DIAGNOSIS OF GRANULOSA CELL TUMOURS

Granulosa cell tumours (GCT or sex cord-stromal tumours) are the most common ovarian tumour in horses and can occur in mares of any age. They may be composed of granulosa cells alone or contain theca cells (granulosa-theca cell tumours). They are almost always unilateral, functional and benign. Whilst generally slow growing they can reach up to 40cm in diameter. Mares with GCT are very unlikely to conceive even if the contralateral ovary preserves normal cyclicity.

Clinical Signs

The hormonal pattern is inconsistent and determines the clinical signs observed. These may include:

- Persistent, irregular or absence of oestrus
- Stallion-like behaviour: mounting, aggressiveness, squealing, striking
- Increased muscle deposition, cresty neck and enlarged clitoris in chronic cases

Rectal Examination

One ovary is normally palpably enlarged with no ovulation fossa being palpable. The contralateral ovary is usually small, firm and inactive. If there is asymmetry in ovary size yet the smaller ovary is cycling then a granulosa cell tumour is less likely and the enlarged ovary is more likely to have a haematoma or teratoma.

Ultrasonographic Examination

Granulosa cell tumours typically have a multicystic honeycomb appearance with some areas of solid tissue. A minority will have a dense homogenous appearance or will appear as a solid ovarian mass with a single anechoic fluid filled cyst. Haematomas or regions of necrosis within the tumour are common. The variable ultrasonographic appearance of GCTs hampers differentiation from other possible diagnoses including haematomata, cystadenoma, lymphoma and germ cell tumours. Measurement of serum hormone concentrations are therefore recommended for diagnosis.

Endocrine assays

Inhibin is produced by granulosa cells of the ovary and is increased in 90% of mares confirmed to have GCT. Testosterone is produced by the theca cells and is produced in increased concentrations in those horses in which theca cells are also neoplastic. In one study, 50–60% of horses with GCT had increased serum testosterone levels, mostly those horses that exhibited stallion-like behaviour. Inhibin is therefore the most useful hormone to measure in cases of suspected GCT. Testosterone is also helpful in a sub-section of cases in which theca cells predominate. Concerns have been raised over wide fluctuations in testosterone that may occur in normal mares so whilst it is unreliable if used alone it can be helpful when used alongside inhibin. When used together, inhibin and testosterone detected 95% of granulosa cell tumours in one study. Inhibin assays are not available commercially in the UK and samples are sent to the US resulting in a delay of 2-3 weeks between testing and results.

Normal follicular and luteal development is inhibited in the presence of GCTs so progesterone concentration decreases. Progesterone can be measured to demonstrate the absence of normal cyclicity but offers little additional value over measuring testosterone and inhibin. Oestrogen levels remain within normal limits even in mares with GCTs that exhibit persistent oestrus and oestrogen is therefore of no value in determining the presence of GCTs.

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<thead>
<tr>
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<th>Inhibin (ng/mL)</th>
<th>Testosterone (nmol/L)</th>
<th>Progesterone (nmol/L)</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>oestrus</td>
<td>dioestrus</td>
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<tr>
<td>Healthy mare</td>
<td>0.1-0.7</td>
<td>&lt; 0.5</td>
<td>&gt; 3</td>
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<tr>
<td>GCT</td>
<td>&gt;0.5</td>
<td>&gt;1.4</td>
<td>&lt;3</td>
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