

# Rh Isoimmunized Pregnancy—Do Maternal Antibody Titre Always Correlate with the Fetal Affection? A Non-Invasive Management

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## Abstract

This case is of Rh –ve 2<sup>nd</sup> gravida having antibody titre detected 1:2 at 8 weeks of 2<sup>nd</sup> pregnancy. Serial antibody titre carried out along with clinical examination. Fetal monitoring was done by assessing MCA-PSV (Middle cerebral artery peak systolic velocity) and CTG (Cardiotocograph) when required. Pregnancy was terminated when the titre reached 1:512 at 34 wks of pregnancy with abnormal MCA-PSV values. Neonate just had begun to show sign of anaemia & haemolysis at birth.

## Keywords

Rh –Ve, Rh +Ve, MCA-PSV, CTG, Rh Isoimmunization, Rh Antibody Titre

## 1. Background

Managing Rh Isoimmunized pregnancy is an obstetric challenge and it is necessary to timely terminate the pregnancy. It has been observed that antibodies formed in maternal circulation may cross the placental barrier in variable amount. This finally decides the state of fetal anaemia. Maternal antibody titres tend to correlate more reliably with the severity of fetal disease in the 1<sup>st</sup> sensitized pregnancy than in subsequent pregnancies. Higher Rh antibody titres in this case did not correspond to fetal haemolytic disease although this was 1<sup>st</sup> sensitized pregnancy for her. With history of a previous sensitization subsequent fetus are affected in >80% cases. Here, maternal Rh titers are not predictive for the severity of fetal anaemia [1].

Non-invasive method by Colordoppler USG measuring MCA-PSV may be considered a standard method for fetal surveillance instead of invasive amni-

ocentesis which was used earlier. This case report describes interpretation of antibody titre & non-invasive management.

## 2. Case Presentation

A 28-year O Rh -ve patient 2<sup>nd</sup> gravida para 1 had presented with 8 weeks pregnancy. She had a full term normal delivery 5 yrs back. There was no history of anti-Dad ministered post-delivery. Father was B Rh +ve homozygous. Her vitals were normal. Important investigations were blood group O Rh -ve, normal complete blood count & TSH levels, negative screening test for GDM. ICT (indirect Coombs test) was found to be positive but titer was 1:2. First trimester USG was normal. She was prescribed tablet folic acid 5 mg and was advised regular antenatal follow up. Double marker screen was negative at 11 weeks. At 18 weeks iron and calcium supplementation were initiated. At 20 weeks patient had normal anomaly scan with length of cervix 35 mm. ICT titers were done monthly until 24 wks & than every 2 wks. At 26 + wks of pregnancy, her ICT was found to be positive in a dilution of 1:8. MCA-PSV was 19.98 cm/s, corresponding to <1.0 MOM, CPR (cerebroplacental ratio) was normal. Single observer measured MCA-PSV values by maintaining angle of insonation 0 or <10 degree. Antenatal steroids were given at 30 wks. MCA-PSV values measured every 1 - 2 weekly were <1.0 MOM till 32 wks when it reached 1.12. From 32 - 34 wks PSV increased to >1.5 MOM and Rh antibody titer increased to 1:512. (Table 1, Figure 1) Decision of delivery by cesarean section was taken as cervix was not favorable. She delivered a 2.075 kg female baby with a normal Apgar score & reflexes. The baby was B Rh +ve with hemoglobin 12 g % (15 - 21) PCV 35.1% (45 - 75), platelet count 89,000/cc (100,000 - 450,000) with retic count 11.8% (2 - 7). Cord blood bilirubin was 3.11 mg/dl (up to 2) and direct Coombs test was positive.

After 24 hr of birth baby's Hb was 13.5 g % (15 - 21) PCV 40.5 % (45 - 67), platelet count 285,000/cc. (210,000 - 500,000) Serum bilirubin was 8.69 mg (up to 12 mg). Now phototherapy was started. After 8 hours of double surface phototherapy serum bilirubin was 8.44. IVIG (1 gm /kg) was given at 36 hours of life.

