

Why can't I get my mare in foal?

With a new stud season imminent, the major topic of conversation in our office concerns prospective stallions for Lynn and Pamela's newly acquired brood mare. However, having saved over the winter for the stud fee and insemination costs, I haven't dared dampen their enthusiasm by asking "what if we can't get her in foal?"

The reality is that, despite the best stud management and veterinary care, approximately one in five mares will be barren, *i.e.* not in foal, at the end of the breeding season. This is not only frustrating, but can be costly with no prospect of a foal to look forward to next spring. So what prevents mares conceiving and what can be done to maximise chances of success?

Many factors contribute to a mare failing to conceive and these generally fall into one of three categories – a) poor fertility of the mare, b) poor fertility of the stallion or loss of semen quality during transport and storage, or c) mistimed breeding of a fertile mare and stallion such that the mare is served or inseminated too soon before or too late after ovulation.

Effective use of ultrasound scanning and drugs to induce ovulation should eliminate the possibility of missing an ovulation. This said we do occasionally encounter mares that fail to ovulate at the predicted time and this is one of the major reasons why artificial insemination (AI) fails. For this reason it is advisable to scan mares 24 hours after serving or insemination to check that ovulation has occurred; if it hasn't, the mare should be covered again.

Good stud management should ensure that stallion fertility and semen quality are maintained throughout the season. We check sperm counts and motility after every insemination and report the results back to the stud.

It is often assumed that conception rates are better with natural service than AI but this is not necessarily true. While a well-managed stallion covering fertile mares should be capable of conception rates in excess of 90%, this can fall to below 40% with excessive work, loss of libido and transfer of infection.

By comparison conception rates by AI with fresh semen approach 95% and last year we achieved rates of over 80% with chilled semen sent to us by 'next day delivery' from the UK and Europe. Frozen semen is associated with lower conception rates (60-70%) for the reason that stallion spermatozoa are easily damaged during freezing and subsequent thawing.

These factors aside, the most common reason that a mare fails to conceive is because of her own infertility, which can be divided into three categories: a) failure to come into season, b) failure of fertilisation of an egg by spermatozoa, and c) early death of an embryo after fertilisation.

Reasons why mares fail to cycle include winter anoestrus, or because they are still in the transition from winter to spring, behavioural problems, prolonged dioestrus (*i.e.* false pregnancy), chromosomal abnormalities, and ovarian tumours. Also, the possibility that she isn't coming into season because of pregnancy must not be over-looked.

The latter is particularly important if a mare has been scanned at 14-16 days and no embryo found, since delayed conception or confusion over covering dates might mean that the pregnancy was not detectable at that time. If such a mare hasn't shown oestrus by 21 days, she should be re-scanned because injecting prostaglandins to bring her back into season would, unfortunately, result in abortion of any pregnancy.

I've told the story before of the mare that I was asked to 'jag into season' as she had been at the stallion for 4 weeks and shown absolutely no conjugal interest. She had been at another

stud the previous year but returned not in foal. Because she was apparently barren, it made sense to scan her first to check for any problems with her ovaries or uterus but, as I put my hand into her rectum, my fingers were practically bitten by the foal sitting in the birth canal ready to be delivered! We never did find out whether the pregnancy had been missed at the stud or if she had been caught by the young colt at home on her return.

Ovarian tumours do occur and the commonest type is the granulosa cell tumour. We see one or two each year and they have a characteristic appearance on ultrasound scans. These tumours are not malignant, but can cause persistent oestrus behaviour as well as failure to cycle, and are best removed by laparoscopic keyhole surgery.

The second category of mare infertility is failure of fertilisation, which is invariably related to inflammation in the uterus or the presence of cysts that prevent spermatozoa reaching the egg in the oviduct, or the fertilised egg migrating to the body of the uterus.

So-called endometrial cysts can be removed by ligatures or laser via an endoscope inserted through the cervix. Although, somewhat bizarrely, some mares with very large or multiple cysts prove capable of conceiving and carrying foals to term. Often the cysts are located in one of the two horns of the uterus and, as long as the mare ovulates from the ovary next to the other horn, there is a chance that conception might take place.

