Haemoglobinopathies in pregnancy

Tracey A Johnston

The haemoglobinopathies are a complex group of red blood cell disorders. The ethnic diversity of the population in many parts of the UK means that these disorders are increasingly being seen in the antenatal setting. With the planned introduction of both antenatal and newborn screening programmes for haemoglobinopathies in England and Wales, a review of the subject is timely. This article explains the genetic background and clinical features of the major haemoglobinopathies, discusses antenatal screening and prenatal diagnosis, and highlights the implications of pregnancy for women with these disorders.

Introduction

The haemoglobinopathies are autosomal recessive inherited disorders of haemoglobin synthesis (thalassaemias) or structure (sickle cell disorders) that are responsible for significant morbidity and mortality on a worldwide scale. They are seen mainly in individuals who originate from Africa, the Middle East, the Caribbean, the Mediterranean, Asia and the Far East. However, the increased mobility of the world’s population and inter-ethnic mixing has meant that these conditions are no longer unusual within the UK, although the prevalence varies enormously from region to region.

Individuals with trait (carriers) are healthy and unaware of their carrier status unless specifically screened. If a couple both carry a clinically significant haemoglobinopathy trait there is a 1 in 4 chance with each pregnancy that their child will inherit a major haemoglobinopathy. The clinically significant haemoglobinopathies are listed in Table 1. There are many more haemoglobinopathies that are not clinically significant.

Haemoglobin synthesis and structure

Thalassaemia

Thalassaemia is caused by a quantitative defect of globin chain production, which leads to instability of haemoglobin and ineffective red blood cell production. There are two pairs of globin chains in each haemoglobin molecule. There are three normal haemoglobins, all of which have one pair of α-globin chains, and one pair of either γ-chains (HbF), β-chains (HbA – over 95% of adult haemoglobin) or δ-chains (HbA2). α-chain production is under the control of four genes located on chromosome 16: two inherited from the mother and two from the father. β-chain production is under the control of four genes located on chromosome 11: one from the mother and one from the father (Figure 1).

The thalassaemias result from globin chain imbalance, either because of abnormalities in α-chain production (α-thalassaemias) or β-chain production (β-thalassaemias), which leads to ineffective red blood cell production. If all four α-globin genes are defective (and therefore there is no α-globin chain production) the outcome is Hb Bart’s hydrops, which results in fetal hydrops. This is incompatible with survival unless intrauterine transfusion is employed; these individuals are then transfusion dependent for life.

One defective gene results in α-thal+ trait and two defective genes results in either α-thal” trait (both defective genes from one parent) or homozygous α-thal+” trait (one defective gene from each parent). In all three of these situations the patient is asymptomatic. If three defective genes are inherited (one from one parent and two from the other) this results in HbH disease, which causes a mild to moderate haemolytic anaemia.

Keywords

haemoglobinopathy, prenatal diagnosis, screening, sickle cell disease, thalassaemia

Author details

Tracey A Johnston MD MRCOG, Consultant in Fetal Maternal Medicine, Department of Obstetrics, St Mary’s Hospital for Women and Children, Oxford Road, Manchester, M13 9WL, UK. email: tracey.johnston@cmmc.nhs.uk
Table 1. Clinically significant haemoglobinopathies

<table>
<thead>
<tr>
<th>Haemoglobinopathy</th>
<th>Increased maternal risk</th>
<th>Offer prenatal diagnosis if fetus at risk?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle cell anaemia (HbSS)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HbSC disease</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HbS/β-thalassaemia</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>HbS/β&lt;sup&gt;–&lt;/sup&gt;-thalassaemia</td>
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<td>Yes</td>
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<td>HbS/H&lt;sup&gt;ββββ&lt;/sup&gt;FH</td>
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</tr>
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<td>Yes</td>
</tr>
<tr>
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<td>Expert advice needed</td>
</tr>
<tr>
<td>HbH disease</td>
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</tr>
<tr>
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<td>Yes</td>
</tr>
<tr>
<td>Hb Bart's hydrops</td>
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</table>

In contrast, if one β-globin gene is defective this causes β-thalassaemia trait or minor, and is associated with mild microcytic anaemia. If both β-globin genes are defective then no β-globin chains are produced. This usually results in β-thalassaemia major in which the majority of individuals are transfusion dependent for life and suffer all the consequences of iron overload. There is a milder form of homozygous β-thalassaemia, β-thalassaemia intermedia, which is similar to β-thalassaemia major but transfusions are not usually necessary. The clinical implications of thalassaemia are described in Table 2.

