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Pattern of Ocular Changes in Infants in A Tertiary Care Hospital

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Abstract

Background: Neonates should undergo an ocular examination soon after birth. This examination plays a positive role in promoting paediatric eye health among paediatricians and parents[3].Red reflex testing is vital for early detection of vision and potentially life-threatening abnormalities such as cataracts, glaucoma, retinoblastoma, retinal abnormalities, systemic diseases with ocular manifestations, and high refractive errors.

Methods: A hospital based cross sectional study was conducted on 360 infants attending ophthalmology department (1year). A detailed eye examination was done which included history, visual acuity, IOP, posterior segment examination after informed consent.

Results: There were 192(53.3%) males and 168(46.7%) females. The sample included 321(89.2%) full term neonates, 36(10%) preterm neonates. Acquired ocular diseases occurred in 142(39.4%) neonates; and congenital in 9(2.5%). Out of 720 eyes, 284(78.9%) had acquired and 18(2.5%) had congenital findings. 238(33.1%) had retinal haemorrhages which was the most common acquired finding, 15(2.1%) had NLD obstruction which was the most common congenital finding.

Conclusions: Acquired was more common than congenital eye diseases. The most common finding was retinal hemorrhages followed by SCH.

Keywords: Retinal Haemorrhages, Subconjunctival Haemorrhages, Congenital Eye Diseases.

Introduction

Congenital abnormalities account for a sizable proportion of stillbirths, infant deaths, and developmental impairments in newborns worldwide.[1]

Congenital abnormalities are thought to be the cause of 15% to 20% of blindness and severe vision impairment cases in children globally.[2]

Neonates require an ocular evaluation immediately after delivery. The promotion of paediatric eye health among

ophthalmologists, paediatricians and parents is aided by ocular examination.[3] The American Academy of Paediatrics advocates red reflex testing following delivery.[4]Around the age of three is when formal testing for the recognition of visual acuity usually begins. The visual development of a child may be negatively impacted in the long run, as well as the child's self-confidence and potential realisation, if early childhood vision issues are not identified and treated correctly.[5]

Infants are unable to communicate their needs, and parents and other caretakers may be ignorant of essential details on the development of vision. The formation of binocular vision and the development of the visual system both occur during the first year of life. Inadequate treatment of a visual deficiency at this age can result in amblyopia and a lifelong visual disability. Early diagnosis and timely treatment are therefore crucial.[6]

The most prevalent eye condition affecting newborns globally is conjunctivitis.[7]It is still a significant issue in developing nations. Major contributing factors in third-world nations include inadequate maternity care and a lack of preventive medication to avoid infections right after birth.[8] Up to 15% [of] blindness cases in industrialised nations and up to 60% in middle-income countries can be attributed to retinopathy of prematurity (ROP).[9]The screening examination is very important as the prognosis of some eye disorders depends on early diagnosis and intervention to prevent complications. Thus, the aim of the study was to assess the frequency of ocular diseases in infants in a tertiary care hospital and to determine the importance of ocular examination, to screen newborn for any potential visual threat so that necessary treatment/advice can be given at proper time before irreversible visual loss occur.

Materials and Methods

This was a cross sectional descriptive type of observational study including360full-term newborn and infants upto1 year of age who were evaluated at outpatient Department of Ophthalmology, Srinivas Institute of Medical Science or who are referred from the Paediatrics and Obstetrics Department were included by a non probability consecutive sampling technique. Eye disease screening was done for all patients after obtaining ethical clearance. Written informed consent was taken from the parents of new born after explaining to them the plan and intention of the study in the language best known to them.

A detailed history regarding the presenting complaint, birth history, and family history was recorded. Examination of the infant included visual assessment by fixating on and following a flashing-light, external inspection of the lids, ocular adnexa, and anterior segment; pupil examination with a torch; and the IOP was measured with an I Care (IC200) rebound tonometer with a new sterile probe for each subject. The forehead support was disinfected with alcohol cotton balls before and after each operation. The length of the support rod was adjusted until the pressure measuring head was 4–8 mm away from the apex of the cornea. With the probe facing the center of the cornea, the tonometer was activated. After recording a measurement, the tonometer automatically calculated its P-value. This was repeated three times, and the mean of the resultant measurements was considered the subject's IOP.

