

Certain biochemical changes in uterine fluid during follicular and luteal phases of estrous cycle and certain reproductive disorders in buffaloes

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ABSTRACT

The uterine fluid obtained after flushing from genitalia of 36 slaughtered buffaloes was collected separately. Biochemical assay on the flushing revealed that total protein levels were significantly higher in luteal phase of the cycle, and from genitalia showing mucometra as against those tracts having smooth ovaries or endometritis. No significant change in albumin levels during two phases of estrous cycle, as well as, in smooth ovaries and endometritis was seen, except that of tracts suggestive of mucometra. In mucometra the level was higher. Globulin levels were significantly higher in luteal phase and mucometra condition. Albumin to globulin ratio was higher in conditions of smooth ovaries and endometritis. Alkaline phosphatase activity was significantly higher in follicular phase of estrous cycle. Cholesterol levels recorded were highest in follicular phase followed by mucometra and luteal phase of the cycle.

Key words: Biochemical Profiles, Uterine Flushing, Reproductive conditions, Buffaloes

Buffalo is the most important domestic ruminant in many countries of Asia and African continents. Recent clinical investigations in bovines arouse interest in the relationship between biochemical changes occurring in uterus during the reproductive cycle and various types of reproductive disorder. The data on biochemical changes during the different phases of estrous cycle and reproductive disorders in buffaloes are lacking.

A total of 36 she buffalo genitalia were selected from 208 pluriparous buffaloes slaughtered at Municipal slaughter house, Hyderabad over a period of 3 months. The selected genital organs were classified into 5 groups.

- Group 1: Follicular phase: The ovaries of genital organs having follicles more than 0.5 cm in diameter.
- Group 2: Luteal phase: Ovaries with well developed mature corpora lutea
- Group 3: Inactive ovaries: Ovaries without follicle or corpus luteum
- Group 4: Endometritis: Uterus in with gross inflammatory changes
- Group 5: Mucometra: Uterus in containing copious amount of mucus with retained corpora lutea.

The selected genitalia were shifted to laboratory in ice pack as early as possible. Each uterus was

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clamped at the cervix and flushed with 20 ml of phosphate buffer. The collected uterine fluid was centrifuged at 6000 rpm for 15 mins and 3 ml aliquots of supernatant fraction were taken immediately for spectrophotometric determination of biochemical composition. The reagents used for estimation of total protein, albumin, total cholesterol and alkaline phosphatase were in the form of test kits purchased from M/S Qualigens*.

The mean levels of total protein, albumin, globulin, albumin- globulin ratio, cholesterol and alkaline phosphates in uterine flushing during follicular phase and luteal phase of estrous cycle as well as during certain disorders like inactive ovaries, endometritis and mucometra are presented in the table 1

Table 1: Biochemical composition of uterine flushing of buffaloes in different phases of estrous cycle and reproductive disorders

Name of the stage/disorder n=6	Total protein (g %)	Albumin (g %)	Globulin (g %)	Albumin and Globulin ratio	Cholesterol (mg %)	Alkaline Phosphatase (KAU)
Follicular	0.70 ^a ±0.02	0.16 ^a ± 0.06	0.54 ^b ± 0.01	0.29 ^b ± 0.01	35.33 ^c ± 3.90	41.09 ^c ± 2.91
Luteal	1.45 ^b ± 0.06	0.14 ^a ± 0.00	1.31 ^c ± 0.06	0.11 ^a ± 0.01	13.15 ^b ±0.75	19.58 ^b ± 1.09
Inactive ovaries	0.43 ^a ±0.01	0.18 ^a ±0.01	0.25 ^a ±0.03	0.77 ^c ±0.06	4.07 ^a ±0.98	1.90 ^a ±0.18
Endometritis	0.40 ^a ±0.01	0.19 ^a ±0.01	0.21 ^a ±0.01	0.92 ^d ±0.02	4.86 ^a ±0.26	4.61 ^a ±0.22
Mucometra	13.19 ^c ±1.19	1.55 ^b ±0.09	11.64 ^d ±1.13	0.14 ^a ±0.01	66.96 ^d ±3.24	

Means bearing different superscripts (column wise) differed significantly.

The assay revealed that the total protein levels were significantly higher during luteal phase than the follicular phase. The uterine flushing collected from mucometra affected uteri was found to have higher total protein levels, whereas in uterine flushing collected from inactive ovaries and those having endometritis; the total protein levels were similar to follicular phase. The, higher total protein levels in healthy cows were reported by Ramakrishna (1996) and Rao (1995) and higher levels in cows affected with endometritis than the present study was reported by Rao (1995).

The albumin levels did not show significant change during physiological or pathological condition of reproductive tract except in case of mucometra where higher albumin levels were observed. In contrast to this study, higher albumin levels in cervical mucus were recorded by Ramakrishna (1996) in cows.

The globulin levels were higher in mucometra as well as during luteal phases of estrous cycle, but in follicular phase, the globulin levels were significantly higher than in the cases of inactive ovaries and endometritis. The albumin - globulin ratio was significantly higher in endometritis followed by inactive ovaries and follicular phase. However, the ratio was low in luteal phase and mucometra. Infections of genital tract destroy the albumin-globulin ratio which affects fertility (Skinner *et al.*, 1991). Many of the chemical mediators involve in uterine mechanism are proteins.

The cholesterol levels were significantly higher in mucometra and follicular phase while as lower cholesterol levels were recorded in luteal phase than the follicular phase. Still low cholesterol levels were recorded in smooth ovaries and endometritis. Higher levels of cholesterol during estrus and luteal phases than the present study were reported by Shashikumar and Dubey (1987). As the Cholesterol is the precursor of steroid hormones (Mc Donald, 1980), higher cholesterol levels may be useful for the

production of steroid hormones.

Alkaline phosphatase activity was higher in follicular phase than luteal phase, where as it was very low in smooth ovaries and endometritis. Ahmed *et al.*, (1993) recorded higher alkaline phosphatase activity in follicular, luteal phases, endometritis and smooth ovarian condition in-vitro studies in cows and buffaloes than the present study. The study was in consonance with the Schultz *et al.* (1971), who reported changes in alkaline phosphatase activity with different stages of estrous cycle. The alkaline phosphatase activities indicate the level of glycolysis to provide energy (Sinha *et al.*, 1986). However, decreased alkaline phosphatase activity in endometritis affected buffalo was also recorded by Bugalia and Sharma (1993).

Increased utilization as well as synthesis of certain biochemical substance was noticed to cope up with increased ovarian activity during different phases of estrous cycle and reproductive disorders (Cheema *et al.*, 1999) which might be responsible for changes in biochemical composition of uterine secretion.

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