Clinical phenotype of haemoglobin Q-H disease

K F S Leung, E S K Ma, A Y Y Chan, L C Chan

Seven patients of Chinese origin who had haemoglobin (Hb) Q-H disease were studied. They were found to have a similar clinical phenotype to that of patients with deletional Hb H disease, who have a near identical genotypic configuration. The complete absence of Hb A in Hb Q-H disease and the similar clinical phenotype to deletional Hb H disease lends support to the observation that Hb Q-Thailand shares similar functional properties with Hb A.

Take home messages

- Seven Chinese patients with haemoglobin (Hb) Q-H disease were found to have a similar clinical phenotype to that of patients with deletional Hb H disease, which has a near identical genotypic configuration.
- The complete absence of Hb A in Hb Q-H disease and the similar clinical phenotype to deletional Hb H disease lends support to the observation that Hb Q-Thailand shares similar functional properties with Hb A.

HAEMATOLOGICAL AND CLINICAL FINDINGS

Table 1 details the clinical and haematological data. All of the study subjects are Hong Kong Chinese, with patient number 7 being of Chinese descent from Thailand. Diagnosis was made on Hb pattern studies in all cases. Archival blood samples were of sufficient quantity for genotype determination in four individuals (patients 3, 4, 5, and 7). Genotyping revealed the Hb Q-Thailand mutation, as confirmed by direct nucleotide sequencing of the z1 globin gene, together with 4.2 kb single z globin gene deletion and SEA deletion, as detected by multiplex polymerase chain reaction. Hb A was absent and Hb Q-Thailand accounted for 93.9–97.9% of the total Hb. There was a high proportion of Hb H inclusion bodies, which were detected in 70–90% of red blood cells in these patients on supravalvular staining.

These seven patients were anaemic with steady state Hb concentrations ranging from 79 g/litre to 109 g/litre (mean, 97 g/litre). None of them required regular transfusions, although three of the seven had a history of infrequent blood transfusions. The other four had never been transfused. Four of the patients had splenomegaly, and splenectomy was performed in two as a result of hypersplenism. Two patients showed hepatomegaly. The six patients with iron studies available showed raised ferritin values, but none was put on iron chelation treatment.

DISCUSSION

Patients with Hb Q-H disease can be categorised under deletional Hb H disease, because genotypically they show deletion of three z globin genes. Therefore, we compared the clinical features of Hb Q-H disease with those of Hb H disease caused by the (–/– SEA) z-thalassaemia deletion configuration in our archive, because their genetic configurations are almost identical. There appears to be no significant difference between the two groups with respect to clinical phenotype (table 1). Our results are entirely in accordance with the observation that Hb Q-Thailand shows normal oxygen affinity, Bohr effect, and cooperativity. Thus, patients with Hb Q-H disease have similar clinical features to patients with deletional Hb H disease, even though Hb A is absent in the former condition.

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Abbreviations: Hb, haemoglobin; SEA deletion, (–SEA) z thalassaemia deletion
REFERENCES

1 Lie-Injo LE, Dozy AM, Kan YW, et al. The α-globin gene adjacent to the gene for Hb Q—a 74 Asp → His is deleted, but not that adjacent to the gene for Hb Q—a 30 Glu → Gln; three fourths of the α-globin gene are deleted in Hb Q-α-thalassemia. Blood 1979; 54:1407–16.


Table 1 Haematological and clinical profiles of patients with Hb Q-H disease

| Patient | Sex | Age (years) | L | S | History of transfusion | Hb (g/l) | MCV (fl) | MCH (pg) | Hb H (%) | Hb A (%) | Hb A2 (%) | Hb F (%) | Hb Q-Thailand (%) | Retic (%) | Bilirubin (µmol/l) | Iron (µmol/l) | Ferritin (pmol/l) | Transferrin saturation (%) |
|---------|-----|-------------|---|---|------------------------|----------|---------|---------|----------|---------|-----------|---------|-----------|------------|--------------|---------------|---------------|----------------|------------------------|
| 1       | M   | 58          | N | N | N                      | 96       | 83.4    | 20.0    | 70       | 0.3     | 0.3       | 97.9    | 39         | 5200       |              |               |               |            |                       |
| 2       | M   | 17          | N | N | N                      | 105      | 60.5    | 18.5    | 80       | 0.4     | 0.3       | 93.9    |            | 69         |              |               |               |            |                       |
| 3†      | M   | 28          | Y | Y | N                      | 100      | 63.6    | 18.8    | 90       | 0.2     | 0.3       | 95.6    | 9.2        | 90         | 32          | 1430         | 77           |              |                       |
| 4       | M   | 23          | N | Y*| Y                      | 105      | 59.7    | 18.4    | 89       | 2.4     | 0.3       | 95.8    | 4.7        | 35         | 20          | 965          | 16           |              |                       |
| 5       | M   | 38          | N | N | N                      | 10.9     | 66.6    | 18.1    | 90       | 3.0     | 0.5       | 94.2    | 3.7        | 30         | 21          | 1530         | 38           |              |                       |
| 6†      | F   | 68          | N | Y*| Y                      | 79       | 70.2    | 18.9    | 70       | 2.1     | 0.3       | 93.9    | 6.5        |            | 25          | 467          |              |              |                       |
| 7†      | F   | 49          | Y | Y | Y                      | 84       | 77.2    | 21.7    | 85       | 1.2     | 0.3       | 96.9    | 5.0        | 26         |            | 1907         |              |              |                       |
| HbH     |     | 35          | 1 | 4 | 3 cases, all           | 94       | 63.9    | 17.0    | 65       | NA      | NA        | NA      | NA        | 5.0        | 29.1        | 20           | 1108         | 41           |                       |
|         |     |             |   |   |                         |          |         |         |         |         |           |         |           |            |             |              |               |              |                       |

*Hb, haemoglobin; Hb H, percentage of red cells with HbH inclusions; L, hepatomegaly; MCH, mean cell haemoglobin; MCV, mean cell volume; N, absent; NA, not applicable; Retic, reticulocytes; S, splenomegaly; Y, present; –, data not available.

REFERENCE Ranges: Hb, 130–180 g/l (men), 115–165 g/l (women); MCV, 80–96 fl; MCH, 27–32 pg; HbA2, 2.3–3%; HbF, 0.9%; reticulocytes, 0.2–2%; bilirubin, 7–19 µmol/l; iron, 9–33 µmol/l (men), 5–28 µmol/l (women); ferritin, 115–884 pmol/l (men), 15–331 pmol/l (women); transferrin saturation, 15–45%.

82 letter to the editor
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