Red reflex examination was done with a distant direct ophthalmoscope. The red reflex of the fundus was used to rule out congenital cataract, persistent hyperplastic primary vitreous, retinal detachment, and other causes of leukocoria. Indirect ophthalmoscopy was performed

after pupil dilation usingtropicamide 1%, phenylephrine 2.5 % ophthalmic drops, where fundus examination was required. The exclusion criterion was critically ill infants. Examination of the infant included visual assessment by fixating on and following a flashing-light, external inspection of the lids, ocular adnexa, and anterior segment; pupil examination with a torch; and red reflex examination with a distant direct ophthalmoscope. Indirect ophthalmoscopy was performed after pupil dilation where fundus examination was required.

Data was entered in Microsoft Excel 2016 and statistical analysis was performed using Statistical Package for the Social Science (SPSS) version 10. Statistical significance was set at $p<0.05$.

Result

Distribution of the subjects based on demographic details

There were 168 females (46.7%) and 192 males (53.3%) in the present study. 3 (0.8%) were post term, 36 (10%) were preterm and 321 (89.2%) were term. According to mode of delivery, 134 (37.2%) were LSCS, 117 (32.5%) were NVD, 109 (30.3%) were VAC. According to birth weight, 17 infants (4.7%) were classified as high, 41 (11.4%) were considered low and 302 (83.9%) were normal. (Table 1)

Acquired and congenital ocular pathologies

In the acquired group, 2 (1.4%) were post term, 21 were preterm (14.7%) and 106 (74.1%) were term. All 14 infants in congenital group were preterm. (Figure 1)

Ocular abnormalities in newborn

In the posterior segment condition, 124 patients had retinal haemorrhages, of which, 51 (40.5%) were females and 73 (57.9%) were males. 2 infants (1.6%) had retinopathy of prematurity. In the anterior segment condition, 99 patients had subconjuctival haemorrhage, of which, 42 infants (42.4%) were females and 57 (57.5%) were males. 94 patients had Subconjunctival haemorrhage, of which, 40 infants (42.4%) were females and 54 (57.4%) were males. (p=0.001)Among the congenital conditions, 9 patients (64.3%) had Nasolacrimal duct obstruction, of which, 5 (35.7%) were females and 4 (28.6%) were males. 1 male newborn (7.1%) had iris coloboma, 1 (7.1%) had Retinochroidal coloboma and 1 (7.1%) had limbaldermoid. (Table 2)

Demographic details with acquired/congenital

The correlation between term, mode of delivery, birth weight and NICU admission was statistically significant in our study. (p=0.001) (Table 3)

Discussion

Conjunctivitis is the most prevalent ocular surface condition, particularly in children.[10] A previous investigation by Gilbert et al. found that 17% of over 1,000 newborns had conjunctivitis.[9] These findings, nevertheless, have never been studied in detail in newborns or infants younger than a year old.

In infants, SCH may be accompanied by retinal haemorrhage (RH). Depending on the method of delivery, RH in babies occurs more or less frequently followed by SCH and conjunctivitis.[11] RH was documented in infants in a research by Vinekar et al. at a ratio/incidence of 75% of vacuum extraction births, 33% of spontaneous vaginal deliveries, and 6.7% of caesarean section (C/S) births.[12]In the present study, in the acquired posterior segment condition, 124 patients had retinal haemorrhages, of which, 51 (40.5%) were females and 73 (57.9%) were males. 2 infants (1.6%) had retinopathy of prematurity.134 (37.2%) were LSCS, 117 (32.5%) were NVD, 109 (30.3%) were VAC.

In the anterior segment condition, 99 patients had Subconjunctival haemorrhage, of which, 42 infants (42.4%) were females and 57 (57.5%) were males. 94 patients had Subconjunctival haemorrhage, of which, 40 infants (42.4%) were females and 54 (57.4%) were males. (p=0.001) The results were in concurrence to those of previous studies, which estimated conjunctivitis to affect 41.3% and 42.5% of the study group, respectively.[13,14] These studies did not, however, particularly include newborns or babies, and only children up to the age of 12 were included.

We found congenital ocular diseases in 39% of patients and acquired ocular diseases in 61%. Congenital issues might be developing or evident at birth. They typically develop as a result of genetic disorders, the intrauterine effects of drugs, alcohol, or high maternal blood sugar, or both.[15]In our study, the most common congenital disease and the second most common ocular disease in infants was congenital Nasolacrimal duct obstruction, which occurred in 64.3% of cases. In a Nigerian research, the prevalence of congenital Nasolacrimal duct obstruction was 12.9%.[16]Among the other congenital conditions, 1 male newborn (7.1%) had iris coloboma, 1 (7.1%) had Retinochroidal coloboma and 1 (7.1%) had limbaldermoid.

