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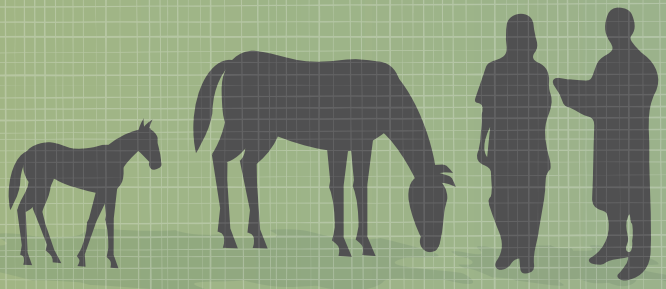

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(When) can we justify prophylactic antibiotic therapy in broodmare practice?

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Antimicrobial resistance is a real and documented problem affecting all aspects of practice and predicted to cause up to 10 million deaths annually by 2050 [1]. Judicious antimicrobial use guidelines are designed to delay or prevent widespread distribution of highly resistant microbes in the human and veterinary population. Cumulatively, guidelines in the UK, USA and EU all encourage limited antibiotic use, targeted application to only those animals with diagnosed conditions and avoidance of high-value and broad-spectrum antibiotics, as well as avoidance of off-label use. A strict interpretation of these guidelines likely would dictate the avoidance of antibiotic use in most reproductive cases. However, antibiotic use around the time of breeding remains widespread both in the USA and UK. In central Kentucky, the vast majority of mares bred receive a single 'post-breeding' intrauterine infusion of antibiotics. Likewise, approximately 50% of intensively managed mares in the UK were treated with intrauterine antibiotics in the 2013/2014 seasons [2]. This practice is a response to intense pressure from farms and clients to maximise per-cycle pregnancy rates and minimise cost and time investment. While these factors do not find their way into guidelines for judicious antimicrobial use, they have a real impact on the equine breeding industry and veterinarians must find a balance between the needs of their clients and the long-term health risks associated with indiscriminate antibiotic use.

One cornerstone of judicious antimicrobial use is case selection based on culture and sensitivity. It is standard practice to routinely obtain uterine samples for culture and cytology and select treatment based on those results. However, due to delays and the potential for underdiagnosis of embedded or dormant organisms, antibiotic use may be appropriate in some cases that do not fit the classic paradigm. The practice of prophylactic post-breeding intrauterine antimicrobial therapy is founded on several retrospective analyses which demonstrate a higher pregnancy rate in mares that received post-breeding antimicrobials [3,4]. In our practice, we have sought to reduce antibiotic use by identifying populations of mares that do not benefit from post-breeding antibiotics. Omission of prophylactic post-breeding antimicrobials did not harm first cycle pregnancy rates in maiden and foaling mares that ovulated within 12–24 hours after breeding. Omission of this infusion has the advantage of preventing prostaglandin release associated with cervical manipulation and limiting potential contamination in early diestrus and has notably reduced antibiotic use in our practice.

In animals that have negative cultures pre-breeding, but which fail to ovulate promptly, have delayed uterine clearance, urine pooling, pneumovagina, or a history of infertility and endometritis, selection of peri-ovulatory therapy may improve pregnancy rates. However, nonantibiotic therapy may produce equivalent results to antimicrobials. An excellent review on the topic by Barter and Barrelet highlighted studies demonstrating that a variety of nonantibiotic therapies, including oxytocin, lavage and autologous plasma can result in equivalent outcomes to post-breeding antibiotics [5]. Further, commercial immunomodulators have been demonstrated to reduce endometritis and improve pregnancy rates [6]. In our practice, first cycle pregnancy rates were not different in a group of barren mares randomly assigned to receive a single post-breeding infusion of a lyophilised amnion product (14/19) compared with those receiving procaine penicillin and gentamicin (10/20). Cumulatively, these and other studies demonstrate that nonantibiotic therapies represent a viable alternative to antibiotic therapy and may represent the best first-line treatment choice.

Finally, in our practice, prophylactic pre- or post-breeding antimicrobial therapy is frequently combined with ancillary treatments such as lavage and immune stimulation in mares bred in the face of known risk factors for endometritis, or which have a history of subfertility and infertility. Antimicrobial selection is made based on sensitivity patterns for common reproductive pathogens on the farm and in the region, and with the intention of minimising resistance and preserving higher-value antibiotics for therapeutic use. Procaine penicillin and gentamicin, two older antimicrobials with diverse mechanisms of action and demonstrated efficacy against uterine pathogens are commonly used in our practice. This combination has been shown to inhibit bacterial growth of both *Streptococcus equi* subsp. *zooepidemicus* and *Escherichia coli* in purulent uterine fluid even after dilution [7] and is not associated with undesirable side effects, such as uterine or vaginal irritation after infusion. Resistance patterns to antimicrobials are proactively monitored over time in our practice by collating sensitivity results from uterine pathogens, pathogens from nonreproductive cases and foal faecal cultures. Pregnancy results and microbial resistance patterns are both shared with farm managers at regular intervals and incorporated into operational planning.

In conclusion, the use of prophylactic antimicrobial therapy should be limited to a targeted population and not used as a substitute for diagnostic cultures or good breeding management. Research and clinical experience demonstrate that a variety of nonantibiotic therapies are equally effective and can be utilised even in populations of mares deemed to be at risk for endometritis or other complications. Finally, when prophylactic antimicrobial therapy is most appropriate, it can be paired with discussion of antimicrobial risks and potential antimicrobial resistance, ensuring that this therapy does not become the expected norm at the farm.

References

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