspecific, with histopathology providing a final diagnosis.

Keywords: Equine, mare, luteoma, ovariectomy

Mammary gland ecchymosis in peripubertal female dogs

Luke Pietsch, Kate Bourchard, Emma Impala, Ruby Prince, Morgan Forney, Naomie Macias, Saeed Lariab, Ahmed Mosallam, Michela Ciccarelli, Salman Waqas

Department of Veterinary Clinical Sciences, Washington State University, Pullman, WA, USA

Periglandular mammary ecchymosis following a dog's first estrus is anecdotally considered nonpathologic by some veterinarians; however, no peer-reviewed publications characterized this change and the mechanism is unknown. A 9-month female miniature dachshund was presented for elective ovariohysterectomy. During surgical site preparation, bilateral ecchymosis along the mammary chains was noted, prompting consultation with the Theriogenology Service. Mammary enlargement and bruising began 2 weeks earlier during estrus and had been gradually resolving. Prothrombin time, partial thromboplastin time, platelet count, and blood smear evaluation performed by WSU Clinical Pathology were normal. There were no signs of systemic illness, mastitis, or bleeding diathesis. Literature review revealed no scientific reports describing similar findings; however, multiple anecdotal accounts were identified in online forums. The dog underwent surgery without complications and ecchymosis resolved 1 week postoperatively. To document this condition and inform the veterinary community, we compiled a series of similar cases with sufficient diagnostics to support mammary ecchymosis as a benign finding following a dog's first estrus. Searches using the terms 'abdominal' and 'mammary' bruising were conducted on the Veterinary Information Network (VIN) and filtered using these criteria: 1. ecchymosis isolated to the caudal mammary chains; 2. normal platelet count and/or coagulation testing; and 3. patients evaluated 2-6 weeks after first estrus. Original posters were contacted, and consenting cases have allowed for clinical detail inclusion. Eight cases on VIN met all criteria, while 9 cases met 2 criteria, commonly lacking coagulation diagnostics. In many cases, elective procedures were delayed, and testing was performed to rule out hematologic disease. Characterization of this physiologic process may reduce unnecessary diagnostics and delays. In human medicine, hormonally mediated histologic breast tissue changes are well described. Investigations in case-specific veterinary patients could determine whether mammary

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ecchymosis following the first estrus is attributable to benign hormonal effects rather than pathology.

Keywords: Ecchymosis, peripubertal dogs, mammary gland

Temperament scoring and substance P outcomes in peripubertal bulls undergoing weekly electroejaculation

Anna Reed,[a] Dane Schwartz,[a] Chance Armstrong,[a] Kiliane Gassipard,[b] Jessica Cowley,[c] Chad Foradori,[a] Jenna Bayne,[a] Bernardo Chaves-Cordoba,[d] Jessica Klabnik[a]

[a]College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]L'Ecole Nationale Vétérinaire de Toulouse, Toulouse, France
[c]Virginia Maryland - College of Veterinary Medicine, Blacksburg, VA, USA
[d]College of Agriculture, Auburn University, Auburn, AL, USA

Electroejaculation (EEJ) is a common method for semen collection but is subject to welfare concerns. We assessed hormonal and behavioral metrics associated with aversive stimuli over a multiple EEJ schedule, using a between- and within-subject design. Objective 1: Compare plasma substance P concentrations, pen score (PS), chute score (CS), and exit velocity (EV) between control (n = 4) and collected (weekly EEJ; n = 7) peripubertal bulls for ~ 5 months. Objective 2: Compare PS, CS, and EV of collected bulls on EEJ dates to themselves on alternating nonEEJ dates for the last 2 weeks of the study. We hypothesized no significant differences. At all processing dates, PS and EV were determined. Blood sampling and CS occurred every 2 weeks during the EEJ period and all processing dates during the last 2 weeks. Based on 30-second videos taken within ~ 2 minutes of EEJ, CS was averaged from 3 masked observers. Approximately 15 minutes after EEJ (collected) or a comparable time (control), blood was collected in potassium EDTA tubes with aprotinin for plasma Substance P quantification via ELISA. Data were analyzed using generalized linear mixed-effects models for treatment and time via R Studio. Results: Objective 1. interaction between time and treatment for PS, CS and EV ($p > 0.05$), was not significant but they decreased over time ($p > 0.05$). Neither interaction nor main effect of treatment was significant for Substance P concentration ($p > 0.05$), but time was significant ($p < 0.05$). Objective 2. neither the interaction nor main effects were significant ($p > 0.05$). Based on these preliminary results, there was no indication of long-term welfare concerns. However, results must be interpreted carefully due to the small sample size on peripubertal bulls and differences of values assigned using a subjective scoring system.

Keywords: Bull, electroejaculation, substance P, temperament scoring

Uterine prolapse in a llama

Anna Reed, Dane Schwartz, Jessica Prim, Robyn Wilborn, Jessica Rush

College of Veterinary Medicine, Auburn University, Auburn, AL, USA

A 5-year female llama weighing 180 kg was presented for evaluation of uterine prolapse. Llama had given birth the morning of presentation with no complications, and owners reported passing of fetal membranes. The llama was in the pasture with a uterine prolapse within an hour after parturition. Prior to presentation, llama had significant bleeding on farm. On presentation, she was quiet, alert, and responsive. Minimal bleeding was observed from the uterus. Llama was hypothermic (97.6°C), tachypneic (45 breaths per minute), and normocardic (72 beats per minute). Uterine prolapse of both horns was observed, with an 8-inch full thickness uterine tear located on the dorsal aspect of the left uterine horn. A lumbosacral epidural and sedation were given. Llama was maintained in the 'kush' position. Uterus was cleaned with soap and water, and the full-thickness tear was sutured on the endometrial surface in a simple continuous pattern using 2-0 chromic catgut. Edema was reduced and the uterus was replaced. Following the inversion of the uterus, Buhner stitch was placed. Due to client constraints, further hospitalization and care were declined. The owner subsequently reported that the llama died 24 hours after presentation. Uterine prolapse is uncommon in South American camelids and is associated with dystocia, retained fetal membranes, hypocalcemia, and late-term abortion.[1] Eversion of one or both horns can occur, with hemorrhage of major vessels occurring near the cervix.[2] This case demonstrated eversion of both uterine horns. Prognosis for life is good with prompt replacement and no complications. However, a full-thickness uterine tear and hemorrhage on farm were complications in this case. The llama was transported to the hospital, as on-farm management was not feasible. It is advised not to transport animals with uterine prolapse due to further hemorrhage via vascular rupture.