We found that retinopathy of prematurity (ROP) occurred in about 1.6% of patients. ROP is responsible for up to 15% of all cases of blindness in industrialized countries and up to 60% in middle income countries.[9]A study conducted by Taqui M et al reported the incidence of ROP to be 32.5% of premature infants.[17]

Our study included only 36 (10%) preterm babies, whereas ROP is specifically diagnosed in preterm and low birth weight babies, which may explain why we found a lower prevalence of ROP than other studies.

The already significant problem of vision impairment in children from third-world nations is further exacerbated by illiteracy, poor socioeconomic situations, and a lack of basic healthcare services. Despite many of these illnesses being preventable, all of the above factors can cause irreversible blindness.[18]

Ocular disorders in children differ geographically. The pattern of incidence of eye disorders is significantly influenced by climatic factors, malnutrition, and a lack of therapeutic options.[19]With the help of a primary health care provider, an ophthalmologist, and a paediatrician, more focus should be put on enhancing eye health, identifying and treating common eye illnesses, and avoiding the onset of blindness in children. This study had some limitations. For example, the sample size was relatively small, and it was a single center study. Increasing the sample size and collecting data from other hospitals at different localities would provide valuable information on infant ocular morbidity.

Conclusion

In conclusion, acquired ocular diseases were more common than congenital ocular diseases in our sample of infants. The most common ocular pathology was retinal haemorrhage, Subconjunctival haemorrhage and conjunctivitis followed by congenital Nasolacrimal duct obstruction.

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Legend Tables

Table 1: Table depicting demographic details

Demographic Details		Frequency	Percent
Gender	Females	168	46.7
	Males	192	53.3
Term	Post term	3	.8
	Preterm	36	10.0
	Term	321	89.2
Mode of Delivery	LSCS	134	37.2
	NVD	117	32.5
	VAC	109	30.3
Birth Weight	High	17	4.7
	Low	41	11.4
	Normal	302	83.9

Table 2: Table depicting ocular abnormalities in Infants

			Sex		Total	Chi-square value	P value
			Females	Males			
Posterior segment-condition (acquired)	Retinal haemorrhages	Count	51	73	124	1.38	0.24
		%	41.1%	58.9%			
	Retinopathy of prematurity	Count	0	2	2		
		%	0.0%	1.6%			
Anterior segment-						84.13	0.001*
	Subconjunctival	Count	42	57	99		

condition (acquired)	haemorrhage	%	42.4%	57.5%			
	Conjunctivitis	Count	40	54	94		
		%	42.5%	57.4%			
Congenital	Nasolacrimal duct obstruction	Count	5	4	9	2.88	0.57
		%	35.7%	28.6%			
	Iris coloboma	Count	0	1	1		
		%	0.0%	7.1%			
	Iris naevus	Count	1	1	2		
		%	7.1%	7.1%			
	Retinochroidal coloboma	Count	0	1	1		
		%	0.0%	7.1%			
	Limbal dermoid	Count	0	1	1		
		%	0.0%	7.1%			

Table 3: Table showing comparison of demographic details with ocular abnormalities

			Acquired/ Congenital		Total	Chi-square value	p value
			Acquired	Congenital			
Sex	Females	Count	51	6	57	0.058	0.809
		%	35.7%	4.2%	39.9%		
	Males	Count	78	8	86		
		%	54.5%	5.6%	60.1%		
Term	Post term	Count	2	0	2	47.88	0.001*
		%	1.4%	0.0%	1.4%		
	Preterm	Count	21	14	35		
		%	14.7%	9.8%	24.5%		
	Term	Count	106	0	106		
		%	74.1%	0.0%	74.1%		
Mode of delivery	LSCS	Count	25	12	37	28.99	0.001*
		%	17.5%	8.4%	25.9%		
	NVD	Count	5	0	5		
		%	3.5%	0.0%	3.5%		
	VAC	Count	99	2	101		
		%	69.2%	1.4%	70.6%		
Birth wt	High	Count	16	0	16	39.96	0.001*
		%	11.2%	0.0%	11.2%		

	Low	Count	26	14	40		
		%	18.2%	9.8%	28.0%		
	Normal	Count	87	0	87		
		%	60.8%	0.0%	60.8%		
NICU admission	No	Count	93	0	93	28.86	0.001*
		%	65.0%	0.0%	65.0%		
	Yes	Count	36	14	50		
		%	25.2%	9.8%	35.0%		