# Retinal Haemorrhage in Neonate, Case Reports and Review of Literature

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## Introduction

Retinal hemorrhages in infancy are not uncommon and were first described by Jaeger. In his study, the incidence of neonatal retinal haemorrhage varied from 2.6 to 50 %. Giles reported the incidence of neonatal retinal haemorrhage was 40% at 1hour post-delivery and significantly reduced to 20% at 72 hours. However, these haemorrhages are mostly self-limiting and resolve between the second and fourth week of life.

Herein, we report multiple retinal haemorrhages in twoneonates during routine retinopathy of prematurity (ROP) screening and related review of literature. Our observation gives us insight into ocular conditions that may affect premature infants, thereby emphasizing the need to have a high degree of clinical suspicion in all cases that undergo routine ROP screening.

Smartphone camera for capturing clinical photos and videos have been described in various literature. The fundus images of neonates screened for ROP can be captured by wide-field digital retinal imaging (Retcam II, Clarity medical system, Pleasanton, CA, USA) or more recently smartphone have been reported to be used for the same purpose. , In this case report, we have documented the fundus images of the cases using the android smartphone as described by Goyal A et al.[7]

## Case reports-

Herein, we report two cases of neonatal retinal haemorrhages which were found coincidentally during ROP screening in a tertiary care hospital.

**CASE 1-**

A 28 weeks old male neonatewith birth weight 1500grams, appropriate for gestational age had a normal vaginal delivery at a private hospital. The mother had premature rupture of membranes and the baby had a breech presentation at the time of delivery. After 25 days of birth, parents noticed the child to be refusing feed and being lethargic for which they consulted a private practitioner who then referred the child to our hospital.

Herein, the baby was diagnosed withlate-onset sepsis and admitted in the neonatal intensive care unit (NICU). The patient under went routine retinopathy of prematurity (ROP) screening at the 4th week of age after birth as per standard ROP screening protocol at our hospital. On examination, there were multiple pre-retinal haemorr hages(>1disc diameter) in both eyes of the neonate but no signs of ROP (Photo 1A,1B).

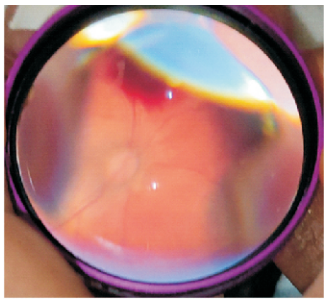

*Figure : 1A*

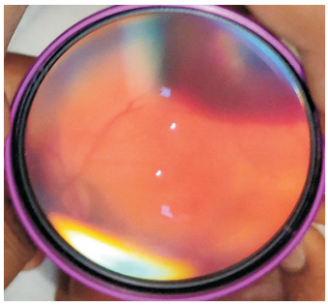

*Figure: 1B*

There was no maternal risk factor for retinal haemorrhages like hypertension, eclampsia or preeclampsia. Other risk factors were present, such as early age of the pregnancy, premature rupture of membrane and succeeding vaginal delivery. On investigation, the platelet count and total leucocyte count were low (0.2lac cells/mm$^3$ and 3800 cells/mm$^3$ respectively) at the time of admission. There was nocoagulation disorder or systemic disease as per blood reports. Patient's activated partial thromboplastin time(APTT) was 40 seconds and prothrombin time(PT) was 16.2 seconds. After packed cell and platelet transfusion, the platelet count improved to 2.11 lac cells/mm$^3$. There was no active ophthalmic intervention and the patient was kept under observation till spontaneous resolution of haemorrhages occurred as the blood parameters improved with treatment. The patient was reviewed 4 weeks after the initial examination and complete resolution of preretinal haemorrhages was found on fundoscopic examination(2A, 2B). The platelet counts were maintained at level of 4.5 lac cell/ mm$^3$ and there was no further dip in platelet count till the time of reporting.

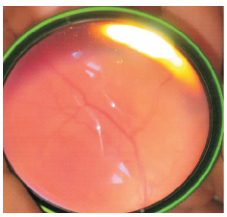

*Figure : 2A*

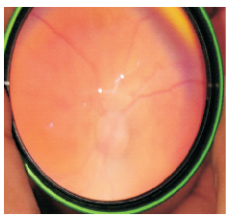

*Figure : 2B*

**CASE 2-**

A full-term (36 weeks of gestational age) male infant with a birth weight of 3300 grams, appropriate for gestational age had assisted vaginal delivery at a community health centre. The patient had a vertex presentation at the time of delivery. The baby did not cry immediately after birth and also had frequent episodes of seizures. Thereafter, the baby was referred to our hospital where he was diagnosedas perinatal asphyxia with meconium-stained liquor with hypoxic-ischemic encephalopathy and was admitted in NICU. The patient underwent ROP screening at 3 weeks of age as per the protocol. On examination, there were multiple small(1/4 to 1/2 disc diameter) pre retinal haemorrhages in both the eyes. In the right eye, haemorrhages also involved the macula. In both the eyes, Zone 1 and Zone 2 were vascularised and there was no sign of ROP (Photo 3A, 3B )