Keywords: Uterine prolapse, llama, full-thickness uterine tear

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Focal paratesticular cyst in a Standardbred stallion

Tressa Reiner,[a] Theresa Beachler,[b] Jarrod Troy,[a] Eric Cassman[c]

[a]Department of Veterinary Clinical Sciences,
[b]Department of Veterinary Diagnostic and Production Animal Medicine,
[c]Department of Veterinary Pathology, College of Veterinary Medicine, Iowa State University, Ames, IA, USA

Paratesticular cysts can include epididymal cysts (arising within the main epididymal duct) or cysts of surrounding structures such as the appendix of the epididymis (remnant of the proximal end of the mesonephric duct). These cysts, especially ones so large, are rare in stallions. A 14-year Standardbred stallion was presented for evaluation of a mass on his testis that had been reported to be there for many years as well as semen evaluation due to deteriorating semen quality. The stallion was collected off a phantom in the presence of a tease

mare and produced an ejaculate with < 10% subjective progressively motile sperm cells and 25% morphologically normal sperm. On physical examination, a large mass located adjacent to his left testis was observed. Stallion's left testis was notably smaller in size than the right and soft on palpation. On ultrasonography, the mass was a mixed echogenic encapsulated cystic structure measuring 8.13 x 5.08 cm. The stallion underwent a unilateral castration to remove the cystic structure and affected testis. Histopathology revealed a large fluid-filled cystic space (7.7 x 6 x 4 cm) extending from the head of the epididymis to the spermatic cord dorsally, containing serous, semitransparent fluid and lined by cuboidal to columnar ciliated epithelium. Sperm were still identified in the tail of the epididymis and spermatogenesis was observed in the testis. Incidentally, a small seminoma was within the testicular parenchyma. The above findings were most consistent with a large cyst of the appendix of the epididymis.

Keywords: Equine, epididymal cyst, hemicastration, stallion

Effect of intrauterine infusion of kerosene in the mare

Debra Roussel,[a] **Javier Funes,**[a] **Patricio Razquin,**[a] **Chelsie Burden,**[a] **Jenny Sones,**[a] **Carleigh Fedorka,**[b] **Patrick McCue,**[a] **Jennifer Hatzel**[a]

[a]Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences,
[b]Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA

Chemical curettage of the equine endometrium using the light petroleum distillate kerosene is employed with varying frequency worldwide, yet few controlled studies have evaluated the effects of intrauterine kerosene infusion in mares. The present study aims to assess the bacterial, cytologic, and histologic effects of intrauterine kerosene infusion, as well as to characterize patient discomfort resultant from the procedure. We hypothesize kerosene causes pronounced inflammation without severe discomfort in the mare while increasing positive culture results. Four mares with Kenney endometrial biopsy scores of IIB were infused with 500 ml kerosene 5 days following ovulation. Uterine culture and cytology, endometrial biopsy, plasma cortisol, and temperature, pulse, and respiration rate (TPR) were evaluated before and 72 hours after kerosene infusion. Uterine cultures and endometrial cytologies were obtained using a double-guarded swab (culture) or cytobrush (cytology) and low-volume lavage (LVL) prior to ovulation and 72 hours after kerosene infusion. Cytology was normal in all mares prior to treatment but demonstrated marked neutrophilic inflammation 72 hours after infusion. Serial plasma cortisol concentrations and TPR following infusion had minimal variation from baseline values. Prior to kerosene infusion, samples from all 4 mares yielded no growth in aerobic culture; however, 72 hours after infusion, 3 of 4 mares were culture-positive for beta-hemolytic *Streptococcus* spp. *Streptococcus equi* subsp *zooepidemicus* was identified by polymerase chain reaction in endometrial tissue collected prior to kerosene infusion, as well as from colonies cultured postinfusion. This finding suggested bacteria present in the uterine lumen which fail to grow in aerobic culture can be successfully cultured following kerosene treatment. The identification of previously undetected bacteria may allow for appropriate recognition and treatment of insidious bacterial endometritis. In summary, endometrial chemical curettage using 500 ml of kerosene 5 days following ovulation induced uterine inflammation and alteration in bacterial growth in culture, without evidence of discomfort in the mare.

Keywords: Equine, intrauterine treatment, chemical curettage, kerosine

Epididymectomy in a Braford bull that reattached and sired calves

Felix Samuel,[a,b] **Jessica Klabnik,**[a] **Miguel Saucedo,**[c] **Jessica Rush**[a]

[a]College of Veterinary Medicine, Auburn University, Auburn, AL, USA
[b]Animal Science Program, Alabama Cooperative Extension System, Alabama A&M University, Huntsville, AL, USA
[c]College of Veterinary Medicine, Iowa State University, Ames, IA, USA