Inflammation of the uterine lining, which is called endometritis, is arguably the most common and problematic cause of mare infertility. It is usually the result of long-standing infection with bacteria and fungi that are introduced at the time of mating or because of contamination of the uterus by urine and faeces.

Bacteria and fungi are normally prevented from infecting the uterus by three anatomical barriers – the vulva, the vaginal-vestibular sphincter, and the cervix. Poor vulva conformation,

as well as tears from previous foaling, results in the lips of the vulva forming an ineffective seal so that air and faeces are able to enter the vagina. Poor conformation may also be associated with pooling of urine in the vagina. When the cervix opens during oestrus, contamination then extends from the vagina into the uterus.

Other causes of endometritis include sexually transmitted infections, notably Contagious Equine Metritis (CEM), inflammatory response to constituents of semen and any contaminating bacteria, and chronic degenerative changes in the lining of the uterus. Endometritis is more common in older mares and explains why their fertility declines to less than 50% by 20 years of age.

The finding of excessive fluid in the uterus on ultrasound scans is indicative of endometritis. In some cases fluid is not present and a biopsy is required to confirm the diagnosis. Treatment involves flushing out the uterus, appropriate antibiotics or anti-fungal agents, and surgical procedures to provide an effective vulval seal, repair tears and prevent urine pooling in the vagina.

A transient endometritis occurs in all mares after breeding and is considered the mechanism by which the uterus clears excess sperm and any contaminants. This normally subsides after 4-5 days in time to allow survival of the embryo, but can become prolonged or persistent in some mares because normal clearance mechanisms fail.

Mares that develop this post-breeding endometritis should be treated with oxytocin and uterine lavage for 1-2 days after breeding, in order to remove debris and clear the uterus ready for the embryo. This is especially important with AI, as some of the proteins used to preserve semen can promote inflammation in certain mares. If being covered naturally, mares prone to post-breeding endometritis should be covered only once during each oestrus cycle.

The final category of mare infertility is early embryonic death and it too has multiple causes, including hormonal problems and pathological changes within the uterus. Mares that struggle to conceive or maintain a pregnancy, and which do not have endometritis, often benefit from receiving the progesterone hormone *Regumate* from 10 days after covering or insemination. This should be stopped if the mare is not in foal at her 16-day scan, otherwise it will delay the return of oestrus.

So, what can be done to maximise the chances of a mare conceiving? The most important step is to ensure that she is in good reproductive health before she goes to stud or enters an AI programme.

A thorough pre-breeding assessment starts with visual examination of the vulva, vagina and cervix for any injuries, anatomic anomalies or contamination. The uterus and ovaries are then examined by ultrasound to establish whether the mare is cycling, where she is in her cycle, and to check for endometrial cysts or inflammation.

Mares going to Thoroughbred studs will also require a clitoral swab to be taken for CEM and a blood sample for Equine Viral Arteritis. Since there are concerns that CEM might be prevalent and an important cause of infertility in the non-Thoroughbred horse population, we also advise that all mares going to stud or for AI have this swab taken.

Additional work may be required in mares that did not conceive in the previous stud season. This should include examination of the endometrium by taking a swab for examination of inflammatory cells and culture of any bacteria and fungi, as well as a biopsy for pathological examination. Direct visualisation of the uterus and its lining using an endoscope will also provide information that help determine the diagnosis and guide the prognosis.

Finally, as I will tell the girls in the office when they accuse me of being a pessimist, it is possible to get mares with poor fertility in foal. It might take a lot of patience, thorough and intensive veterinary input, and another raid on their savings, but it can be done!

Figure legends

1. Examining the vagina and cervix of a mare using a speculum
2. A clitoral swab is required for Contagious Equine Metritis
3. Ultrasound appearance of an endometrial cyst (arrow) – care examination of the scan is required to distinguish this from fluid in the uterus or an early pregnancy