SERUM TRI-IODOTHYRONINE AND THYROXINE PROFILE IN INSULIN TREATED ACYCLIC GOATS*

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ABSTRACT

The present work was carried out with the objective of estimating of tri-iodothyronine (T3) and thyroxine (T4) concentrations in insulin treated acyclic goats. Fourteen acyclic goats were randomly divided into two groups, i.e. group A (control, n = 7) and group B (insulin treated, n = 7). Animals of treatment group were injected subcutaneously with long acting bovine insulin at 0.2 IU/kg bodyweight, once daily for five consecutive days. All the experimental goats were subjected to collection of blood on day 0 (day of first injection), 4, 8, 12, 16, 20, 24 and day 28. Estimation of T3 and T4 were carried out by using RIA. The mean values of T3 were significantly higher or on day 4, 28 ($P < 0.01$), 12, 16, 20 and 24 ($P<0.05$) in treated goats as compared to control. However, the T4 levels in treatment group were significantly higher ($P<0.05$ or $P < 0.01$) on days 4, 8, 12, 16 and 20.

Key words: Insulin, Tri-iodothyronine, Thyroxine, Acyclic goats.

In the past, the thyroid hormones were thought to influence mainly thermoregulation and homeostasis of energy and protein metabolism. Recently, several studies have confirmed their involvement in regulation of certain ovarian functions in ruminants (Huszenicza *et al.,* 2002). Hypo or Hyperthyroidism may reduce the secretion of gonadotrophin by the anterior pituitary (Roberts, 1971). Hypothyroid condition reduces the responsiveness of ovary to pituitary gonadotrophin (Mudgal, 1992). Hence, lower level of thyroid hormones may play an indirect but important role in anestrus/sub estrus condition of the animals (Sharma *et al.,* 1999). Application of insulin to modulate reproduction in livestock is fairly a recent development. Insulin has been implicated in processes related to reproduction besides normal serum glucose regulatory action. It has an important role in follicular development and function (Gong *et al.,* 1997). Exogenous insulin administration has been found to be augment the ovarian function, i.e., enhanced follicular development, steroidogenesis and induction of estrus in acyclic goats (Sarath *et al.,* 2008). The effect of insulin on serum thyroid hormones profile especially, in acyclic goat is not known. Hence, the present study was conducted with the objective of estimation of tri-iodothronine (T3) and thyroxine (T4) in insulin treated acyclic goats.

The study was conducted on non-descript adult female goats of 2-3 years of age with fairly good body condition (score: 3-4) maintained at experimental animal sheds of Animal Reproduction Division, Indian Veterinary Research Institute, Izatnagar (UP). The study was undertaken during the period between the month of March and June 2005 with average environmental temperature of 28.4° C and average relative humidity of 65%. The experimental goats were maintained in intensive system of rearing with uniform feeding and managemental conditions. The goats were identified as acyclic based on absence of estrus through buck parading twice a day and through B-mode transrectal real time ultrasonography for two cyclic lengths. Experimental goats were randomly divided into two groups, i.e. group A (control, n = 7) and group B (insulin-treated, n = 7). Animals of group B were injected subcutaneously with long acting bovine insulin (LONGACT B, Biopharm Pvt Ltd., Mumbai) at 0.2 IU/kg bodyweight, once daily for five consecutive days. Control group was treated with saline. All the experimental goats were subjected to collection of blood on day 0 (day of first injection), 4, 8, 12, 16, 20, 24 and 28 through Jugular venipuncture. Estimation of T3 and T4 were carried out by using RIA kit (Immunotech,

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France). The data obtained during the study were statistically analyzed through paired't' test by using computer software package (SPSS version 4.5).

The serum T3 and T4 concentrations varied between 0.57±0.09 to 1.26±0.21 ng/ml and 0.93±0.04 to 1.82±0.20 ng/ml and between 51.76±4.20 to 80.04±7.94 ng/ml and 75.98±6.93 to 106.30±9.02 ng/ml in control and treated groups, respectively. The mean values of T3 were significantly higher on day 4, 28 ($P < 0.01$), 12, 16, 20 and 24 ($P<0.05$), respectively in treatment group as compared to control which might be due to positive role of insulin in thyroid function. However, no significant variation was noticed among control group. The T4 level in treatment group were significantly higher as compared to control on day 4, 12, 16 and 20 ($P<0.05$) and day 8 ($P < 0.01$) respectively. It is evident from the present study that insulin administration has resulted in enhancement of concentrations of T3 and T4 in acyclic goats in comparison to control. Exogenous insulin administration is found to enhance estradiol concentrations and induction of estrus activity in acyclic goats (Sarath *et al.,* 2008). The increased estradiol during estrous is responsible for increased concentration of thyroid hormones. Association of increased thyroid hormones with estradiol during proestrus and estrus has been well documented by Bhattacharya *et al.,* (1994). Moreover, thyroid gland requires insulin or IGF-I for its normal function. Insulin and IGF-I stimulate thyroid cell growth and differentiation in the presence of thyroid stimulating hormone (TSH) (Margaret C. Eggo *et al.,* 1990). It might be concluded from the present findings that exogenous insulin administration may modulate the thyroid function favorably which might have future implications in acyclic goats.

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