Acta Medica Okayama

Volume 29, *Issue* 5 1975 *Article* 3

OCTOBER 1975

Inhibitory effects of glucocorticoids on prolactin release induced by thyrotropin-releasing hormone in man

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Inhibitory effects of glucocorticoids on prolactin release induced by thyrotropin-releasing hormone in man*

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Abstract

Glucocorticoid effect on thyrotropin-releasing hormone (TRH)-induced prolactin (PRL) release was studied in female patients with collagen or autoimmune diseases. Long-term, high dose glucocorticoid therapy tended to inhibit the response of plasma PRL to TRH. A negative correlation (r=-0.40) was found between the logarithm of total dose of glucocorticoids received and the magnitude of plasma PRL response to TRH (p less than .05).

*PMID: 132086 [PubMed - indexed for MEDLINE]

Acta Med. Okayama 29, 351—354 (1975)

INHIBITORY EFFECTS OF GLUCOCORTICOIDS ON PROLACTIN RELEASE INDUCED BY THYROTROPIN-RELEASING HORMONE IN MAN

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Received for publication, March 31, 1975

Abstract: Glucocorticoid effect on thyrotropin-releasing hormone (TRH)-induced prolactin (PRL) release was studied in female patients with collagen or autoimmune diseases. Long-term, high dose glucocorticoid therapy tended to inhibit the response of plasma PRL to TRH. A negative correlation ($r = -0.40$) was found between the logarithm of total dose of glucocorticoids received and the magnitude of plasma PRL response to TRH ($p < .05$).

Glucocorticoids have been known to inhibit the secretion of adrenocorticotropic hormone (ACTH), growth hormone (GH) and thyroid stimulating hormone (TSH) (1-5); however, not much is known about the effect of glucocorticoids on prolactin (PRL) secretion.

The release of TSH stimulated by the administration of synthetic thyrotropin-releasing hormone (TRH) is sensitive to inhibition by natural and synthetic glucocorticoids (6). We have previously investigated the effect of glucocorticoids on the secretion of prolactin- utilizing synthetic TRH, which stimulates PRL release by direct action on the pituitary (8). In the present study, the PRL response to synthetic TRH was determined on female patients receiving glucocorticoids.

MATERIALS AND METHODS

The subjects were 10 normal females and 29 female patients with collagen diseases or autoimmune diseases. They patients were examined before and during glucocorticoid (GC) therapy.

All tests were begun at 9 a.m. after an overnight fast. After 1 ml of blood sample was drawn for control purposes, 500 μg of synthetic TRH (Tanabe Seiyaku Co., Ltd.) was injected intravenously. Additional blood samples were drawn at 15, 30, 45, 60 and 90 min after injection of TRH. The plasmas were immediately separated after each blood collection and frozen until PRL assay.

The dose of glucocorticoids (GC) was calculated at the prednisolone equivalent. Patients received GC at the equivalent dose just after injection of TRH.

The maximum increment of plasma PRL above the basal level after TRH administration was used as the index of PRL response to TRH. Plasma PRL was measured by the radioimmunoassay kit that was kindly supplied by the National Institute of Arthritis, Metabolism, and Digestive Diseases, U.S.A. (9).

RESULTS

No significant difference was present between basal PRL levels in normal females and in glucocorticoid-treated patients. Fig. 1 shows the plasma PRL response of patients with collagen diseases or autoimmune

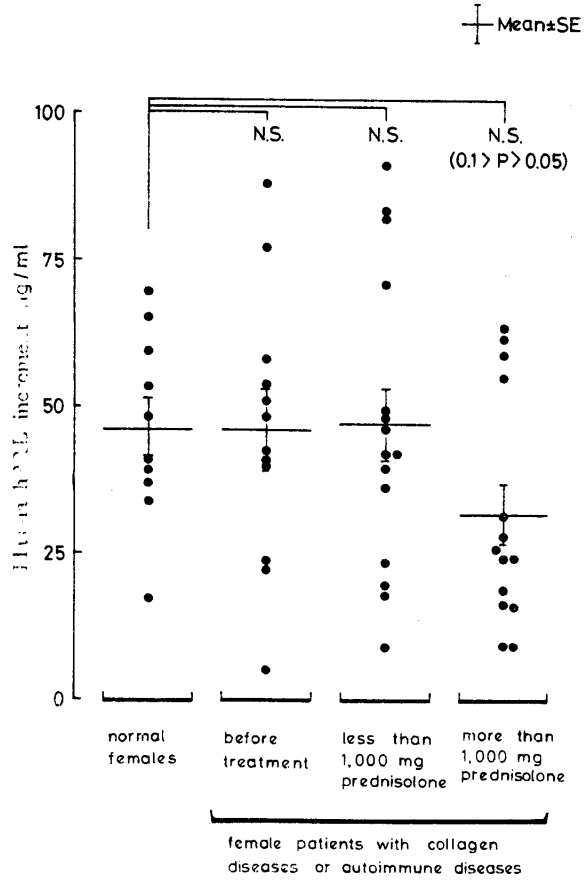

Fig. 1. Plasma prolactin responses to TRH in normal females and in female patients with collagen diseases or autoimmune diseases before and during glucocorticoids treatment. NS, not significant.

