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Ovulation failure and abnormal cycles

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Palpation and ultrasonographic examination of follicles in order to try and predict ovulation is an important skill to acquire. Various parameters, some well established and some the subject of current study are used to help anticipate the time of ovulation. Follicle diameter is a useful tool whilst the follicle retains its spherical shape and its diameter can be easily and consistently measured. Once the follicle has reached a size of around 40 mm (typical Thoroughbred) the follicle is usually soft and loses its spherical shape. In these situations, diameter measurement is less useful.

Follicle size at ovulation

Ovulation usually occurs when the follicle reaches 40 mm and rarely occurs below 35 mm. The range can be as wide as 22–65 mm (Newcombe 2007). This observation could render the criterion unreliable to estimate the optimal breeding time.

Why is there a range of follicle size at ovulation?

- Time of year: follicles are large early in the season (Ginther and Pierson 1989).
- Single vs. double ovulations: single ovulatory follicles have a greater diameter than for each follicle in double ovulating follicles (Ginther et al. 2008). Occurs with bilateral as well as unilateral double ovulations and so is not just a crowding effect.
- Breed variation: large draught breeds have larger follicles than ponies or Standardbreds.
- Use of ovulation induction agents: induction of ovulation with hCG occurs from smaller pre-ovulatory follicles than noninduced cycles (Gastal et al. 2006).

Ultrasonographic changes as follicle approaches ovulation

- Flattening
- Outpouching towards the ovulation fossa
- Increased echogenicity of follicle wall
- Small echogenic particles appear in the follicular fluid

Normal ovulation may be rapid or prolonged with eventual complete or almost complete evacuation of the follicle. Ovulation failure occurs in almost 10% of oestrous cycles according to a study by McCue and Squires (2002). These authors report that the majority of anovulatory follicles luteinise (85.7%) but some remain as persistent follicular structures (14.3%). More recently it has been suggested that the incidence is between 5% and 20% of oestrous cycles (Ginther et al. 2007). All types of anovulatory follicles are infertile since follicular collapse and oocyte release (ovulation) has not occurred. It is difficult to predict if a dominant follicle will fail to ovulate (McCue 2007). The best indicator is the ‘snow storm’ appearance of echogenic particles in the follicular fluid (Fig 1).

The follicles continue to grow and may reach diameters of 125 mm. The particles are likely to be the result of haemorrhage into the follicle. In some situations, haemorrhage into the follicular antrum is minimal and the ‘snow storm’ appearance disperses and the follicle returns to normal appearance.

The haemorrhage in these anovulatory follicles may organise to form a cobweb-like network of narrow hyperechoic fibrin strands. These structures can be confused with a granulosa theca cell tumour (Fig 2).

These luteinised anovulatory follicles respond to prostaglandin. Best results are obtained by giving a full dose of prostaglandin on 2 successive days at least 7 days after the formation of the anovulatory luteinised follicle.

Nonluteinised anovulatory follicles (Fig 3)

These are more difficult to treat as they do not respond to prostaglandin. Attempts to induce their disappearance with human chorionic gonadotrophin or deslorelin are usually unsuccessful. Sometimes a 12 day course of altrhogest followed by an ovulation induction agent may be successful. Fortunately, they usually spontaneously regress although this can take as long as 4 weeks. Rarely, they persist beyond this period and transvaginal puncture may be useful in these rare cases.

The most challenging aspect of these anovulatory follicles is their recognition. As stated earlier, some echoic particles appear in normal follicles in the 48 h period preceding ovulation. These particles may be transient and are gone when the follicle is evaluated 24 h later. In addition, a second follicle may be developing normally elsewhere on the same ovary or on the opposite ovary. This follicle may go on to ovulate normally. It is, therefore, important when examining mares in which the development of a haemorrhagic anovulatory follicle is suspected, to look very carefully for a normal pre-ovulatory follicle developing. For these reasons, if the mare has been bred, I do not administer prostaglandin, but make a note in the mare record that an anovulatory haemorrhagic follicle was suspected. Certain mares seem prone to development of anovulatory follicles and there is often a history of repeated prostaglandin administration in these mares. Prostaglandin is best avoided in mares prone to development of haemorrhagic follicles. This topic has recently
been described in detail (Cuervo-Arango and Newcombe 2009). There is also some evidence that the incidence of haemorrhagic follicles is greater in mares treated with ovulation induction agents compared with spontaneous cycles (Cuervo-Arango and Newcombe 2009).

References


