

## Follicular Dynamics in Crossbred cows undergoing prostaglandin induced luteolysis

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### Abstract

Growth and regression of ovarian follicles were studied in crossbred cows (n=6), induced with prostaglandin (PGF2 alpha) analogue for luteolysis. After PGF2 alpha treatment, four cows (Group A) ovulated from dominant follicle of first follicular wave and remaining 2 animals ovulated from second dominant follicle (Group B). The intervals from treatment to estrus (P<0.01) and treatment to ovulation (P<0.01) were significantly longer in animals of group B compared to the animals of group A. Significant differences were observed in growth profile of ovulatory follicle between animals of group A and group B with respect to daily growth rate (P<0.01), increase in diameter (P<0.01) and size of the follicle on day 0 (P<0.01).

**Key words :** Crossbred cows, Prostaglandin, Ovarian follicles.

### Introduction

PGF2 alpha has been successfully used for induction of estrus (Reddy *et al.*, 2001), ultrasonographic studies on events associated with regression of corpus luteum and emergence of new dominant follicle during the period from treatment to response will be help to improve the strategy involved in resumption of estrous cycle. The study of follicular dynamics during estrus may help to clarify the phenomena that interfere in estrus synchronization and ovulation as well as in the ovarian response of super ovulated buffalo and may improve fertility levels (Bhosrekar, 2006). So recently interest and research activity in ovarian function have contributed greatly to our understanding of ovarian particularly with respect to follicular dynamics.

### Material and Methods

Six normal cycling pluriparous crossbred cows from Livestock Instruction Farm, Dr. PDKV, Akola in healthy state were utilized for the present study. These animals received two injection of Lutalyse (Dinoprost tromethamine) 25 mg given 11 days apart. These animals were observed for effect of PGF2 alpha on induction of estrus and follicular dynamics.

The ultrasound scanning were performed using

a real time B-mode ultrasound scanner equipped with a 6.0 MHz convex linear array transducer. The scanning of ovaries was accomplished in several planes to identify all the follicles greater than 4 mm in diameter. Desired images were frozen on the screen and the measurements were taken.

The corpus luteum was present on the ovary in all the crossbred cows before treatment.

### Results and Discussion

The response to PGF2 alpha treatment with respect to expression of estrus, interval from treatment to ovulation and growth profile of ovulatory follicle is presented in Table 1. Animals were derived in to two group viz. A and B based on pattern of ovulation. The animals of group a (n=4) ovulated from dominant follicle of first follicular wave, while the animals of group B (n=2) ovulated from dominant follicle of second follicular wave.

The interval from treatment to estrus ( $55 \pm 2.46$  Vs.  $63.5 \pm 0.90$  hrs, P<0.01) as well as treatment to ovulation ( $95.75 \pm 0.38$  Vs.  $98.12 \pm 0.31$  hrs P<0.01) were significantly greater in animals of group B as compared to that of group A. Moreover, significant difference were observed in growth profile of ovulatory follicle between animals of group A and B with respect to growth rate (P<0.01) increase in

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Table 1. Effect of PGF2 alpha on interval to estrus and ovulation and growth profile of ovulatory follicle in crossbred cows ovulated from first and second dominant follicle

Sr. No.	Characteristics	Group A	Group B	't' value
A)	Interval			
1.	Treatment to estrus (hrs)	55.00 ± 2.46	63.5 ± 0.90	3.240**
2.	Treatment to ovulation (hrs)	95.75 ± 0.38	98.12 ± 0.31	4.805**
B)	Ovulatory follicle			
3.	Growth rate (mm/day)	1.17 ± 0.06	1.71 ± 0.05	6.527**
4.	Increase in diameter (mm)	4.67 ± 0.26	6.81 ± 0.09	7.882**
5.	Diameter on day of treatment (mm)	10.76 ± 0.37	8.39 ± 0.05	6.288**
6.	Maximum diameter (mm)	15.43 ± 0.12	15.20 ± 0.06	1.664NS

Group a : Ovulated from first dominant follicle  
\*\* - Significant at 0.01 per cent level

Group b : Ovulated from second dominant follicle  
NS - Non significant

diameter ( $P < 0.01$ ) and size of the follicle on day of treatment (day 0) ( $P < 0.01$ ). Significant difference was recorded with maximum diameter of follicle at ovulation between two groups (Table 1).

Animals of group A showed greater size of ovulatory follicle on day of treatment, as compared to those of group B ( $10.76 \pm 0.37$  Vs.  $8.39 \pm 0.05$  mm). The size of ovulatory follicle was smaller on day of ovulation in group B as compare to group a ( $15.2 \pm 0.06$  Vs.  $15.43 \pm 0.12$  mm).

