

either side of the joined sternum. There was another fused thoracic limb that formed a bipedal hoof below the metacarpophalangeal joint with the metacarpal bones fused. There were 2 prepuces and 2 anuses present with meconium present in both anuses. Two tails were also present. There was an umbilical hernia present with small intestines protruding through the hernia. Respiratory and digestive tracts were fused at the larynx with a single trachea and esophagus. There was a single pair of lungs along with a single heart with 2 descending aortas. The single esophagus entered into a single stomach. The jejunum was divided into 2 ~ 90 cm oral to the ileocecolic junctions. Caudal to that point, there were 2 ilea, ceca, and large intestines present with fecal balls in both small colons. Thoraco-omphalopagus conjoined twins have been reported in other species, including humans. To our knowledge, this is the first reported case of thoraco-omphalopagus conjoined twins in the horse.

Keywords: Mare, dystocia, twins, thoraco-omphalopagus

Anaphylactic reaction following intrauterine administration of misoprostol in a mare

Jordan Kiviniemi-Moore

Rood & Riddle Equine Hospital, Lexington, KY

Deep horn intrauterine application of misoprostol, a synthetic prostaglandin E1 (PGE1), has been demonstrated to improve fertility in mares suspected of oviductal dysfunction.¹ Adverse reactions in horses included mild abdominal discomfort and soft feces after oral misoprostol and in women anaphylactic reactions were observed after oral and vaginal treatment. An 18-year-old Friesian mare weighing ~ 650 kg was presented for unexplained infertility of 3 years duration. Misoprostol (600 µg, Greenstone LLC, Peapack, NJ) dissolved in sterile water was deposited at the tip of each uterine horn.¹ Ten minutes after treatment the mare collapsed in the stall. Her mucous membranes appeared dark red with a prolonged capillary refill time of 4 seconds and she demonstrated tachycardia of 100 beats per minute, cool extremities, tachypnea of 60 breaths per minute, and was minimally responsive. Dexamethasone (50 mg) and flunixin meglumine (750 mg) were given intravenously in addition to 6 mg epinephrine. A 14-gauge intravenous catheter was placed and 5 liters of lactated Ringer's saline (LRS) was given. While the mare was laterally recumbent, a cuffed intrauterine catheter was inserted and the uterus lavaged with 9 liters of LRS in 3 liter aliquots. Fifteen minutes after the onset of treatment, the mare's heart rate and respiratory rate improved and she was able to achieve sternal recumbency and stand with encouragement. However, 15 minutes later she again became tachycardic and tachypneic and collapsed a second time. An additional 6 mg of epinephrine was given intravenously in conjunction with continuous bolus fluids and the uterus was again lavaged with 9 liters of LRS. Ten minutes after the second epinephrine the mare improved and regained ability to stand. Her vital signs gradually normalized, she passed normal manure and began

to graze. Over the course of the 1.5-hour treatment window the mare received intravenously 50 mg dexamethasone, 750 mg flunixin meglumine, 12 liters of LRS, 2 doses (6 mg each) epinephrine, and twice 9 liters of uterine lavage with LRS. Following recovery, no further ill effects of the incident were noted. The mare was bred with fresh cooled semen 2 weeks later but failed to become pregnant. She had no previously reported medication allergies or history of drug reaction. This is the first reported adverse event of its kind associated with intrauterine PGE₁.

Keywords: Misoprostol, intrauterine, adverse reaction, anaphylaxis

Reference

1. Alvarenga MA, Segabinazzi LG: Application of Misoprostol as a treatment of unexplained infertility in mares. J Equine Vet Sci 2018;71:46-50.

Next generation sequencing in deciding to discontinue antibiotic treatment in a stallion

Soon Hon Cheong, Yamilka Lago-Alvarez, Jennine Lection, Mariana Diel de Amorim

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

A 10-year-old Morgan stallion presented for test cooling of semen with a history of mares not conceiving from cooled shipped semen. Five weeks prior, the stallion was collected for semen shipment. The semen was greyish in color and had 60% progressively motile sperm (PMS), mild teratozoospermia, 58% morphologically normal sperm, and 4.48 x 10⁹ total number of sperm. Penis was washed thoroughly before collection to minimize debris in the semen sample from the penis as a possible cause of semen discoloration. Semen was collected using a Missouri artificial vagina, and the semen sample was again greyish in color and had 3.4 x 10⁹ total number of sperm, 60% PMS, and 66% morphologically normal sperm. Cytological examination of the semen sample with Diff-Quik stain had no leukocytes or germ cells. Large numbers of branching rods were observed on cytology and an aerobic culture was performed. A fastidious and slow-growing *Actinomyces* species was identified by culture. Antibiotic susceptibility was not possible due to the bacteria's slow-growing nature. *Actinomyces* has been reported to infect the testes and accessory sex glands in humans. Empirical antibiotic selection was based on published reports and oral doxycycline (10 mg/kg) was prescribed for 8 weeks. Stallion was presented again 43 days later. Semen appeared normal with improved number of total sperm (7.45 x 10⁹), 60% PMS, and 90% normal morphology. A culture was performed, and the sample was submitted for next generation sequencing (NGS) of 16S rRNA for bacteria and ITS for fungi. The culture was negative, and NGS had 59% *Klebsiella oxytoca*, 18% *Petrimonas* sp., 7% *Streptococcus uberis*, 3% *Corynebacterium kroppenstedii*, 2% *Luteococcus* sp., and 2% *Proteiniphilum* sp. for bacteria and 91%

of ITS reads were *Mucor circinelloides* and 8% *Pleospora herbarum*. Traditional culture method is of limited use to identify when antibiotic treatments can be discontinued due to antibiotics' inhibitory effects on culture results. The NGS results had several mixed bacteria and fungi that are more resistant to antibiotics. *Actinomyces* species was not identified, which we interpreted as a positive sign. The improved spermogram, negative culture, and lack of *Actinomyces* detected by NGS were indications that antibiotic treatment could be discontinued. Ideally, NGS should have been performed prior to the start of antibiotic treatment to be used as a baseline, and further studies are indicated to determine thresholds of potentially pathogenic bacteria on fertility. Availability of a commercial clinical NGS laboratory service for the veterinary industry is a potentially groundbreaking advancement. One potential use of this technology may be to identify when long-term antibiotic treatments can be safely discontinued.