diseases to 500 μg TRH before and during glucocorticoid treatment. In patients on high doses of glucocorticoids (more than 1,000 mg of prednisolone equivalent) the plasma PRL response to TRH was slightly inhibited.

The decrease in PRL response to TRH after glucocorticoid treatment was examined further in glucocorticoid-treated patients, as shown in Fig. 2. The correlation coefficient between the magnitude of the logarithm of the

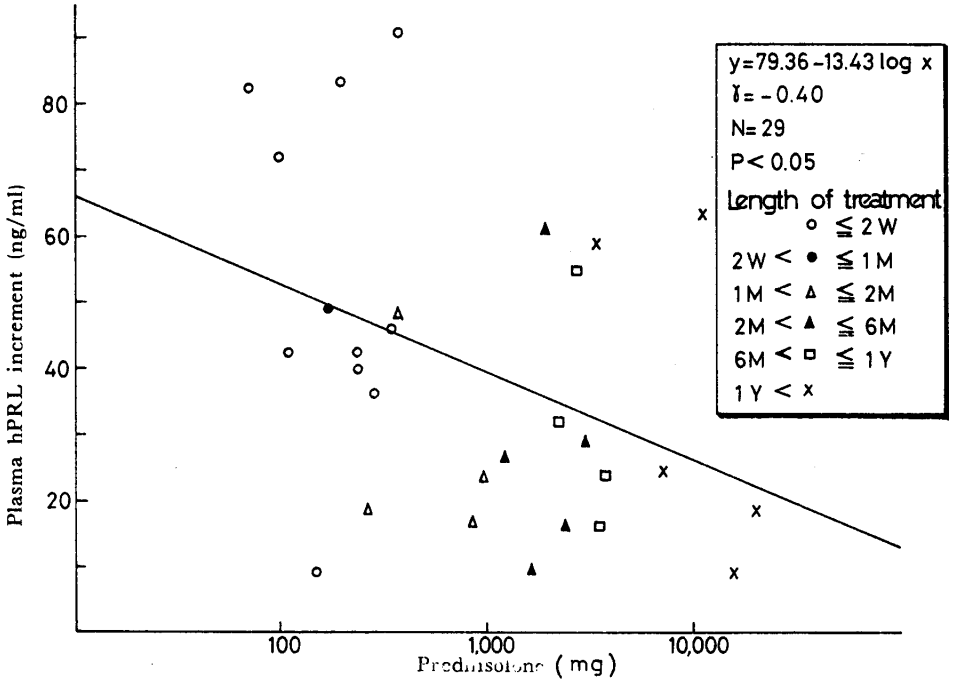

Fig. 2. Correlation between the magnitude of the plasma prolactin response to TRH and the total dose of glucocorticoid received, in patients.
W, week(s); M, month(s); Y, year

total dose of glucocorticoid received and the plasma PRL response was -0.40 ($p<.05$).

DISCUSSION

The effect of glucocorticoids on human PRL secretion remains obscure, although PRL secretion has been examined extensively in recent years. The availability of synthetic TRH enables investigatons of the effect of glucocorticoids on the secretion of PRL from the anterior pituitary.

It is known that most patients with Cushing's syndrome show impaired TSH response to TRH (6, 8). We have previously reported that two out of

seven patients with Cushing's syndrome showed subnormal PRL responses to TRH before adrenalectomy, although these patients responded normally after adrenalectomy (9). Therefore, it is possible that the natural glucocorticoid cortisol could inhibit PRL secretion at the pituitary level.

In the present study, TRH-induced PRL secretion tended to be impaired in patients receiving long-term, high doses of synthetic glucocorticoids. Almost all such patients showed impaired TSH response to TRH (10).

Thus, glucocorticoids inhibit both TRH-induced PRL secretion and TRH-induced TSH secretion. However, the degree of suppression by glucocorticoids of PRL secretion was less than that of TSH secretion.

Acknowledgment: We wish to thank the National Institute of Arthritis, Metabolism, and Digestive Diseases, U.S.A., for supplying the materials for human prolactin radioimmunoassay.

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