CASE REPORT - A NEONATE WITH NONIMMUNE HYDROPS FETALIS

S P Ram, W A Ariffin, Z Kassim

ABSTRACT

A post-dated intra-uterine growth retarded male Malay baby was born to a 30-year-old mother gravida II by Caesarean section. Her previous pregnancy ended in still-birth. The baby was severely asphyxiated at birth. He was intubated and immediately admitted to the neonatal intensive care unit. He had anasarca, anaemia, purpura and firm, massive hepatosplenomegaly. X-rays revealed ascites and bilateral metaphysiitis of the long bones. The haemoglobin level was 5.0 gm/dl and PCV 18.3%. Coombs' test was negative. Prothrombin time (PT) and partial thromboplastin time(PTT) were prolonged. The baby and mother were positive for Venereal Disease Research Laboratory (VDRL) and the treponema pallidum haemagglutination assay (TPHA) tests. The baby was actively resuscitated but expired at three and a half hours of life due to overwhelming sepsis associated with severe anaemia and disseminated intravascular coagulation.

Keywords: *hydrops fetalis, nonimmune hydrops fetalis (NIHF), intrauterine infection, congenital syphilis.*

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INTRODUCTION

Potter in 1943 described nonimmune fetal hydrops as generalised oedema of the foetus unassociated with erythroblastosis[1]. Subsequent studies have identified many causes for this condition. Hydrops fetalis (HF) is characterised by accumulation of fluid in the serous cavities and oedema of the foetal soft tissues[2]. There are 2 types of HF : immune and nonimmune. The incidence of nonimmune hydrops fetalis (NIHF) is 1 in 2,500 to 1 in 3,500 in the newborns. The cause of NIHF is often idiopathic (50%)[3]. The common causes of NIHF in order of decreasing frequency are vascular (20%), chromosomal (16%), placental (8%), haematological (10%) and a miscellaneous group[4,5]. HF due to maternal causes is rare and is usually due to infection or diabetes mellitus in the mother[5]. Intrauterine infection (IUI) accounts for only 8% of NIHF.

The purpose of this case report is to describe a neonate with NIHF due to intrauterine syphilis and to underline the importance of considering congenital syphilis in the differential diagnosis of NIHF.

CASE REPORT

A 40-week gestation intrauterine growth retarded male Malay baby was born to gravida II para 0, 30-year-old mother by Caesarean section. Her previous pregnancy ended in still birth. Antenatal history for the present pregnancy was uneventful. The baby was severely asphyxiated at birth. The Apgar score was 1 and 5 at one and five minutes respectively. The baby was resuscitated initially with bag and mask ventilation and subsequently intubated. His skin was smeared with meconium. He was immediately admitted to the neonatal intensive care unit. Physical examination on admission revealed the following: weight 2000 gm(<3rd centile), length 48 cm (25th to 50th centile), head circumference 34 cm (25th to 50th centile), anterior fontanelle was open and soft. The baby was drowsy, pale, anaemic with gasping respirations and had generalised oedema. Scattered purpuric spots were seen over the abdominal wall and the dorsum of the hands. His skin was desquamated over the extremities. The heart rate was 126/min, respiratory rate 20/min, irregular, the blood pressure was 62/42 mmHg, both pupils were 2 mm in size and sluggishly reactive to light. Abdominal examination revealed firm hepato-splenomegaly of 10 and 6.7 cm respectively with ascites and oedema of the scrotum. Auscultation of lungs showed diminished breath sounds over the bases of the lungs and bilateral scattered

Fig 1 - X-ray of the body showing distension of the abdomen suggestive of ascites.

