

## EXPERIENCE WITH INTRAUTERINE BLOOD TRANSFUSION IN UNIVERSITY HOSPITAL, KUALA LUMPUR

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### SYNOPSIS

Since Liley<sup>7</sup> described the technique of intrauterine blood transfusion (I.U.T.), many fetuses that were severely affected from Rhesus isoimmunisation had been saved by giving these fetuses prenatal blood transfusions to prevent intrauterine deaths and delivering them at a later period of gestation to prevent deaths from prematurity. Although the problem of Rhesus isoimmunisation is uncommon in South-East Asia we have recently seen such patients with bad obstetric histories requesting help in order to have a live child. The technique of I.U.T. and our experience with it in 3 patients is described. One patient received 3 such transfusions before delivery. All the babies have been followed up for a period ranging from 6 months to 4 years and they are all developing normally.

### INTRODUCTION

The problem of Rhesus isoimmunisation is uncommon in Asia but when it occurs the foetal loss in severe cases may be 80% to 100%, and for them there was little to offer until recently. In 1963 Liley<sup>7</sup> suggested that I.U.T. for the severely immunised fetus would prolong life to a later stage before induction can be safely carried out. By employing I.U.T. fetal survival has improved to between 34% to 50%.<sup>2, 11, 14</sup> It will be of interest to review here our experience with I.U.T. in the University Hospital, Kuala Lumpur, Malaysia.

### PATIENTS AND METHODS

#### Case No. 1

An Indian aged 21 years and G4/P2 was first seen on 9.9.69. She had one previous abortion, one intrauterine death, and one hydropic stillborn infant. She was group B Rhesus negative and had rapidly rising antibodies, which rose to 1/512 at 30 weeks gestation. Amniocen-

tesis at 30 weeks showed the bilirubin peak at 450 m $\mu$  to be 0.14 which rose to 0.15 a week later. These values when plotted on Liley's chart<sup>9</sup> indicated that the fetus was severely affected. I.U.T. was performed on 26.2.70 at 33 weeks gestation, and 120 ml. fresh group O Rhesus negative blood was injected slowly taking 2 $\frac{3}{4}$  hours for the transfusion. On 13.3.70 at 35 weeks' gestation a live female infant was delivered by Caesarean section. At birth she showed evidence of severe haemolytic disease and signs of cardiac failure. The cord blood haemoglobin was 13.5 Gm. and blood studies showed 46% adult haemoglobin as a result of the intrauterine blood transfusion. The cord blood bilirubin was 8 mg./100 ml. and direct Coombs test was positive. She had multiple exchange blood transfusions to prevent hyperbilirubinaemia and was discharged on 25.4.70 with no evidence of abnormality or kernicterus. Follow-up till the present showed that she was growing and developing normally.

#### Case No. 2

An Indian aged 24 years G5/P3 was referred to the antenatal clinic on 20.3.73 at 17 weeks' gestation because of her bad obstetric history and two previous Caesarean sections. She had a series of abortions and stillbirths except the last pregnancy which ended in a live child after I.U.T. during pregnancy. During the present pregnancy the Rhesus antibody titre was rising and the serial liquor bilirubin tests predicted a severely affected fetus. Intrauterine blood transfusion was performed at 33 $\frac{1}{2}$  weeks' gestation and 120 ml. fresh O Rhesus negative

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blood was given. On 9.8.73 at 36½ weeks' gestation she had a Caesarean section and a live female infant weighing 2590 Gm. was delivered. The cord blood bilirubin was 3.0 mg./100 ml. and Coombs test strongly positive. The infant was given an exchange transfusion on 12.8.73, a transfusion with packed cells on 13.8.73 and discharged well on 21.8.73. Follow-up examination at 6 months revealed no abnormality in the infant.

