Growth Hormone Studies in Patients with Rheumatoid Arthritis with or without Glucocorticoid Therapy*

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Received May 19, 1974

Abstract. 4 patients with rheumatoid arthritis or Still’s disease with a secondary dwarfism had normal growth hormone secretion; they were physiologically normal both after an overnight fast and following insulin-induced hypoglycemia.

16 patients with glucocorticoid treatment—most of them on an alternate regimen—had low fasting levels of growth hormone and a mean increase of 7.7 ng/ml (range 0 to 34.2 ng/ml) as compared to healthy controls with a mean increase of 18.0 (range 8.4 to 40) ng/ml. One of these patients who was on daily steroids had a good growth hormone response, while another patient on daily steroids had no increase in growth hormone. Different responses were also found in 2 patients treated only with Depot ACTH.

A diminished secretion of growth hormone is not the cause of growth retardation in rheumatoid arthritis or Still’s disease, unless there is a depression caused by necessary glucocorticoid or ACTH therapy.

Key words: Rheumatoid arthritis — Glucocorticoid therapy — Growth hormone.

Rheumatoid arthritis sometimes is complicated with growth retardation, especially if there are symptoms of systemic visceral involvement [1, 3, 20, 25]. Growth retardation has already been described by Kienböck in 1916 [11] at a time when corticosteroids were not available for therapy of this disease. Corticosteroids themselves depress the normal growth rate [2, 9 and others] because of both the catabolic effect of the corticosteroids and suppression of the growth hormone secretion [7, 10, 13, 23, 28]. Numerous investigations on growth hormone concentrations have been performed in patients with different chronic diseases [5, 14, 18], including rheumatoid arthritis [4, 26, 28], during long term steroid therapy with quite controversial results. However, no children with rheumatoid arthritis or Still’s disease were investigated who were not treated with glucocorticoids or ACTH but nevertheless showed growth retardation.

* Supported by Deutsche Forschungsgemeinschaft, SFB 51.
Therefore, we studied the growth hormone concentration before and during insulin-induced hypoglycemia in 21 children with this disorder. The children were treated either with antirheumatic nonhormonal drugs alone or additionally with glucocorticoids and/or ACTH.

Methods

a) Insulin Tolerance Test

0.1 U insulin was given per Kilogram body weight after an over night fast. Blood was drawn 20 min before as well as immediately prior to the intravenous injection of insulin, and thereafter every 20 min for a total of 2 hrs.

b) Growth Hormone Determinations

Growth hormone in plasma was measured radioimmunologically using the test combination produced by Sorin (Sallugia, Italy). This method is based upon a double antibody technique. The coefficient of variation checked on determinations of a pooled serum with a mean concentration of 10.4 ng/ml growth hormone was 5.1%; in daily determinations on the same sample it was 6.9%. All plasma samples were assayed in triplicates.

Patients

The patients are listed in Table 1, stating: age, duration of the disease, severity of the disease at time of testing, actual height, and normal height for age, growth rate during the time prior to the test, as well as current therapy.

Patients with rheumatoid arthritis show only involvement of the joints. In systemic rheumatoid arthritis as in the Still syndrome we find: swelling of the lymph nodes, hepato-splenomegaly, myo- and pericarditis, severe anemia, septic course of fever, rheumatic rash, and high leucocytosis to a greater or lesser degree.

The course of the disease is given in 4 stages:

Stage I (severe). High blood sedimentation rate (BSR) (over 60/hr); pathologic electrophoresis; positive C-reactive protein; anemia; fever of intermittent type; articular pain, even without movement; eventual symptoms of the Still syndrome or of subsepsis allergica.

Stage II (active). BSR more than 20/hr; still pathologic electrophoresis; positive CRP and anemia. Intermittent pain without movement, but continuous pain with joint movement.

Stage III (latent). Significant improvement; BSR slightly elevated or normal. Electrophoresis shows only minor changes or is normal; CRP negative. Minor or no anemia. No spontaneous pain.

Stage IV (inactive). No pathologic findings except for possible joint stiffness.

Control Group

20 healthy children with histories of familial dwarfism were grouped according to age and sex and used as controls. The insulin tolerance test was performed in these patients to exclude growth hormone deficiency as a possible cause of growth failure.