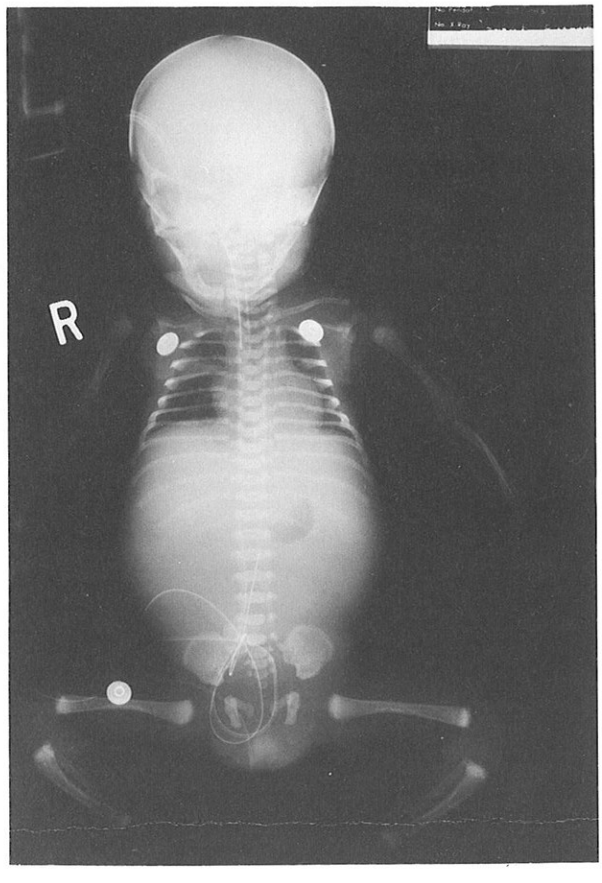

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Fig 2 - X-ray of right and left wrist joints showing translucency of the metaphysis.

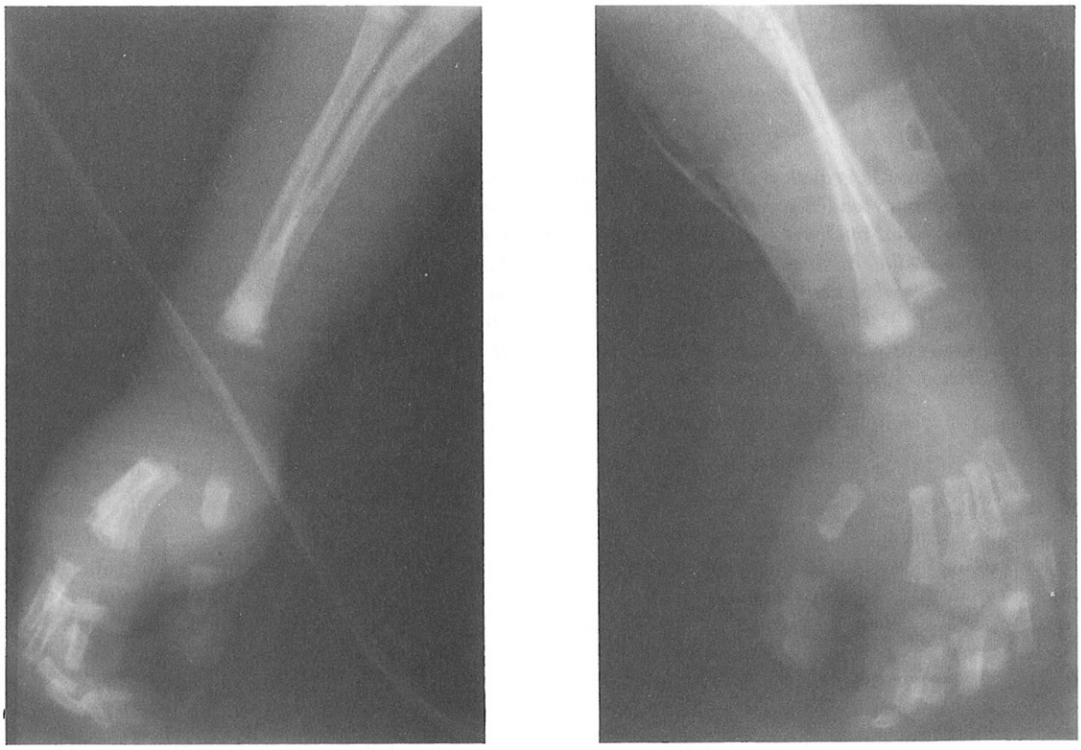
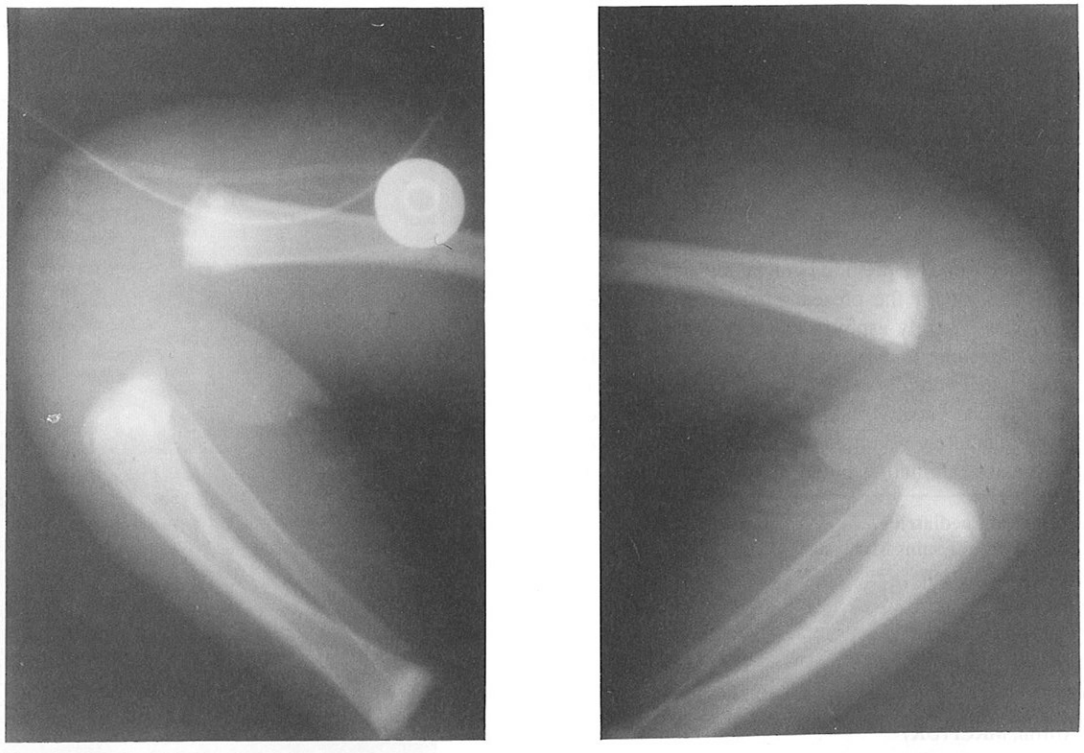


