Favism in the African type of glucose-6-phosphate dehydrogenase deficiency (A⁻)

Silvana Galiano, Gian Franco Gaetani, Arrigo Barabino, Franco Cottafava, Helen Zeitlin, Margaret Town, Lucio Luzzatto

Division of Haematology, University of Genoa, Italy
Silvana Galiano, BSC, *senior technologist*
Gian Franco Gaetani, MD, *associate professor of haematology*

Department of Paediatrics, G Gaslini Institute, Genoa, Italy
Arrigo Barabino, MD, *assistant*
Franco Cottafava, MD, *associate professor*

Alexandra Hospital, Redditch B98 7UB
Helen Zeitlin, MRCPATH, *consultant haematologist*

Department of Haematology, Royal Postgraduate Medical School, Hammersmith Hospital, London W12 0NN
Margaret Town, MSC, *senior scientific officer*
Lucio Luzzatto, MD, *professor*

Correspondence to:
Professor Luzzatto.

Br Med J 1990;300:236

Susceptibility to haemolytic anaemia after ingestion of fava beans has been investigated extensively in the Mediterranean, but favism has also been observed in other countries¹ including England,² where variants of glucose-6-phosphate dehydrogenase other than the Mediterranean variant have been responsible. In general, all patients have very low glucose-6-phosphate dehydrogenase activity in red cells (<5% of normal activity). Favism is widely believed not to occur in subjects with the glucose-6-phosphate dehydrogenase A⁻ variant, which has a higher residual activity (10-20% of normal) and is present mainly in people of African origin. We report on three patients with the A⁻ variant who suffered typical attacks of clinical favism.

Case reports

Case 1—A 19 month old Italian boy was admitted to hospital in Genoa three days after eating fava beans. He was acutely ill and was passing dark urine. On admission his haemoglobin concentration was 50 g/l, he had reticulocytosis of 7%, and a direct antiglobulin test yielded a negative result. Glucose-6-phosphate dehydrogenase activity in erythrocytes was within normal limits, but four months later it was 10% of the normal value.

Case 2—A 4 year old black boy from Venezuela was admitted to the paediatric clinic in Genoa with headache, vomiting, anaemia, and dark urine. Haemoglobin concentration was 51 g/l, and he had reticulocytosis of 9%. Sixty hours earlier he had eaten fresh fava beans. During the haemolytic attack glucose-6-phosphate dehydrogenase activity was within the normal range, but five months later it was 12% of normal.

Case 3—A 6 month old girl with an English mother and Jamaican father was admitted to Alexandra Hospital, Worcestershire, with a 24 hour history of jaundice, pallor, and dark urine. Haemoglobin concentration was 66 g/l, and she had reticulocytosis of 5%. A direct antiglobulin test yielded a negative result.

She had eaten a large portion of fresh fava beans 24 hours before and on the day that the symptoms began. Glucose-6-phosphate dehydrogenase activity was within normal limits during the favism. Her father's red cell glucose-6-phosphate dehydrogenase activity was 7% of normal, and electrophoretic analysis showed a single band in the A position. We concluded that she was heterozygous for glucose-6-phosphate dehydrogenase deficiency.

Comment

In cases 2 and 3 the deficient variant of the enzyme was classified as A⁻ on the grounds of the enzyme activity, the electrophoretic mobility, and the increase in activity during the posthaemolytic period. In case 1 the Michaelis constant and the enzyme activity on substrate analogues were also consistent with it being the A⁻ variant.

These observations indicate that subjects carrying glucose-6-phosphate dehydrogenase A⁻, including heterozygotes, can develop classic acute favism. All three patients showed a transient increase in enzyme activity to the normal range, which is recognised to occur with the A⁻ but not the Mediterranean variant. Whether favism has not been reported in Africa because fava beans are not commonly grown there or because only a small subset of people with the A⁻ variant are susceptible remains to be established. The A⁻ variant is not limited to Africa as it has been found in southern Italy and Spain, where a polymorphic variant previously called betica is now recognised as being A⁻.³ Favism has been reported in patients with glucose-6-phosphate dehydrogenase betica and in one patient with glucose-6-phosphate dehydrogenase matara,⁴ now also known to be identical with the A⁻ variant.⁵ The increasing presence of Africans in Europe, where fava beans are popular, may lead to a greater incidence of the condition.

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4 Calabro V, Cascone A, Malaspina P, Battistuzzi G. Glucose-6-phosphate dehydrogenase deficiency in southern Italy: a case of glucose-6-phosphate dehydrogenase A⁻ associated with favism. *Haematologica* 1989;74:71-3.

5 Vulliamy TJ, D'Urso M, Battistuzzi G, et al. Diverse point mutations in the human glucose 6-phosphate dehydrogenase gene cause enzyme deficiency and mild or severe hemolytic anemia. *Proc Natl Acad Sci USA* 1988;85:5171-5.

(Accepted 19 October 1989)

Postneonatal mortality among illegitimate children registered by one or both parents

Ronald R Gordon

Gosfield Hall, Halstead, Essex CO9 1SF
Ronald R Gordon, FRCP, *retired consultant paediatrician*

Br Med J 1990;300:236-7

Postneonatal mortality is still higher in social class V than social class I,¹ in illegitimate than legitimate children, and in children of younger than older mothers.² Over a fifth of babies born in England and Wales are illegitimate. These births may be divided into two groups: those registered by both parents and those registered by only one parent. When both parents register the birth it is taken to indicate paternal support for the mother. It is often thought that having parents in a stable relationship, albeit unmarried, is as beneficial to a child as having married parents. If this

is true the postneonatal mortalities, which are taken to indicate the standard of care for infants, should be similar.

Methods and results

All the data were obtained from the Office of Population Censuses and Surveys (DH3 and FM1 series (all crown copyright)). The data for 1984 and 1985 were added together and then divided by two to give an annual rate. Postneonatal mortality for the five main social classes (I-V) was compared with that for the five main maternal age groups (<20, 20-24, 25-29, 30-34, and ≥35) (figure); the rate for the social classes was based on legitimate births only and the rate for the maternal age groups on all live births. Rates by social class were compared with rates by maternal age groups. The annual numbers of postneonatal deaths were: among illegitimate children registered by one parent, 303; in social class V, 164; among mothers aged <20,