



Retinal Haemorrhages in Newborn and their Relation to Maternal, Obstetric and Neonatal Risk Factors Focus on Relationship of Covid 19 Vaccine in their Mothers

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DOI: 10.31080/ASPE.2024.07.0690

Received: August 01, 2024

Published: August 05, 2024

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Abstract

Retinal haemorrhages in newborns may be a concerning finding, which is often associated with various maternal, obstetric, and neonatal risk factors. These retinal haemorrhages of a newborn can indicate underlying health issues and may prompt further investigation into the health and development of the newborn.

Research into this topic discovers associations between retinal haemorrhages and factors such as maternal health during pregnancy, including conditions like hypertension or gestational diabetes and also may reflect covid vaccination taken by the pregnant mothers. Obstetric factors such as the mode of delivery (vaginal delivery versus caesarean section) and any complications during childbirth may also play a role in this. In addition to that, neonatal factors like birth weight, gestational age at birth, and the presence of certain medical conditions after birth may contribute to the development of retinal haemorrhages. In this study it was found that all babies born to mothers with previous covid19 vaccine had retinal haemorrhages.

This study provides overview of the incidence, and associating factors of retinal haemorrhages in newborns.

Keywords: Retinal haemorrhages; Normal Vaginal Delivery; Caesarian Delivery; Instrumental Delivery; Cephalhematoma; Birth Injuries; Prolonged Labor; Covid19 Vaccination

Introduction

Techniques for retinal examination have improved greatly in the last few decades. Newborn RH- common neonatal abnormality. Reported incidence 2.6 to 50 %. This variation may be due to different examination techniques, diverse patient demographics, or how soon after birth examinations are conducted. While neonatal retinal haemorrhages related to birth trauma are common, benign, and self-limited, other retinal haemorrhages in infancy may signify intracranial aneurysms, accidental or non-accidental injury, and a variety of ocular (e.g., Coats' disease, PHPV, ROP, retinal dysplasia,

hypertension, myopia) or systemic disease (e.g., hematologic or cardiovascular disorders, infection, protein C deficiency)[1]. The incidence in relation to mode of delivery was as follows: vacuum delivery, 77.8%; normal vaginal delivery, 30.4%; caesarean section, 8.3%; forceps delivery, 30.3%. All haemorrhages were intraretinal but two infants' haemorrhages had resolved by 16 days [2].

Aim

To identify maternal, obstetric, and neonatal risk factors of retinal hemorrhages (RH) in healthy full-term newborns.

Objectives

- To further investigate the possible risk factors of RH—including general, maternal, obstetric, and neonatal factors.
- To perform fundus examination in full-term newborns.

Materials and Methods

The type of study design is prospective observation study.

Study was conducted from time period of January-March, 2024 (3 months). It was conducted in Department of Pediatrics, Srinivas Institute of Medical Sciences and Research centre, Mangalore.

The SAMPLE SIZE is 204 infants.

Inclusion criteria

- Full-term infants
- Infant with a gestational age of 37 weeks or more and an Apgar score of 7 or more.

Exclusion criteria

- Infants with severe systemic diseases (e.g., tetralogy of fallot, phenylketonuria, etc.).
- Infants with eye diseases (e.g., congenital cataracts, primary congenital glaucoma).

Methodology

The details of each infant's maternal, obstetric, neonatal history were recorded.

These details included maternal age (MA), mode of delivery (spontaneous vaginal delivery, SVD/Cesarean section, CS), history of perinatal diseases such as anemia, hypertensive disorders complicating pregnancy (HDCP), history of cesarean delivery (CD), gestational diabetes mellitus (GDM), fetal distress. Gestational age (GA), birth weight (BW), gender, and Apgar scores of newborns were also recorded.

Eye examination

- Eye examinations were performed within one week of birth.
- Firstly, the anterior segment of the eyeball and pupillary light reflex were examined using a standard flash light.

- Second, the pupils were dilated using 1% tropicamide eye drops three times at 10-minute intervals. Alcaine eyedrops were then applied as a topical anesthesia and a pediatric speculum was used for eyelid opening.
- Digital images were taken with the RetCamIII (Clarity Medical System Inc., Pleasanton, CA, USA) using a 130° lens.