Epididymectomy is a surgical sterilization procedure that removes or transects the caudal epididymis to block sperm transport, causing permanent infertility while preserving androgen production. In August 2022, a 2-year, 280.3 kg Braford bull underwent elective bilateral caudal epididymectomy using a transscrotal approach with blunt dissection and removal of the epididymal tails, with incisions left to heal by second intention. Postoperative instructions recommended a breeding soundness examination (BSE) and seminal alkaline phosphatase testing 60 days later to confirm sterility; the referring veterinarian performed a BSE and diagnosed the bull to be sterile. Three years later, the now 1,330 kg bull was represented after reportedly siring calves in the most recent year. A BSE was performed, revealing 70% progressive sperm motility and 82% normal morphology. Scrotal ultrasonography identified an enlarged remnant of epididymal tissue on the right side, suggesting either incomplete removal or spontaneous reconnection of the epididymal ducts, allowing sperm passage. Given the confirmed ejaculation of sperm, the owner elected castration that was performed using a closed technique. Postoperative treatments included subcutaneous ceftiofur crystalline free acid (6.6 mg/kg) once, transdermal flunixin meglumine (3.3 mg/kg) once daily and tetanus toxoid. On day 8 postoperatively, the bull developed scrotal edema, pyrexia (40.8 °C), tachycardia and decreased appetite. On day 10, mucopurulent nasal discharge and increased bronchovesicular lung sounds were noted. Hematology revealed mild microcytosis, hypochromia, low reticulocyte percentage and moderate echinocytosis. Serum biochemistry demonstrated hypoalbuminemia, hyperglobulinemia, low A/G ratio, low magnesium, low serum iron and lipemia. Thoracic ultrasonography identified diffuse bilateral comet tails, confirming pneumonia. Treatment with subcutaneous florfenicol (40 mg/kg) once and transdermal flunixin meglumine (3.3 mg/kg) resulted in clinical improvement. This case highlighted persistent fertility following epididymectomy due to reattachment of residual tissue and emphasized the importance of postprocedural fertility confirmation, client compliance and prompt diagnostic intervention.

Keywords: Epididymectomy, bull, subfertility, breeding soundness examination, castration, epididymal remnant

Metastatic granulosa cell tumor in a North American Spotted Draft Horse

Julia Slocum-Coffey,[a] **Marco Coutinho da Silva,**[a] **Erin Runcan,**[a] **Laura Hostnik,**[a] **Brittney Graham,**[b] **Christopher Premanandan**[b]

[a]Department of Veterinary Clinical Sciences,
[b]Department of Veterinary Biosciences, College of Veterinary Medicine, The Ohio State University, Colombus, OH, USA

A 15-year North American Spotted Draft Horse was presented to the Ohio State University's Veterinary Medical Center for evaluation of exercise intolerance and progressive dyspnea. On presentation, the mare was quiet, alert, and responsive with tachypnea, tachycardia and increased bronchovesicular sounds. Thoracic ultrasonography revealed ~ 5 cm of anechoic pleural effusion. Abdominal ultrasonography revealed ~ 20 cm of echogenic free fluid, and a large mass effect along the abdominal surface of the diaphragm and in the retroperitoneal space. An abdominocentesis revealed a low cellularity, mildly hemodiluted fluid (PCV 8%, total protein 4.8 g/dl). Cytology revealed proportionally increased neutrophils, consistent with mild inflammation. Radiographs confirmed moderate bi-cavitary effusion with multi-lobar atelectasis. A complete blood count and chemistry analysis revealed mild anemia, an unremarkable leukogram, marked hepatocellular enzyme elevations, and hypertriglyceridemia. Based on these results, a neoplastic process was suspected. The owners declined further diagnostics, and the horse was discharged with oral prednisolone (1 mg/kg) once daily and sulfadiazine/trimethoprim (30 mg/kg) twice daily for palliative care. Horse was euthanized 6 days later due to progression of dyspnea, pallor, and colic. On necropsy, severe tri-cavitary effusion and multifocal nodules along the serosa of the diaphragm, stomach, and spleen. A firm, centrally cavitated mass effaced the right ovary with multifocal to coalescing nodules arising from the mesovarium, suggesting a primary neoplasm with subsequent metastasis. Samples from the ovary, diaphragm, and spleen were submitted for histopathology and identified a metastatic granulosa-theca cell tumor. Granulosa-theca cell tumors are a common ovarian tumor; however, metastasis is rarely reported in the horse. Typical clinical suspicion arises from behavioral changes such as nymphomania, persistent anestrus, stallion-like behavior, or aggression. The owner reported none of these behavioral changes; only a progressive reluctance to work and exercise intolerance, not typically indicative of this ovarian neoplasm.

Keywords: Equine, ovary, neoplasia, metastatic, necropsy

Symmetrical parapagus dicephalus in an equine fetus after twin reduction

Taylor Smith, Hannah Maxwell, Dane Schwartz, Hayley Moore, Katelyn Lundquist, Robyn Wilborn, Jessica Klabnik

Department of Clinical Sciences, College of Veterinary Medicine, Auburn University, Auburn, AL, USA

A 15-year multiparous Quarter Horse mare presented for pregnancy termination at 75 days of pregnancy. For resident training, the mare had been selected to be artificially inseminated and serve as an embryo recipient on the same cycle. When ovulation was confirmed on the donor, the recipient received hCG for ovulation induction. The mare was inseminated the following day with frozen thawed semen extended to 50 x 10^6/ml with INRA96, and ovulation was confirmed 24 hours after insemination. Six days after the recipient's ovulation, the donor's fresh day-8 blastocyst was transferred using Wilsher cervical forceps; the mare was treated with flunixin meglumine and 150 mg injectable altrenogest. Pregnancy diagnosis 1-week after transfer revealed 2 embryonic vesicles, ~ 2 days apart in pregnancy. Following bilateral fixation, ultrasonographic-guided manual reduction was attempted on the recipient's own 17-day vesicle but was unsuccessful; manual reduction was then successfully performed on the transferred 19-day vesicle. The surviving single pregnancy progressed normally, exhibiting expected fetal maturity and activity. On day 75 of pregnancy, the mare aborted a filly fetus following several days of dinoprost injections. Upon gross examination, the fetus had 2 symmetric heads including 4 eyes, 4 ears, 1 neck and 1 complete body, consistent with symmetric parapagus dicephalus, a rare type of conjoined twinning with an unknown pathogenesis. Some hypotheses describe disruption of certain cell signaling pathways involved in morphogenesis whereas the fission hypothesis proposes incomplete fission of an embryo destined to produce monozygotic twins during the primitive streak stage.[1] The early head of the equine conceptus is first present on day 17.[2] Though the cause of the fetal malformation in the presented case was unknown, disruption of the embryonic vesicle during the manual reduction attempt on day 17 was noteworthy in this case, as it may have contributed to abnormal cephalic development.

