Plasma Growth Hormone and Insulin Response to Levodopa and Amantadine*


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With 2 Figures

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Summary

Blood levels of growth hormone, insulin and glucose were studied in 63 patients before and after intravenous levodopa (1.5 mg/kg), oral levodopa (0.5 g and 1.0 g) and amantadine (100 mg). A significant increase of growth hormone concentrations was found after intravenous and oral 1.0 g doses. No significant differences were found in insulin and glucose concentrations.

Introduction

Since the therapeutic value of levodopa in the treatment of parkinsonian patients became evident, attention has been paid to the other than antiparkinsonian effects of this drug. There is evidence suggesting that levodopa treatment may affect sexual functions in parkinsonian patients; it increases libido (Rinne et al., 1970) and causes vaginal bleeding on postmenopausal women (Rinne et al., 1970; Kruse-Larsen and Garde, 1971). The involvement of the dopaminergic tubero-hypophysial system may play a significant role in this process, because functionally these neurons are primarily concerned with the regulation of gonadotrophin secretion (Schneider and McCann, 1969; Fuxe et al., 1969; Hyyppä, 1969). In the growth

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hormone releasing system dopaminergic neurons are probably also involved. Indeed, it has been found that in man levodopa given orally as a single dose caused a considerable rise in plasma levels of the growth hormone (Boyd et al., 1970; Eddy et al., 1971; Boden et al., 1972), but this was not the case during long-term treatment with relatively high doses of levodopa (Burton et al., 1971; Lundberg, 1972).

In this investigation we have tried to discover how various doses and manner of dosage of levodopa stimulate growth hormone secretion. Since changes in the concentration of plasma insulin and blood sugar effectively regulate the secretion of growth hormone, particular attention has been paid to these factors. Corresponding analyses were made after administration of amantadine, because it has been reported to have a beneficial effect in some parkinsonian cases (Schwab et al., 1969; Godwin-Austen et al., 1970; Hunter et al., 1970; Rinne et al., 1972).

**Materials and Methods**

The investigation was carried out using 63 patients (28 female, 35 male). 31 were parkinsonian patients and the remaining 32 suffered from various other neurological diseases. The mean age of the patients was 56 ± 11 years. All patients were free from endocrinopathies.

The patients were divided into four groups. The patients of the first group (39) were given a single dose of levodopa (1.5 mg/kg) intravenously, the second group (10) 1 g of levodopa perorally, the third group (8) 0.5 g of levodopa perorally and the fourth group (7) 100 mg of amantadine perorally. After these single doses the concentrations of plasma growth hormone and insulin and blood sugar were calculated. All tests were performed in standard hospital conditions in the morning, thus avoiding all kinds of stress.

Blood samples were taken by indwelling needle, which was kept open by physiological saline infusion. Serum was kept at -20°C. Insulin and growth hormone levels were determined by the radioimmunological method, in which separation was based on the solid phase technique of Wide (1970). Standard preparation for growth hormone was NIH-GH-HS1394 and for insulin human insulin of WHO 166/304, Intern labor.

**Results**

The most remarkable change in plasma growth hormone was observed after the intravenous levodopa injection (Table 1). The increase was on average fourfold, but in some particular cases as