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Bedtime insulin injections in the diabetic child.

The prevention of early morning hyperglycaemia remains a challenge to conventional subcutaneous insulin regimens based on two injections. We have studied the effect of delaying evening insulin administration. 16 children (age 3-12 y) participated in a 12 month cross-over study comparing bedtime (BT) with evening meal (EM) injections. Results from the first 9 patients to complete the trial (all 16 will be presented) show consistent differences in home blood sugar profiles but no overall change in HbA_1. The BT injection resulted in higher blood sugars at bedtime ($p<0.001$), midnight ($p<0.01$) but lower levels pre-breakfast (NS), midday (NS) and evening meal ($p<0.05$). Hypoglycaemic episodes were commoner but the majority of parents preferred the convenience of BT injections. The four children whose HbA_1 levels were lower on the BT injections were younger ($p<0.01$) and went to bed earlier ($p<0.05$), indicating that delayed injection may have a place in children under 7 years of age.

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Low incidence of Type I diabetes in Israeli children of all ethnic groups.

A retrospective study of the entire population of Israel revealed 392 newly diagnosed Type I diabetics aged 0-20 for the period 1975-1980. The mean annual age specific incidence of Type I (insulin-dependent) diabetes mellitus was 3.8 per 10^5 for the age group 0-14 yrs and 4.2 per 10^5 for the age group 0-20 yrs. The incidence among the Jews of Ashkenazi origin was 6.8×10^5 and that for Jews of non-Ashkenazi origin was 4.3×10^5, whereas that for the Arabs was 1.2×10^5. The overall incidence is lower than that reported for similar populations in most European countries, the USA, Canada and New Zealand, similar to that reported for Arabs in Kuwait and higher only than that found in Japan. The highest proportion of patients was registered between ages 10-14 yrs and the lowest at 0-4. In the young age group there was a preponderance of females differing ($p=0.05$) from the ratio over age 5 which was almost 1. Out of 294 patients for whom month of onset could be established, 170 had their onset from November to March and 124 from April to October. The relative importance of environmental and genetic factors in the interpopulation differences in incidence of Type I diabetes remains to be established.

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Long-term effect of palatable guar gum diet in diabetic children (IDDM).

This cross-over study evaluates the effect of long-term guar gum (G) and guar gum-fructose (GF) diet on the diabetes balance in children with IDDM. We studied 22 children aged 8.9-15.9 years with a mean duration of diabetes of 4.4 (0.7-14.8) years. All were on 2 daily insulin injections. The diet was supplemented for 3 weeks with G, (5% of daily carbohydrate intake in crips bread, rolls, marmalade etc.) and with GF (30 g/d or 1 g of fructose/kg body weight) for another 3 weeks. The diabetes balance was assessed by glucosuria index (percent of tests with less than 1% glucosuria of all urine tests) and measurements of glycosylated haemoglobin ($GHbA_{1c}$) at the beginning and end of each diet period. Serum total and HDL-cholesterol, C-peptide, pancreatic and enteroglucagon were also measured. Glucosuria index improved during both diets ($p<0.01$). $GHbA_{1c}$ decreased from 9.3 ± 1.6 to 8.5 ± 1.3 (mean $\pm$ SD, $p<0.001$) during G and to $8.2 \pm 1.6\%$ ($p<0.001$) during GF diet. Serum total cholesterol decreased from 4.72 ± 0.82 to 4.28 ± 0.82 ($p<0.01$) and to 4.31 ± 0.72 mmol/l ($p<0.02$), respectively. Guar gum in the diet of diabetic children appears to improve the balance of diabetes in long term use.

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Plasma Somatomedin-C in children and adolescents with IDDM.

Previous studies in diabetic patients have reported elevated normal and reduced somatomedin levels.We used RIA method to determine Somatomedin C (SMC) in 57 diabetic children and adolescents(29 f. and 28 m.;age range 2.75-20.16 yrs; duration of disease 0.08-15.85 yrs)and in 274 control subjects of the same age. SMC behaviour was not seen to be different from that of controls concerning those differences related to sex(SMC levels higher in f. than in m.,$p<0.005$)and to pubertal stage(SMC levels higher in pub.than in prepub.children,$p<0.0001$).Plasma SMC levels in pubertal diabetic patients were not different from those of pubertal control children,while in prepubertal diabetic patients SMC was significantly lower than in the respective control children($p<0.0001$).In the group of diabetic children,as a whole,there was no correlation between SMC and duration of disease,insulin dosage,HbA1,growth velocity standard deviation score.If we give separate consideration to pubertal and prepubertal subjects and exclude the influence of chronological age from this correlation,we find a significant negative correlation between SMC and HbA1.In diabetic subjects with no fluoroangiographic retinal changes the mean SMC value was not seen to differ from that encountered in subjects having retinal changes(microaneurysms,leakage,IRMA).In conclusion:1)SMC levels in diabetic patients are lower than in normal subjects; only as long as sex hormones do not eliminate this difference at puberty;2)poor control of disease has a negative influence on SMC only in pubertal subjects.

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The growth of children with diabetes mellitus.

The growth of 116 children attending the Diabetic Clinic was assessed in a retrospective study. Boys were tall at diagnosis and the skeletal age of boys and girls was advanced. Mean height standard deviation scores gradually decreased from the time of diagnosis :

♂ 1st year +0.38 SD, 5th year -0.41 SD, $p < 0.001$.
♀ 1st year +0.03 SD, 5th year -0.68 SD, $p < 0.001$.

Prepubertally height velocity was progressively and significantly reduced in both sexes during treatment, ($p < 0.01$). Children diagnosed at puberty had a reduced mean height velocity during the first two years but after that height velocity was normal. In both sexes the pubertal growth spurt occurred at the same mean age as healthy controls but the girls had a significantly reduced mean peak height velocity ($p < 0.05$). Menarche was delayed. Skeletal maturation progressed normally. Although some catch up growth may occur later height predictions based on the estimation of skeletal maturity indicates that a significant reduction in final adult height may occur in both sexes. If normal growth reflects good diabetic control then this study is further evidence that most children with diabetes are poorly controlled.

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Presence and persistence of islet cell antibodies in children with type I diabetes mellitus.

It is wellknown that immune responses play a major role in the development of type I insulin dependent diabetes mellitus (IDDM). This mixed crosssectional and longitudinal study was undertaken to evaluate the presence of islet cell antibodies (ICA) in diabetic children in relation to age and to duration of diabetes. Cytoplasmic ICA were determined by immunofluorescence in 72 patients (40 boys and 32 girls) aged 9 months to 17 years, with IDDM. ICA were measured only once in 54 patients and at regular intervals in 18, amounting to a total of 95 samples collected. ICA were present in 10 out of 11 patients at the time of diagnosis of IDDM. They were still found in 10 out of 61 patients in whom IDDM lasted for at least 2 years (persistent ICA). In the other patients ICA were not detected or disappeared within a 2 years duration of diabetes (non persistent ICA). HLA-DR3 type was found in all patients with persistent ICA for at least 2 years and in 65% of the others; HLA-DR4 was found in both groups of patients at an incidence of 70% and 62% respectively. None of the 21 children who became diabetic before the age of 5 years, had persistent ICA whereas 25% of the patients becoming diabetic after that age had persistent ICA. These data clearly show the importance of genetic factors and of age at onset of diabetes in the development and persistence of ICA in infancy and childhood.