Keywords: Dicephalus, equine, twin reduction

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Acetate at day 34 of pregnancy has a role in equine chorionic girdle differentiation

Jenny Sones,[a] **Patricio Razquin,**[a] **Javier Funes,**[a] **Julie Wall,**[a] **Isabella Faulkner,**[a] **Jenn Hatzel,**[a] **Carleigh Fedorka,**[b] **Patrick McCue**[a]

[a]Equine Reproduction Laboratory,
[b]Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA

Early pregnancy loss is a poorly understood cause of economic loss in the equine breeding industry. Often this is diagnosed by pregnancy loss between days 35 and 45 after ovulation. Failure of chorionic girdle (CG) trophoblasts to differentiate into endometrial cups (EC) in the pregnant uterus of mares is

a differential diagnosis but represents a knowledge gap. Microarray data had upregulation of free fatty acid receptor (FFAR)2 in day 34 equine CG, suggesting a role in the development of EC. A potent ligand of FFAR2, acetate, is a short chain fatty acid (SCFA) produced by microbial fermentation in the gut. Therefore, we hypothesized that SCFAs is present in the uterus of nonpregnant mares and increasing concentrations in pregnant mares prior to EC formation. Twenty-one mares were bred with fresh semen from 1 stallion. Serum and uterine fluid samples were obtained before and after insemination, and on day 34 conceptus retrieval (n = 10). Acetate concentrations were measured using gas chromatography mass spectrometry (GC-MS). Day 34 CG was dissected and cultured with acetate as well as an FFAR2 antagonist for detection of equine chorionic gonadotropin (eCG) mRNA expression. Statistics were performed using GraphPad Prism 10.6.1. Normally distributed data was tested by one-way ANOVA, with significance set at $p < 0.05$. Acetate concentrations in uterine fluid significantly increased after breeding ($p = 0.01$), which persisted at day 34 of pregnancy ($p < 0.05$), whereas serum acetate concentrations were lower ($p < 0.05$). RT-qPCR confirmed increased FFAR2 mRNA in CG versus chorion ($p < 0.001$) and stimulation of eCG mRNA with in vitro acetate that was blunted by an FFAR2 antagonist ($p < 0.05$). In conclusion, acetate was present in the equine uterus and at day 34, and stimulated eCG in CG in vitro cultures. Future work is needed but this suggests utilization of acetate by the equine CG to promote EC formation.

Keywords: Equine, pregnancy, chorionic gonadotropin, trophoblast, acetate, endometrial cup

Ovariohysterectomy following chronic pyometra in an American Miniature Horse mare

Kaitlyn Steele, Haley Tate, Michelle Tucker, Justin Hayna

College of Veterinary Medicine, Purdue University, West Lafayette, IN, USA

A 6-year American Miniature Horse mare was referred for management of chronic pyometra of ~ 4 months duration. History included abortion at 8-9 months of pregnancy, 8 months prior to presentation. Clinical signs consisted of intermittent discomfort and dysuria. Three months prior to presentation, manual debridement of cervical adhesions was performed by the referring veterinarian, temporarily alleviating the clinical signs. On presentation, physical examination parameters were unremarkable, while reproductive examination revealed a grossly inflamed, fibrotic and sealed transverse fold; attempts to bypass the transverse fold and enter the vagina were unsuccessful. Transabdominal ultrasonography revealed a large, fluid-filled viscus in the caudal abdomen. The cervix could not be identified. Complete blood count and serum biochemistry profiles were consistent with an inflammatory process. Transvaginal ultrasonography demonstrated a transverse fold thickness greater than 1 cm, thus making it unsuitable for laser ablation. Abdominal computed tomography confirmed the diagnosis of a severe pyometra extending cranially to the 11th intercostal space. Due to pain refractory to medical management, ovariohysterectomy was performed. After partial exteriorization and abdominal packing, the uterus was decompressed through a stab incision using suction and ~ 8 l of purulent material were drained. The cervix could not be identified; therefore, intraoperative transvaginal palpation was used to establish the caudal boundary for resection. Sharp resection was performed, and the cranial vagina was closed using 2-layer closure. The uterus and both ovaries were submitted for gross and histopathologic analysis. The uterus had severe endometritis with marked fibrosis. Both ovaries contained hemorrhagic luteal structures. Culture and susceptibility testing of uterine contents revealed mixed bacterial growth, with a predominant population of multidrug-resistant methicillin-resistant *Staphylococcus pseudintermedius.* Mare recovered and was discharged on flunixin meglumine and chloramphenicol. Three weeks after surgery, the client reported the mare was doing well.

Keywords: Equine, pyometra, ovariohysterectomy

Entrapment of vaginal secretions between circumferential ligatures 6 years following an ovary-sparing hysterectomy in a German Shepherd dog

Robert Stein,[a] Michelle Kutzler[b]

[a]Veterinary Anesthesia & Analgesia Support Group, New York, NY, USA
[b]College of Veterinary Medicine, University of Minnesota, St. Paul, MN, USA

