Research Article
Open Access
CrossMark

Retinopathy of prematurity at CNHU-HKM in Cotonou, Benin

Abstract

Introduction: Retinopathy of prematurity is one of the leading causes of preventable visual impairment in children. It was first described by Terry in 1942 under the generic terms of retrolental fibroplasia.

Objective: To determine the epidemiological and clinical profile of retinopathy in preterm newborns in the neonatology unit of CNHU-HKM.

Patients and methods: This is a prospective study with descriptive and analytical aims, conducted from August 1, 2019 to January 9, 2020. All premature newborns admitted to the neonatology unit of CNHU-HKM in Cotonou during the study period were included. The data were analyzed using Epi info software. Proportions were compared using the chi-square statistical test and a value of $p<0.05$ was considered significant. Authorization from the head of department and the general director of the hospital was obtained.

Results: The frequency of retinopathy was 20.6% (13/63 premature newborns). The majority of retinal lesions observed were at stage 1 (68.4%) represented by a line of demarcation. All lesions were located in zone 3. Low gestational age (p=0.028), low birth weight (p=0.013), oxygen therapy (p=0.018), its duration (p=0.042), blood transfusion (p=0.019) and maternal-fetal infection (p=0.017) were the factors associated with retinopathy of prematurity.

Conclusion: It appears necessary to set up a systematic screening program in all neonatology units to better assess the extent of this pathology.

Keywords: retinopathy of prematurity, visual impairment, associated factors, systematic screening

Volume 14 Issue 1 - 2024

Bagnan Tossa L,[1] Abouki CO,[2] Tchiakpè N,[3] Séidou H,[1] Gandégnon M,[1] Lalya HF[1]
[1]University Pediatric Clinic and Medical Genetics, CNHU-HKM, Benin
[2]University Eye Clinic, CNHU-HKM, Benin
[3]Mother and Child University Hospital Center of Lagune, Benin

Correspondence: Bagnan Tossa Lehila, Faculty of Health Sciences of Cotonou-Mother and Child, University Pediatric Clinic and Medical Genetics, CNHU-HKM 10 PO Box 1213 Cotonou, Benin, Tel +229973 116 85, Email lehilabagnan@gmail.com

Received: October 27, 2023 | **Published:** January 12, 2024

Introduction

Each year, there are an estimated fifteen million premature newborns, or approximately 10% of births worldwide.[1] It is estimated that around 50,000 children suffer from blindness related to Retinopathy of Prematurity (ROP).[2] Epidemiological studies find between 10 to 37% blindness in preterm infants. There are multiple causes, including ROP and blindness of cortical origin.[3] Retinopathy of prematurity is one of the main causes of preventable visual impairment in children.[4,5] In Benin, more precisely in Cotonou, few data are available on the retinopathy of prematurity. This study aims to take stock of the ROP in the unit. The objective was to determine the epidemiological and clinical profile of retinopathy in preterm newborns in the neonatology unit of CNHU-HKM in Cotonou.

Patients, methods

Our study was conducted in the neonatology unit of CNHU-HKM in Cotonou which has a capacity of 60 cradles. This was a prospective study with descriptive and analytical aims, conducted from August 1, 2019 to January 9, 2020. All premature newborns aged 4 to 6 weeks of life, admitted to the neonatology unit of CNHU-HKM in Cotonou during the study period and who had a fundus examination were included in the study. The sampling was exhaustive. At the end of the examination, the retinopathy was classified according to the international classification of retinopathy of prematurity.

The variables studied were anamnestic, clinical and therapeutic data. The parents of preterm newborns meeting the inclusion criteria were called back and an appointment was given to them between 4 and 6 weeks of postnatal period. A fundus examination was performed in these children once a week by an ophthalmologist. The data were analyzed using Epi info software. Proportions were compared using the chi-square statistical test and a value of $p<0.05$ was considered significant.

Authorization from the head of department and the general director of the hospital was obtained. Informed consent was also obtained after verbal explanation of the purpose of the examination to the parents. The study was carried out while respecting anonymity and confidentiality.

Results

In total, we identified 63 premature newborns who underwent a fundus examination between 4 and 6 weeks of postnatal period. Among these 63 premature newborns, 13 had retinopathy, representing a hospital frequency of 20.6%.

1) Anamnestic data

The mothers had a risk factor for premature birth in 76.2% of cases. The most common pathology during pregnancy was high blood pressure in 21.1% of cases. The delivery was carried out vaginally in 57.6% of mothers. Antenatal corticosteroid therapy was administered to mothers in 32.6% of cases.

2) Clinical data

The average gestational age was 32.4 weeks with the extremes of 27 and 36 weeks of amenorrhea. The sex ratio was 0.6. The average birth weight of the preterm newborns was 1715.0 grams with the extremes of 890 and 3100 grams. Anemia was the main complication

found in 14 premature newborns. The number of premature newborns who had benefited from oxygen therapy was 47.

