T he loss of a developing fetus during pregnancy can be a frustrating, emotional, and costly experience for horse owners, foal handlers, veterinarians, and the public. A thorough evaluation of the aborted foetoplacental unit (fetus and placenta) by a veterinary pathologist can help determine the cause of abortion, identify new, unseen, or foreign causes of fetal loss, rule out conditions such as microbial infection, and aid in the pharmacological management of an ongoing or future pregnancy.

In this issue, Dr. Alan Loynachan addresses the importance and need for the future of equine abortion. This retrospective look is important to help us understand what threats exist and how to identify and respond to emerging threats. It’s easy to identify what new and possibly emerging causes of abortion might be available soon. As placentitis comprises the majority of the infections diagnosed in the UK Veterinary Diagnostic Laboratory, it is important to understand how non-infectious causes of abortion are identified and whether we could have done more.

As with most any field of study, we continue to learn and refine our techniques and where we should focus our future research efforts. It’s likely that better options for dealing with placentitis will become available soon.

In conclusion, equine abortion remains to be sufficiently common. Both infectious and non-infectious causes of abortion can often not be easily assessed or tested regularly and is frustrating to both clients and diagnosticians. Based on the human and veterinary literature, many of these occur due to physiologic abnormalities (e.g. fetal cardiovascular disease, hypoxia, stress and disease in the pregnant mare, abnormalities, genetic, pathologic, environmental, and environmental abnormalities), which cannot be assessed or tested for in the aborted foetoplacental unit. A diagnosis of abortion due to infectious organisms was diagnosed in 47% of cases in 2016 and 16% of cases in 2017. Equine herpesvirus was diagnosed in 46% of samples in 2016 and was identified in 21% of cases in 2017. Escherichia coli was diagnosed in 14% of cases in 2016 and 2017 (20%). Approximately 50% of the abortions evaluated by the laboratory of Dr. Barry Setz and the Kentucky Equine Research Center were not caused by identifiable, classic infectious agents. This likely means abortion due to unidentified agents occurred in 79 (6.9%) cases during 2016 and 37 (7.7%) cases during 2017. 

Equine abortion is defined as the death of the fetus before birth, at birth, or within 30 days of birth. In this issue, Dr. Alan Loynachan addresses the importance and need for the future of equine abortion. This retrospective look is important to help us understand what threats exist and how to identify and respond to emerging threats. It’s easy to identify what new and possibly emerging causes of abortion might be available soon. As placentitis comprises the majority of the infections diagnosed in the UK Veterinary Diagnostic Laboratory, it is important to understand how non-infectious causes of abortion are identified and whether we could have done more.

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Biofilm-Associated Endometritis

Endometrial infection (infection of the inner lining of the uterus) that is resistant to traditional antibiotic treatment is a significant threat to the equine breeding industry. A common nat-ure-strategy employed by bacterial pathogens is the formation of a biofilm, which is a complex and dynamic structure composed of aggregates of bacteria surrounded by a thick protective layer called a biofilm. Bacteria in a biofilm can be up to 1,000 times more refractive to treatment with antibiotics than single bacteria. Biofilm formation increases disease persistence and antibiotic resistance. Using a model of equine endometritis, an infective endometrial infection in the uterus in mares, we evaluated the potential for biofilm formation in an endometrial infection. The endometrium was infected with a strain of Escherichia coli that is commonly found in equine endometritis. The infection was cultured in vitro for up to 48 hours to simulate a chronic biofilm infection. A series of in vitro experiments were conducted to evaluate the effectiveness of antibiotics against biofilm-associated bacteria. The antibiotics tested included ceftriaxone, imipenem, ampicillin, and gentamicin. All antibiotics were found to be effective against biofilm-associated bacteria. The results of these experiments suggest that biofilm formation in endometrial infections is a major obstacle to effective treatment with antibiotics. The development of new antibiotics that are effective against biofilm-associated bacteria is necessary to improve the treatment of endometrial infections in mares. The equine endometritis model provides a valuable tool for the development of new antibiotics and the evaluation of existing antibiotics against biofilm-associated bacteria. The equine endometritis model also provides a valuable tool for the study of the role of biofilms in other infectious diseases, such as urinary tract infections and dental infections. The study of biofilm formation in endometrial infections is important for the development of new treatments for endometritis in mares and for the understanding of the role of biofilms in other infectious diseases.
Tall Fescues – Endophyte-infected, Endophyte-free, and Novel Endophyte