Figure 1. Genotypes of the different forms of thalassaemia. The four α genes are carried on chromosome 16, and the two β genes are carried on chromosome 11.

Sickle cell disorders

Sickle cell disorders are associated with a qualitative globin gene defect, i.e. it is the structure of the globin chains rather than their production that is abnormal. Many different forms exist but the most common and clinically most important is HbS. In this form a single amino acid substitution at point six in the β-globin chain (from glutamic acid to valine) renders it insoluble in the deoxygenated state. This alters the shape of the red blood cells into a sickle shape, hence the name. These red blood cells ultimately become permanently sickled and are removed from the circulation (haemolytic anaemia), with the subsequent release of the iron element that is stored within the body and reused in the manufacture of new red blood cells. The life expectancy of a normal red blood cell is 120 days and that of a sickled cell is 5–30 days.

Sickle cell trait (HbAS) is much more common than sickle cell anaemia (HbSS). Many other haemoglobin variants exist but these are less common and only a few are of clinical significance (Table 1). The clinical implications of sickle cell disease are described in Table 2. If both partners carry a haemoglobin variant (i.e. trait) then there is a 1 in 4 chance of the child inheriting both the abnormal genes and, thus, of having sickle cell disease. This risk increases to 1 in 2 if one partner has two abnormal genes, i.e. one has the disease and the other has trait.

Screening

The implications of the major haemoglobinopathies are such that the introduction of
antenatal and neonatal screening programmes have been recommended for over 15 years.\textsuperscript{5} Haemoglobinopathy services were the subject of a report by a working party of the Standing Medical Advisory Committee published in 1993.\textsuperscript{6} This report recommended universal antenatal and neonatal screening in areas where the antenatal ethnic minority population was greater than 15\%. In 1998, the National Screening Committee\textsuperscript{7} recommended universal antenatal screening for haemoglobinopathies and universal neonatal screening for sickle cell disorders. In the NHS Plan\textsuperscript{8} the Government outlined the need to develop a ‘… new national linked antenatal and neonatal screening programme for haemoglobinopathy and sickle cell disease.’

The NHS Sickle Cell and Thalassaemia Screening Programme\textsuperscript{9} is currently developing and aiding implementation of policies for: (1) universal newborn blood spot screening for sickle cell disease (as part of the existing blood spot screening programme for phenylketonuria and congenital hypothyroidism); (2) universal antenatal screening for sickle cell disorders and thalassaemia in high prevalence areas; and (3) effective selective antenatal screening in other areas of England.

The objective of antenatal screening is to identify those women who carry a clinically significant trait, and who are therefore at an increased risk of having a child with a major haemoglobinopathy if the baby’s father also carries a clinically significant trait. Screening also identifies those women with a significant haemoglobinopathy who require extra care during pregnancy to minimise maternal and perinatal morbidity and mortality. The rationale behind antenatal screening is that as the major haemoglobinopathies are autosomal recessive conditions, with carrier status having little implication for health, many women are completely unaware that they are carriers. Knowing their haemoglobinopathy status allows women increased reproductive choices in terms of partner screening, prenatal diagnosis and termination of pregnancy. Clinically significant traits with regard to prenatal diagnosis are listed in Box 1. Regarding neonatal screening, there is a proven reduction in morbidity and mortality in sickle cell disease with early diagnosis and prophylactic treatment.\textsuperscript{10,11}

In many areas initial screening is based on assessment of ethnic and family origins. This can be fraught with difficulties as many people do not have the appropriate skills or tools to ask about ethnicity. This difficulty can be largely avoided in high prevalence areas by performing universal screening, although information about ethnic and family origin is still required in the interpretation of possible $\alpha$-thalassaemia in the laboratory. In low prevalence areas, however, screening will still be based on assessment of
Microcytosis can also indicate normal HbA2 is from a high risk area for urgent partner testing in such cases as the woman may have haemoglobinopathy. However, microcytosis alone can also indicate haemoglobinopathy. None of these conditions confers a risk to either the mother or the fetus of a major haemoglobinopathy. However, microcytosis alone can also indicate α-thalassaemia trait; this is almost exclusively found in those from China, Thailand, Taiwan, Cambodia, Laos, Vietnam, Indonesia, Burma, Malaysia, Brunei, Singapore, the Philippines, Greece, Turkey and Cyprus. Therefore, finding out about ethnic origin forms a vital part of screening for α-thalassaemia. Microcytosis can also indicate normal HbA2, β-thalassaemia trait. Both traits confer a fetal risk of a major haemoglobinopathy.

