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"A Study On 'Anaemia In Mother' As A Risk Factor - For Retinopathy Of Prematurity"

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Abstract:
Importance*: Retinopathy of Prematurity (ROP) is becoming more prevalent now owing to increased survival of premature infants. It has come to greater light along with technological advances. ROP babies are at risk of developing myopia, squint, amblyopia or worse RD- Partial or complete. The treatment includes Lasers and Anti-VEGF which are quite costly for middle and lower socioeconomic population of India. Henceforth, nothing can surpass prevention and early diagnosis with appropriate management of these cases.*
Objective*: To recognize causal correlation of Maternal Anemia as risk factor for ROP*
Study Design*: Case control study.*
Settings*: We identified Anemia in mothers of cases of ROP children as an important risk factor for causation of ROP. We collected data by examining 100 cases of at risk infants out of which 50 had several stages of progressive or regressive ROP and remaining were normal on primary presentation. We divided them accordingly. Mother's Hemoglobin measurements were done in Hospital setting free of cost.*
Participants*: 100- 50 cases. 50 control*
Results and Conclusion*: We compared the results and found higher degree of association between ROP and Maternal Anemia proving a direct correlation.*

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I. Aims And Objectives

To recognize the causal association of Maternal Anemia as risk factor for ROP.

Maternal Risk Factors:
- Maternal age
- Maternal Anaemia
- Pre-eclampsia
- GDM
- Use of antenatal steroids in the mother
- Type of pregnancy- singleton / multiple
- Premature rupture of membranes (PROM)

Neonatal Risk Factors:
- Birth weight
- Gestational age at birth
- Oxygen required after birth (for more than 7 days)[1]
- Infants born after 32 weeks of gestation/ or those > 1500g if they fall under high risk:
  - Newborns with RDS (Respiratory distress syndrome) or those needing prolonged oxygen requirement,
  - hypotension needing pressor,
  - apnea of prematurity
  - anemia requiring blood transfusions
  - neonatal sepsis

○ surgery in the first several weeks of life[2]

This last criterion makes sure that not babies are missed, by bringing more babies under the screening criteria.

II. Materials And Methods:

Type of the study: A case control study of Anemia as a risk factor for Retinopathy of Prematurity. (ROP)

Study setting: Study of risk factors for development of retinopathy of prematurity in premature babies presenting to pediatrics department in Hospital.
Study duration: 1.5 years

Sample size: 50 cases of retinopathy of prematurity and control group of routine new born infants who were taken for screening.

Sampling technique:
Purposive sampling of all the newborns screened to be ROP positive.

Selection of study subjects:
Inclusion criteria:
- All newborns who underwent routine newborn screening for ROP and found to be positive.
- Newborns whose parents have given consent for the study

Study Methodology:

The mothers of ROP babies retrospectively investigated by blood reports (in those population group in which previous records during pregnancy were not available) and clinical history for Hemoglobin and classified as Mild Moderate and Severe Anaemia. Prospective screening was also advised as per routinely practiced in Obstetrics clinic.[3]

	Mild	Moderate	Severe
Mother's Hemoglobin (estimated by westgreen method)	10-11 gm/dl	7-10 gm/dl	<7 gm/dl

National Neonatology Forum(Nnf)- Screening
Protocol:
○ Baby born >28 weeks of gestation ROP screening should be conducted at 4 weeks after birth.
○ Baby born <28 weeks of gestation or with birth weight <1200grams should be screened at 3 weeks after birth.
By the current protocols, among the babies screened for ROP 8% needs treatment.

The Neonatal Opthalmological Examination:
Place of choice:

ROP screening was done in the NICU itself under the supervision of the pediatrician.
Pupillary dilatation:

Phenylephrine 2.5% and Tropicamide 0.5% were used for pupillary dilatation. The latter to be instilled one drop each, every 15 minutes, up to a maximum of 4 times, 1 hour prior to examination. One drop of Phenylephrine just before the examination is usually enough, since its repeated administration can lead on to increased systemic absorption leading to hypertension

Procedure:

Screening was done by a binocular indirect ophthalmoscopy using 20 D or 28/30 D condensing lens, by an experienced ophthalmologist. A topical anesthetist(proparacaine) and antibiotic (diluted povidone iodine) was instilled prior to examination. First, a wire speculum is used to keep the eye- lids apart and the anterior segment of the lens is looked for tunica vasculosa lentis, pupillary dilatation and lens / media clarity. Next, the posterior pole is examined for presence of plus disease and sequential examination of all clock hours of retina peripherally. This is done by scleral depressors that indent the eye externally, thus rotating and stabilizing the eye.[4,5,6,7]