Tall fescue (Festuca arundinacea) is one of the most important forages for livestock and horses worldwide. It is grown extensively in the United States alone. It can be infested with various endophytes, which are fungi that are symbiotically associated with the plant and confer various benefits to the plant. These endophytes produce a range of chemicals called “clerodane diterpenoids” that confer benefits to the plant, including increased stress resistance, improved crop yield, and enhanced forage quality.

The most abundant alkaloid produced by endophytes is ergovaline, which is produced by the fungus Epichloë festucae. Ergovaline is toxic to horses and other grazing animals, and exposure to tall fescue can result in a condition known as fescue toxicosis. This condition affects the pituitary gland and can lead to decreased prolactin secretion, hair loss, and weight loss in affected animals. Ergovaline has been linked to the occurrence of these symptoms, and the concentration of ergovaline in the forage can be used as an indicator of the risk of fescue toxicosis.

Ergovaline and related compounds are found in tissues other than the pituitary, including ovarian tissues and the corpus luteum, but the exact roles of those receptors in fescue toxicosis, if any, are not fully understood. In a recent study, researchers investigated the effects of ergovaline on the pituitary gland and found that it has a significant impact on prolactin secretion. This study provides new insights into the mechanisms underlying fescue toxicosis and highlights the importance of continued research in this area.

In conclusion, tall fescue is an important forage crop that is widely grown in the United States and worldwide. Its productivity and economic benefits make it a valuable resource for livestock and horse producers. However, exposure to tall fescue can result in fescue toxicosis, which affects the pituitary gland and can lead to decreased prolactin secretion. Further research is needed to better understand the mechanisms underlying fescue toxicosis and to develop strategies to minimize its impact on livestock and horses.
Biofilm-Associated Endometritis

Equine herpesvirus 4 respiratory disease was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with evidence of outbreaks in numerous states (140 cases, many in the state of Ohio).

Equine influenza is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Clostridium tetani was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Chromobacterioendometritis was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Enterococcus faecalis was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

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Proteus mirabilis was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Pseudomonas aeruginosa was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Staphylococcus aureus was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Toxoplasma gondii was diagnosed in a horse in the RSA Province of Gauteng. The disease is endemic in the USA with outbreaks occurring in many states (140 cases, many in the state of Ohio).

Biofilm formation in the endometrium is a common occurrence in reproductive endometritis. Biofilm formation can provide a protective barrier for the bacteria within the endometrium, making it more difficult to treat with traditional antibiotics. Therefore, new strategies and treatments are needed to effectively clear biofilms and prevent recurrent infections.

A recent study has shown that biofilms can harbor antibiotic-resistant bacteria, which can lead to treatment failure and recurrence of infections. The study used a combination of antibiotics and biofilm disruption methods to successfully clear biofilms and reduce the risk of recurrence. These findings highlight the importance of targeting biofilm formation in the treatment of endometritis.

Biofilm formation can also provide a sanctuary for bacteria, allowing them to evade immune detection and treatment. This can lead to persistent infections and a decreased response to therapy. Therefore, strategies to disrupt biofilms and enhance immune response are critical in the treatment of endometritis.

In conclusion, biofilm formation in the endometrium is a significant aspect of reproductive endometritis. Understanding the mechanisms of biofilm formation and developing effective treatments are essential to improving reproductive health in horses. Further research is needed to develop new strategies and therapies to combat biofilm-associated endometritis.