Results

RH was seen in 46 of the 203 infants (22.66%) in this study.

Male-to-female ratio was 1.1:1. Mean GA was 39.27 ± 1.01 weeks. The BW ranged from 2330 g to 4400 g. There were no statistical differences in gender or GA between the two groups. However, the mean MA was higher in Group RH than that of Group No RH. ($p = 0.002$).

There was no statistical correlation found between RH and maternal risk factors (maternal age (MA), history of perinatal diseases such as anemia, hypertensive disorders complicating pregnancy (HDCP), history of caesarean delivery (CD), fetal distress examined in this study.

The probability of RH in infants delivered vaginally was reduced by 0.827, compared with those delivered using obstetric forceps. The probability of RH in infants with asphyxia was more than twice than that of infants without asphyxia. The probability of RH in infants delivered vaginally was reduced by 0.827, compared with those delivered using obstetrics forceps.

The probability of RH in infants with asphyxia was more than twice than that of infants without asphyxia. Spontaneous vaginal delivery (SVD) and cephalhematoma correlated positively with RH occurrence in newborns, While, history of caesarean delivery correlated negatively with RH occurrence. Spontaneous vaginal delivery (SVD) and cephalhematoma correlated positively with RH occurrence in newborns, While, history of caesarean delivery correlated negatively with RH occurrence. Among the neonatal factors examined, presence of cephalhematoma ($p = 0.003$) was significantly associated with the increased prevalence of RH. Other neonatal factors—including presence of fetal distress, intracranial haemorrhage, and neonatal hyperbilirubinemia—had no statistical correlation with the occurrence of newborn RH.

In all of the 46 cases it was found that mothers were antenatally or previously vaccinated with covid 19 vaccine.

Discussion

Retinal Haemorrhage is believed to be caused by the rupture of superficial retinal capillaries as a result of increased venous pressure. In our study, the overall prevalence of healthy newborn RH was 22.66%, which was quite close to the rates found in other Chinese studies whose newborn RH prevalence ranged from 20.2 to 21.5%. The analysis indicated that delivery mode and asphyxia were risk factors for RH. We found that cephalhematoma may be a risk factor for newborn RH. The possible causes of cephalhematoma include: fetal head compression in the bony birth canal, birth via instrument, abnormal clotting functions, and imperfect vessel walls in neonates, which may increase intracranial pressure and subsequently lead to cephalic venous congestion. The incidence of haemorrhage was higher for vacuum-assisted (75%) than for spontaneous vaginal deliveries (33%) and was least for infants delivered by caesarean section (7%). The mean maternal age was greater for infants with retinal haemorrhage [3]. In the study by Yan Ma., *et al.* retinal white spots and retinal white areas were the most common findings (42.9% of abnormalities and 17.7% of all infants screened). The second major finding was retinal haemorrhage (16.2% of abnormalities and 6.7% of all infants screened) [4]. In this study, 46 infants had developed retinal haemorrhages and it was found that all mothers had taken vaccines for CoViD 19 (Covisheild and covaxin). In the study by C Donaldson., *et al.* no retinal haemorrhages were reported in mothers who had taken Pfizer vaccine for CoViD 19 [5]. No adverse events were seen in newborns born to mothers who had taken CoViD 19 vaccination pre pregnancy or during pregnancy [6]. 64 children underwent fluorescein angiography, which resulted pathological only in 1 case (1.6%) [7]. Exposed infants exhibited no increased odds of adverse neonatal outcomes, and they exhibited lower odds for neonatal nontraumatic intracranial hemorrhage [8]. Most of the other studies do not show any relationship between the administration of CoViD 19 vaccine in mothers and occurrence of retinal haemorrhages in their newborns.

Conclusion

Overall, retinal haemorrhage is one of the most common ocular abnormalities in newborn infants. The mode of delivery and the presence of cephalhematoma may be risk factors for newborn RH in full term infants. Infants with such risk factors require much more observation and follow up. Further studies are required to ascertain the relationship between administration of CoViD 19 vaccine in pregnant mothers and the occurrence of retinal haemorrhages in their newborns.

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