Seasonal variation of glycosylated haemoglobin

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SUMMARY Retrospective analysis of glycosylated haemoglobin concentrations in a diabetic outpatient clinic over three and a half years showed a small seasonal variation in the mean value with a peak in mid February and a nadir in mid August.

Measurements of glycosylated haemoglobin are commonly used in diabetic clinics to monitor glycaemic control. It has been suggested that seasonal fluctuations in concentrations occur[1] and could be of clinical importance. We present a retrospective analysis to determine whether seasonal variations in glycosylated haemoglobin concentrations are detectable in a paediatric diabetic outpatient clinic.

Patients and methods

Diabetic children and adolescents attending a single paediatric diabetic clinic between December 1982 and June 1986 with a minimum of four estimations of glycosylated haemoglobin concentrations each were studied. Concentrations measured at diagnosis and during admissions for infection and ketoacidosis were excluded. A total of 1232 estimations in 125 children were analysed. There was no seasonal variation in frequency of estimations made. The age range of the patients was 0·6 to 19·3 years, and sex distribution was almost equal.

Glycosylated haemoglobin concentrations were measured in one laboratory by an ion exchange column method for total haemoglobin A_1 (HbA_1) with a borate eliminator for aldimine reversible material in a thermostatically controlled environment.

A mainframe computer was used to analyse the values for each patient by a sophisticated single cosinor program to compute the population mean cosinor using a number weighted mean cosinor analysis.[2]

Results

The mean (SD) total glycosylated haemoglobin was 9·93% (0·06)%. There was a highly significant ($p < 0·001$) seasonal variation (Figure) and the amplitude of oscillation in total glycosylated haemoglobin was

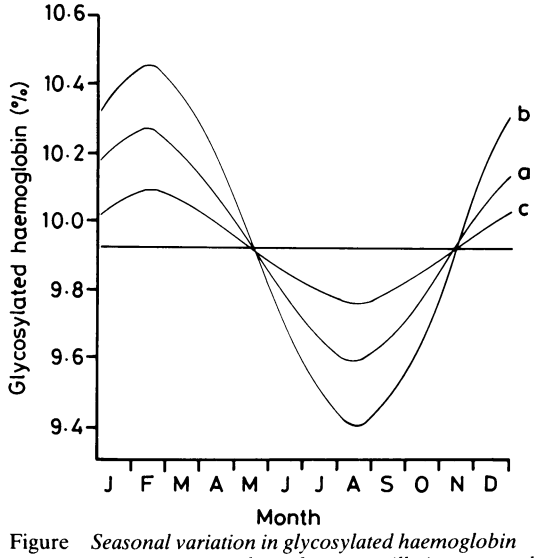

Figure *Seasonal variation in glycosylated haemoglobin concentrations (curve a = line of mean oscillation; curves b and c = 95% confidence limits).*

0·34% (95% confidence limits 0·16–0·53%). The acrophase, the time of year at which glycosylated haemoglobin concentrations peak, was 1·47 months—namely, mid February—with 95% confidence limits from early January to mid March, and the nadir occurred at 7·47 months—namely, mid August—with 95% confidence limits from early July to mid September.

Discussion

The seasonal variation in glycosylated haemoglobin concentrations almost certainly reflects similar variations in mean blood glucose concentrations and is unlikely to be artefactual. Glycosylated haemoglobin can be affected by the temperature at which samples are stored and assayed, but seasonal temperature differences would produce changes opposite to those documented here.[3]

Physical activity is likely to be greater in the summer because of more daylight hours and milder weather, and this could produce lower glucose concentrations. Viral respiratory infections are

more common in winter and worsen glucose control. Similarly, food intake is greater in the winter months when children gain relatively more weight than height. Seasonal variations in hormone concentrations may influence or be influenced by glucose concentrations.[4]

This study was done because of the clinical impression that diabetes was better controlled in the summer, and it is interesting that the mean amplitude of variation detected was small. This probably indicates that some patients have greater and therefore noticeable seasonal fluctuations; and it might be of clinical value to identify such children. This seasonal variation may be accentuated in higher latitudes where greater climatic differences between winter and summer occur.

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Mitral valve disease in Marfan's syndrome

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SUMMARY Cardiovascular disease in Marfan's syndrome presenting in childhood affects the mitral valve more often than the aortic valve or the aorta, as in adults. Early evaluation of the cardiovascular system is necessary for any child in whom Marfan's syndrome is suspected.

Marfan's syndrome comprises a characteristic phenotype with skeletal, ocular, and cardiovascular disorders. The dissection of the aorta and disorders of the aortic root which usually become apparent during the second and subsequent decades have been described. Impairment of the mitral valve is, however, also associated with Marfan's syndrome. Indeed, it is the most common cardiac manifestation in childhood and may present in the first year of life. We report on a child with Marfan's syndrome, which was apparent at birth, who died in early infancy from mitral valve disease. Early specialist evaluation of the cardiovascular system is essential in all cases of Marfan's syndrome.

Case report

The patient was the third child of unrelated white parents, with no family history to suggest Marfan's syndrome. Both siblings were well, the first having a ventricular septal defect that had closed spontaneously. After a spontaneous labour at term delivery was vertex vaginal; birth weight was 4040 g (90th percentile), length 54·5 cm (0·7 cm above the 97th percentile), and occipitofrontal circumference 35·5 cm (90th percentile). Several abnormalities were apparent: the baby seemed abnormally long and slim with little subcutaneous fat; there was obvious arachnodactyly of both feet and hands (middle finger length 4 cm (97th percentile); metacarpal length was 1·9 cm (excluding the epiphysis; metacarpal index 8·25)) and span 57 cm (2·5 cm >length); she had a long thin face and sparse hair; the fingers and toes were hyperextensible; there was ulnar deviation of both hands and limitation of extension of both elbows and knees as well as pectus carinatum with prominence of the right side of the chest and divarication of the recti; and she had a high arched palate. A soft systolic murmur was audible at the first examination but subsequently disappeared.

Investigations in the neonatal period included chest radiography, electrocardiography, chromosome analysis, and estimation of plasma and urinary amino acid concentrations; all yielded normal results, except that the *x*-ray pictures showed the arachnodactyly. She was discharged home, being bottle fed, on the fourth day and followed up in the baby clinic at 7 and 12 weeks of age, when her