### Case No. 3

A 30-year-old Indian G5/P3 who had a live child in 1963 followed by an abortion in 1965, a stillborn full term baby in 1969, and a stillborn fetus at 32 weeks' gestation in 1972, was referred to the antenatal clinic on 21.6.73 at 29 weeks' gestation when the Rhesus antibody titre was 1/256 in albumin. Her blood group was A Rhesus negative while her husband's was B Rhesus positive (homozygous). Amniocentesis done showed the liquor bilirubin peak at 450 mμ was 0.24 which was in the upper zone in Liley's chart<sup>9</sup> and predicted a severely affected fetus. Intrauterine blood transfusion was given with fresh O Rhesus negative blood: the fetus received 90 ml. blood on 2.7.73 (30 weeks' gestation), 120 ml. blood on 18.7.73 (32½ weeks' gestation), and 120 ml. blood on 7.8.73 (35 weeks' gestation). Delivery was planned at 37 weeks' gestation, at which time she developed mild pre-eclamptic toxæmia and there was also evidence of intrauterine growth retardation. As the cervix was not favourable for induction an elective Caesarean section was done on 18.8.73 at 37 weeks' gestation. She had a live male infant weighing 1850 Gm. The cord blood haemoglobin was 10.4 Gm. and the bilirubin 4.5 mg./100 ml. He was given an exchange blood transfusion on the same day and discharged on 21.9.73. Follow-up examination at 6 months showed the infant's development was normal.

### TECHNIQUE OF INTRAUTERINE TRANSFUSION

A placental scan is done to outline the placenta before amniocentesis. On the day before the I.U.T. an amniocentesis is performed and 2—4 ml. Myodil injected into the amnion. An hour before the I.U.T. the patient is given injection pethidine and promazine hydrochloride for sedation. The patient is placed in the supine position on the X-ray table with fluoroscopic tube equipped with image-intensifier

and television screening. Just before the actual procedure the fetal position is checked to be safe and suitable for the I.U.T. and if the fetal spine is uppermost, the I.U.T. is delayed temporarily until it is safe to proceed. Under fluoroscopic control an 18 cm. long 16 or 17 gauge Tuohy needle is directed into the fetal abdomen. There is a characteristic feel when it enters the fetal peritoneal cavity. After preliminary testing by aspiration and injecting 2 ml. saline, through the needle, 2—4 ml. Urografin 30% is injected and a spot film taken with an under-couch X-ray tube (Fig. 1). One can ascertain

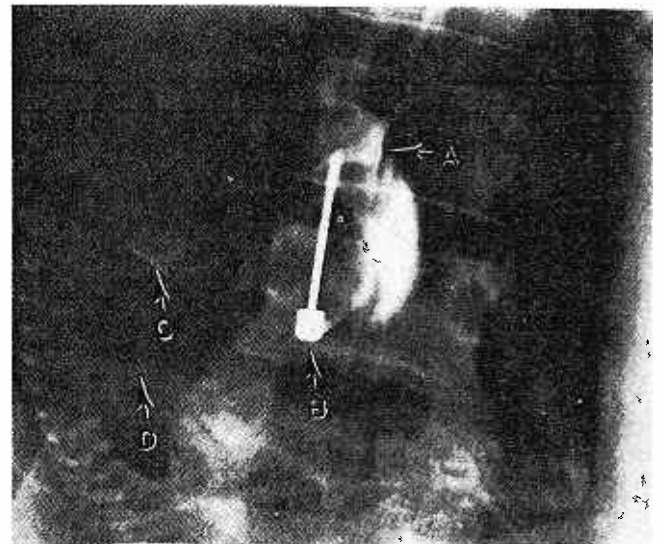


Fig. 1. Spot film shows radio-opaque dye (Arrow A) being injected through Tuohy needle B, and outline of large bowel (Arrow C). Arrow D indicates fetal rib cage.

that the dye has been correctly placed in the peritoneal cavity by one or more of the following radiographic features: demilunes or a honey-comb appearance, outline of large bowel, outline of diaphragm, outline of posterior surface of anterior abdominal wall, and outline of the under surface of the liver (Fig. 2). A fine polythene catheter is then threaded into the peritoneal cavity through this needle and the needle withdrawn. A spot film is taken, and if the catheter is radio-opaque it gives a typical coiled appearance. For the transfusion fresh O Rhesus negative packed cells are used, after removing the buffy layer. The blood is introduced gradually taking about 2 hours for the procedure. The amount of blood given is usually 60 to 120 ml., depending on the fetal size and the period of gestation. The I.U.T. is repeated at 2 to 3 weekly intervals until the 36th or 37th week of gestation when pregnancy is terminated. We have employed the above technique of I.U.T.

