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THE RED EYE REFLEX EXAMINATION IN NEONATES OF MONGOLIAN AND NEGROID BREED

Tripaldi Clelia MD*[1], Grande Elisabetta MD[2], Annicchiarico Elettra MC[3] and Sannace Carmela MD[4]

[1]UOSVD Neonatologia e Pediatria Ambulatoriale, Ospedale di Putignano, ASL BA, Italy.
[2]Scuola di Specializzazione in Pediatria, Università degli Studi di Siena, Italy.
[3]Collegium Medicum Nicolaus Copernicus Bydgoszcz, Poland.
[4]UOC Oftalmologia, Ospedale di Putignano, ASL BA, Italy.

***Corresponding Author: Clelia Tripaldi MD**

UOSVD Neonatologia e Pediatria Ambulatoriale, Ospedale di Putignano, ASL BA, Italy.

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ABSTRACT

The red reflex has in recent years become part of the recommended neurosensory screening of newborns and infants. The ocular objective finding varies depending on the presence of diseases, but also in relation to the ethnicity of the newborn. We performed a retrospective study on all newborns of 2015 and 2016 in our center, examining all those in which the red reflex was altered, recalling them after a week and making a specialist eye assessment. In newborns of the Negroid and Mongolian race there is a greater probability of alteration of the red reflex. This was demonstrated by statistical analysis on our sample examined. The anatomical reason for this alteration, which therefore would have to be considered physiological, would be linked to the different retinal pigmentation in the Negroid and Mongolian races.

KEYWORDS: Red Reflex, Neonate, Race.

INTRODUCTION

The red reflex has already been part of the neurosensory screening performed on newborns during the first three days of life, and is a fundamental test for early detection of potentially serious ocular pathologies such as cataracts, glaucoma, retinoblastoma, retinal anomalies, and systemic illnesses with ocular manifestations. The American Academy of Pediatrics recommends performing the test before discharge from the Nursery during neonatal admission and during all subsequent health records in the first year of life.

MATERIALS AND METHODS

Red reflex examination test uses light transmission from an ophthalmoscope through all the normally transparent parts of the eye, including tear film, cornea, water mood, crystalline and vitreous mood. This light, reflected from the bottom of the eye, is transmitted backwards through the optical means and through the ophthalmoscope's opening to the eye of the examiner. Any factor that prevents or blocks these optical paths will result in an alteration of the red reflex. Examination of the red reflex of the bottom can be performed with the ophthalmoscope or with a lamp held at a distance of about 40 cm from the child's eye. The light beam is directed to the pupil of each eye separately. Normally there is a red reflection that is uniform throughout the pupillary field as a response to the luminous stimulus. If the reflex is abnormal, that is, absent wholly or partly, or evident but with reduced intensity, we are faced with an opacity that prevents the transmission of light; in these cases we can find a cataract or corneal opacity for the front segment. If the reflection is whitish (leucocoria) it may be a retinoblastoma, a retinal detachment, or congenital or acquired pathologies that should be subjected to more extensive ophthalmological investigation.

An alteration of the red reflection may be due to different causes:

- Mucus or other foreign bodies exempt from the thin layer of tears;
- Opacities of cornea, water humor or vitreus
- Alteration of iris;
- Cataract;
- Retinal disorders, including tumor or corio-retinal coloboma;
- Strabismus or refractive asymmetries.

The experience of inserting the red reflex examination in the neurosensory screening of the baby's pre-discharge started in our department in March 2014. The red reflection was sought in all newborn babies within the third day of life.

The target finding normally observed in the forward-looking infant is a homogeneous and symmetric reddish-red reflection. However, it has been noted in some infants that the reflex was pale, yellow-pink and not very intense. In infants with positive or equivocal test, it was reviewed again after a week, during the check- up visit. In a group of the babies, the control examination showed a normal red reflection, while in others the target finding had not changed.

We looked at the population of neonates born in the years 2015 and 2016, in which the red reflex examination was long-time and full-scale performed by experienced practitioners. We reviewed all data of the paper records of Neonatology Department, noting all cases of newborns with pale red or not clearly visible red reflex, who were re-checked after a week.