In 2019, a 1-year female German Shepherd was presented for an ovary-sparing hysterectomy. Recovery from surgery was uncomplicated and the dog had no health problems during semiannual routine wellness veterinary visits until June 2025. On this visit, a 3-cm right caudal abdominal mammary mass was diagnosed. The mass was surgically excised and histopathologically diagnosed as a grade 2 mammary adenocarcinoma with complete margins. Follow-up thoracic and abdominal radiographs performed on November 13 were within normal limits, other than a soft tissue opacity mass in the caudal abdomen ventral displacing the bladder neck and dorsal displacing and narrowing the descending colon. Abdominal ultrasonography performed on November 21 revealed an 8-cm echogenic, fluid-filled structure. Although the mass was not causing any clinical signs, a laparotomy was performed on December 2. The mass was broadly and intimately attached to urinary bladder and deemed unresectable by the surgeon, but fluid was aspirated for evaluation. Cytologic evaluation of the aspirated fluid revealed degraded squamous epithelial cells, consistent with vaginal secretions. The caudal abdominal mass was diagnosed as a dilated portion of the cranial vagina formed between 2 circumferential ligatures that had been placed during the hysterectomy performed 6 years previously. Because of the previous diagnosis of mammary adenocarcinoma, a bilateral ovariectomy was performed. Both ovaries were within normal limits other than the presence of a 3-cm paraovarian cyst adjacent to the right ovary. This case is important to applied theriogenology because it illustrates a potential (albeit incidental) complication following ovary-sparing hysterectomy sterilization. The incidence of entrapped vaginal fluid following hysterectomy is not known, but this is the second case this author (MK) has diagnosed. Modifying the surgical procedure by transfixing the caudal uterine arteries and performing only a single circumferential vaginal ligature should prevent this condition from occurring.

Keywords: Hysterectomy, postsurgical complication, entrapped vaginal secretions, mammary adenocarcinoma

Leptospiral abortion and prepartum ultrasonographic findings in a Thoroughbred mare

Queen Trigg,[a] **Kristen Near,**[b] **Nathaniel Newton,**[a] **Pete Sheerin,**[a] **Maria Schnobrich**[a]

[a]Rood and Riddle Equine Hospital, Lexington, KY, USA
[b]Bluegrass Equine Surgery, Versailles, KY, USA

A 5-year primiparous Thoroughbred mare with no vaccination against *Leptospira* spp. was evaluated on day 277 of pregnancy for premature mammary gland development. Transrectal ultrasonography revealed normal combined thickness of the uterus and placenta (CTUP; 0.6 cm) and fluid echogenicity. Transabdominal ultrasonography revealed anterior fetal presentation, normal fetal heart rate (86 bpm), mild stromal enlargement surrounding allantoic vessels (allantoic megavessels;[1] 1 cm diameter) and umbilical cord thickening (11 cm diameter) with stromal edema. Treatment for placentitis was initiated with oral trimethoprim-sulfadiazine (24 mg/kg) twice daily, oral flunixin meglumine (1.1 mg/kg) once daily, oral aspirin (3.8 g/day) once daily, oral altrenogest (0.044 mg/kg) twice daily, and oral pentoxifylline (8.5 mg/kg) twice daily. Total estrogens (468.82 pg/ml) and progestogens (16.79 ng/ml)[2] indicated fetoplacental compromise. Microscopic Agglutination Test (MAT), the gold standard reference test for diagnosing leptospirosis in humans and animals, identified titers against serovars Pomona (1:400) and Grippotyphosa (1:3200). Four days later, ultrasonography revealed progressive edema of the allantoic vessels and umbilical cord, a dilated urachus (5.7 cm diameter), and chorioallantoic separation containing swirling fluid. Repeat MAT 12 days later demonstrated an increased Pomona titer (1:12,800). The mare aborted the following day. Histopathology identified placental edema, lymphoplasmacytic placentitis, and fetal nephritis. Warthin-Starry staining revealed numerous spirochetes within the chorioallantois. Real time polymerase chain reaction of fetal tissues was positive for *Leptospira* spp. These findings described the preabortion ultrasonographic appearance of leptospiral placentitis and abortion in a mare.

Keywords: Abortion, leptospirosis, fetal ultrasonography, umbilical abnormality

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Seminoma in a 17-year breeding Thoroughbred stallion

Alexandra Trulsen, Peyton Draheim, Cosette Faivre

Hagyard Equine Medical Institute, Lexington, KY, USA

A 17-year Thoroughbred stallion presented for scrotal swelling that increased throughout the 2025 breeding season. However, no signs of discomfort were described Pregnancy rates were reported at ~ 80-90% from 2023-2025. On examination, the right testis was significantly larger than the left, with ultrasonography revealing a mixed echogenicity, well-demarcated lesion affecting much of the parenchyma. The left testis appeared unaffected. Unilateral orchiectomy was pursued to preserve the stallion's health and breeding status. The testis was submitted for histopathology, weighing 1.81 kg and measuring 14 x 14 x 8 cm. Histopathology confirmed a seminoma, one of the most common testicular tumors in stallions. One month later, the stallion presented with fevers and weight loss. Stallion was diagnosed with surgical site infection and right superficial inguinal lymphadenopathy. Transrectal palpation revealed an orange-sized, firm mass caudal to the right kidney. Treatment was started with 2,200 mg oral minocycline twice daily, 57 mg oral firocoxib (Equioxx®) and 1 mg oral pergolide (Prascend®) once daily. At 1 month reexamination, surgical site had partially healed, right inguinal lymph node was still mildly enlarged and pelvic mass still palpable but reduced in size. Thoracoabdominal ultrasonography remained unremarkable. Antimicrobial therapy switched to 4,000 mg oral enrofloxacin, which resolved the infection. In January 2026, a breeding soundness examination was performed. After failure to ejaculate in an artificial vagina, the stallion bred a tease mare, and a dismount sample was analyzed. Subjective visual motility evaluation estimated 70% total motility and 60% progressive motility. Morphological evaluation revealed 72% normal sperm, with the most common defect being proximal droplets (12%). On ultrasonography, the remaining testis measured 6.40 cm wide, 7.63 cm tall, and 8.76 cm long, and right superficial inguinal lymphadenopathy had resolved. Predicted daily sperm output was calculated at 4.612 x 10^9 total sperm. The stallion has a book of 40 mares to cover this season.

