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Reproductive Evaluation of the Mare

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Introduction

The goals of a mare reproductive evaluation or breeding soundness examination (BSE) are to identify known or potential reproductive abnormalities and to evaluate the potential of a mare to become pregnant and carry a foal successfully to term. Mare reproductive examinations are performed in open (non-pregnant) mares prior to the onset of the breeding season, in problem mares during the breeding season, in barren mares at the end of the breeding season, as well as in mares with a history of embryonic loss, abortion, or other reproductive problems, or as part of a pre-purchase examination. The goal of this chapter is to provide an overview of the mare breeding soundness evaluation. Details on specific examinations will be covered in other chapters.

Equipment and Supplies

Obstetrical sleeve (non-sterile), obstetrical lubricant (non-sterile), tail wrap, metal bucket and garbage bag liner, non-irritant soap, roll cotton, vaginal speculum, obstetrical lubricant (sterile), obstetrical sleeve (sterile), uterine culture device, culture transport system (optional), uterine cytology device, glass slides, uterine biopsy forceps, formalin.

Examination Technique

Identification

All mares should be properly identified, and the breed, registration name, registration number, and date of birth recorded. Photographs should be taken or accurate drawings of markings and tattoos recorded.

Reproductive History

A complete breeding history should be obtained, including current reproductive status (maiden, barren, pregnant, or foaling), number of cycles bred during the last season, date of last breeding, breeding technique used (artificial insemination, natural cover, or pasture breeding), number of stallions, date of last foal, number of previous foals, and any previous history of abnormal estrous cycles, uterine infections, embryonic loss, or abortion.

Physical Examination

A general physical examination should be performed to assess whether the mare has the capacity to carry

a foal to term. The evaluation should include, but is not limited to, examination of the oral cavity, eyes, and the respiratory, cardiac, and musculoskeletal systems. In addition, diet and body condition should be evaluated.

Perineal Conformation

The external genitalia (vulva) should be evaluated for conformation and muscular tone. The optimal perineal conformation consists of a vulva in a nearly vertical position with at least 70% of the vulva ventral to the brim of the pelvis. The muscular tone of the vulva should be sufficient to prevent or minimize aspiration of air into the vestibule or vagina. Horizontal sloping of the vulva secondary to recession of the anus or poor muscular tone to the labia of the vulva may predispose the mare to an ascending infection of the uterus.

Estrous Detection

The mare should be exposed to a stallion with good libido to evaluate estrous cycle stage. Adequate time should be taken to allow shy or nervous mares to express behavioral estrus. When teasing a mare with a foal, the foal must be restrained, and the mare may need to be restrained with a twitch before signs of estrus are exhibited.

Palpation Per Rectum

The entire reproductive tract, including the cervix, uterus, and ovaries, should be thoroughly and systematically examined by palpation per rectum. The tone of the uterus and cervix, size and consistency of ovarian follicles, and the presence of a recent ovulation or a corpus hemorrhagicum should be recorded. The presence of abnormal ovarian, parovarian (i.e., fimbrial cysts), or uterine structures should be recorded.

Ultrasonography Per Rectum

Manual palpation should be followed by a systematic ultrasound evaluation of the entire reproductive tract. Ultrasound is used in broodmares to visualize structures in the reproductive tract that cannot be palpated

or differentiated on palpation per rectum, and in the early diagnosis of pregnancy, diagnosis of twins, and evaluation of potential ovarian or uterine pathology.

Vaginal Speculum Examination

A vaginal speculum examination is performed to evaluate the anatomy of the vagina and the external os of the cervix. Speculum examination is useful in determination of the stage of the estrous cycle (via cervical morphology and vaginal mucous membrane changes), and detection of urine pooling and the presence of cervical/vaginal inflammation or discharge.

Digital Examination of the Cervix

After the speculum examination is completed, the cervix should be examined manually for patency and the presence of abnormalities, such as adhesions, lacerations, or other cervical defects.

Uterine Culture

Culture of the uterine lumen is usually performed in conjunction with cytology for the diagnosis of endometritis. Endometritis can be suspected in mares that exhibit an abnormally short estrous cycle, vaginal or cervical discharge, inflamed cervix on speculum examination, and free fluid in the uterus during diestrus detected on ultrasound.

Endometrial Cytology

Cytologic evaluation of the uterus involves the collection and interpretation of cells lining the uterus (endometrium) and within the uterine lumen. Cytology is used in conjunction with culture and biopsy in the diagnosis of endometritis. Advantages of endometrial cytology for the diagnosis of endometritis include the ease of sample collection, low cost, and rapid availability of results.

Endometrial Biopsy

Endometrial biopsy involves collection of a small sample of the uterine lining (endometrium) for histologic

Table 1.1 Diagnostic tests that may be performed in addition to the standard tests in a mare breeding soundness evaluation.

Test	Indication
Chromosome analysis (karyotype)	Evaluate numeric or structural changes in chromosomes
Hormone analysis	Evaluate pituitary and/or ovarian endocrine function. Most commonly used to evaluate corpus luteum function and in the detection of an ovarian granulosa cell tumor
Hysteroscopy	Direct visualization of the interior of the uterus to detect intrauterine adhesions and other localized lesions, as well as inflammation and fibrosis
Laparoscopy	Direct visualization of the serosal surface of the ovary, oviduct, uterus, and abdominal cavity. Also used in ovarian biopsy, evaluation of oviductal patency, and the application of prostaglandin E ₂ (PGE ₂) to the oviductal surface
Low volume lavage	Collection of uterine samples for culture, cytology, and other evaluations (i.e., polymerase chain reaction). The effluent fluid may also be evaluated for clarity and pH
Oviductal flush	Performed by laparotomy or laparoscopy; used both diagnostically and therapeutically in suspected cases of oviductal blockage
Oviductal patency test	Deposition of fluorescent microbeads or starch granules onto the surface of the ovary or possibly within the infundibulum of the oviduct and subsequent examination of the uterine lumen for passage of the test material is used diagnostically to evaluate oviductal patency
Oviductal PGE ₂ application	Direct application of PGE ₂ can be used diagnostically and therapeutically in suspected cases of oviductal blockage
Ovarian biopsy	Laparoscopic collection of ovarian tissue for histologic evaluation may be used in the diagnosis of ovarian pathology
Test breed	Breeding to a highly fertile stallion can be used diagnostically to help determine if the mare is a cause of subfertility or infertility

evaluation. It is primarily used as an aid in the diagnosis of uterine disease and as a prognostic indicator of the ability of a mare to carry a foal to term. An endometrial biopsy can also be used as the sample source for culture and cytologic evaluation.

Other Tests

The standard examination procedures in the mare BSE may not identify the cause of subfertility. Consequently, other examinations may be indicated (Table 1.1).

Additional Comments

Interpretation of the results of a mare BSE should take into account the mare's age, reproductive history,

breed, stallion, breeding management, and other factors. Ultimately the goals are to determine the potential for fertility and detect abnormalities that may be associated with reduced fertility. Management and therapeutic options may be outlined to help optimize a successful outcome. It is important to emphasize that a mare BSE is only an evaluation of potential fertility and that the true assessment of fertility is the ability of the mare to conceive and carry a foal to term.

Further Reading

- LeBlanc MM, Lopate C, Knottenbelt D, Pascoe R. 2003. *The Mare. Equine Stud Farm Medicine and Surgery*. London: Elsevier, pp. 113–213.
- McCue PM. 2008. The problem mare: management philosophy, diagnostic procedures, and therapeutic options. *J Eq Vet Sci* 28: 619–26.