Prenatal diagnosis of alpha thalassaemia major following cordocentesis — a case report

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Summary

The relevant investigations and management of a case of alpha-thalassaemia major suspected antenatally is discussed. The value of ultrasonically guided cordocentesis in the definite diagnosis of this condition is emphasised in the management of this pregnancy. We believe that this is the first time such a procedure has been done in this country.

Key words: prenatal diagnosis, alpha thalassaemia.

Introduction

With the advent of high resolution ultrasound various structural fetal anomalies can be diagnosed. Certain conditions like alpha thalassaemia major can only be suspected indirectly when they present as hydrops fetalis. The confirmation of this disorder can now be done by DNA analysis in the first trimester or by electrophoresis of cord blood obtained by umbilical cord needling and aspiration of fetal blood. We present a case which presented as hydrops fetalis in the third trimester and successfully diagnosed by the above named procedure.

In view of the potential complications to the mother (pre-clampsia and obstetric complications associated with difficult vaginal delivery) and the poor prognosis of the fetus to survive, the pregnancy was terminated.

Case Report: L.Y.P. was an 18 year old Chinese primigravida referred at 27 weeks of gestation by a private obstetrician for fetal ascites diagnosed on routine ultrasound scanning in December 1989. Prior to that she had four uneventful follow-ups by him. She had no relevant past medical or surgical history. She denied having any family history of anaemia, stillbirth or blood transfusions. On general physical examination the only relevant finding was mild pallor. Examination of the abdomen revealed a single viable fetus at 28 weeks of gestation with adequate liquor.

Detailed ultrasound scan done using a Toshiba SAL-77A machine showed a single fetus in longitudinal lie with cephalic presentation. The biparietal diameter and femur length corresponded to 26 weeks of gestation (SD ± 2 weeks). There was fetal ascites and all four chambers of the heart were enlarged. There was no scalp or generalised oedema. Liquor volume was within normal limits. The placenta was fundal and had a maximum thickness of 4.8 cm.

Relevant routine investigations showed her blood group to be B-positive, with a haemoglobin of 82gm/L. Her peripheral blood smear showed mycrocytic hypochromic red blood cells. Her serum iron and total iron binding capacity were within normal limits. Serum vitamin B12 and folate levels were also normal. The haematological data including haemoglobin electrophoresis were suggestive of alpha thalassaemia trait in the couple. Ultrasonically guided cordocentesis (Fig 1) was performed using a 25 gauge Terumo spinal needle and free hand technique; 2mls of cord blood was aspirated into a heparinised syringe and put into an EDTA tube. The haemoglobin of the fetal blood sample was 72gm/L. Peripheral blood smear showed numerous nucleated red blood cells, many macrocytes, some microcytes and many target cells (Fig 2). Haemoglobin electrophoresis clinched the diagnosis of alpha thalassaemia major (Fig 3).

The poor prognosis of the fetus was discussed with the couple, who opted for termination of pregnancy. Prostaglandin E2 pessary (Cervagem) was used and the patient delivered vaginally a 1.9 kg male hydrophic baby which died shortly after birth. Cord blood sent after delivery also confirmed the previous diagnosis. The placenta was large and oedamatous, with the weight of the placenta being 1.2kg.

The couple had been counselled regarding the recurrence of this condition in future pregnancies and advised early follow up. The possibility of early antenatal diagnosis by chorionic villus sampling was told to the patient. It was also suggested that the other family members be screened for the presence of alpha thalassaemia.

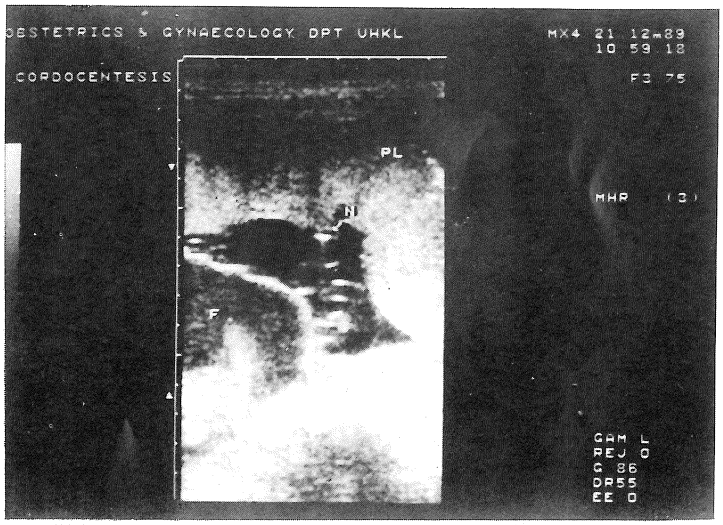

Fig. 1. Ultrasound pictures showing the needle tip (N) inside the umbilical vein which was sampled
PL (placenta) F (fetus) with ascites)

