HYPERPHOSPHATASIA, NEUROLOGIC DEFICITS AND MENTAL RETARDATION IN FOUR SIBLINGS

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During a systematic screening of the mentally retarded children it was noted that one case had elevated serum alkaline phosphatase. There were no other biochemical abnormalities. The clinical examination showed neurologic deficits but not hepatic or bone anomaly to account for raised alkaline phosphatase level. An examination was then made of other sibs as well as parents and the findings are briefly reported.

Index Case

Male aged 16 years, was born at full term and after a normal delivery. Mother’s health was reported to be normal during pregnancy. He was brought for consultation as he was very backward in his scholastic career. He was of average build; had bushy eye brows; right eye larger than left and due to an injury there was no vision in the left eye, gradual onset of hearing defect from the past three years, pigeon chest; scoliosis; malformed ear and teeth. The milestones were delayed – walking at 3rd year, and toilet control at 5th year. Psychological assessment revealed a mental age of 6 years and 4 months and I.Q. of 39. Alkaline phosphatase was 28 KA units (normal ranging from 3-13). No other biochemical abnormalities were noted. Urine did not show any evidence of metabolic defects. X-ray examination did not show any anomalies. By using the heat denaturation technique the alkaline phosphatase was found to be of the liver type of isoenzyme (Moss & Whitby 1975).

The examination of other sibs and parents are as follows:

Sib 1: 14 years old male. Reported to be backward in his scholastic career and social adjustment. He had loss of vision in right eye due to an injury and left eye was larger in size than the right and had malformed ears, pigeon chest and scoliosis; He had generalized convulsions from the age of 6 to 8 years and was reported as short tempered. His mental age was 5½ years and I.Q. was 28. His serum alkaline phosphatase was 26 K & A units and heat denaturation test showed it to be of the liver type. Other biochemical tests and X-ray investigations did not reveal any abnormalities.

Sib 2: 9 years old male. He had delayed milestones and could not walk or talk; during childhood had frequent episodes of upper respiratory tract infection; had broad palpebral fissures; depressed nasal bridge; pigeon chest; asymmetric limbs; hypotonia and ataxic gait, mental age of 3 years and I.Q. below 33. His serum alkaline phosphatase was 30 K & A units. Other biochemical tests and X-ray investigations were normal.

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Sib 3: 6 years old female, delayed milestones of development-walking 3rd year, talking 5th year, since childhood impaired hearing; restless and irritable, destructive tendency. She had mental age of less than 3 years and I.Q. of 27. Her serum alkaline phosphatase was 24 K & A units.

Parents: Father 40 years old and mother 37 years. The mother was husband’s sister's daughter (Uncle-niece type of consanguinity). Both were in good health. Their alkaline phosphatase levels were below 10 K & A units. Other biochemical tests and X-ray investigations were normal.

Comments

It could be noted that in a family, four sibs had an elevated alkaline phosphatase in the serum which was higher than age-sex matched control children as well as mentally retarded subjects. There were no evidence of bone or liver anomalies to account for the elevated levels. The familial occurrence of neurological deficits and hyperphosphatasia associated with mental retardation is similar to one of the reports published during 1970, by Mebry et al from USA. From the published literature the present group of cases appear to be the second of the type to be reported.

References

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