Kastelic *et al.* (1990) and Kastelic and Ginther (1991) demonstrated that the dominant follicle of first follicular wave during the growth or early static phase was capable of further growth and ovulation when luteolysis was induced with PGF2 alpha in cattle. However, when the dominant follicle of first follicular wave was in late static phase and a new follicular wave had been emerged, the first dominant follicle regressed and the dominant follicle of the second follicular wave became the ovulatory follicle. Similar observations were recorded in water buffaloes (Brito *et al.*, 2002). In the present study, treatment with PGF2 alpha was employed in known stage of the estrous cycle and the diameter of the largest and second largest follicles present in the ovary were recorded and analyzed. In the animals that ovulated from the largest follicle (Group A), this follicle continuously increased in diameter to become the ovulatory follicle, while the second largest follicle continuously regressed, indicating that the largest follicle was dominant follicle and the second largest follicle was the subordinate follicle of ovarian follicular wave present before treatment. In the animals, which ovulated from second largest follicle (Group B), the largest follicle continuously regressed while the second largest follicle continuously to become

ovulatory follicle therefore, the largest follicle was the dominant follicle of first follicular wave at the time of treatment, but was in its regression phase, it regressed, the dominant follicle of succeeding follicular wave grew until ovulation occurred. In the present study ovulation after PGF2 alpha treatment occurred from the dominant follicle of first and second follicular waves in a ratio of 4:2.

When the dominant follicle of first follicular wave present at the time of treatment became ovulatory follicle (Group A), it exhibited slower growth rate, a smaller increase in diameter and a non significantly greater maximum diameter prior to ovulation than the ovulatory follicle of succeeding follicular wave (Group B). On the other hand, longer intervals from treatment to estrus and from treatment to ovulation were recorded among animals that ovulated from second dominant follicle despite their faster growth rate before ovulation. These results are in agreement with earlier report in cattle (Kastelic, *et al.*, 1990) and in buffaloes (Brito *et al.*, 2002), which recorded differences in interval from treatment to ovulation and in characteristics of ovulatory follicle in animals that ovulated from first or second follicular wave after induced luteolysis. Kastelic and Ginther (1991) reported that as compared to ovulatory follicle of first follicular wave, the ovulatory follicle of second follicular wave had to undergo considerable growth prior to ovulation and this was consistent with its faster growth rate and longer interval from treatment to ovulation. Similar observations were recorded in present study.

#### Conclusion

Ultrasonic imaging is very important and useful technique in the study of patterns of follicular developments. Time of onset of oestrus could be

predicted by the presence of dominant follicle at time of PGF2 alpha treatment.

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## Dozens of Rare Reptiles Die in India

BISWAJEET BANERJEE, LUCKNOW, India (AP) - Conservationists and scientists scrambled Tuesday to determine what has killed at least 50 critically endangered crocodile-like reptiles in recent weeks in a river sanctuary in central India.

Everything from parasites to pollution has been blamed for the deaths of the gharials - massive reptiles that look like their crocodile relatives, but with long slender snouts. The bodies, measuring between five and 10 feet long, have been found washed up on the banks of the Chambal River since early December, according to conservationists and officials.

The precise number of gharials that have died remains unclear, with the Gharial Conservation Alliance saying 81 bodies have been found since early December, but Chief Wildlife Warden D.N.S Suman putting the number of dead animals at 50.

Conservationists believe there are only some 1,500 gharials left in the wild, many of them in a sanctuary based along the Chambal, one of the few unpolluted Indian rivers. The Chambal contains the largest of three breeding populations in the world.

In early December, officials found the bodies of at least 21 gharials over three days. The bodies have continued washing ashore in the weeks since. The latest possible clue to what's killing the rare reptiles is an unknown parasite that scientists found in the dead gharials' liver and kidneys, according to Dr. A.K. Sharma of the Indian Veterinary Research Institute.

"We can say that liver and kidney of these gharials were badly damaged," said Sharma. "They were swollen and bigger than their usual size." Other believe the gharials may have gotten sick and died after eating contaminated fish from the polluted Yamuna river, which joins the Chambal in the state of Uttar Pradesh. Pathological tests confirmed lead and cadmium in the bodies of the dead gharials, said Suman, the wildlife official. "The Chambal river has clear water free from heavy metals. The only possibility seems that these gharials might have migrated from heavily polluted Yamuna river where they might have eaten fish," said Suman.

The gharial, also known as the Indian crocodile, was on the verge of extinction in the 1970s, but a government breeding program that has released several hundred into the wild has raised their numbers.

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