Keywords: Testis, hemicastration, seminoma, neoplasia

Characterization of uterine lesions in relation to fertility in dogs

Joshua Trumble,[a] **Christopher Premanandan,**[b] **Marco Coutinho da Silva,**[a] **Erin Runcan**[a]

[a]Department of Veterinary Clinical Sciences,
[b]Department of Veterinary Biosciences, College of Veterinary Medicine, The Ohio State University, Colombus, OH, USA

Endometrial health is critical for initiating and maintaining pregnancy in all species. Endometrial biopsy has been used for assessing and predicting reproductive efficiency and is best defined in equids.[1] Studies have determined a potential link between endometrial lymphoplasmacytic inflammation and infertility in dogs.[2,3] However, there has yet to be any comparison of the lesions in the endometrium of fertile and subfertile female dogs. Goals of this study were to evaluate the canine endometrium of fertile and subfertile female dogs and determine inflammatory changes and other lesions associated with the history of subfertility. Our hypothesis was that female dogs with no history of infertility have fewer endometrial lesions and less inflammation compared to subfertile female dogs. Seven female dogs were subjected to ovariohysterectomy after at least 3 breeding attempts were made. Uteri were sectioned uniformly, collecting 3 sections from proximal, middle, and distal uterine horns and both ovaries to estimate the estrous cycle stage. The tracts were assigned to fertile and subfertile groups, based

on predefined criteria. Subfertile dogs were defined by documented resorptions via ultrasonography, reduced litter sizes, and/or difficulty establishing and maintaining pregnancy. Fertile dogs had no issues in those criteria. Presence and type of inflammatory cells within the endometrium were evaluated and scored based on the number of cells observed. Presence and number of endometrial fibrosis and cysts were also determined and compared by Fisher's exact test, with significance set at $p < 0.05$. Samples from subfertile female dogs received a numerically higher score for lymphoplasmacytic inflammation (1.66 out of 4.0) compared to fertile female dogs (1.21 out of 4.0). Samples from subfertile female dogs had higher frequency of cysts (22 versus 7%; $p = 0.017$) and tended to have more fibrosis (13 versus 4%; $p = 0.097$) than fertile female dogs. These results suggested that previously described endometrial lesions may be more prevalent in subfertile female dogs.

Keywords: Canine, uterus, biopsy, fertility

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Microscope lens affects bull sperm morphology assessment outcomes

Elly Vinton, Jessica Rush, Chance Armstrong, Katelyn Waters, Jessica Klabnik

College of Veterinary Medicine, Auburn University, Auburn, AL, USA

Assessing sperm morphology is a critical component of bull breeding soundness examinations; however, it may not be consistently prioritized due to the extra time and supplies required. Removing barriers, such as the need for immersion oil or widening the field of view, may decrease resistance. The objective of this study was to determine if the percentage of normal sperm morphology differed between 100 x oil, 100 x dry, and 50 x oil objectives. The hypothesis was the percentage of normal sperm are lower for 100 x oil compared to either 100 x dry or 50 x oil objectives. Ejaculates with < 70% normal sperm (based on eosin-nigrosin stain under 100 x oil objective) from 23 bulls were included. From these ejaculates, each observer read 23 eosin-nigrosin stained slides per lens (100 x oil, 100 x dry, and 50 x oil); within each set of 23 slides, bull identity was randomized and masked. Observers (n = 2) categorized 100 sperm per slide as either normal or abnormal morphology using an Olympus CH-2 microscope. Data were averaged between observers and analyzed using a generalized linear mixed model, with lens as independent variable, percent normal morphology as dependent variable, and bull identity as a random variable in RStudio. Significance was set at $p \leq 0.05$. Relative to the 100 x oil lens, the 100 x dry was different ($p = 0.05$) but the 50 x oil was not different ($p = 0.08$). Numerically, the 100X oil lens had the greatest mean ± standard deviation (53.4 ± 16.2) compared to either the 100 x dry (47.9 ± 14.3) or the 50 x oil (48.4 ± 14.7). These results will be expanded to include additional masked observer(s) and to analyze the types of defects. Preliminary results suggested other lenses could be considered, but larger studies should be conducted before adoption of an alternative to the current 100 x oil standard.

Keywords: Breeding soundness examination, microscope, semen, morphology, bovine

Association between lifetime reproductive investment and late-life frailty in female dogs: cost of reproduction?

David Waters,[a,b] Aimee Maras,[b] Rong Fu,[c] Andres Carrillo,[d] Emily Chiang[b]

[a]Center on Aging and the Life Course, and Department of Veterinary Clinical Sciences, College of Veterinary Medicine, Purdue University, West Lafayette, IN, USA
[b]Center for Exceptional Longevity Studies, Gerald P. Murphy Cancer Foundation, West Lafayette, IN, USA
[c]Department of Sociology, Siena University, Loudonville, NY, USA
[d]Department of Exercise Science, College of Health Sciences, Chatham University, Pittsburgh, PA, USA

A recent review of canine longevity suggested that, in female dogs, reproduction might accelerate aging due to investment in production of offspring.[1] That stance was supported by a study correlating breed-average litter size and neonatal weight with average life expectancy across various breeds.[2] However, that study used no individual data on reproductive investment. Here, we test the hypothesis that production of live offspring (parity) comes at a cost; contributing to senescence, thereby leading to increased late-life frailty. We tested this hypothesis by measuring deficit accumulation using a 34-item clinical frailty index in a cohort of 95 geriatric, client-owned Rottweiler female dogs. Study outcome was late-life robustness, defined as the lowest quintile of frailty score at age 13 years. Logistic regression estimated likelihood of late-life robustness in 38 parous compared to 57 nulliparous female dogs (intact > 2 years). There was no evidence of reproductive cost. Instead, there was a positive association between parity and late-life robustness. Compared to nulliparous female dogs, parous female dogs were 3 times more likely to retain late-life robustness (OR = 3.23, 95% CI 1.10-9.47, $p = 0.03$), a relationship that was not attenuated adjusting for gonad exposure, age at frailty scoring, and owner-reported reason for nulliparity. Moreover, female dogs with largest number of litters (> 3) had highest late-life robustness ($p = 0.04$). Finally, among nulliparous female dogs, there was no difference in late-life robustness between female dogs with or without health deficits (including reproductive failure) as reason for nulliparity. This represents the first evaluation of canine reproductive investment and frailty. The linkage we observed between parity and higher late-life robustness is congruent with results of several studies in women, suggesting parous females may have the capacity to dampen development of later-in-life frailty. This cohort may be valuable in exploring environmental, genetic and epigenetic factors contributing to the apparent frailty-ameliorating capacity of some parous females.