Fig 3 - X-ray of the right and left knee joints showing translucency of the metaphysis.



crepitations. The heart sounds were normal and grade 3/6 systolic murmur was heard over the precordium.

Investigation at the time of admission revealed the following: the arterial blood gases: pH 6.79, PO_2 22.7 mmHg, PCO_2 74.4 mmHg, HCO_3 10.5mmo1/L, BE -24.2, O_2 saturation 10.9%; haemogram: Hg 5.0g/dl, PCV 18.3%, the red blood cell count 1.58 x 10^{12}/L, reticulocyte count 5.1%, white cell count 17.2 x 10^9/L, differential count, P 23%, L 59%, M 2%, E 2%, atypical lymphocytes 2%, myelocytes 1%, promyelocytes 3%, blast cells 8%, MCV 116.0 fl, MCH 32.1 pg, MCHC 27.6 g/dl, platelet count 45 x 10^9/L and the random blood sugar 8.1 mmol/L. The blood group was A positive and the direct

Coombs' test was negative. The haemoglobin electrophoresis showed HB A 11.9%, HB F 88.1%, the prothrombin time (PT) > 60.0 sec, International normalised ratio (INR) 6.0, the partial thromboplastin time (PTT) > 60.0 sec, control 42.0 sec, the total proteins 35 g/L, albumin 19 g/L, globulin 15 g/L, albumin /globulin ratio 1.25, serum aspartate aminotransferase 208 IU/L, serum alanine aminotransferase 127 IU/L, serum alkaline phosphatase 146 IU/L, total bilirubin 44 umol/L, direct bilirubin 13 umol/L, indirect bilirubin 31 umol/L, the VDRL was reactive 1 in 64 dilution, the TPHA (the treponema pallidum haemagglutination assay) test was positive 1 in 320, the serum electrolytes, serum calcium, blood urea and the screening for glucose-6-phosphate dehydrogenase were normal. X-ray of the body showed abdominal distension suggestive of free fluid in the abdomen (Fig 1) and X-rays of both wrist and knee joints showed bilateral metaphysiitis of the radius, femur and tibia. (Fig 2 and 3). Sonogram of the abdomen showed evidence of free fluid and hepatosplenomegaly. The mother's blood tests revealed blood group 0 positive, the VDRL and TPHA tests done three days after delivery were 1 in 32 and 1 in 640 positive respectively. The maternal IgG to and IgM antibodies to rubella were negative. The indirect Coombs' test was also negative.

