Pakistan Journal of Pharmaceutical Sciences
Vol. 14(2), July 2001, pp.43-46

EFFECT OF DEXAMETHASONE ON PITUITARY PROLACTIN IN THE LIZARD *UROMASTIX HARDWICKII*

MAHMOOD AHMAD, IFTIKHAR MAHMOOD, RUQAIYA HASAN, HABIB FATIMA AND MANSOOR AHMAD*
Department of Physiology, University of Karachi, Karachi-75270, Pakistan
**Department of Physiology, New York Medical College, Valhalla, New York, U.S.A.*

ABSTRACT

The effect of 0.2-mg/ml dexamethasone (DXM) given intravenously to *Uromastix hardwickii* for 4 days; suppressed prolactin secretion by influencing the hypothalamus or para pituitary region. This effect of DXM through 30 min and 60 min extracted pituitary suspensions also supported prolactin deficiencies through crop sac diametric response.

INTRODUCTION

A number of hormones and majority of endocrine organs participate vigorously in the initiation and maintenance of lactation. As the knowledge of prolactin (PRL) increased, it became evident that many drugs, by affecting the central nervous system, can produce hyperprolactinemia (Turkington, 1972, Kleinberg *et al*, 1977).

In addition, many of the synthetic hormones directly or indirectly have an impact on PRL balance. However, no information is available as to whether the administration of dexamethasone (DXM) raises or depresses the pituitary PRL in *Uromastix hardwickii*.

The purpose of the present study is to establish the effects of DMX on the PRL production of lacertilian pituitary.

MATERIALS AND METHODS

Assay Animals:

White race pigeons aging 8 to 10 weeks, weighing 320 ± 25g were used for crop sac assay. Pigeons obtained in two lots of 12 each were housed one to a cage, fed millet and water *ad libitum.* The birds were kept in the laboratory for 5 days in similar conditions of light and temperature.

Three batches each of 12 *Uromastix hardwickii* obtained from local suppliers were tagged 1 to 12 for identification.

Drug Information:

Dexamethasone sodium phosphate is a water-soluble inorganic ester of decadron. It is 25 to 30 times as potent as hydrocortisone. It has predominantly glucocorticoid activity with low mineralocorticoid activity. The administration of DXM inhibits the production of ACTH. Glucocorticoids are primarily active in protecting against stress and affecting protein and carbohydrate metabolism.

Dosimetry:

Injectable preparations (Meyers *et al.,* 1980) of commonly used natural and synthetic corticoids and parenteral doses of 1,2,4,5 and 8 mg/ml DXM are readily available for use. However, regarding the size of *Uromastix hardwickii* a dose of 0.2 mg/ml was considered suitable for this investigation.

Drug Administration:

In experiment-I, a dose of 0.2 mg/ml aqueous DXM was administered intravenously to each lizard of batch A for this purpose a median slit of about an inch was made in the abdominal integument The incised skin was detached and stretched from the muscles on both the sides to make the abdominal vein visible for intravenous injection The incision was later protected with a piece of adhesive plaster. The lizards were decapitated on the day 5. Each of the pituitary extracted was tagged for the preparation of a separate suspension for bioassay.

In experiment II the amount of DXM and the method of injection adopted was the same; with the exception, that 12 lizards were killed after 30 min following DXM administration. Similarly lizards belonging to batch C were killed exactly after 60 min. following DXM administration. No sooner their pituitaries were extracted, suspensions were prepared and tagged.

Pituitary Suspensions:

Suspension of each pituitary was prepared separately by grinding with an agate and a mortar in a small fixed quantity of pyrogen free distilled water. The amount for suspension was 0.4 ml inclusive of pituitary. It was transferred by a hypodermic syringe to a tagged serum bottle and refrigerated for use in bioassay.

Assay Procedure:

The procedure adopted for bioassay was that of Grosvenor and Turner (1958). Twelve pigeon were used in each experiment. Feathers overlying the crop were plucked of six hour before starting intradermal injections.

In experiment I, 0.1 ml pituitary suspension of a corresponding tag was injected intradermally in the geometrical centre of each half of the crop-sac. Whereas, in experiment-II, 0.1 ml pituitary suspension belonging to 30 min were injected on the left half of the crop and 0.1 ml pituitary suspension of 60 min were injected in the centre of the right half of the crop for 4 days according to the operational scheme.