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Keywords: Cost of reproduction, frailty index, deficit accumulation, aging, healthspan, life course approach

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Dystocia secondary to fetal hydrocephalus in a Quarter Horse mare

Rachael Willis,[a] Jamie Libow,[a] Jennine Lection,[a] Eva Fata,[a] Erin Pearson,[a] Hannah Stephen,[b] Elizabeth Rose,[b] Sabrina Cousseau[a]

[a]Department of Clinical Sciences,
[b]Department of Population Health and Pathobiology, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA

A 13-year Quarter Horse maiden mare was presented to the North Carolina State University Theriogenology Service in dystocia lasting ~ 5 hours. The estimated pregnancy length was 329 days. The fetus was in anterior presentation, dorsosacral position with right ventroflexion of the head and neck and bilateral flexion of the carpi. Fetal hydrocephalus was also noted. Assisted and controlled vaginal deliveries were attempted, but cesarian surgery was elected. The mare was kept hospitalized for 8 days for retained fetal membranes management. The uterus was lavaged with ~ 5-10 l total of isotonic saline solution twice a day until the placenta was expelled intact. The mare retained the placenta for ~ 48 hours. At ~ 72 hours after surgery, the mare exhibited moderate colic signs. A mural hematoma, 12 cm in diameter, was noted via transabdominal ultrasonography on the ventral portion of the left uterine horn. Medical management was elected and she recovered uneventfully thereafter. Upon necropsy of the fetus, moderate unilateral right carpal valgus and left carpal varus were noted. No other congenital abnormalities were noted, apart from the head. Severe calvarial enlargement with an open fontanelle measuring 25 x 20 cm and containing ~ 3.8 l of clear pale-yellow watery fluid was observed. The cerebral neuropil and leptomeninges were thin, measuring 2-3 mm in thickness. On gross and histological examination of the brainstem, no ventricle or aqueduct were identified. Although hydrocephalus is considered the most common congenital brain malformation in foals, its overall incidence is still very low; ~ 0.6 in 1,000 foals with congenital defects. It is most commonly reported in miniature horses and Friesians, with the most common cause being aqueduct stenosis. Finally, despite its low incidence, hydrocephalus cases have been reported to contribute to up to 5% of dystocias, highlighting their clinical importance.[1]

Keywords: Equine, hydrocephalus, dystocia

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Deep-horn antibiotic gel treatment decreases endometritis and improves pregnancy rates in the mare

Karen Wolfsdorf,[a] Carleigh Fedorka,[b] Hannah Vagedes,[a] Anna Snell,[a] Peyton Draheim,[a] Kristina Lu,[a] Brittany Middlebrooks[a]

[a]Hagyard Equine Medical Institute, Lexington, KY, USA
[b]Department of Animal Sciences, Colorado State University, Fort Collins, CO, USA

Chronic endometritis is a common cause of infertility in the mare and often requires multiple diagnostic and therapeutic approaches for successful management. Uterine abnormalities, such as adhesions or strictures, may impair uterine clearance and limit effective distribution of intrauterine treatments. This study evaluated whether deep-horn deposition of an intrauterine antibiotic gel improves endometrial contact time, enhances antibiotic distribution, and thereby reduces endometritis. It was hypothesized that deep-horn application of an intrauterine antibiotic gel improves treatment success and increases pregnancy rates. Forty-six mares with chronic endometritis were included after treatment failure or hysteroscopic identification of anatomical abnormalities that could impair uterine clearance. Antibiotics were selected based on culture and sensitivity results. Antibiotic was reconstituted in sterile sodium chloride and combined with sterile lubricant to a total volume of 60 ml, to create a viscous gel suspension. A single syringe of antibiotic gel was deposited at the tip of each uterine horn, or divided between horns, depending on uterine size and dose. Treatment followed sterile lavage, if intralumenal fluid was present, or as an infusion alone. All mares were positive on culture and cytology before treatment. During the subsequent estrus, a low-volume culture and cytology was performed using 1 l of sterile sodium chloride: 23 out of 37 (62%) were negative and 14 out of 37 (38%) remained positive. The average length of treatment was 4.2 days. Positive pregnancy rate at 14 days was 23 out of 37 (62%) within 1 or 2 cycles after treatment. Fisher's exact test revealed significant improvement in resolution of endometritis ($p < 0.0001$) and pregnancy rates ($p = 0.0007$). Deep-horn intrauterine antibiotic gel treatment appeared to be a practical and effective treatment for chronic endometritis, improving pregnancy rates in mares.

Keywords: Mare, endometritis, antibiotic, uterine adhesions, hysteroscopy

Low-volume lavage culture/cytology postkerosene infusion identifies bacterial endometritis in the mare

Karen Wolfsdorf,[a] Carleigh Fedorka,[b] Hannah Vagedes,[a] Anna Snell,[a] Mattie White,[a] Brittany Middlebrooks[a]

[a]Hagyard Equine Medical Institute, Lexington, KY, USA
[b]Department of Clinical Sciences, Colorado State University, Fort Collins, CO, USA