3) Therapeutic data

The average duration of oxygen therapy was 6.6 days with the extremes of 1 and 30 days; 78.7% of premature newborns remained on oxygen for more than 72 hours.

CPAP was the type of oxygen administered in 25 premature newborns (53.1%), the 22 remaining newborns had received pure oxygen (46.8%). The flow of oxygen administered was less than or equal to one liter in 43 premature newborns, i.e. in 91.4% of cases.

The average length of hospital stay in the neonatal unit was 16.12 days with the extremes of 2 and 45 days.

4) Data on the fundus examination

All premature newborns underwent a fundus examination between 4 and 6 weeks. The modal age of fundus examination was 5 weeks. In the 13 preterm infants who had a retinopathy, the localization was right unilateral in 6 premature newborns, left unilateral in 1 preterm infant and bilateral in 6 preterm infants, representing a total of 19 ocular lesions observed. The lesions observed were at stage 1 represented by the line of demarcation in 13 cases and at stage 2 represented by a retinal ridge in 6 cases. The lesion was located in zone 3 in all our patients. The birth weight, gestational age, oxygen therapy, CPAP, blood transfusion and maternal-fetal infection were associated with the presence of retinopathy (statistically significant p-value) as shown in Table 1.

Table 1 Distribution of retinopathy according to associated factors

Variables	Retinopathy of prematurity				P-value
	Yes		No		
	N	%	N	%	
Gestational age (WA)					**0.028**
<28	1	100	0	0	
[28-32]	7	31.8	15	68.1	
[32-37]	5	12.5	35	87.5	
Birth weight (g)					**0.013**
<1000	1	50	1	50	
[1000-1500]	9	40.9	13	59	
[1500-2000]	2	9	20	90.9	
≥2000	1	5.8	16	94.1	
Oxygen therapy					**0.018**
Yes	13		34		
No	0		16		
Duration of oxygen therapy					**0.042**
24 h	0	0	4	100	
48 h	4	66.6	2	33.3	
≥72 h	9	24.32	28	75.6	
CPAP					**0.01**
Yes	10			12	
No	3			38	
Blood transfusion					**0.019**
Yes	6	42.8	8	57.1	
No	7	14.28	42	85.7	
Maternal-fetal infection					**0.017**
Yes	11	31.4	24	68.5	
No	2	7.1	26	92.8	

Discussion

The frequency of retinopathy of prematurity was 20.6%. This rate was similar to those reported in 2012 in Morocco by Abdel et al[6] and Amer et al[7] in Saudi Arabia, which were 19.2% and 23.3%, respectively. In Niger in 2020, Abba Kaka reported a frequency of 18.8% in neonatology unit.[8] On the other hand, this frequency was low compared to a similar study conducted in the Central African Republic in 2017 with a frequency of 32.9%.[9]

This variability in the frequency of retinopathy from one region to another could be explained by the different techniques of fundus examination from one study to another with different specificities and sensitivities.

Abdel H et al[5] identified 48.8% of girls and 51.2% of boys while Wang SK et al[10] reported a male predominance of 56% with 44% of girls. In Tunisia, Ben Thabet also found a male predominance in his study covering 15 years of screening.[11]

The average gestational age of 32.4 weeks with the extremes of 27 and 36 weeks of amenorrhea varies from one study to another depending on the population of premature newborns studied and the proportion of very preterm and extremely preterm newborns included. Ademola et al reported a mean gestational age of 30.9 weeks of amenorrhea.[12] In Turkey, a mean gestational age of 33.2 weeks was reported.[13] Low gestational age was significantly associated with the occurrence of retinopathy in our study (p-value = 0.028). Indeed, retinopathy is detected in 61.5% of preterm neonates born before the 32nd week of amenorrhea. These data are consistent with the literature suggesting that the lower the gestational age, the higher the risk of developing retinopathy.[10,13,16]

Citation: Bagnan TL, Abouki CO, Tchiakpè N, et al. Retinopathy of prematurity at CNHU-HKM in Cotonou, Benin. *J Pediatr Neonatal Care.* 2024;14(1):6–8. DOI: 10.15406/jpnc.2024.14.00533

The birth weight of 1715.0 grams with the extremes of 890 and 3100 grams is close to those reported by other authors.[14,17] Elsewhere it is lower.[9] This difference can be explained by the inclusion criteria which vary from one study to another and by the difficulties of survival of preterm newborns with low birth weight in developing countries. The rate of retinopathy noted in premature newborns weighing less than 1500g was 76.9%.This is compatible with the statistically significant relationship we have between the presence of retinopathy and low birth weight (p-value=0.013) as described in the literature. The temporal sector is the most frequently affected because it is the most eccentric. This observation was also made in our study because all the lesions were temporal. This could be explained by the centrifugal progression of vasculogenesis which later affects this area of the retina.

