Title of thesis : Influence of various factors on duration of postpartum anestrus of cows in H.P.
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Abstract

The study was designed to determine the effect of various managerial factors on the duration of postpartum anestrus in cows under rural conditions in H.P. The study was conducted on animals presented in Teaching Veterinary Clinical Complex, during clinical camps and field visits organized by the department from May 2011 to April 2012. In all 340 animals were evaluated on the basis of history provided by the farmers and detailed clinico-gynecological examination. Animals that had exhibited estrus within 3 months postpartum were considered normal (control n=95) and beyond this, they were grouped based on duration for which they remained anestrus viz. 3-6 months (m; n=84), 6-9 m (n= 88) and >9 m (n=73).

A questionnaire (Annexure 1) was designed to record the different managerial practices followed by farmers. Detailed anamnesis i.e. amount of concentrate feed provided, milk yield, body condition score (BCS), presence of male, sex of calf, suckling, feeding pattern, supplementation of mineral mixture and salt, ectoparasite infestation and deworming status, were recorded to determine the possible predisposing managerial factors.

Blood samples were collected aseptically from 12 control and 50 anestrus cows through jugular venipuncture. The white blood cells (WBC), red blood cell (RBC), hemoglobin (Hb) concentration and packed cell volume (PCV) were estimated from whole blood collected in 3% dipotassium EDTA by using Auto Hematology Analyser. The macromineral i.e. calcium (Ca) and magnesium (Mg) and microminerals viz. copper (Cu), zinc (Zn), iron (Fe) and cobalt (Co) were estimated from plasma using atomic absorption spectrophotometer. The inorganic phosphorus (P), total protein, albumin, and total cholesterol were estimated from plasma using Agappe Diagnostic kits in Automated Biochemistry Analyzer 5010. The hormones i.e. T3, T4 and TSH was estimated from stored (-20°C) serum samples after proper thawing. All the hormones were analyzed using Lumax™
Chemiluminiscence Immuno Assay (CLIA) Strip Reader (Monobind, Inc. USA) using Acculite CLIA microwells. The data was statistically analyzed using paired (Fisher-t / Cochran) test with SAS (Statistical Analysis Software), SAS® 9.2 TS Level version 2M2 for windows.

The control group cows were provided significantly higher amount of concentrate ration compared to anestrus cows. The per day milk production in control and anestrus group cows ranged between 6.24±0.41 to 4.86±0.34 L/day and lowest milk yield was recorded in cows with highest duration of anestrus (>9m). The BCS of control group cows though marginally but was significantly higher than anestrus cows. Presence of male did not influence onset of early postpartum cyclic activity in control or altered the duration of anestrus in postpartum cows. More female calves were born to control group cows whereas male to female ratio was comparable in different anestrus groups. Suckling was prevalent among the animals reared by the farmers which enhanced the anestrus duration. Highest proportion (73.97%) of more than 9 months (>9m) group anestrus cows were allowed to suckle by their own calves.

Other practices of mineral mixture and salt supplementation were also evaluated to study their influence on postpartum anestrus. It was observed that cows that were anestrus for less than 6 months (control and 3-6m) post calving were received more amount of mineral mixture (76.84 and 91.67%, respectively). The salt was added in diets of majority (92.63 and 88.16%, respectively) of the control and anestrus animals.

The data regarding grazing pattern, deworming status and visually detected ectoparasite was also analyzed. The random deworming and stall feeding along with grazing was more prevalent in villages of Kangra and Hamirpur districts. Only 6.32 per cent of control and a higher proportion (20.82 %) anestrus cows were infested with ectoparasites. The proportion of anestrus cows infested with ectoparasite ranged between 19.05 to 22.73 per cent.

The WBC count was more in anestrus than control group animals. The red blood cell concentration was higher for >9m anestrus (5.71±0.21 x10^{12} /L) than 6-9m (5.05±0.25 x10^{12} /L) anestrus group cows. The RBC concentration was comparable between control and 3-6m anestrus group animals. However, the hemoglobin concentration and PCV of control group were more than those of anestrus group cows. Although, no variation was recorded in macro mineral status of control and anestrus group cows, but the plasma calcium concentration was
generally marginally low in both groups. Altered Calcium: phosphorus ratio was also observed. The plasma magnesium and phosphorus concentrations were marginally low in anestrus group than the control group cows however, the differences were statistically non significant.

Higher concentration of copper was recorded in anestrus (0.76±0.03 mg/L) than control group (0.62±0.05 mg/L) cows. Similar results were obtained for plasma cobalt concentration being higher in anestrus (0.17±0.01 mg/dl) than control group (0.11±0.01 mg/dl) animals. However 3-6m anestrus group (0.19±0.01 mg/dl) had highest cobalt concentration than other anestrus (6-9m and >9m) and control group cows. The plasma concentration of Zinc and Iron did not vary among control and different anestrus groups and the values were within physiological limits.

The plasma cholesterol concentration was higher in control (152.95±16.02 mg/dl) than anestrus (109.10±6.08 mg/dl) cows. Similarly cholesterol concentration was higher in control than anestrus cows irrespective of duration of anestrus. The plasma albumin showed lower values for anestrus (1.80±0.11g/dl) than control group (2.33±0.19g/dl) cows. However total protein and globulin concentration were comparable for all the groups.

The serum T3 concentration was similar in control (2.15±0.19 ng/ml) and > 9 month anestrus group (2.14±0.26 ng/ml) cows. Both these groups had lower T3 concentration than 3-6m (1.65±0.09 ng/ml)) and 6-9m (1.64±0.14 ng/ml) anestrus group cows. The T4 concentration was higher in control than all the anestrus group cows whereas TSH concentration did not show any variation among control and any of the anestrus groups.

Conclusions

- Anestrus cows were provided less quantity of concentrate ration and mineral mixture compared to control cows.
- Housing of cows with males did not influence the duration of anestrus postpartum.
- The duration of anestrus was more in suckled cows.
- Higher proportion of anestrus cows was infested with ectoparasites.
- Random deworming was more prevalent under rural conditions.
- Leukocyte count was higher in anestrus cows.
- Anestrus cows had low plasma cholesterol and serum T4 concentrations.