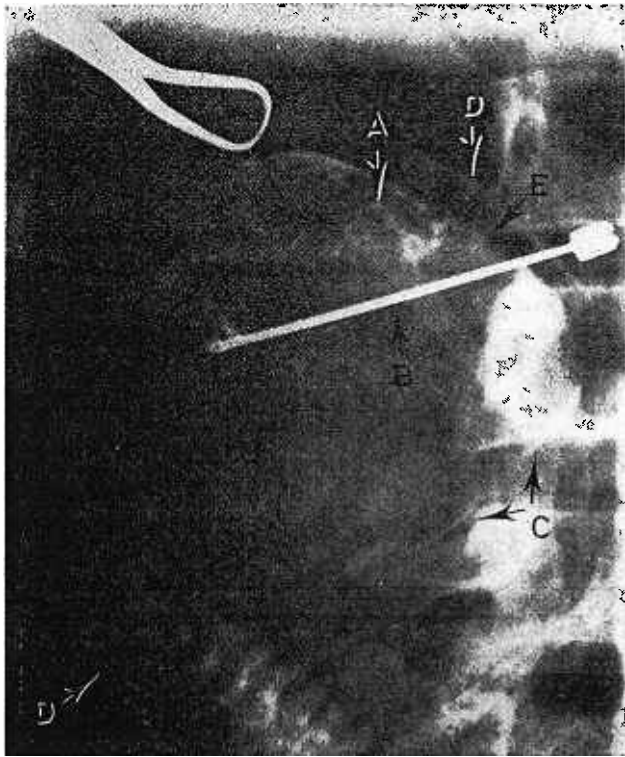


Fig. 2. Characteristic honeycomb appearance (Arrow A), crescentic shape of contrast medium under the diaphragm (Arrow C), and outline of posterior surface of anterior abdominal wall (Arrow E) confirm intra-peritoneal injection of contrast medium through Tuohy needle B. Arrow D indicates skin of fetal abdomen outlined by contrast medium.

in all our transfusions except in Case No. 1 where we used a modified technique.<sup>10</sup>

#### DISCUSSION

The introduction of I.U.T.<sup>7</sup> has offered hope for the severely immunised fetus of Rhesus negative mothers with bad obstetric histories. This procedure has been shown to salvage many fetuses where the prognosis was hopeless.<sup>2, 5, 6, 14</sup> Amniocentesis for estimation of liquor bilirubin provides a useful indication of fetal prognosis by using the charts of Liley.<sup>9</sup> The timing of the I.U.T. can be precisely determined by performing two or more amniotic fluid examinations of liquor bilirubin and studying the trend of the bilirubin levels in relation to the "action line" of Whitfield.<sup>13</sup>

A preliminary amniogram to outline the fetal abdomen is extremely helpful as it outlines clearly the fetal abdomen so that the needle may be aimed directly at it.<sup>8</sup> It is important to avoid the right hypochondrium where the liver, if enlarged, may be traumatised causing intra-peritoneal haemorrhage. The I.U.T. is performed in the X-ray department using an image-intensifier with fluoroscopic control to reduce

radiation exposure.<sup>15</sup> Fresh group O Rhesus negative blood that has been packed is used in the I.U.T. The buffy layer is removed to avoid the theoretical risk of injecting large numbers of viable lymphocytes into the fetus<sup>1</sup>.

All our three fetuses were salvaged following I.U.T. Case No. 3 had a total of three intra-uterine blood transfusions and all the three infants are developing normally, both physically and mentally. The physical and mental development of the surviving babies after I.U.T. has been noted to be as satisfactory as that of other prematurely delivered infants.<sup>3, 4, 12</sup>

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