DIAGNOSIS AND TREATMENT OF OVARIAN AFUNCTION DISORDER WITH A NORGESTOMET EAR-IMPLANT (CRESTAR) IN DAIRY COWS

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In the study, 1118 Polish Black and White cows from a dairy herd were examined during a three-year period. In 388 (34.7%) animals no visible oestrus signs were observed until day 60 postpartum. In those cows clinical examinations were performed twice, with a 10 d interval, and blood samples for progesterone analysis were collected simultaneously. Progesterone was measured by RIA. Based on clinical examination and progesterone values ovarian afunction (OA) was diagnosed in 178 (15.9%) cows. Twenty-eight of the affected cows were treated with a norgestomet ear-implant Crestar over a 10 d period while 32 untreated animals served as controls. The oestrus rate (85.7% vs 71.9%), conception rate to all services (75.0% vs 68.8%) and the service period length (105.7 vs 173.1 d) were significantly better in treated than control group, respectively (P ≤ 0.05). Overall analysis of the obtained results shows the potential advantages of Crestar application in management of OA in multiparous dairy cows.

Key words: cows, ovarian afunction, diagnosis, treatment, Crestar.

The basis for a successful cattle-breeding programme is the efficient functioning of the entire reproductive system. The recovery of ovarian activity following parturition is determined by a number of factors such as nutrition, milk yield, suckling, breed, age, body condition, month of calving, state of uterus and environmental conditions (1, 3, 9). Delayed postpartum ovarian activity is a well known drawback in cattle reproduction (4, 5). One of the most prominent ovarian clinical disorder is ovarian afunction. This is an absolute ovarian inactivity with no functional structures on its surface beyond 60 d postpartum (11). Different methods (hormonal and non-hormonal) of ovarian treatment have been employed, but data on their efficacy are conflicting.
Recent development of the Crestar, a subcutaneous device containing a progesterone derivative, norgestomet, has presented a new challenge to fully investigate progestagen effectiveness in OA treatment in cows. There are only a few reports about the use of ear implants in cows with OA.

The objectives of this study were to estimate the prevalence of OA and determine the efficacy of Crestar in treatment of OA in multiparous dairy cows 60 to 90 d postpartum.

Material and Methods

Dairy cows of the Polish black and white breed were used. They were housed in tie-stall barns and mainly fed on grass and corn silage, hay and concentrate during winter, and on pasturage in summer months. Average milk yield in a 310-d lactation period was 4000 kg. The animals were selected during herd control visits and only those in at least their second lactation, 60 to 90 d postpartum with OA, and free from any form of endometritis were considered. Following inspection of the vulva and perineal region for evidence and (or) type of vaginal discharge, rectal palpation of the uterine cervix, uterus and ovaries was performed. Blood samples for progesterone level analysis were collected from coccygeal vein into heparinized test tubes twice, simultaneously with clinical examinations, at a 10-d interval from all animals with OA and immediately centrifuged. Then, plasma samples were transferred into sterilized test tubes and stored at -20°C until assayed. Progesterone was analysed using RIA according to Hoffman et al. (8). The intra- and inter-assay coefficients of variation were 8.1 and 13.2%, respectively. Detection limit of the assay was 50 pg/ml. Low (< 1 ng/ml) progesterone level on both clinical examinations was indicative of OA.

Twenty-eight of the 178 OA affected cows were treated with a subcutaneous ear-implant containing 3 mg of the progestagen, norgestomet (Intervet Int. B.V, Poland) for 10 d, while 32 animals served as controls. The Crestar injection was not applied due to lack of luteal tissue in these cows. However, an accompanying Folligon (pregnant mare serum gonadrophin = PMSG, Intervet International B.V. Boxmeer, Holland) injection in a dose of 1000 I.U. per animal was administered at implant removal to stimulate final maturation and ovulation of the dominant follicle. The cows were inseminated on oestrus.

The fertility indices were analysed statistically by Student t-test and chi-square test.