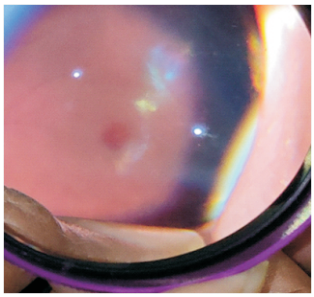

*Figure: 3A*

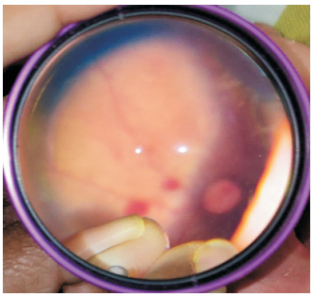

*Figure: 3B*

Maternal risk factors present in this case were early primiparity with assisted vaginal delivery. All blood investigations of the patient were in the normal range. The patient was kept on injection phenobarbitone in NICU for repeated episodes of seizures. There was no active ophthalmic intervention and the new born was re-examined weekly until the haemorrhages were completely resolved. All haemorrhages cleared within 3 weeks except macular haemorrhage in the right eye which had taken 2 more weeks to resolve completely after the initial examination (4A,4B).At the time of subsequent

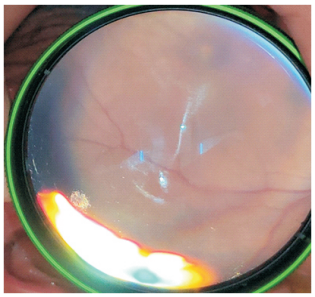

*Figure: 4A*

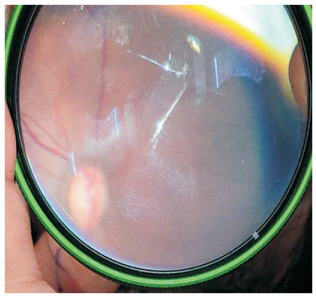

*Figure: 4B*

follow up, the retinal haemorrhages had cleared completely and there was no residual pathology seen.

## Discussion

Retinal haemorrhagesare one of the most common neonatal abnormalities diagnosed on fundus examination.[6]

*Table -1 : Showing risk factors for retinal haemorrhage in neonates based on previous studies*

| S.No. | RISK FACTORS | CAUSES |
|---|---|---|
| 1. | Maternal | Preeclampsia, eclampsia, pregnancy-induced hypertension [8,9]<br>Early age of pregnancy8<br>Primiparity[8]<br>Multiparity[10] |
| 2. | Birth process associated | Mode of delivery (common in spontaneous vaginal delivery than cesarean section[2,6,11]<br>Method of delivery (more common in vacuum extraction)[12,13]<br>Delivery time[10,14] |
| 3. | Foetal | Prematurity,[15,16] neonatal asphyxia,[17] perinatal distress,[18] low birth weight[8] |

The risk factors are known to cause retinal haemorrhages in neonates as listed in table 1 and are discussed below.

Mode of delivery-The rate of retinal haemorrhages is higher in spontaneous vaginal deliveries than caesarean section because extrusion of fetal head can result in increased intracranial pressure and increased pressure in ophthalmic artery.[2,6,11]

Instrumental delivery –The incidence is more in infants delivered by vacuum extraction.[12,13] It is probably due to the constant suction force resulting in increase in intra cranial pressure, which leads to stasis of blood flow in the central retinal vein. This further causes an increase in the pressure in ophthalmic artery and may thus precipitate the retinal bleeding.

Early primiparity- Some studies have also found early primipara as a risk factor associated with retinal haemorrhage because they have more resistance in the birth canal during delivery, uterine inertia and insufficient force of labour which can lead to perinatal distress.[8]

Delivery time-Another study showed that retinal haemorrhage were more commonly found during succeeding vaginal deliveries than first delivery because mothers delivering for the second time have birth canal looser than mothers delivering for the first time, their stages of labour are shorter, and rapid descent or rapid compression and decompression of foetal head may affect the rate of retinal haemorrhages.[10,14]

Perinatal distress and Neonatal asphyxia- Neonatal asphyxia and hypoxia causes increase the permeability of brain capillary endothelium. The increase in cerebrospinal fluid

pressure can lead to auto regulatory hypoxic cerebral vasodilatation which produces an increase in intracranial pressure, which in turn increases retinal venous pressure. Additionally, hypoxia-related vascular fragility also increases the risk for intraocular haemorrhages.[17,18]

In our first case, the maternal risk factors were early age of pregnancy, premature rupture of membrane and succeeding vaginal delivery and the risk in baby were prematurity, low birth weight, and throm bocytopenia.There has been only one case series that considered throm bocytopenia to be a possible etiological factor of retinal haemorrhage in neonates.[15] In our case, throm bocytopenia was one of the major risk factors for retinal haemorrhage. Although few studies state that throm bocytopenia associated with aggressive posterior ROP might cause retinal haemorrhage in the term infant. But in our case, there is no evidence of ROPand zone 3 was vascularised at the time of evaluation.

Possible maternal risk factors present in our second case were primiparity and assisted vaginal delivery. And foetal risk factors were perinatal distress and neonatal asphyxia.

We kept both the patients on regular follow up for monitoring of resolution of retinal haemorrhages. In both the cases, retinal haemorrhages underwent complete resolution within 4-6 weeks after initial examination with no morphological and functional sequelae.

Since both our patients were under critical care in NICU, so we adapted for smartphone retinal imaging for documentation of retinal haemorrhages. As smartphone fundus photography is a unique, simple and affordable technique that allows picture documentation of retinal changes.

## Conclusion

This report exemplifies the uncommon occurrence of retinal haemorrhages in neonates as seen during routine ROP screening which can be associated with a multitude of maternal and foetal risk factors. However, these haemorrhages usually resolve within 4-6 weeks and have no morbidity as seen during the observed short clinical course. Long term effects on visual functions and other retinal insufficiencies that may occur with time will require longer longitudinal studies.

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