Keywords: Stallion, *Actinomyces* species, next generation sequencing

Thromboembolic disorder in a postcesarean section bitch

Yamilka Lago-Alvarez, Hailey Rose, Denae Campanale, Ian Porter, Kenneth Simpson, Soon Hon Cheong, Mariana Diel de Amorim

Department of Clinical Science, College of Veterinary Medicine, Cornell University, Ithaca, NY

Pregnancy and the postpartum period substantially increase the risk for venous thromboembolism (VTE) in women, a disease that leads to pulmonary embolism and deep venous thrombosis. The most important risk factor contributing to a thrombotic event is the hypercoagulable state that occurs during a normal pregnancy, with the highest risk occurring the first 6 weeks postpartum. Risk factors among women are age (> 35-years-old), cesarean delivery, hypertension, heart disease, obesity, and the presence of infection postpartum. To the authors' knowledge, this condition has not been reported in dogs. A 3-year-old female intact primiparous Labrador Retriever presented as an emergency due to fever (104.3 °F), lethargy, and anorexia. History included dystocia due to secondary uterine inertia with fetal distress (stillborn fetus) that was resolved by emergency cesarean section 4 days prior to presentation. On initial evaluation, the patient was quiet and responsive, obese with a body condition score of 8/9, and had a moderate amount of lochia with no foul-odor. Bloodwork revealed a normocytic, normochromic, regenerative anemia (hematocrit of 27%, absolute reticulocytes $99.6 \times 10^3/\mu\text{l}$), leukocytosis with a neutrophilia characterized by a left shift and monocytosis (WBC $43.6 \times 10^3/\mu\text{l}$, reference interval [RI] 5.7 - 14.2; segmented neutrophils $35.8 \times 10^3/\mu\text{l}$, RI 2.7 - 9.4; band neutrophils $0.4 \times 10^3/\mu\text{l}$, RI 0.0 - 0.1; monocytes $2.6 \times 10^3/\mu\text{l}$, RI 0.1 - 1.3), hyperproteinemia (8.0 g/dl, RI 5.9 - 7.8) and hypoalbuminemia (1.8 g/dl, RI 3.2 - 4.1). Considering the clinical condition, medical intervention and hospitalization for further diagnostic testing were pursued. Medical management consisted of intravenous plasma-lyte A fluids (60 ml/kg/

day), ampicillin/sulbactam (Unasyn, 30 mg/kg every 8 hours), and maropitant citrate (Cerenia®, 1 mg/kg every 24 hours). A disseminated intravascular coagulation panel indicated significantly increased D-dimers (4965 ng/ml, RI 0 - 575), decreased antithrombin III activity (50%, RI 65 - 145), and an increased aPTT (19.6 seconds, RI 8.5 - 15.5). Abdominal ultrasonography revealed a diffusely, severely mottled spleen with innumerable hypoechoic regions of acute, multifocal infarction, suggesting the presence of splenic infarcts and no evidence of peritonitis. That evening, the patient developed labored breathing with a respiratory rate of 36 breaths per minute and pulse oxygenation of 93% (RI > 95%). An arterial blood gas revealed an alveolar-arterial oxygen gradient of 30 mmHg (RI 10 - 25). These findings were concerning for pulmonary thromboembolism. The patient improved after 24 hours of supplemental oxygen, and the supplementation was discontinued. Subsequent echocardiogram revealed no evidence of pulmonary hypertension. The patient was discharged 48 hours after hospitalization with oral amoxicillin/clavulanate (13.75 mg/kg every 12 hours for 14 days). Considering the clinical manifestation and increased risk reported with cesarean delivery and peripartum obesity in women, it was presumed that the pregnancy-related hypercoagulable state and postpartum period led to the development of a VTE in the postcesarean section bitch.

Keywords: Mare, pregnancy, placenta, cervix, ultrasonography

Funding: Cesarean section, hypercoagulable, pulmonary embolism, venous thromboembolism

Polled intersex syndrome in a Finnish Landrace lamb

Katelyn Waters, Jenna Stockler, Richard Hopper, Ester Malmström, Yatta Boakari, Julie Schnuelle

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

An apparently healthy, 4-month-old female Finnish Landrace lamb was presented for the presence of female and male external genitalia. The lamb was polled and a twin to a normal female. On initial examination the lamb had a short anogenital distance of 3.5 cm and a normal appearing vulva with a mildly enlarged clitoris. Left gonad was descended and palpable in the inguinal area, whereas the other gonad was suspected to be retained intra-abdominally. Left inguinal ring was severely dilated and the descended gonad could be moved freely intra- and extra-abdominally. Abdominal ultrasonography revealed a retained intra-abdominal right gonad that appeared testicular in origin with a hyperechoic mediastinum testis and a less echogenic parenchyma as seen in a normal testis. A fluid filled uterus was also identified, but ovaries were unable to be identified. Lamb underwent a midline exploratory laparotomy with a bilateral castration/hysterectomy. Uterus was identified and the uterine horns were followed to the location of the ovaries where testicular appearing structures with a pampiniform plexus