Screening for the thalassaemias is done by examining the red blood cell indices and the HbA2 levels. As all pregnant women have a full blood count performed at the beginning of their antenatal care, universal screening for thalassaemia (using red blood cell indices alone) is already in place. With thalassaemia traits there is a reduced mean cell volume (MCV; <75 fl), reduced mean corpuscular haemoglobin (MCH; <27 pg) and a normal or near normal mean corpuscular haemoglobin concentration (MCHC). MCH is the most accurate marker.

The main difficulty with this screening method is the incidence of iron deficiency in the antenatal population, which can result in similar red blood cell indices. Iron deficiency must therefore be excluded before a diagnosis of thalassaemia can be made on indices alone. However, confirmation of iron deficiency does not exclude thalassaemia as the two conditions can co-exist. Microcytosis alone can be indicative of iron deficiency (which should be treated appropriately), heterozygous α-thalassaemia or homozygous α-thalassaemia. None of these conditions confers a risk to either the mother or the fetus of a major haemoglobinopathy. However, microcytosis alone can also indicate α-thalassaemia trait; this is almost exclusively found in those from China, Thailand, Taiwan, Cambodia, Laos, Vietnam, Indonesia, Burma, Malaysia, Brunei, Singapore, the Philippines, Greece, Turkey and Cyprus. Therefore, finding out about ethnic origin forms a vital part of screening for α-thalassaemia. Microcytosis can also indicate normal HbA2, β-thalassaemia trait. Both traits confer a fetal risk of a major haemoglobinopathy.

Screening for sickle cell variants is more straightforward and is mainly done by high performance liquid chromatography (HPLC), with anything other than HbAA being a variant. Screening for sickle cell variants is more straightforward and is mainly done by high performance liquid chromatography (HPLC), with anything other than HbAA being a variant. Figure 2 shows a useful screening algorithm, which has been taken from the NHS screening programme website.

If a woman is found to carry a significant trait then the baby’s father should be screened as early as possible. If there is a risk of the fetus having a major haemoglobinopathy, urgent expert counselling should be given to enable the couple to make an informed choice regarding prenatal diagnosis and termination of pregnancy. This is a complex area and specialist counsellors should be involved. Uniform, accurate patient information is available from Accessible Publishing of Genetic Information (www.chime.ucl.ac.uk/ApoGI/), but language can be a problem and appropriate media should be used.

Ideally, screening and counselling should be done pre-pregnancy: time is limited if both partners are to be screened, counselled, prenatal diagnosis performed and the results processed in time to allow first trimester surgical termination of pregnancy if the couple choose this option. However, this rarely happens and there is, therefore, some urgency for effective antenatal screening to allow optimal care. This issue has been addressed generically in the NICE guidelines for antenatal care, where it is recommended that two appointments in the first trimester should be considered to allow adequate time for counselling and performing antenatal screening tests. As with any genetic screening test, women should be counselled that issues regarding paternity may be identified.

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Prenatal diagnosis

Prenatal diagnosis is done by DNA analysis. Chorionic villi and fetal blood are preferable to amniotic fluid. If inadequate free fetal DNA is obtained from the amniotic fluid, culture will be required to obtain sufficient DNA (this adds 10–14 days to the diagnostic process). The optimal method of prenatal diagnosis is chorionic villous sampling in the first trimester, which also allows surgical termination of pregnancy should the fetus be affected, although prenatal diagnosis is technically feasible at any gestational age. Invasive prenatal diagnosis carries with it a small risk of miscarriage and this is one of the reasons (others include religious and ethical reasons) why uptake of prenatal diagnosis in identified high risk couples is not universal. Uptake is higher in those at risk of thalassaemia (80%) compared with sickle cell disease (30–50%), and drops with advancing gestational age.13,14 The same is true of termination of affected pregnancies.15

Pre-implantation genetic diagnosis can give couples at high risk of an affected pregnancy an alternative to invasive prenatal diagnosis and termination of pregnancy.16

Thalassaemias: implications for and management in pregnancy

α-thalassaemias

Those with trait can become anaemic during pregnancy; iron (if there is proven iron deficiency) and folate supplementation should be given although parenteral iron should be avoided. Those with HbH disease have a chronic haemolytic anaemia and require folic acid (5 mg/day). Often they are not iron deficient because of the chronic haemolysis and transfusion is frequently indicated to treat the anaemia. It must be remembered that the maternal complications that occur when a fetus has Hb Bart’s hydrops include early onset severe pre-eclampsia and intrapartum problems secondary to the delivery of a grossly hydropic fetus and placenta, including primary postpartum haemorrhage.