Chronic endometritis is a major cause of equine infertility. Bacteria can evade immune clearance and antibiotic therapy, contributing to chronic infection. Kerosene chemical curettage produces glandular activation, improving conception rates and

biopsy grades in treated mares; however, bacterial culture and sensitivity testing following kerosene treatment is not routinely performed. The objective of this study was to identify underlying bacterial endometritis postkerosene treatment. It was hypothesized that low volume culture/cytology (LVLCC) after kerosene treatment identify bacteria not previously cultured. Forty-eight mares with a history of subfertility (multiple cycles with negative pregnancy establishment, early embryonic loss and/or chronic endometritis) were included in the study. Mares were infused with 100 ml of K-1 kerosene > 6 days after ovulation, with concurrent intramuscular PGF_{2a} treatment (375 µg cloprostenol; Estrumate, Merck). Twenty-four hours later, transrectal palpation and ultrasonography were performed in conjunction with a 1-l sterile LVLCC using Lactated Ringer's solution. Bacterial endometritis was treated according to organism identification, sensitivity, and ultrasonographic findings. Prior to kerosene, 24 out of 48 (50%) were cultured negative. Following kerosene, only 3 out of 48 (6%) remained culture negative ($p < 0.0001$, Fisher's exact test), indicating a significant increase in bacterial detection. Notably, 22 out of 23 (95.7%) mares that cultured positive posttreatment were negative previously. *Streptococcus equi* subsp. *zooepidemicus* was the predominant isolate. Overall, 19/48 (39.6%) mares conceived. Further improvement in pregnancy rates, 11 out of 23 (48%) was noted within the subset negative pre and positive postkerosene. These findings suggested that LVCC performed following kerosene treatment enhanced detection of occult bacterial endometritis and facilitated targeted therapy, improving reproductive outcomes.

Keywords: Equine, chronic endometritis, kerosene, low volume lavage

Proteomic analysis of IZUMO1 abundance in the reproductive tract of the stallion

Patricia Xavier,[a] Daniel Gomes,[a] Robyn Ellerbrock,[a] Lilian Oliveira,[b] Maria Ferrer[a]

[a]Department of Large Animal Medicine and Surgery,
[b]Department of Pathology, College of Veterinary Medicine,
University of Georgia, Athens, GA, USA

Sperm-oocyte fusion is essential for fertilization and requires the sperm protein IZUMO1. Previous transcriptomic analysis of the stallion reproductive tract demonstrated greater IZUMO1 gene expression in the testis compared to epididymal segments (testis: 60.27, epididymal head: 10.14, body: 6.02, and tail: 2.99 FPKM), suggesting predominant transcription during spermatogenesis. We hypothesized that IZUMO1 protein abundance increases during epididymal transit in stallions. Tissue was collected from testis (T), epididymal head (EH), body (EB), and tail (ET) from 4 light-breed stallions undergoing routine castration. Sperm were recovered using a tissue-mincing and swim-up protocol. Protein extraction and tryptic digestion were performed using S-Trap methodology. Data-independent acquisition liquid chromatography–tandem mass spectrometry was conducted on an Orbitrap Fusion Lumos mass spectrometer. Proteins were identified against the *Equus caballus* UniProt database. Exclusive intensity values were log10-transformed and analyzed using linear mixed-effects models, with segment as a fixed effect and stallion as a random effect. Post-hoc comparisons were Bonferroni-adjusted ($p < 0.05$). A total of 5,089 proteins were identified. IZUMO1 was detected in sperm from all stallions and segments. IZUMO1 sperm abundance increased along the reproductive tract ($R^2 = 0.99$; $p < 0.001$). Mean ± SD log10 intensities were lowest in T (7.73 ± 0.07) and higher in EH (9.05 ± 0.11), EB (9.23 ± 0.11), and ET (9.24 ± 0.06). All epididymal regions differed from T ($p < 0.001$). IZUMO1 was greater in EB and ET compared to EH ($p = 0.039$ and $p = 0.025$), with no difference between EB and ET ($p = 1.000$). Overall, IZUMO1 abundance increased ~ 30-fold in sperm from testis to distal epididymis, demonstrating an inverse relationship between transcript abundance and protein content. This inversion suggested posttranscriptional regulation and progressive protein enrichment during epididymal maturation, likely reflecting protein stabilization and membrane remodeling associated with acquisition of fertilization competence in stallions.

Keywords: Equine, proteomics, sperm maturation, sperm-oocyte proteins, epididymis, IZUMO1

Suspected Buttercup (*Ranunculus* spp.) toxicity as a cause of late-term abortion in a quarter horse mare

Patricia Xavier, Daniel Gomes, Robyn Ellerbrock, Maria Ferrer

Department of Large Animal Medicine and Surgery, College of Veterinary Medicine, University of Georgia, Athens, GA, USA

Late-term abortion in mares is commonly associated with infectious etiologies; however, noninfectious causes, including toxic plant ingestion, should be considered in pasture-based management systems. This report describes a suspected case of buttercup (*Ranunculus* spp.) toxicity associated with abortion in an embryo transfer recipient mare. A multiparous 9-year Quarter Horse mare presented following abortion at ~ 8 months of pregnancy. Fetal remnants were partially recovered near the pasture; however, a complete evaluation was not possible due to apparent scavenging. Two additional mares in the same pasture exhibited hypersalivation and edema of the buccal mucosa. Buttercup plants (*Ranunculus* spp.) were observed in an overgrazed pasture with limited grass. On presentation, the mare was bright, alert, and sound at walk. Vital parameters were within normal limits; mammary gland development was minimal, and moderate brown vulvar discharge was present. Transrectal ultrasonography demonstrated an enlarged uterus containing a small volume of fluid, with no retained fetal membranes, consistent with a completed abortion. Mare's perineal area was cleaned, uterine samples were collected for PCR-based abortion diagnostics, and uterus was lavaged. The recovered fluid was slightly cloudy. A comprehensive PCR abortion panel was negative for common infectious agents, including equine herpesvirus-1 and -4, equine arteritis virus, *Leptospira* spp., *Streptococcus equi* subsp. *zooepidemicus*, *Salmonella* spp., *Neospora caninum*, *Bartonella* spp., and *Candida albicans*. In the absence of detectable infectious causes and given the environmental findings and clinical signs in herd mates, toxic ingestion of buttercup was considered the most likely etiology. Buttercup contains protoanemonin, a known irritant that can cause oral ulceration, hypersalivation and gastrointestinal disturbances; however, its role in equine abortion remains poorly documented. This case highlighted the importance of considering toxic plant exposure in abortion investigations and emphasized the need for pasture management and nutritional supplementation during periods of limited forage availability.

Keywords: Reproductive loss, noninfectious abortion, toxic plants, protoanemonin, assisted reproductive technology

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