Changes in hematological parameters in sahiwal cows reaching to estrus following PGF$_2$α (double) injections

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Abstract

PGF$_2$α being a luteolytic agent regulates the lifespan of the corpus luteum on the ovary and is therefore, used for estrus synchronization. The present study was conducted on 6 non-inseminated, non-pregnant, anestrus (pre or post-service) or repeat breeder Sahiwal cows. Blood samples were collected after double injections of PGF$_2$α for haematological analysis on day 0, 11, 12, 13 & 14. TLC (thousands/µl), TEC (millions/µl), Hb (%), PCV (%), MCV (fl), MCH (pg) and MCHC (g/dl) were evaluated by using an automatic blood analyser. The study indicated no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC during estrus synchronization with double PGF$_2$α protocol. The alteration in blood picture of cow on day of induced estrus (day 14) was non significant decrease in TEC, Hb and PCV.

Keywords: PGF$_2$α, estrus, haematological parameters, sahiwal cows

Introduction

PGF$_2$α being a luteolytic agent regulates the lifespan of the corpus luteum on the ovary and is therefore, used for estrus synchronization. However, estrus cannot be synchronized precisely with PGF$_2$α because it does not synchronize growth of ovarian follicles. Thus, estrus detection is needed over a 7 day period after PGF$_2$α administration. The use of two PGF2α injection at interval of 11 to 14 days is the most popular technique of estrous synchronization in cattle and buffaloes (Singh et al., 2000) [5]. Since blood profile changes during various reproductive states, it is imperative to study haematological constituents during these states. Hence, the haematological profile can be used to monitor the health and reproductive status of herd.

Materials and method

The proposed work was conducted at Livestock Farm Adhartal, Jabalpur (M.P.) and Department of Veterinary Physiology & Biochemistry, College of Veterinary Science & A.H., NDVSU, Jabalpur (M.P.). The study was conducted on 6 non-inseminated, non-pregnant, anestrus (pre- or post-service) or repeat breeder Sahiwal cows. Clearance of this experimental study was taken from the Institutional Animal Ethics Committee. Blood samples were collected from each animal aseptically by jugular vein puncture by using sterilized needle for haematological analysis on day 0, 11, 12, 13 & 14. The haematological parameters were TLC (thousands/µl), TEC (millions/µl), Hb (%), PCV (%), MCV(fl), MCH (pg) and MCHC (g/dl) evaluated by using an automatic blood analyser. Statistical analysis of haematological parameters at different days was done using CRD as per the method describe by Snedecor and Cocharan (1994) [6].

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**Result and discussion**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Day 0</th>
<th>Day 11</th>
<th>Day 12</th>
<th>Day 13</th>
<th>Day 14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SE</td>
<td>Mean±SE</td>
<td>Mean±SE</td>
<td>Mean±SE</td>
<td>Mean±SE</td>
</tr>
<tr>
<td>TLC(10^3/µl)</td>
<td>27.56±3.14</td>
<td>27.25±3.14</td>
<td>24.83±2.41</td>
<td>24.38±2.11</td>
<td>24.03±1.98</td>
</tr>
<tr>
<td>Hb(%)</td>
<td>11.15±0.58</td>
<td>10.57±0.55</td>
<td>10.98±0.33</td>
<td>10.41±0.32</td>
<td>10.38±0.68</td>
</tr>
<tr>
<td>PCV(%)</td>
<td>36.15±1.87</td>
<td>35.51±1.95</td>
<td>35.65±1.72</td>
<td>33.65±0.78</td>
<td>33.1±2.75</td>
</tr>
<tr>
<td>MCV(µl)</td>
<td>66.51±1.55</td>
<td>66.18±1.64</td>
<td>65.54±1.78</td>
<td>66.03±1.67</td>
<td>64.63±2.72</td>
</tr>
<tr>
<td>MCH(pg)</td>
<td>20.48±0.32</td>
<td>20.62±0.47</td>
<td>20.13±0.30</td>
<td>20.31±0.52</td>
<td>20.28±0.68</td>
</tr>
<tr>
<td>MCHC(g/dl)</td>
<td>30.83±0.79</td>
<td>30.72±0.78</td>
<td>30.95±0.93</td>
<td>30.96±1.03</td>
<td>31.65±1.08</td>
</tr>
</tbody>
</table>

Mean values with different superscripts in a row vary significantly (P<0.05)

The present study indicate no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC at the time of induced estrus (day 14) in Sahiwal cows during double PGF\_\_ protocol. Akhoon et al. (2012)\(^1\) also reported haematological parameters (TEC, PCV, MCV, MCH and MCHC) studied showed no significant difference between the two groups (oestrus and non oestrus) in crossbred Jersey cows. The alteration in blood picture of Sahiwal cows in estrus was decrease in TEC, Hb and PCV. These changes could be attributed to the direct action of the increased production of estrogen at this stage or indirectly from the anterior pituitary activity (Wolf, 1949)\(^8\). Shakkarpude et. al (2017)\(^4\) reported significant decrease in the TEC, Hb and PCV at the time of induced estrus from the day before start of treatment with double PGF2a protocols in crossbred cows.

Another explanation for such haematological deviation might be the increased adrenocortical activity. It is generally agreed that androgen stimulates the erythropoiesis and estrogen produce anemia by inhibiting erythropoiesis. Mirand and Gordan (1966)\(^2\) described how estrogen inhibit erythropoiesis by suppressing the production of an external precursor of erythropoiesis stimulating factor which requires activation by the kidney mechanism for elaboration of the functional circulating erythropoiesis stimulating factor. Soliman and Selim (1966)\(^6\) has studied the blood picture of various reproductive phases in buffaloes and concluded that erythrocyte number and haematological content dropped at estrus. In present study TLC was decreased on day of induced estrus as compare to 0 day, which is in agreement with investigation of Pariza et. al (2013)\(^3\) which reported that the TLC in anestrous group of cows was significantly higher than that in the normal cycling control group of cows.

**Conclusion**

The study concluded no significant changes in the TEC, Hb, PCV, MCV, MCH and MCHC during estrus synchronization with double PGF\_\_ protocol in Sahiwal cows. Hematological parameters alongwith biochemical and hormonal parameters may be an important tool for the asessment of reproductive behavior in Sahiwal cows.

**References**