Rh Isoimmunization

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Case Report

Mrs X a 28 year female married since 3.5 yr Gravida 3 Para 1 Living 1, Still Birth 1 with one full term normal vaginal delivery and 1 LSCS with 34 wk/d, 32.1 wk/s

Admitted for safe confinement i/v/o Rh negative pregnancy with A Negative blood group with increased peak systolic velocity in MCA & early foetal anaemia

No h/o pain in abdomen, bleeding pv, leaking pv

FM +

- M/H:
  LMP- 20/04/2018 EDD: 25/01/2019
  Pa Mc - 3-4 d/ 28-30 d Regular, moderate flow, painless
- O/H- G1 /still birth /male/2.7 kg birth weight /pre term vaginal delivery
- Pt gives h/o oligohydramnios with 3 loops of cord around neck
- She has taken ANTI D post delivery
- ICT records not available
- G2-p3/female/1.5 y/2.5 kg birth weight /LSCS /i/v/o single loop of cord around neck with GDM with hypothyroidism in pregnancy
- ICT was + ve at 28 wks
- G3-(PP)(SC)- ANC period was uneventful.
- 2 doses of betamethasone 12 mf 24 hrs apart was given at 34 wks

Past h/o-

h/o hypothyroidism since 1.5 years on medicine since sept 2018

h/o GDM in previous pregnancy.

Surgical & Family history - not significant.

On Clinical Examination

- GC Fair, Afebrile
- P- 112/min; BP- 110/70 mmHg
- CVS/RS- NAD
- No Pallor/ icterus/ cyanosis/ clubbing/ lymphadenopathy
- p/a- ut- 32 wks, cephalic, relaxed, FHS + reg, NST- normal

Investigation

- ICT done on 18 wks titre 1 : 8
- 28 wks titre 1 : 128
- 30 wks titre 1 : 512
- All 3 times Anti D was taken.
- Patient was taken up for elective LSCS at 34 wks i/v/o IUGR with Rh incompatibility with increased peak systolic velocity in MCA
- Post delivery on day 1 ANTI D was given.
- Post delivery baby shifted to NICU.

NICU status of baby

- On admission : weight of baby : 2000 gm
- APGAR score- 9/10 at 1min, 9/10 at 5 min, 9/10 at 10 min
- Baby was stabilised on 1.5 L/min O_2 y cannula & double surface phototherapy started i/v/o jaundice

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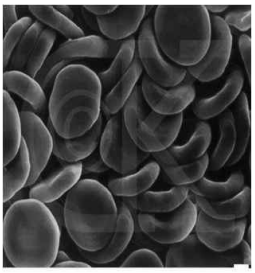
(bilirubin - 3.3) along with IV fluids D10 at 5.8 ml/hr & IV antibiotics.

- Inj vit. K 1 mg i/m given stat.
- Vitals stable.
- CVS/RS- NAD
- p/a - soft, B.S. present, jaundice present.
- Day 2 - baby started at 5 ml/3 hrly orally followed by 30 ml/2hrly after 24 hrs. Baby tolerated feeds well.
- Day 3 - respiratory distress increased, depth of subcostal retractions increased. 2 D echo s/o pulmonary hypertension hence started on Sildenafil infusion
- Referred to paediatric cardiologist
- Adv- stop sildenafil & baby was put on ventilator with minimal ventilatory settings
- Baby maintaining well
- Trial of extubation given. Baby extubated successfully, with minimal respiratory distress & maintaining saturation well on nasal canula at 1L/min of O_2.
- Gradually oxygen supply reduced & baby maintaining saturation on room air.
- Day 3 - 2 d echo suggestive of patent ductus arteriosus of 3.5 mm, left to right shunt. Hence PDA closure with Ibugesic
- 3 doses of Ibugesic given as per protocol , repeat 2 d echo shows closed PDA . No further cardiac complaints.
- Jaundice : baby born to Rh negative mother with O Positive blood group .
- At birth – Direct Coomb Test- Strongly Positive (4 +),
- HCT %- 52.7, TSH- 2.66, G6PD- normal, Hb- 17.2 , TLC – 18500,
- Sr bilirubin at birth : 3.3 below exchange transfusion levels hence started on phototherapy. 6 hrs later Sr. bilirubin : 2.9 hence continued phototherapy.
- On Day 7- bilirubin 13, below phototherapy level hence phototherapy stopped
- Day 8 – bilirubin -13.6, Hb- 12.8,TLC- 8000, HCT- 41.1 %
- Weight on discharge – 1910 gm

Rh negative pregnancy

- Background



What is the Rhesus factor?

