Negative Impact of Growth-Hormone Deficiency on Psychological Functioning in Dwarfed Children and Adolescents

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Abstract. This study compares the psychological findings in three groups of dwarfed children and adolescents, namely those suffering from isolated growth-hormone deficiency, from multiple pituitary hormone deficiencies, and without endocrine disease. The study is based on psychometric data from one multifactorial intelligence test and several personality questionnaires. It was found that growth hormone deficiency had no impact on the psychological variables.

Key words: GH-deficiency, psychological function.

Psychoendocrinological studies have been mainly concerned with the impact of hormones on personality and behaviour. As the range of experimentation is limited in human subjects for several reasons, endocrine disorders of clinical significance have to serve as models. In this context a variety of endocrine diseases have been studied not only from the clinical point of view but also with regard to the psychological status of the patients.

As far as children and adolescents are concerned, there are several groups of patients suffering from endocrine deficiencies or excesses which have been investigated by psychoendocrinologists. These groups include patients suffering from hypothyroidism (Klein et al., 1972; Raiti and Newns, 1971; Man et al., 1963; Smith et al., 1957; Money, 1956; Gluck et al., 1977; Steinhausen et al., 1977), thyrotoxicosis (Money et al., 1966), the adrenogenital syndrome (Baker and

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Although hypopituitarism in children has been studied for at least the last two decades by psychiatrists and psychologists (for a review see Steinhausen, 1973) the question whether growth-hormone (GH) deficiency has an influence on cerebral functioning in dwarfed children and adolescents has not been answered clearly. As hypopituitarism may imply more than one hormone deficiency, the relationship between GH-deficiency and psychological function cannot be adequately studied by use of heterogeneous clinical samples. Unfortunately, all the relevant studies in the literature (Weber, 1971; Frankel and Laron, 1968; Money et al., 1967; Money and Pollitt, 1966; Pollitt and Money, 1964; Rosenbloom, 1966) either lack sufficient diagnostic description of the sample or do not compare subjects with isolated GH-deficiency against those with multiple pituitary hormone deficiencies.

In the first report of our own investigations (Steinhausen and Stahnke, 1976) we reported the psychoendocrinological findings in dwarfed children and adolescents, compared with normal controls. Furthermore, we presented results on the effects of age, sex, and socioeconomic status. The final part of the publication compared dwarfs with and without endocrine disease. We did not analyze the effects of isolated GH-deficiency on psychological function in our patients. These findings are presented in this paper.

Material and Methods

The subjects were 32 children and adolescents (26 males and 6 females) referred to our clinic because of growth retardation (below 3rd percentile in height). Their mean age was 14.9 years (range 9—18 years).

All the patients were studied by clinical examination, laboratory assessment and several psychological tests and questionnaires. The standards used for height and height velocity were those of Tanner et al. (1966). The measurements of height and height velocity are presented in terms of Standard Deviation Scores (SDS) (Tanner et al., 1971). Roentgenograms of the left hand and wrist interpreted for bone age using the atlas of Greulich and Pyle (1959).

Thyroid, adrenal and neurohypophyseal functions were evaluated as previously described (Steinhausen and Stahnke, 1976). Plasma growth hormone (GH) levels were estimated following an insulin-induced hypoglycaemia test during which blood glucose fell to 50% or less of the fasting value and below 50 mg/100 ml. In addition, the GH response to arginine infusion was measured. GH was determined by double-antibody radioimmunoassay (Quabbe, 1969). The lower limit of sensitivity of this assay in our laboratory is 0.5 ng/ml. The intraassay and interassay coefficients of variation at a levels of 1.6 and 19.4 ng/ml ranged from 1.39—5.28% and 3.11—9.55%, respectively. The recovery of 4 ng human GH added to 1 ml plasma was 96% ± 1.5 SEM in 41 assays. A patient was considered to have GH deficiency if the plasma GH concentration did not rise above 5 ng/ml (Stahnke et al., 1975).

In each subject intelligence and personality were studied. The LPS (Leistnngs-Prüf-System), a multifactorial test of German origin based on Thurstone’s test of primary mental abilities (PMA), was used to measure intelligence. Personality traits were assessed using a questionnaire measuring the second-order factors, extraversion, and neuroticism (Hamburg Neuroticism-Extraversion-Scale, HANES) and a new, unpublished scale measuring aggressiveness. Furthermore, the children from 8 to 12 years of age were asked to complete the Children’s Personality