Retinopathy of prematurity is a disease involving several factors, and its exact etiology is not known.[16] In our study, the main risk factor for the occurrence of retinopathy of prematurity was the degree of immaturity, estimated according to birth weight and gestational age, which were highly correlated and inversely linked to the risk and severity of retinopathy.[17] Our results are comparable to those of other studies and confirm that the incidence of retinopathy of prematurity decreases when the gestational age is higher.[14] In our study, we can conclude that the longer the duration of oxygen therapy, the greater the risk of developing retinopathy, oxygen being mainly used in its pure state. Hence the need to prefer wall-mounted oxygen to reduce the risk of retinopathy of prematurity.

The follow-up was not completed due to the renunciation or financial limitation because the fundus examination was chargeable, hence the interest in setting up a systematic screening and free follow-up program of retinopathy for more comprehensive management of preterm newborns.

Conclusion

Retinopathy of prematurity remains a sad reality in our country. It mainly affects preterm newborns of less than 32 weeks of amenorrhea and less than 1500 grams. We suggest the implementation of a systematic screening program for retinopathy of prematurity in neonatology units by systematically requesting a fundus examination in preterm newborns between 4 and 6 weeks of life.

Acknowledgments

None.

Funding

None.

Conflicts of interest

The authors have read and approved the final version of the manuscript. The authors have no conflict of interest to declare.

References

1. World Health Organisation. *Naissances prématurées*. 2018.
2. Gilbert C. Retinopathy of prematurity: a global perspective of the epidemics, population of babies at risk and implications for control. *Early Hum Dev*. 2008;84(2):77–82.
3. Jarjour IT. Neurodevelopmental outcome after extreme prematurity: a review of the literature. *Pediatr Neurol*. 2015;52(2) :143–152.
4. Kong L, Fry M, Al-Samarraie M, et al. An update on progress and the changing epidemiology of causes of childhood blindness worldwide. *J AAPOS*. 2012;16(6):501–507.
5. Caputo G, Metge-Galatoire F, Arndt C, et al *Décollement de rétine*. 2011.
6. Abdel H, Gamal B, Mohamed F. Retinopathy of prematurity: a study of prevalence and risk factors. *Middle East Afr J Ophthalmol*. 2012;19(3):289–294.
7. Amer M, Jafri WH, Nizami AM, et al. Retinopathy of prematurity: are we missing any infant with retinopathy of prematurity? *Br J Ophthalmol*. 2012;96(8):1052–1055.
8. Abba Kaka HY, Moussa M, Guirou N, et al. La rétinopathie du prématuré de la maternité Issaka Gazobi de Niamey, Niger. *Health Sci Dis*. 2020;21(4):21–24.
9. Yaya G, Koki G, Malendoma J R, et al. La Rétinopathie du Prématuré en Centrafrique: Résultats de l'Examen du Fond d'OEil chez 88 nouveau-nés au Complexe Pédiatrique de Bangui. *Health Sci Dis*. 2017;18(1):16–21.
10. Wang SK, Callaway NF, Wallenstein MB, et al. SUNDROP: Six years of screening for retinopathy of prematurity with telemedicine. *Can J Ophthalmol*. 2015;50(2):101–106.
11. Ben Thabet A, Regaieg C, Bouraoui A, et al. La rétinopathie du premature: resultants après 15 ans de dépistage dans un centre tunisien. *J I M*. 2023;45:14–19.
12. Ademola-Popoola D, Adesiyun O, Obasa TO. Screening programme for retinopathy of prematurity in Ilorin, Nigeria: a pilot study. *West Afr J Med* 2013;32(4):281–285.
13. Basmak H, Niyaz L, Sahin A, et al. Retinopathy of prematurity: screening guidelines need to be reevaluated for developing countries. *Eur J Ophthalmol*. 2010;20(4):752–755.
14. Lala-Gitteau E, Majzoub S, Saliba E, et al. Étude épidémiologiquede la rétinopathie du prématuré: les facteurs de risque au CHU de Tours. *J Fr Ophtalmol*. 2007;30(4):366–373.
15. Sadiq MAA, Karamat I, Khan AA. Retinopathy of prematurity in Pakistan. *J AAPOS*. 2016;20(6):541–542.
16. Yunxia L, Wenzhi H, Guoliang R, et al. The treatment and risk factors of retinopathy of prematurity in neonatal intensive care units. *BMC Ophthalmol*. 2018;18:301.
17. Onyango O, Sitati S, Amolo L, et al. Retinopathy of prematurity in Kenya: prevalence and risk factors in a hospital with advanced neonatal care. *Pan Afr Med J*. 2018;29:152.