It is a Red blood cell antigen

5 type of Rh antigen:

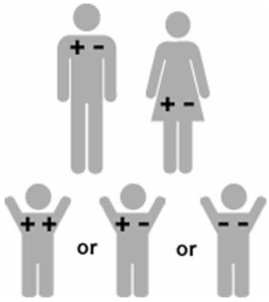
c C D E e

D antigen : is the most important and determines Rh positivity

If present Rh positive

If Absent –Rh Neg

Genetics of Rh factor



LOCATION : of D antigen

Short arm of chr No 1

- Two alleles – heterozygotes or homozygotes
- DD-Homozygous Rh positive individuals
- Dd – Heterozygous
- Dd – rh negative individuals
- Mother is Rh Neg ➡ Problem
- AND Farther is Rh Positive
- Mother is Rh Neg ➡ No Problem
- And Father is Rh Neg

How to know foetus is Rh positive or Negative

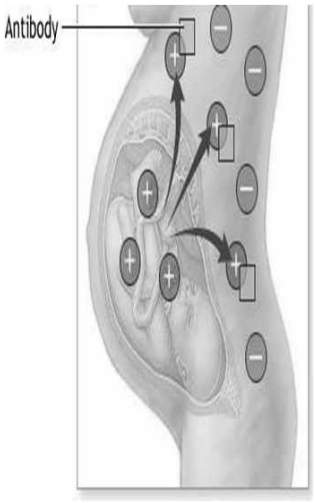
- Through Husband Blood Group:
- If both are Rh Neg :

100% foetus Rh Neg

If Husband is Rh Positive :

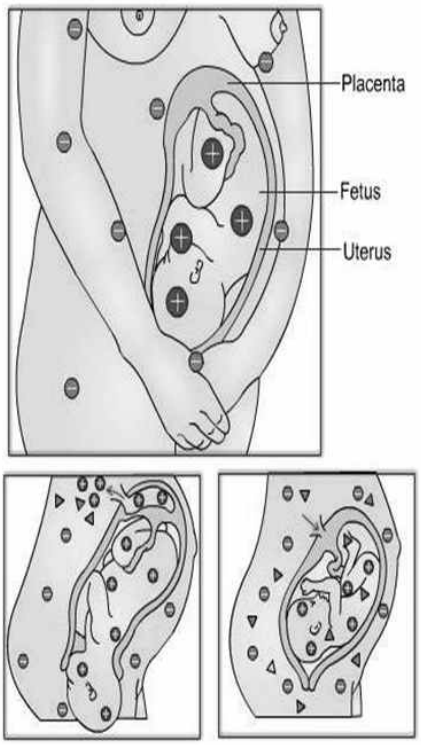
50 % or 25 % chances of Rh Positive foetus depending upon whether husband is homozygous or heterozygous for D Antigen

Pathophysiology in pregnancy



- Rh negative mother
- Carrying a Rh positive foetus
- Some Rh positive RBCs cross over the maternal circulation
- Since the mother has not been exposed to these antigens,
- She makes antibodies to this "D" antigen

First Pregnancy



There are Two Form Of Antibody D:

1) IgM Antibody : Immediately form After exposure – can't cross placenta
2) IgG Antibody : form over 5 to 6 month

Which can cross placenta

Non Antibody enter in Foetus Circulation hence

First Pregnancy is safe In Rh Neg Mother

Subsequent Pregnancy

- Mother Rh negative and Foetus Rh positive
- When blood mix Stimulate Mother Immune System by Action as Foreign Antigen
- **Anamnestic Response**

Very quickly conversion of IgM to IgG Antibody

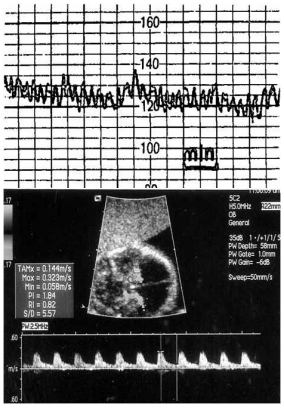
- All foetus cell has Rh Antigen
- Antigen Antibody Reaction occur on Foetal RBC lead to Haemolysis
- Rh Isoimmunisation : it means Antibody formation in one individual (mother) lead to problem in other individual (foetus)

Haemolysis foetal Manifestation

A) Foetal Anaemia
B) Icterus Gravidarum
C) Hydrops Foetalis
D) Placentomegaly
E) Hepatosplenomegaly & Bone Marrow Hyperplasia (Erythroblastosis Foetalis)

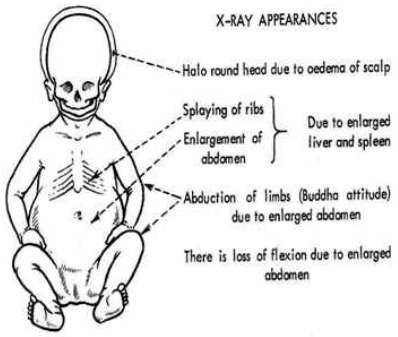
Foetal Anaemia

1. Sinusoidal Heart rate pattern on NST
2. Doppler: Peak systolic velocity increase in Middle Cerebral Artery



3) Collection of fluid in third Space Leads to – space leads to :