The baby was admitted and ventilated with intermittent positive pressure. He was treated with 10% dextrose 4 cc/hr, intravenous penicillin G 100,00 units/kg, gentamicin 5mg/kg/day in divided doses and vitamin K_1 2mg/day. He was also given fresh frozen plasma 15 ml/kg, intravenous frusemide 2 mg/kg/loading dose and dopamine infusion 2 ug/kg/minute. Two hours later, he was transfused with fresh A positive blood 10cc/kg. The metabolic acidosis was corrected with intravenous sodium bicarbonate. Sequential arterial blood gases showed persistent hypoxemia and combined metabolic and respiratory acidosis. Three hours after admission, the baby was bradycardic and found to have increased number of purpuric spots over the body and to be bleeding from venipuncture sites. He developed cardio respiratory arrest and expired at 3 1/2 hours of life.

DISCUSSION

The relative importance of different causes of HF has changed dramatically in the past 20 years due to prevention of immune related HF secondary to Rhesus(Rh) isoimmunisation. The incidence of NIHF is more than HF[6]. NIHF is mainly due to foetal causes (80%). Maternal infection causing NIHF is a relatively rare cause of NIHF (8%)[2]. The maternal risk factors for the development of NIHF include polyhydramnios (50%), hypertension, similar illness in previous siblings, ethnic background particularly for alpha thalassemia, placentomegaly, chronic maternal illnesses like anaemia, glucose-6-phosphate deficiency, diabetes mellitus, infections and drug ingestion[2]. In congenital syphilis hepatosplenomegaly, haemolytic anaemia and thrombocytopenia are observed in more than 50% of cases. Other less frequent features are pneumonia (24%), skin and mucous membrane lesions (5%)[7].

The plausible explanation of the pathogenesis of NIHF due to maternal infection is severe hepatitis leading to hypoalbuminemia and portal hypertension. Besides, the bone marrow may be suppressed resulting in anaemia and congestive cardiac failure[2]. The risk of vertical transmission of syphilis to the foetus is 70-100% if the mother is untreated for the first four years after acquisition of the infection[8]. Meyer et al observed that the maternal VDRL of 1 in 32 or more is one of the positive predictive factors for the development of congenital syphilis in babies. The specificity being 78% and sensitivity 93%[9]. Ruiz et al[10] in their post-mortem series of infants with NIHF observed right ventricular failure either due to a structural defect or obstruction of venous drainage. Antenatal sonography permits the detection and often helps to determine the cause of HF[2].

More effective treatment of NIHF is now possible during intrauterine period and immediately after birth. Intrauterine therapy includes appropriate removal of amniotic fluid, management of cardiac arrhythmias, early referral to level III neonatal centre, foetal thoracentesis and/or peritoneocentesis (for the growth of the lungs) followed by infusion of albumin into the peritoneal cavity[11]. The management at birth includes aggressive resuscitation, appropriate fluid therapy, diuresis, dialysis, treatment of cardiac failure, partial or total exchange transfusion if PCV is less than 25%[3] and the treatment of underlying cause[2].

The mortality rate in NIHF varies from 50 to 95% and the prognosis depends on the aetiology of the condition. The outcome is favourable in conditions like cardiac arrhythmias, frequent blood transfusions to the mother and twin to twin transfusions. However, in other conditions, like congenital infection, chromosomal anomalies and metabolic disorders, despite early detection and aggressive management, the prognosis is poor[2-5].

In the present case, the following features were suggestive of HF: anasarca, low albumin, anaemia and pallor. Since the mother was Rh positive and the Coombs' test was negative, the pathogenesis of HF in this neonate is probably of the nonimmune type. The features like anaemia, firm hepatosplenomegaly, purpuric spots, bleeding from venipuncture sites, severe neutropenia, moderate thrombocytopenia, prolonged PT and PTT were suggestive of IUI associated with disseminated intravascular coagulation(DIC). The history of still-birth in the mother and the findings of intrauterine growth retardation, peeling of skin, bilateral metaphysiitis of the long bones, positive VDRL and TPHA tests in the mother and the baby were suggestive of syphilis in the neonate. The cause of death in this neonate was considered to be due to overwhelming infection associated with DIC and severe anaemia. The recognition of history of still-birth, ultrasonographic detection of NIHF, early diagnosis of syphilis and improved antenatal care in the mother, we believe, could have prevented the death of this neonate.

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