Figure 2. Universal antenatal screening algorithm

(Reproduced with permission from: NHS Sickle Cell & Thalassaemia Screening Programme)
β-thalassaemias

Those with trait (β-thalassaemia minor) are often anaemic. These women should take folic acid (5mg/day) and oral iron supplements if the ferritin level is low (never parenteral iron). If the anaemia does not respond transfusion may be indicated, although this is rarely required in practice.

Preconception

Pregnancy is possible in women with transfusion dependent β-thalassaemia major with the use of assisted conception, and with aggressive pre-pregnancy iron chelation programmes the rate is increasing. As assisted conception is the norm, this should not be embarked on without appropriate preconceptual assessment and counselling. In all women with β-thalassaemia major iron overload is a major concern, and certainly those who are transfusion dependent should undergo aggressive iron chelation, especially pre-pregnancy. Chelating agents are usually contraindicated in pregnancy. Preconceptual counselling is, therefore, advisable to ensure that iron levels are as low as is feasible prior to stopping the chelating agents and embarking on a pregnancy. This is because the required transfusions in pregnancy will increase the iron load without chelation. Occasionally, women need iron chelation in late pregnancy but this decision must be taken in conjunction with a specialist haematologist.

Iron overload can lead to hepatic and endocrine dysfunction (which leads to infertility secondary to pituitary failure), but in particular can cause myocardial dysfunction. A cardiology assessment should be performed to look for cardiomyopathy secondary to myocardial iron deposition. If there is evidence of significant myocardial dysfunction preconceptually or in early pregnancy, consideration should be given to the cardiac consequences of continuing with a pregnancy.

As assisted conception is responsible for the vast majority of pregnancies in women with β-thalassaemia major, this should not be commenced until iron levels are acceptable and end organ damage has been minimised. The partner should also have a haemoglobinopathy screen performed and the couple should be counselled appropriately about the chances of an affected child and what options are available to them regarding prenatal diagnosis. Some may opt for pre-implantation genetic diagnosis.

Pregnancy

Those with homozygous β-thalassaemia, either major or intermedia, should be managed jointly by an obstetrician with the relevant expertise and a haematologist with an interest in haemoglobin disorders. If conception occurs prior to preconceptual counselling, maternal iron status, cardiology assessment and partner screening for haemoglobinopathy carrier status should be carried out as a matter of urgency to allow appropriate counselling of the couple regarding the potential risks of pregnancy. In pregnancy, iron supplementation should always be avoided as these women are almost always iron overloaded, and the anaemia treated with transfusion if indicated. Folate supplementation (5 mg/day) is required throughout pregnancy, and fetal growth should be monitored at regular intervals. A history of regular transfusions means that these women often have multiple red blood cell alloantibodies thereby putting the fetus at risk of haemolytic disease of the newborn. Appropriate monitoring of maternal red blood cell antibody levels is essential and fetal surveillance for anaemia should be carried out if indicated, with regular assessment of middle cerebral artery peak systolic velocities.

As the number of pregnancies in women with β-thalassaemia major is relatively small there is not a vast literature base regarding outcomes although those reported are generally good.

Sickle cell variants: implications for and management in pregnancy

Those with trait are not at an increased risk of adverse maternal or fetal outcome other than the risks to the mother if severe hypoxia develops, and the risks to the fetus should the father also have trait. If the mother does develop severe hypoxia the anaesthetist should be aware of her sickle cell trait and general anaesthesia, if required, administered with care.

Sickle cell disorders

It is unusual to diagnose a sickle cell disorder during pregnancy as the vast majority of affected individuals are aware of the diagnosis from childhood, especially those with sickle cell anaemia (HbSS). Occasionally, women with milder forms of sickle cell disease (for example, HbSC) may be diagnosed through antenatal screening as discussed above. During pregnancy women become acidotic more easily and there is an increased frequency of infection (particularly urinary tract infection). Labour and delivery predispose to dehydration and infection; all these factors increase the risk of sickle crises. Close attention must be paid for optimal management.

The frequency of crises is higher in HbSS (up to 50%) compared with HbSC (27%).

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Symptoms of crisis can overlap with the symptoms of pregnancy. Therefore, healthcare professionals and the woman herself should have a low threshold for considering the diagnosis and instituting appropriate investigation and treatment to minimise the increased risk of morbidity and mortality seen in pregnancy.

