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Equine Cushing's and Insulin Resistance Group Inc. (ECIR Group Inc.)



REPRODUCTIVE ABNORMALITIES IN MARES WITH DIET-RESISTANT INSULIN RESISTANCE

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Although the mechanism had never been clear, for many years we at the Equine Cushing's and Insulin Resistance group have had reports of udder enlargement and even lactation in some insulin resistant mares. There have also been reports of irregular cycling and hoof comfort changing with the stage of the cycle.

In women, there is a well-described syndrome of ovarian cystic disease (PCOS – Polycystic Ovarian Syndrome), which is accompanied by insulin resistance. For a brief overview of the condition in women, see: <http://www.nlm.nih.gov/medlineplus/ency/article/000369.htm>

Several mares with severe insulin resistance refractory to good control by the usual diet measures alone have been found to have one or more features similar to PCOS in women, including:

- ◆ may be overweight or normal weight
- ◆ prolonged interval between estrus cycles or prolonged periods of estrus behavior
- ◆ flank pain during estrus, varying from sensitivity to touch to severe pain mimicking colic
- ◆ serial ovarian ultrasounds showing anovulatory follicles, often very large
- ◆ persistently elevated insulin despite tight diet control (not unusual to be above 100 μ IU)
- ◆ refractory hoof pain, typically worse during estrus
- ◆ crest changes over the estrus cycle, with crests enlarging during estrus
- ◆ aggression (rare, may be more related to pain than hormonal changes)
- ◆ inverted LH:FSH ratio
- ◆ high-normal to elevated progesterone
- ◆ enlarged udder, some with lactation
- ◆ early spring laminitis

There is little, if any, evidence to date to suggest mares show the higher androgen levels found in PCOS women. Otherwise, however, they are very similar. For screening, findings of LH in normal to elevated range with normal to low FSH and LH:FSH ratio often > 1 on two consecutive tests taken 10 days apart is highly suggestive. Alternatively, one-time sampling for LH, FSH and progesterone to determine stage of cycle can be used. With the exception of a 5 to 6 day window centered around ovulation, FSH levels should be higher than LH in the mare: <http://www.reproduction-online.org/cgi/content/full/130/3/379/F1>

FSH is also approximately 10 times higher than LH in normal mares during seasonal anestrus, so the LH:FSH ratio can be utilized all year. Tests for progesterone, LH and FSH can be submitted to BET Labs: <http://www.betlabs.com/testsched.htm>

Serial ultrasounds can be used to evaluate ovarian activity.

Preliminary results show treatment with estrogens is effective in ameliorating the refractory insulin resistance and laminitis in these mares.