(Neonate examined for ROP by expert VRS surgeon)
Photo source: Phone Camera

SR NO.	NAME	ANEMIA	ROP
1	Baby of Ayesha	Moderate	BE) Stage-2 in Zone 2A. No plus.
2	Baby of Sumeha	Mild	RE) FV LE) Stage- 1 in zone 3
3	Baby of Fatima	Moderate	BE) Stage-3 in Zone 2A. Pre plus.
4	Baby of Suleja	Severe	BE) A-ROP
5	Baby of Neha	Moderate	BE) Stage-2 in Zone 2A. No plus.
6	Baby of Kashmira	Moderate	RE) Stage-3 in zone 2A. LE) Stage-3 in zone 2P. Pre- plus.
7	Baby of Sonal	Mild	RE) Stage-1 in zone 3. LE) FV
8	Baby of Bilkis	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
9	Baby of Falguni	Severe	RE) Stage-4 Partial RD LE) Stage-3 in Zone 2P. pre-plus
10	Baby of Harsha	Mild	RE)Stage-1 in zone 3. LE) FV
11	Baby of Jenny	NO	BE) Almost FV
12	Baby of Pallavi	Moderate	RE) Stage-5 Total RD LE) Stage-4 Partial RD
13	Baby of Twisha	Mild	RE) Stage-1 in zone 3. LE) FV
14	Baby of Disha	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
15	Baby of Jinal	Severe	RE) Stage-5 Total RD LE) Stage-4 Partial RD
16	Baby of Payal	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 2P.
17	Baby of Farida	Severe	BE) A-ROP
18	Baby of Zainab	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
19	Baby of Nirali	NO	RE) FV LE) Stage-1 in zone 3
20	Baby of Usha	Mild	BE) Stage-2 in Zone 2A. No plus.
21	Baby of Lila	Severe	RE) Stage-2 in zone 3 LE) Stage-3 in zone 2P. Pre-plus.
22	Baby of Pooja	Severe	RE) Stage-3 in zone 2P LE) Stage-4 Partial RD
23	Baby of Hetal	Severe	RE)Stage-3 in zone 1 LE) Stage-4 Partial RD
24	Baby of Farida	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
25	Baby of Amal	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
26	Baby of Giri	Moderate	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.
27	Baby of Adeeba	Mild	BE) Almost FV
28	Baby of Asha	Moderate	BE) A-ROP
29	Baby of Meena	Severe	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.
30	Baby of Rina	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
31	Baby of Yasmin	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 1 in zone 3
32	Baby of Samira	Moderate	BE) Stage-2 in Zone 2A. No plus.
33	Baby of Nuri	Severe	BE) A-ROP
34	Baby of Jaya	Mild	BE) Stage-2 in Zone 2A. No plus.

35	Baby of Sofina	Severe	BE) Stage-3 in Zone 2A. No plus.
36	Baby of Ameena	Moderate	BE) Stage-2 in Zone 2P. Pre plus.
37	Baby of Daya	NO	RE) Stage-1 in zone 3 LE) FV
38	Baby of Sulekha	Moderate	BE) Stage-2 in Zone 2A. No plus.
39	Baby of Nilam	Severe	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.-
40	Baby of Setu	Moderate	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.
41	Baby of Monali	Mild	RE) FV LE) Stage- 1 in zone 3
42	Baby of Dhara	Mild	RE) FV LE) Stage-1 in zone 3.
43	Baby of Alka	Moderate	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.
44	Baby of Haseena	Moderate	RE) Stage-2 in Zone 2A. LE) Stage 3 in zone 2P Pre-plus.
45	Baby of Prabha	Mild	RE) FV LE) Stage- 1 in zone 3
46	Baby of Kiran	Moderate	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P. Pre-plus.
47	Baby of Sakina	Mild	RE)- Stage-1 in zone LE) FV
48	Baby of Selja	Moderate	RE) Stage-3 in Zone 2A. LE) Stage 3 in zone 2P Pre-plus.
49	Baby of Hamida	Severe	RE) Stage-3 in Zone 2A. LE) Stage 2 in zone 2P Pre-plus.
50	Baby of Bina	Moderate	BE) Stage-2 in Zone 2A. No plus.

Abbreviations: BE)- Both eyes; RE)- Right eye; LE)- Left eye.
FV- Fully Vascularized.

Newborn ROP screening procedure

Recording the findings:

We noted down the zone, stage, extent of ROP and the presence of any plus or pre-plus disease in a record maintained by the NICU. The findings were recorded in Neonatal Intensive Care Unit by expert Vitreoretinal surgeon- Dr. Ruchir Mehta according to RBSK guidelines [Rashtriya Bal Swasthya Karyakram] The ROP zones, stage and extent were recorded along with the presence or absence of plus or pre-plus disease.