**Preconception**

Women with sickle cell disease are at an increased risk of obstetric complications (Table 2). Pre-pregnancy counselling is optimal when the severity of the sickle cell disease can be assessed and pregnancy management planned. The increased risk of pregnancy complications should be discussed (Table 2) together with the care plan to address them. Assessment of iron status should be performed and aggressive chelation should be implemented before pregnancy, if indicated. However, if ferritin levels are low then oral iron should be given in the usual manner. The need for folic acid supplementation (5 mg/day) and penicillin prophylaxis (because of hyposplenism secondary to sickle damage) throughout pregnancy should be discussed. In addition, analgesia for sickle pains should also be discussed. Cardiac, renal and liver function should all be assessed to establish the presence of any end organ damage. Partner screening and counselling regarding prenatal diagnosis should be addressed. Iron chelation should be stopped prior to conception as the agents used are contraindicated in pregnancy.

**Pregnancy**

Unfortunately, many women present already pregnant and, therefore, all the above need to be performed as a matter of urgency. Ideally, women should be seen by both an obstetrician and a haematologist (with expertise in haemoglobinopathies), and preferably a specialist midwife. Renal and hepatic function should be assessed regularly as both can be compromised. Haemoglobin levels should be monitored regularly and a programme of top-up or exchange transfusion implemented if indicated.

The role of transfusion in pregnancy is controversial. The aim is to reduce the amount of HbS, thereby reducing the risk of sickling. Drawbacks are the development of red blood cell alloantibodies (which can cause haemolytic disease of the newborn), transfusion reaction and bloodborne viral infection. Although regular transfusions during pregnancy have been demonstrated to reduce the number of crises, there is no improvement in obstetric outcome. Any transfusion programme must be individualised and should be under the supervision of an experienced haematologist. There are no ‘blanket rules’ with regard to the use of transfusions for sickle cell disease in pregnancy, and their use is usually limited to the management of frequent crises or a past history of sickle cell disease-related obstetric complications. As with β-thalassaemia major, patients with sickle cell disease have often had multiple transfusions in the past and may have multiple blood group antibodies that can cause problems with cross-matching, as well as haemolytic disease of the newborn. Therefore, appropriate surveillance should be employed as described above. Venous access can also be significantly compromised. Any signs of infection should be treated aggressively. Dehydration (for example in hyperemesis) and exposure to cold should be avoided as in the non-pregnant state.

From the fetal perspective, regular assessment of fetal growth and placental function with ultrasound and Doppler assessment is indicated. The frequency of this is dictated by the severity of the disease and a past history of sickle cell disease-related adverse pregnancy outcome. Caesarean section should only be performed for obstetric indications and general anaesthesia avoided. Again, induction of labour should only be considered for obstetric reasons.

In labour, intravenous fluids must be given to avoid dehydration and oxygen used to prevent hypoxia. Attention should be paid to analgesia and continuous electronic fetal monitoring is recommended. Labour should be supervised by senior experienced personnel to ensure timely intervention when indicated. Neonatal unit staff should be informed if there is a risk of a major haemoglobinopathy in the child, haemolytic disease of the newborn or neonatal opiate withdrawal syndrome. Postpartum, the risk of crisis remains high and, therefore, hydration and oxygenation need to be maintained. Consideration should be given to the use of thromboprophylaxis, and the use of prophylactic antibiotics remains controversial.

**Contraception**

Progesterone-only preparations are safe and effective and may reduce sickling, although low dose combined pills can be used safely as long as there are no other contraindications. The risk of infection with intrauterine contraceptive devices should be noted, but this in itself is not a contraindication to their use if this is the woman’s preference.
Management of sickle cell disease complications in pregnancy

Full discussion of the complications of sickle cell disease is beyond the remit of this review and are well documented in the literature. What follows is a brief overview of the relevant complications, but further information can be obtained elsewhere if required.21

Painful vaso-occlusive crisis

Painful vaso-occlusive crisis is the most common sickle cell disease complication, with an increased incidence in pregnancy.22 It is secondary to vaso-occlusion and often affects the bone marrow leading to bone pain and infarction. Most episodes are managed at home and are usually easily recognised by the woman.

