Normal haemoglobin electrophoretic pattern in a patient with sickle cell disease and end stage renal failure

Chronic renal failure is an important cause of morbidity and mortality in older patients with sickle cell disease, and its onset is often heralded by a progressive fall in steady state haemoglobin concentration. The renal failure is probably multifactorial, and recent work has suggested that an associated reduction in erythropoietin activity may play a particularly important part in the development of anaemia. It is also well recognised that regular blood transfusion in sickle cell disease in the absence of renal impairment suppresses endogenous erythropoiesis.

We report a patient with sickle cell anaemia who developed chronic renal failure and a regular requirement for blood transfusions. This combination of factors produced such a profound degree of bone marrow erythropoietic suppression that the presence of sickle haemoglobin could no longer be detected by routine electrophoretic procedures. In 1975 a 27 year old woman from Montserrat travelled by air to London and shortly after arrival presented with limb and back pains. Examination showed that she had anaemia, jaundice, heart failure with a blood pressure of 170/100 mm Hg and bilateral chronic leg ulceration. Haematological investigation showed haemoglobin to be 6.0 g/dl, white cells 11.6 × 10⁹/l (differential count normal), platelet count 375 × 10⁹/l, and a reticulocyte count of 34%. Hb SS disease was diagnosed by a positive sickle solubility test and the presence of a major band in the position of Hb S with a faint band in the position of Hb F on haemoglobin electrophoresis (cellulose acetate, pH 8.6, and agar gel, pH 6.8). Hb F value was 5-5% of the total haemoglobin. Serum urea and creatinine concentrations were normal.

Eight years later mild renal impairment had become apparent, and over the next two years progressed to chronic renal failure associated with anaemia requiring regular blood transfusion. Investigation now showed a serum urea concentration of 65-4 mmol/l, creatinine concentration of 1003 μmol/l, and creatinine clearance 2 ml/minute. Urinary protein output was 1-8 g/24 hour; she was abacteruric and a renal ultrasound scan was normal. A renal biopsy specimen showed glomerulosclerosis, severe tubular atrophy, diffuse interstitial fibrosis, and increased amounts of haemosiderin in tubular epithelial cells. The biopsy specimen showed no evidence of amyloid or hypertensive change. There was no evidence of immunologically mediated disease on electron microscopical examination or immunofluorescence. Her renal failure was successfully managed by continuous ambulatory peritoneal dialysis (CAPD).

Haematological investigation seven weeks after blood transfusion now showed a haemoglobin concentration of 5-7 g/dl, a reticulocyte count of <2%, with normal white cell and platelet counts. A sickle solubility test was negative and haemoglobin electrophoresis on cellulose acetate and agar gel showed only Hb A. Analysis of the absorbance of haemoglobin eluted from CM cellulose chromatography showed α and β⁺ peaks but no β⁻ peak (figure). Examination of the rate of incorporation of ³H-leucine into the globin of reticulocytes from the patient with fractionation of the globin chains by CM cellulose chromatography, however, showed incorporation into only α and β⁺ fractions, consistent with synthesis of only Hb S (figure). The α/β⁺ globin biosynthesis ratio was normal at 0-997. Analysis of peripheral blood DNA using the restriction enzyme MST II showed only the 1-3 Kb gene fragment, thus confirming the presence of homozygous sickle cell disease (Hb SS). Ferrokinetic studies showed a normal ⁵⁷Fe plasma clearance T½ of 94 minutes (normal range 60-140) with a plasma iron concentration of 32 μmol/l (normal range 14-29). Red cell utilisation was greatly reduced at 2% on day 6 (normal maximum utilisation is 70-80% by day 10-14). A bone marrow aspirate showed severely reduced erythropoietic activity with greatly increased reticulo-endothelial iron but absent erythron iron. Serum assay for human parvovirus Ig M antibody showed no rise, thus making recent infection unlikely to be the cause of the aplasia.

In view of our findings a negative sickle solubility test with a normal haemoglobin electrophoretic pattern may need to be anticipated in patients with homozygous sickle cell disease, end stage renal failure, and a transfusion requirement.