References:
Equine Disease Quarterly Newsletter
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Lexington, Kentucky 40446-0099

Abortion of undetermined cause occurs quasi-
sporadically and is frustrating to both client and
provider. It has been postulated that, based on
literature, many of these occur due to physiological
anomalies (e.g., fetal and/or maternal disease),
seasonal disease and the pregnancy time,
autonomous disorders, genetic abnormalities,
environmental exposure, and individual animal
factors (of which cannot be summed or straitfor-
wardly linked to the aborted fetus/placental unit).
Abortion of undetermined cause is multifactorial
and is considered a common cause of infertility
and was identified in 280 cases (24.6%) in 2016
and 102 cases (20.2%) in 2017. Approximately
50% of abortion cases were attributed to systemic
problems originating from the uterus, namely:
Escherichia coli (45.2%), Streptococcus zooepidemicus
(24.6%), and Nocardioform/mucoid placentitis
(20.2%).

In conclusion, equine abortion remains to
be sufficiently common. Both infectious and
non-infectious causes are frequently responsible.
Evaluation of the aborted fetal/placental unit by
your local veterinary diagnostic laboratory can aid
in determining the cause of abortion help to moni-
tor and track known abortions, and identify
new and possibly emerging causes of abortion.

Tall Fescue Endometritis

The loss of a developing fetus during pregnancy
can be a frustrating, emotional, and costly
experience for horse owners, farm workers, veteri-
narians, and the public. Although an evaluation of
this aborted bovine placenta (placenta and fetus) by
a veterinary pathologist can help determine the
cause of abortion, identify new, unexplored, or
less common conditions, and aid in the under-
standing of the pathogenesis of the disease,
many of these occur due to physiological
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Abortion of undetermined cause occurs quite regularly and is frustrating to both owners and examiners. While a variety of possible causes and its presence in the literature, many of these occur due to physiologic abnormalities (e.g. fetal anencephaly, brain atresia, molar pregnancy), autolysis, dystocia, congenital anomalies, environmental stressors, and other unknown causes of abortion. A prospective study by veterinarians who identified these in 4% of cases in 2016 and 15 cases (2.3%) in 2017. Abortion due to bacterial infection was diagnosed in 4.4% of cases in 2016 and 16 cases in 2017. Equine herpesvirus type 1 was diagnosed in 6 cases in 2016. A two-year review of equine abortion cases in the United States from 2016 and 2017. Abortion due to unidentified agents occurred in 79 (6.9%) cases in 2016 and 102 cases (20.2%) in 2017. Abortion due to fetal bacterial septicemia was diagnosed in 145 (12.7%) and 27 (5.3%) cases in 2016 and 2017, respectively. There were 280 cases (24.6%) in 2016 and 16 cases (1.4%) abortions or perinatal deaths in the twin pregnancies, 16.4% and 29.4% of cases in 2016 and 2017, respectively. In conclusion, equine abortion remains to be one of the most devastating and costly events for horse owners, farm workers, veterinarians, and the public. A thorough evaluation of the aborted fetoplacental unit by a veterinary pathologist can help determine the cause of abortion, identify new, non-infectious causes of fetal loss, and aid in the epidemiologic monitoring of abortion trends. It is a labor-intensive process, but it is absolutely necessary for the prevention and control of abortion. Again, I cannot stress enough the importance of every abortion, every time.

Infectious abortions comprised the other 58% of abortions, with placentitis accounting for the majority of these cases. Unfortunately, we know little about what predisposes a mare to develop placentitis, and still have trouble with early, accurate and specific diagnosis. Even so, there are steps that owners can take to reduce and early diagnosis, including routine testing, regular ultrasound examination of the fetus, and regular checkup for maternal health. If anything out of the ordinary is noted, a veterinarian should be called to examine the mare and start treatment if indicated. In addition to the majority of infectious abortions seen, the laboratory of Dr. Barry Ball at the Gluck Equine Research Center has been working closely with the National Veterinary Services Laboratories and other diagnostic laboratories to better understand the causes of abortion. They believe that better understanding the causes of abortion will lead to better prevention and management practices. Although more work is still needed, we believe that better options for dealing with placentitis will be available in the future.

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