Diametric Measurement:

The birds were killed on day 5. The skin was separated, before bisecting the crop sac. The lining of each half was rinsed with tap water and all the adipose tissue was removed. Each half of the crop was then stretched against the light of a table lamp, fitted with 100 watt bulb; while another person measured thrice the proliferated, circularly opaque area with the help of a caliper.

RESULTS

0.2 mg DXM treated pituitary suspension gave a minimum crop-sac response of 1.33 cm, a maximum of 1.66 cm and 1.49 $\pm$ 0.073 cm as the mean of 24-crop measurement (Table 1).

On the other hand, suspension of pituitary extracted 30 min after showed a minimum response of 1.11 cm, a maximum of 1.23 cm and 1.16 cm as the mean of 12 left crop measurements (Table 2).

While, suspension of DXM treated lizard pituitary, extracted after 60 min gave a minimum crop-sac response of 0.96 cm; a maximum of 1.05 cm and 1.01 $\pm$ 0.03 cm as the mean of 12 right crop measurements (Table 2).

DISCUSSION

Deficiencies of prolactin (PRL) have not been described. But excess of PRL is known to produce lactation, amenorrhea and infertility (Franks *et al.,* 1975). It is often difficult to decide whether an abnormally high concentration of PRL is caused either by pituitary, or tumor. Sometimes over production is caused by normal cells of the pituitary that have lost the normal suppressive influence due to a lesion either in the hypothalamus or parapituitary region, or secondary to the effect of drugs.

In the present study the poor crop-sac diametric response indicates that DXM has influenced the hypothalamus or parapituitary region to suppress the normal secretion of PRL. Since the suspension of normal *Uromastix* pituitary produced a diametric crop-sac response of 2.12 cm (Ahmad *et al*., 2002).

Table-1
Crop-sac diametric response to the suspensions of *Uromastix* pituitaries extracted after 4-days of DXM treatment

Pigeons	Pigeon's weight g	Diametric response *cm
1	345	1.33
2	342	1.49
3	351	1.66
4	326	1.52
5	350	1.46
6	348	1.49
7	338	1.52
8	332	1.47
9	335	1.51
10	351	1.46
11	342	1.49
12	332	1.49
Average wt:	341	** 1.49 ± 0.073

*Each figure is the average of right and left crop-sac diametric measurements.
**The figure is the mean of 24 diametric measurements with. ± S.D.

Table-2
Diametric response to the suspensions of lacertilian pituitaries extracted after 30 and 60 min of DXM treatment

Pigeons	Pigeon's weight	Diametric response (cm)	
		30 min	60 min
1	345	1.15	1.05
2	342	1.11	0.96
3	351	1.23	0.98
4	326	1.15	0.97
5	350	1.17	1.04
6	348	1.16	1.02
7	338	1.18	1.04
8	332	1.14	1.00
9	335	1.17	1.03
10	351	1.15	1.00
11	342	1.19	1.04
12	332	1.13	0.98
Average wt:	341	*1.16 ± 0.03	**1.01 ± 0.030

*The mean of 12 measurements of the left crop-sac with ± S.D.
**The mean of 12 measurements of the right crop-sac with ± S.D.

REFERENCES

Ahmad, M., Mahmood, I., Hasan, R Naim, T., Javaid, A., Fatima, H. and Ahmad, M. (2002). Bioassay of pituitary prolactin of the lizard *Uromastix hardwickii* (In preparation).

Frank, S., Murray, M.A.F., Jaquire, A.M., Steels, S.J., Nabarro, J.D.W., and H.S. Jacobes (1975). Incidence and significance of hyperprolactinemia in women with amenorrhea. *Clin. Endocrinol.* **4**: 597-607.

Grosvenor. C.E. and C.M. Turner (1958). Assay of lactogenic hormone. *Endocrinology*. **63**: 530-534.

Kleinberg, D.L., Noel, G.L and A.G. Frantz (1977). Galactorrhea: A study of 235 cases including 48 with pituitary tumors. *N. EngI. J. Med*. **296**: 589-600.

Meyers, F.H., Jawetz, E., and A. Goldfein (1980). Commonly used natural and synthetic corticosteriods. In Review of Medical Pharmacology, 7th ed. pp. 356-357. Maruzen Asian Edition

Turkington, R.W. (1972), Inhibition of prolactin and successful therapy of the Forbes Albright syndrome with L-Dopa. *J. Clin. Endocr*. **34**: 306-311.