Results

Of the 1118 calving incidences recorded, 178 ovarian afunction cases were diagnosed. The prevalence rate of OA in the herd was 15.9%. This represented 45.9% of the 388 anoestrous cows (Table 1).

Twenty-four (85.7%) of the 28 treated cows came in oestrus and were served with 12 (50.0%) conceiving on the first service. Oestrus occurred within 6 d of implant removal and Folligon application. Three (12.5%) treated cows cycled, but failed to conceive, while four did not respond and were later allocated to other treatment
regimens. The oestrus rates (85.7% vs 71.9%) and total pregnancy rates (75.0% vs 68.8%) were significantly higher in treated than control cows, respectively (P ≤ 0.05). Artificial insemination index and service period length of 1.7 and 105.7 d, respectively, were observed, and the latter was significantly shorter in the treated than control group (P ≤ 0.05) (Table 2).

Table 1
Incidence of ovarian afunction (OA) in the herd

<table>
<thead>
<tr>
<th>Calving incidence</th>
<th>Cows with anoestrous</th>
<th>Incidence of OA in relation to calving number</th>
<th>Incidence of OA in relation to anoestrous cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>s n n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>118 388</td>
<td>34.7</td>
<td>178 15.9</td>
<td>178 45.9</td>
</tr>
</tbody>
</table>

Table 2
A summary of the clinical results showing fertility indices obtained in the treated and control groups

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>Oestrus exhibition (%)</th>
<th>Conception rate after 1st service (%)</th>
<th>Total pregnancy rate (%)</th>
<th>A.I. index</th>
<th>Service period length (days) (x ± s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crestar</td>
<td>85.7a</td>
<td>50.0</td>
<td>75.0a</td>
<td>1.7</td>
<td>105.5 ± 28a</td>
</tr>
<tr>
<td>Control</td>
<td>71.9b</td>
<td>47.8</td>
<td>68.8b</td>
<td>2.0</td>
<td>173.1 ± 41b</td>
</tr>
</tbody>
</table>

a, b - difference statistically significant (P < 0.05)

Discussion

Although incidences of OA may differ in various herds due to their management and individual cattle status or genetic make-up, or as a result of different diagnostic procedures, an overall prevalence rate of 10-30% is usually observed (6, 11, 13, 14, 17, 19). This is in agreement with the 15.9% observed in this study. However, as high as 30-60% prevalence of OA cases have also been observed in problematic herds (14, 15).

The reproductive performance of OA cows treated with Crestar ear implant was improved in comparison with the controls. The oestrus rate, total pregnancy rate and duration of the interval from calving to conception were significantly better. The mechanism of action of these implants is based on a slow and steady release of progestagen, mimicking the luteal phase. Administration of PMSG at the remove of
progesterone stimulates follicular growth and maturation, leading to oestrus. Not much information is available on the efficacy of ear implants in multiparous dairy cows with ovarian anfunction 60-90 d postpartum. Jaśkowski et al. (10) observed 100% and 50% oestrus and total conception rates, respectively, in dairy cows with inactive ovaries with average 173.7 d postpartum. Ghallab et al. (7) found 61% oestrus rate in anoestrous beef cows treated with ear implant devices. Similar results were achieved after treatment using progesterone releasing intra-vaginal devices such as PRID or CIDR (12, 19).

Since as much as $3.00 could be lost each day open after day 100 postpartum depending on herd size, local economic standards and type of reproductive management strategies employed (18), the service period length should be the principle determinant of economic effectiveness of the treatment method. In this trial we observed a significant reduction in the service period in the treated compared to the control group (105.7 vs 173.1 d). Thus, it can be deduced that Crestar did not only bring about ovarian function, but also effectively improved the reproductive system efficiency manifested through better fertility indices and significantly reduced postpartum period in the treated group in relation to the control.

The results show that OA is still an important problem in dairy cows. Furthermore, Crestar treatment of OA in multiparous dairy cows is a reasonable alternative that could significantly improve cattle productivity. However, more studies are needed to fully determine Crestar efficacy and profitability in OA affected multiparous cows.

References