Schedule for next visit was also recorded. They were followed up as per schedule till a definitive outcome reached.

The definitive outcome for this study included – spontaneous regression / severe ROP requiring treatment (type 1 ROP), thus classifying them into 2 groups. Treatment given at our NICU was laser therapy or Intravitreal Anti-VEGF injection. Follow up was terminated at this stage.

Risk factors among each group were analyzed and data collection transferred into Excel sheet, which was then subjected to statistical analysis.

Use of wide field digital camera (RetCam) for screening:

A mobile self-contained RetCam system with a portable fundus camera as an alternative to routine indirect ophthalmoscopic examination can take pictures of retina that can be stored, transmitted to expert, reviewed, analyzed and sequentially compared over time. We captured and stored the images taken on RETCAM in Pediatrics department.

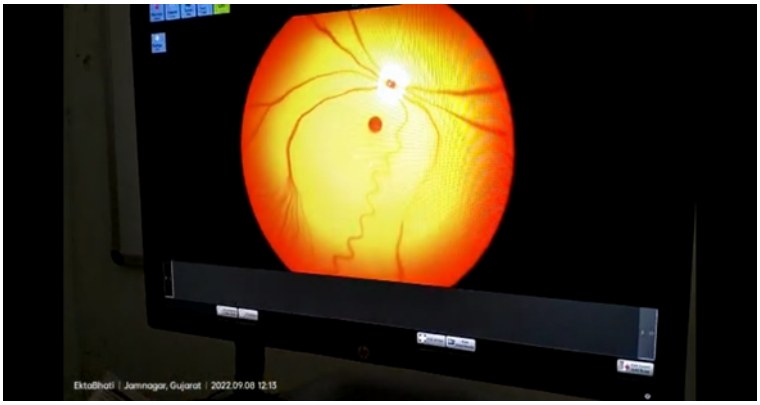

Table-1 Relation To Anemia In Mother

Mother's Hemoglobin (g/dl)	ROP	PERCENTAGE
<11	42	84%
>11	8	16%

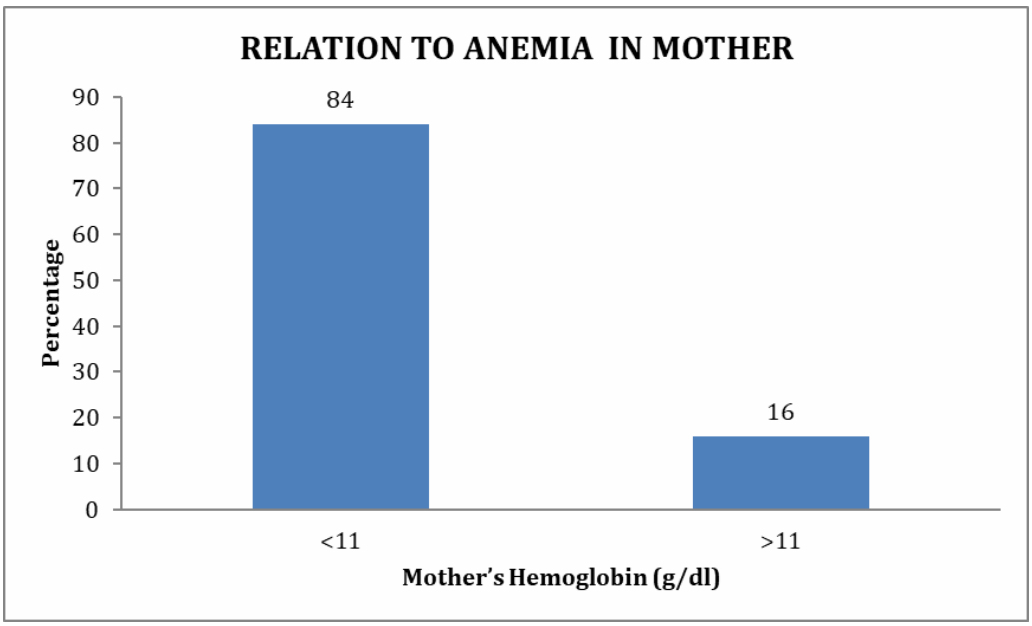

Table-1 shows effect of Anemia in mother with development of ROP in infant. It shows that infants with anemic mothers are highly prone to develop ROP; 84% in <11 mg/dl.
A Turkish study showed that maternal iron deficiency anemia was associated with development of ROP.

III. Conclusion:

Anemia in mother was found to have higher association to ROP in our study. In particular; Severely Anemic mothers were found to have infants with higher stages of ROP which was in co-relation to study findings

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