J CW MARSH, LRI BAKER, GW MARSH
†Department of Haematology, Royal Postgraduate Medical School, Hammersmith Hospital, Du Cane Road, London W12 *Department of Nephrology, St Bartholomew's Hospital, Smithfield, London EC1V

References

Four hour rapid urease test (RUT) for detecting Campylobacter pylori: Is it reliable enough to start treatment?

Detection of Campylobacter pylori in antral or duodenal biopsy specimens usually entails histological or microbiological methods that may not produce a result for seven days. Langenberg et al described the unusual characteristic of rapid urea hydrolysis by Campylobacter pylori that indicated the presence of pre-formed urease. McNulty and Wise reported a rapid urease test (RUT) capable of detecting the presence of Campylobacter pylori on the same day as endoscopy. An evaluation of the commercially available CLO-Test has also recently been reported. More recently, however, Das et al cast doubt on the reliability of this test by reporting specificity at 86% and sensitivity at only 59%. In a small series we previously described that the specificity and sensitivity of RUT was 100% and 81%, respectively. We now report our results on a modifica-
Normal haemoglobin electrophoretic pattern in a patient with sickle cell disease and end stage renal failure.

J C Marsh, L R Baker and G W Marsh

*J Clin Pathol* 1988 41: 355
doi: 10.1136/jcp.41.3.355-a

Updated information and services can be found at:
http://jcp.bmj.com/content/41/3/355.1.citation

These include:

**Email alerting service**
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Errata**
An erratum has been published regarding this article. Please see next page or:
/content/41/6/708.4.full.pdf

**Notes**

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/
This book is a stupendous compendium of basic sciences which covers much more than its title suggests. All major advances in immunology, molecular biology, human biochemistry, ultrastructure, physiology, and many more are described, evaluated, and expected further developments indicated. The stated aim of the editors is to bridge the gap between science and clinical practice that few on either side are able to cross unaided. Yet, it is paramount that the two do not grow further apart. The aim throughout is to integrate and this is reflected in section headings like interrelated cell functions, relation of the liver to other organs, and analysis of disease mechanisms. This is not a book on how but on why. Its massive physical size and appropriately high cost place it in the category of departmental or library, rather than individual purchase but all major hospitals should possess a copy.

PP ANTHONY


The authors have successfully produced a pocket size handbook of practical procedures employed in dynamic function tests commonly used in general medicine. The first two chapters relate to the provocative tests frequently used in endocrinological cases, while the third chapter is a compilation of tests used in gastric, renal, and oncological medicine. The section on adrenal cortex function is particularly well documented. Steroid hormone biochemistry is a specialty often shunned by clinicians and biochemists because of its reputedly complex and specialised nature. This book will enhance the interaction between the clinician and biochemist to ensure that the biochemical function test is expedited correctly and interpretation of the result is correct. This will ensure that their effort is not wasted, nor is the patient subjected to an unpleasant and perhaps unnecessary test.

The information is well presented and I am sure that it will not be long before most laboratories have this book on their shelves.

LA PERRY

**Corrections**

On page 355 of J Clin Pathol 1987;41, G W Marsh, one of the coauthors of the letter about haemoglobin electrophoretic pattern in single cell disease, was attributed an incorrect address. It should have been Department of Haematology, North Middlesex Hospital, Edmonton, N18.

In the same issue, a table pertaining to the letter from Ho-Yen et al on limitations of Chlamydiazyme in general hospital laboratories (P357) was published with all columns ELISA positive: it should have read as follows:

<table>
<thead>
<tr>
<th>Patients from STDs</th>
<th></th>
<th>Patients from GPs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ELISA positive (%)</strong></td>
<td><strong>ELISA negative (%)</strong></td>
<td><strong>ELISA positive (%)</strong></td>
</tr>
<tr>
<td><strong>Confirmed by immunofluorescence</strong></td>
<td><strong>Not confirmed by immunofluorescence</strong></td>
<td><strong>Confirmed by immunofluorescence</strong></td>
</tr>
<tr>
<td>32 (17)</td>
<td>158 (83)</td>
<td>48 (13)</td>
</tr>
<tr>
<td>22 (12)</td>
<td>29 (8)</td>
<td></td>
</tr>
<tr>
<td>10 (5)</td>
<td>19 (5)</td>
<td></td>
</tr>
</tbody>
</table>