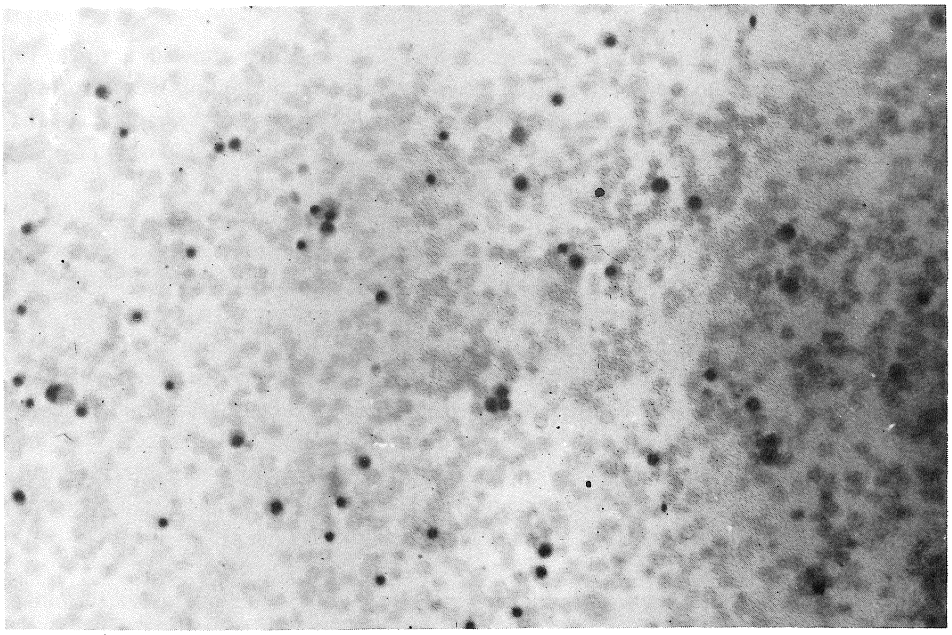

Fig. 2. Peripheral blood smear of fetal blood showing nucleated red blood cells, macrocytes, microcytes and target cells.

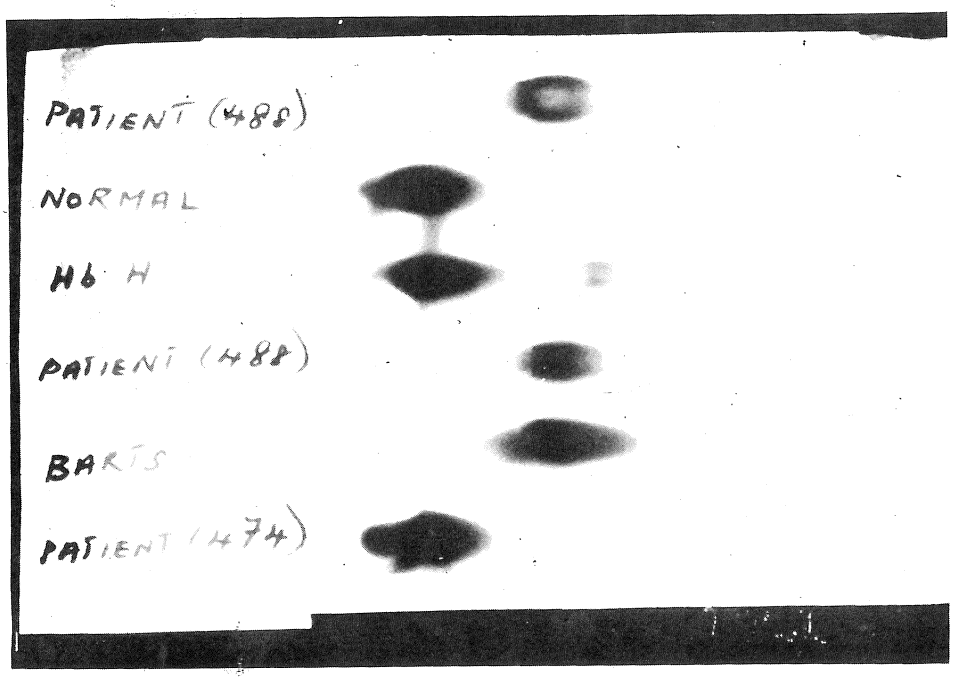

Fig. 3. Haemaglobin electrophoresis of the patient (488) showing that the blood sample was all Bart's Haemoglobin.

Discussion

Alpha thalassaemia occurs as a result of a disorder in the protein part of the haemoglobin molecule. In 1984 there were an estimated 140,000 alpha thalassaemia carriers[1] in Malaysia. With the increase in population this number will no doubt have increased tremendously. The Chinese and Malays are the major carriers, and in Singapore the incidence in these two races is approximately similar (3%).[1] Four genes are responsible for alpha chain synthesis and this is located on chromosome 16. There are thus four types of alpha thalassaemia due to gene deletion and the worst type (four gene deletion) which occurred in our fetus is Bart's hydrops fetalis. This condition is incompatible with life and usually results in a stillbirth or early perinatal death. When the mother presented to us with a hydropic fetus the probability of the fetus having Bart's hydrops fetalis was high but other causes of hydrops fetalis which are amenable to intra uterine fetal therapy were considered, hence cordocentesis was carried out.

In view of this the patient and her husband were offered percutaneous fetal blood sampling (cordocentesis) to help confirm the diagnosis. This procedure is not new having been reported since 1973.[2] Earlier techniques required the use of the fetoscope which resulted in higher fetal losses. The technique described in this patient is relatively new and can be done under ultrasound guidance in an outpatient ultrasound room. We have used a 25 gauge disposable spinal needle (Terumo) and a 5cc heparinised syringe. The umbilical vein is easier to sample and was done in this case close to the cord insertion which was forunately anterior. Complications of this procedure like fetal bradycardia, blood leakage from puncture site and chorioamnionitis did not occur in our patient. The rate of spontaneous abortion and fetal death rate is reported as 0.8% and 1.1% respectively making this procedure relatively safe.[3] Electrophoresis clinched the diagnosis in our patient although globin chain synthesis prior to electrophoresis is a more sophisticated technique which is not available in our centre. The other technique of early antenatal diagnosis is by DNA analysis from chorionic tissue obtained at 8–10 weeks of gestation. Unfortunately this technology is also not available in Malaysia at the present moment.

References

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