About the birth rate in 2015, for a total of 710 newborns, red reflex was repeated at a distance of a week in a total of 26 infants (3.7%). Of these 26 babies, 3 were lost at follow-up, in 18 newborn babies the examination was normal after a week, while in 5 of them the red reflection was pale symmetrically and uniformly. These 5 newborn babies were negroid raced and were sent to an ophthalmologist for mydriatic examination that didn't show any pathology.

If we consider the population of infants born in 2016, out of a total of 611 newborn babies who were subjected to the examination, in 22 newborn babies (3.6%) the red reflex was repeated at a distance of a week because it was not clearly highlighted during the first exam. Of these babies, 2 were lost at follow-up, in 13 cases after one week it was possible to detect the presence of normal red reflection, while in 7 cases the reflex was not present and newborns were directed to an ophthalmologist examination.

Of these newborns, one was of Asian race (Chinese parents), one was born from Romanian parents and five of the Negroid race (parents coming from Senegal, Nigeria and Angola). In all cases, ophthalmic mydriatic examination was normal.

The reason for our retrospective study was to find a correlation between the baby's breed and the pallor of the red reflex.

RESULTS

Between 2015 and 2016, 48 patients with red reflex alterations in third day of life were enrolled (table 1), 38 (77.1%) of Caucasian race, 10 (20.8%) of African race, 1 (2.1%) of Asian race (table 2). Five patients were lost in follow up. In 12 of the 43 remaining patients (25%) at the next control red reflex alteration persisted (table 3). Of these 12 patients, 92% were of a different ethnicity from the Caucasian, only 1 (8%) were white ($P<0.001$). Statistical analysis was performed using IBM SPSS 20.0. The test applied is the Chi Square one with calculation of the Pearson correlation coefficient (table 4); $P<0.05$ were considered statistically significant. The statistical data confirmed what is already clinically evident, that in non-Caucasian babies there is most frequently a pallor of the red reflex.

Table 1:

Anno (2015=1 2016=2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	26	54,2	54,2	54,2
	2	22	45,8	45,8	100,0
	Total	48	100,0	100,0	

Table 2:

Razza (0 caucasica 1 africana 2 asiatica)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	37	77,1	77,1	77,1
	1	10	20,8	20,8	97,9
	2	1	2,1	2,1	100,0
	Total	48	100,0	100,0	

Table 3:

Red reflex controllo (0= normale , 1= alterato)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	31	64,6	72,1	72,1
	1	12	25,0	27,9	100,0
	Total	43	89,6	100,0	
Missing	System	5	10,4		
Total		48	100,0		

Table 4:

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	38,185[a]	1	,000		
Continuity Correction[b]	33,522	1	,000		
Likelihood Ratio	42,018	1	,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	37,297	1	,000		
N of Valid Cases	43				

a. 1 cells (25,0%) have expected count less than 5. The minimum expected count is 3,07.

b. Computed only for a 2x2 table

DISCUSSION

Every child aged under 2 years needing any kind of eye examination should have a red reflex check. If there is doubt about the reflexes the pupils should be dilated. Dilating pupils is a fast way to be sure about the red reflex. In all babies born to black and minority ethnic the red reflexes appear more yellowy white than orange, and they may be almost absent if the pupil is very small. The anatomical reason for this clinical difference linked to the ethnic group is due to the different intensity of retinal pigmentation in African and Mongolian patients. The outer layer of the retina, or pigmented layer, is represented by a single layer of special cells with epithelial characteristics, applied on the basement membrane of the choroid and rich in dark pigment (fuscina). In subjects with cutaneous hyperpigmentation on a racial basis, these epithelial cells include a higher density of pigment, which therefore justifies the lower intensity of the detected red reflex.

Our data on a small sample of patients may be confirmed with extended studies conducted in other hospitals to standardize physiological visual findings in neonates of non-Caucasian breed at present known to us. The visual findings seen in these infants are little known, but given the epochal wave of immigration to which Europe is subjected, it becomes very important learning to know them.

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