Should hospital admission be required, management is the same as in the non-pregnant state. It is essential that an experienced haematologist is involved and it may be that the most appropriate place of care is on a maternity ward, especially later in pregnancy. A full blood count should be taken, and urea, creatinine and electrolyte levels should be checked. Signs of infection, dehydration, acute chest syndrome, severe anaemia, cholecystitis, splenic enlargement, abdominal crisis and neurological events should be sought, and investigation and treatment directed specifically.

The mainstay of an uncomplicated vaso-occlusive crisis is adequate analgesia. The only differences in analgesic use in pregnancy are that nonsteroidal anti-inflammatory drugs are contraindicated after 32 weeks of gestation. This is because of the risks of premature closure of the ductus arteriosus. Chronic opiate use can lead to neonatal withdrawal syndrome. However, women should not be denied adequate analgesia if they need opiates.

Adequate hydration is essential and fluid balance should be monitored. Intravenous fluids may be necessary if the woman is unable to maintain an adequate oral intake. Oxygen saturation monitoring should be performed, with supplemental oxygen given if the saturation is below the woman’s usual level, or below 95% if this is not known. Antibiotics will be required if there are signs or symptoms of infection. It is normal for the haemoglobin to fall by 1–2 g/dl during an acute crisis, but transfusion is rarely indicated. If the haemoglobin falls more than this, is less than 5 g/dl, or the woman is symptomatic, the consultant haematologist should be notified and splenic sequestration or aplastic crisis secondary to parvovirus infection should be considered. Careful consideration should be given to the use of thromboprophylaxis, as set out in the Royal College of Obstetricians and Gynaecologists guidelines.19 Full details of management can be obtained in the British Society of Haematology guideline.22

Acute chest syndrome

Acute chest syndrome is a rare but life-threatening complication of sickle cell disease which can cause significant diagnostic confusion.21 The patient presents with chest symptoms, particularly pain, but also cough, wheeze and haemoptysis, pyrexia and new pulmonary infiltrates seen on chest x-ray (the appearances of which can be delayed). The differential diagnosis includes pulmonary embolism (especially in pregnancy) and chest infection.

Vaso-occlusive crises are common prior to the onset of acute chest syndrome; fat embolism to the lungs from infarcting bone marrow is often an underlying factor. Diagnosis is made on clinical grounds together with the results of arterial blood gases and chest x-ray. If pulmonary embolism is being considered then spiral computed tomography is better than a ventilation-perfusion scan. This is because acute chest syndrome will also give rise to perfusion defects from vaso-occlusion of the pulmonary vessels.

Management includes assessment of oxygenation and supplementary oxygen therapy, with cardiorespiratory support needed in severe cases. Analgesia is important to prevent hypoventilation which exacerbates the condition, and antibiotics are indicated if a pyrexia is present. Transfusion is indicated if oxygenation cannot be maintained and the clinical condition is deteriorating rapidly. An experienced haematologist must be involved in the management of these women from the outset.

Aplastic crisis

Aplastic crisis is usually the result of acute parvovirus B19 infection, which leads to aplasia secondary to direct cytotoxicity of the parvovirus to erythroid precursors.21 The symptoms are those of worsening anaemia and the signs are of respiratory and/or gastrointestinal infection. A reduced reticulocyte count precedes the anaemia, with a subsequent reticulocytosis that can cause diagnostic confusion with an increased haemolytic process. Transfusion is indicated in those who are symptomatic (more than 80%), but if the woman is coping and the reticulocyte count is increasing, transfusion may be avoided.
Splenic sequestration

Splenic sequestration is a rare complication caused by intrasplenic trapping of red blood cells which leads to a rapid decrease in haemoglobin concentration and a significant risk of severe hypoxia.21 The clinical symptoms are those of acute anaemia and an enlarged tender spleen. Treatment is directed towards management of acute hypervolaemia with transfusion, following which the sequestered red blood cells return to the circulation, increasing the haemoglobin concentration and reversing the splenomegaly.

Summary

The haemoglobinopathies are a challenging group of disorders both in terms of antenatal screening and counselling, and care during pregnancy. The National Screening Committee is about to issue a policy in the summer of 2005 regarding antenatal and neonatal screening, which should clarify many things. Their website is an extremely useful source of information, which is updated constantly.

With regard to the pregnancy care of women with haemoglobinopathies, a multidisciplinary team approach with experts in the field is optimal to minimise morbidity and mortality for both mother and baby, while trying to maintain a level of normality during a major life-event for a couple.

Acknowledgements

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References

9. NHS Sickle Cell and Thalassemia Screening Programme [www.kcl-phs.org.uk/haemscreening/].

Erratum