**Table 1.** Maternal ICT titers and fetal MCA-PSV values.

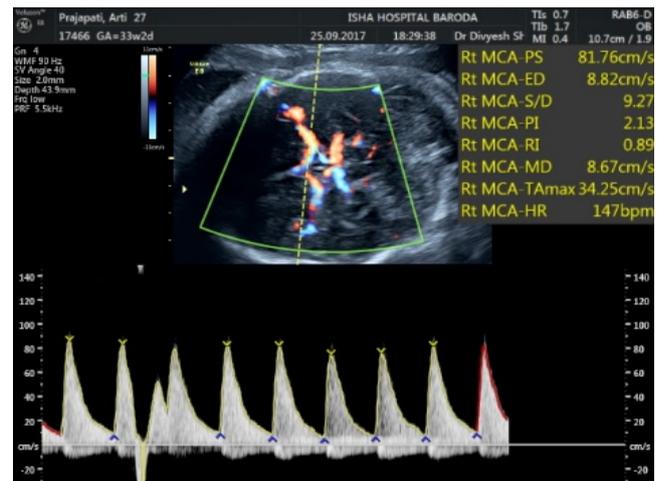
Date	Gestational age	ICT titer	MCA PSV cm/s	MOM of value of patient	Median peak systolic velocity for gestational age
21/3/17	6 weeks	1:2	-	-	-
7/4/17	10 weeks	1:2	-	-	-
26/5/17	16 weeks	1:2	-	-	-
5/8/17	26 weeks	1:8 (critical titer)	19.98	0.59	33.65
2/9/17	30 weeks	1:256	32.69	0.80	41.65
14/9/17	32 weeks	1:256	49.82	1.12	44.45
25/9/17	34 weeks	1:512	81.76	1.67	48.77



(a)



(b)



(c)

**Figure 1.** Color Doppler of fetal MCA-PSV serial assessment: (a) Colordoppler of MCA PSV at 26 weeks; (b) Colordoppler of MCA PSV at 32 weeks; (c) Colordoppler of MCA PSV at 34 weeks.

8 hours post IVIG s. Bilirubin decreased to 7 mg and Hb 12.4 gm % PCV 36% so phototherapy was omitted on day 5<sup>th</sup> of life. Maximum serum bilirubin noted on 3<sup>rd</sup> day of life 12.74 mg. 2<sup>nd</sup> dose of IVIG (1 gm/kg) was given on 8<sup>th</sup> day of life as Hb decreased. As the patient had RDS oxygen with prongs was given. USG brain was normal. Patient discharged on day 10<sup>th</sup> of life with weight 1.960 kg.

### 3. Follow Up

It was uneventful with normal rise in Hb, weight & other developmental parameters after 3<sup>rd</sup> week.

### 4. Discussion

There is poor correlation between Rh antibody titres and severity of haemolytic disease especially in 2<sup>nd</sup> sensitized pregnancy. With history of a previous anemic fetus or newborn, the probability of subsequent affected Rh D-incompatible fe-

tus is more than 80% [2]. But similar poor correlation of antibody titer & fetal anaemia was reported in this case without previous sensitized pregnancy. Serial Rh antibody titers along with MCA-PSV values were performed. MCA-PSV calculation was the only method to assess fetal anemia as it correlated well with fetal Hb & delta OD 450 findings (Liley curve) [3]. Up to 34 wks sensitivity of detecting fetal anaemia is predicted 100% by MCA-PSV [4]. Fetal surveillance by CTG was performed. In this patient, the rising antibody titres were not correlated with fetal anaemia. USG additionally detects signs of fetal anemia. MCA-PSV are obtained from 18 wks to 35 wks of gestation, not after 35 wks as false +ve increases. The MCA is examined close to its origin in the internal carotid artery, angle of insonation should be 0 or <10 degree for accurate measurement of velocities [3]. As standard management fetal blood sampling by cordocentesis is done to assess fetal anemia, hematocrit & acidosis. Hematocrit values < 30% obtained requires intrauterine transfusion up to 34 wks. The antibody titre below which there is no risk for hydrops fetalis or stillbirth before term is conventionally 1:8 to 1:16 [5]. In the case presented here, an anti-D antibody titre at 1:512 was associated with fetal anaemia & haemolysis. There are several factors affecting transfer of maternal IgG across placenta, this can be the reason for non-correlation of fetal anaemia and antibody titre (maternal chronic infection, malnutrition, gestational diabetes, hypergammaglobulinemia, ABO incompatibility associated and IgG types) [6]. In view of this in the first and or in the subsequent sensitized pregnancies, the Rh antibody titer may not correlate with the severity of fetal affection.

## 5. Learning Points

MCA-PSV is important non-invasive test which correlates with fetal anaemia, delta OD 450 & hyperdynamic fetal circulation. In this case of Rh -ve mother even in 1<sup>st</sup> sensitized pregnancy the high Rh antibody titres which were not indicative of fetal haemolysis as against previously reported fact that this happens only in 2<sup>nd</sup> sensitized pregnancy.

## Conflict of Interest

There was no conflict of interest & due consent of the patient was taken to report her clinical case.

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