

Evaluation of linear growth in pre-pubertal insulin-dependent diabetics

H.B. Chandalia and T. Sahastrabudhe

ABSTRACT

Height-centiles, as determined from the tables compiled by Indian Council of Medical Research, were calculated in 89 insulin-dependent diabetics (IDDs) with onset of diabetes in the prepubertal period. Percent of IDDs in each height-centiles group were as follows: 15.73 % (0-10 centile), 28.08% (11-25 centile), 17.97% (26-50 centile), 15.73% (51-75 centile), 10.11% (76-90 centile), 12.36% (91-100 centile). Seventeen of these patients were at the prepubertal stage.

Their height-velocity, as calculated from a minimum follow-up of 6 months in every patient was (Mean \pm SD) 5.67 ± 1.9 cms per year.

Bone-age was evaluated by Tanner-Whitehouse (TW-2, RUS) method in 11 IDDs. Chronological age and bone-age (Mean \pm SEM) in this group was 9.09 ± 1.27 and 9.40 ± 1.47 years respectively. All of these patients were on two-dose insulin therapy. The glycated Hb (Mean \pm SEM, n=51) was $9.84 \pm 0.3\%$ in this group. Taking glycated Hb of $< 8\%$, $8-10\%$, and $> 10\%$ as indicative of good, fair and poor control respectively, these diabetics were under fair metabolic control.

We conclude that normal linear growth can be achieved in pre-pubertal IDDs with fair control of diabetes.

INTRODUCTION

The process of growth can be divided into infancy, childhood and pubertal phases, each of these phases being governed by a set of hormones. A severe metabolic disease like insulin dependent diabetes (IDDM) is likely to influence the growth profoundly.

Insulin dependent diabetics (IDDs), with the onset of their disease in the prepubertal period are gravely concerned about their growth. We studied the linear growth of a group of prepubertal IDDs being followed by us on regular basis.

MATERIAL AND METHODS

The height centiles of a group of 89 IDDs were determined from the tables compiled by the Indian Council of Medical Research. The heights were measured accurately against the markings on a wall with proper erect positioning of the patient. A mean of two readings was taken at each clinic visit.

Seventeen of the IDDs were at the prepubertal stage; the remainder had attained adulthood or were undergoing puberty. The prepubertal patients were followed for a minimum duration of 6 months to determine their height velocity.

Bone age was evaluated in 11 prepubertal IDDs by Tanner Whitehouse-2 method, reading the skeletal maturation of radius, ulna and short bones (1).

The metabolic control of all patients, was evaluated by glycated hemoglobin (GHb) readings usually taken at quarterly intervals. We used a chemical method described by us earlier to estimate the GHb (2).

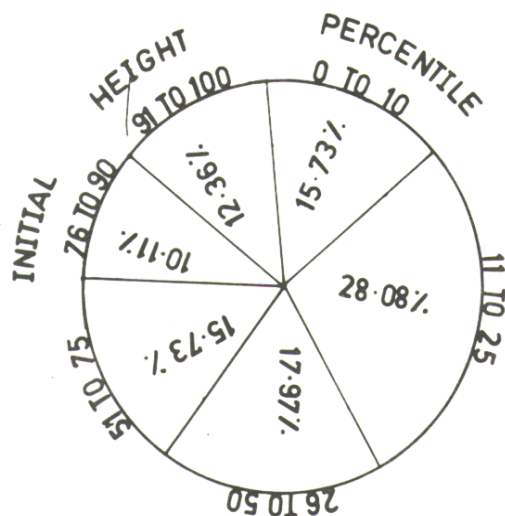
RESULTS

The height percentiles of 89 IDDs are shown in fig.1. The height percentiles were distributed fairly uniformly in various categories.

Seventeen of these patients were at the prepubertal stage. They were followed for a duration of 6-24 months to determine their height velocity. The height velocity (mean \pm SD) was 5.67 ± 1.9 cms per year. As height velocity of 5 cm or more per year is considered optimal in the prepubertal period, these children were growing at a satisfactory rate.

Bone age was evaluated in 11 IDDs. The chronological age and bone age (Mean \pm SEM) in this group was 9.09 ± 1.27 and 9.40 ± 1.47 years respectively. All of these patients were on two-dose insulin therapy. The glycated Hb (Mean \pm SEM, n=51) was $9.84 \pm 0.3\%$ in this group. In our laboratory, upper limit of normal (Mean $+2$ SD) GHb is 8 percent and $<8\%$, $8-10\%$ and $>10\%$ of GHb are classified as indicative of good, fair and poor control respectively.

From: Diabetes Clinic, Department of Medicine, Grant Medical College, Bombay-400 008.



DISCUSSION

The metabolic control achieved in IDDM by the conventional insulin delivery methods is far from ideal. Most of our IDD's were on two-dose insulin therapy, only 18% from the whole group of 89 were on three-dose intensive regime,. The control achieved by us would be classified as fair. In most clinics using conventional insulin therapy, the best GHb levels achieved are about one per cent above the upper limit of normality. It is important to see if such metabolic control jeopardizes the linear growth of these children.

It is interesting to note that the percentile height, height-velocity and skeletal maturation was normal in out IDD's. In fact, the skeletal maturation was slightly advanced as compared to the chronological age.

Chiarelli and co-workers (3) also found normal height percentiles and height velocity in prepubertal IDD's. These investigators found some impairment of growth velocity in children under 5 year of age, but older prepubertal children had a normal growth pattern.

It is also possible that prepubertal children have a higher height centile, especially those who are obese at the time of onset of their disease. Insulin therapy may have an influence on the growth, irrespective of its effect on the metabolic control. This requires further elucidation. Our data show that the growth rate is optimal in these children. Diabetes may have different effect on prepubertal and pubertal growth which requires further study. The patients reported here belong to a high socio-economic group which might be partially responsible for better growth rates.

REFERENCES

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