- pericardial effusion
- pleural effusion
- ascites
- skin oedema
- scalp oedema leads to halo around the head of the foetus known as Buddha sign



Icterus Gravidarum

Increase bilirubin in foetus ⟶Jaundice ⟶ >20 mg/dl⟶ Kernicterus

Bilirubin excreted via foetal urine ⟶ dark yellow coloured urine came in amniotic fluid⟶Golden Yellow Colour amniotic fluid

Hydrops foetalis

Hydrops Foetalis

The foetus weighing 1,010 g shows features of hydrops foetalis. Mild maceration is observed

- Diagnosis:

If fluid in > 2 body cavities Eg- pleural effusion Pericardial effusion Ascites

Skin oedema

Scalp oedema

2 other features seen in hydrops foetalis but not a part of diagnostic criteria

1) Polyhydramnios
2) Placentomegaly

Mx of Rh negative Pregnancy

CATEGORY 1:

- Rh negative female at ANC :
- 1st test – Husband rh status (if rh positive) ⟶
- Do Indirect Coombs Test (ICT) to mother at 12 wks, 20 wks, & 28 wks

→ If ICT Negative
→ Give Anti D to mother at 28 wks
→ Dose of Anti D

300 ug (1500 IU)- neutralised 15 ml of foetal blood known as Anti Partum Prophylaxis

Anti D

Anti Partum Prophylaxis: at 28 wks

(ICT Negative)- dose – 300 µg (1500 IU)

⟶ POST PARTUM PROPHYLAXIS: WITHIN 72 HOURS OF DELIVERY TO RH NEGATIVE FEMALE WITH RH POSITIVE BABY

Dose- 300 µg (1500 IU)

⟶ OTHER PREGNANCY EVENTS WE HAVE TO GIVE Anti D

- Ectopic pregnancy
- Molar pregnancy
- CVS

Anti partum Haemorrhage

- Attempting any version (ext cephalic version / int podalic version)

Abdominal trauma

Abortions

- 15 ml – 300 µg (1500 IU)
- 4 ml – 100 µg (500 IU)
- For every ml of foetal blood above 4 ml (500 IU)

we have to give 125 IU of Anti D.

Anti D (i/m) – deltoid/ anterolateral aspect of thigh

Category 2

Rh negative mother with ICT Positive at any time during pregnancy

Know How Many Antibodies Are Produced

(antibody Titre)

Critical titre : >/ 1: 16

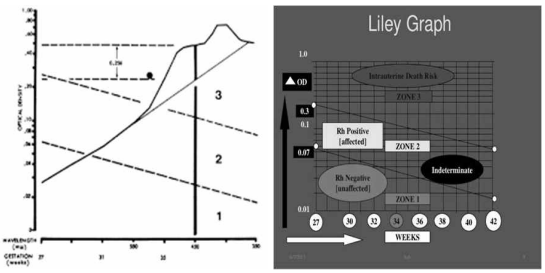
A) If Ab titre is < critical titre :follow up pt by Ab titre every 4 wks till 24 wks then every 2 wks after that

B) If Ab titre is >/ critical titre

Know How Much Foetal Haemolysis Has Occurred

In past : AMNIOCENTESIS

In present: DOPPLER OF MCA (INCREASED PEAK SYSTOLIC VELOCITY)



- If DELTA optical density in ZONE 1 : do amniocentesis every 4 wks delivery at 37-38 wks
- If DELTA optical density in BOTTOM of ZONE 2: amniocentesis every 2 wks
- If DELTA optical density in UPPER part of ZONE 2 & ZONE 3 : LUNG MATURITY

IF PRESENT → (>34 wks)→DELIVERY
IF ABSENT →(< 34 WKS) → GIVE
T. PHENOBARBITONE 30 mg PO 1-1-1 FOR 7 DAYS & IN UTERO BLOOD TRANSFUSION → DELIVERY

- **CATEGORY 3 :**
  Patient whose previous pregnancy had HYDROPS FOETALIS

→ Directly monitor PEAK SYSTOLIC VELOCITY in MCA

- ROSSETE TEST :
- IF POSITIVE (FETAL BLOOD >/ 15 ML)? DO KLEIHAEUR BETKE TEST
- PRINCIPLE: HbF is present in foetal RBC -> resistent to acid & alkali
- HbA present in mothers blood is SENSITIVE to acid & alkali
- REAGENT- CITRIC ACID PO4 BUFFER

Conclusion

We had to interfere & do elective LSCS

- As ICT was 1: 512 which was very alarming .
- PSV in MCA was also alarming .
- On delivery baby's DCT was strongly positive & bilirubin was positive at birth.

Timely intervention helped as in serving the neonate.

Though prematurity problem were there but with expert management we sailed through.