Screening and management of retinopathy of prematurity in Colombo during the pandemic

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Abstract

Introduction: *COVID-19 related travel restrictions and lockdown status of the country has affected the routine work of most of the health sector. Screening and treatment of retinopathy of prematurity is considered as a procedure which must be continued despite the adverse situation.*

Methods: *ROP register of the Department of Paediatric Ophthalmology was analyzed to see how the pandemic situation affected the ROP screening and treatment.*

Results: *Out of the total number of 363 babies who were screened for ROP 48 developed severe forms of ROP needing treatment. 45 babies could not attend the clinic visits on the given date.*

Discussion and conclusion: *Severe forms of ROP can be treated with one dose of intravitreal injection of bevacizumab. 532nm Green Laser is reserved for zone 3 stage 3 ROP and for babies who develop tractional elements. Robust and prolonged follow up mechanism is necessary to maintain the integrity of the ROP management.*

Introduction

On 11th March 2020, Sri Lanka reported the first locally transmitted case of COVID-19 infection. This led to a country-wide lockdown for several weeks. After that on several occasions there were lock down of smaller regions and the whole country affecting the income, travelling and the public transport. Routine clinics and surgery sessions were cancelled in the hospitals during the pandemic as a measure to prevent crowding in health institutions. But the emergency procedures were carried out without fail to maintain the services in the hospitals. Screening and treatment of retinopathy of prematurity (ROP) is also named as a procedure which must be carried out during the lock down times[1-3].

Retinopathy of prematurity can cause irreversible blindness through tractional retinal detachment. Duration between the onset of ROP and escalation into tractional retinal detachment is usually few days or weeks. Therefore, proper diagnosis and appropriate treatment to prevent tractional retinal detachment must be carried out within this narrow window of opportunity. Therefore, examination of the at-risk babies by a competent ophthalmologist is of paramount importance during this period. Smooth operation of the screening program depends on compliance of the families to bring the babies on time, once they are discharged from the neonatology units.

Guidelines for screening for ROP was initially published in Sri Lanka in 2009 which was revised in 2019 as summarized in Table 1. Treatment including intravitreal injection of bevacizumab (IVB) and 532nm Green laser treatment are done at few centers around the country including the Lady Ridgeway Hospital. Treatment protocol for ROP at the Lady Ridgeway Hospital is shown in Table 2. Paediatric ophthalmology unit at the Lady Ridgeway Hospital for Children is a center for screening of ROP in neonatology units in Colombo as well as it serves as a national treatment unit for ROP.

Table 1. Referral guidelines for ROP (Guidelines for Screening for ROP – College of Ophthalmologists / Perinatal Society of Sri Lanka – 2019)

Birth weight <1500 g
Gestational age at birth <32 weeks
Babies at risk of developing ROP due to oxygen therapy due to severe illness during first few weeks of life
1st ROP examination should be carried out at 3 weeks post natal.

Methods

This study is a retrospective analysis of ROP screening and treatment data from 1st March 2020 to 31st August 2021 of the Paediatric Ophthalmology Unit at the Lady

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Table 2. Treatment protocol for ROP (IVB – Intravitreal Bevacizumab)

Diagnosis	*Treatment*
Zone 1 Stage 1 with plus disease	IVB
Zone 1 Stage 2 with plus disease	IVB
Zone 1 Stage 3 with or without plus disease	IVB
Zone 2 Stage 3 with or without plus disease	IVB
Posterior Zone 2 Stage 2 with plus disease	IVB
Anterior Zone 2 Stage 2 without plus disease	Observation
Zone 3 stage 3	Laser
Recurrent ROP	IVB +/-Laser
Stage 4/5	Laser +/- Retinal Surgery

Ridgeway Hospital for Children, Colombo. Screening was done at the eye unit of the Lady Ridgeway Hospital for Children and the author has visited the neonatology intensive care units shown in table 3 for the screening of babies who are too ill to visit the clinic.

Intravitreal injection of bevacizumab (IVB) was carried out in the eye theater at LRH and in few occasions at the neonatology ICU as well. Laser treatment was carried out at the eye theatre at LRH.

ROP screening data is maintained at the eye unit of the LRH including caregiver's contact numbers and the permanent address. A carbon copy of the details of each visit is maintained at the ROP register of the eye unit. With the onset of the pandemic related travel restrictions, patient delays were expected and at the end of each visit, the caregiver is given a explanation of the importance of proper follow up and the mode of travel was discussed.

A dedicated phone line was made available by the hospital for the patients to contact the clinic staff in case of inability to arrive at the clinic on time. Since the next clinic date is entered in the ROP clinic data book, the patients who do not turn up at the end of a week were identified. The families who default clinic appointment were contacted by a nursing officer or a medical officer. Certain families who have no way of visiting at the LRH, were advised to go to the nearest ophthalmology unit for the ROP examination.

Gestational age at birth, birth weight, place of referral, method of treatment and the reason not to attend clinic were recorded and subsequently analyzed.

All treatments were done under topical anesthesia. Baby was fed and well burped before treatment. Pupils dilated with tropicamide 0.8% and phenylephrine 5% solution. Local anesthetic, properacaine hydrochloride 0.5% was applied soon before the treatment session. RETCAM images were taken for future references in selected cases. Bevacizumab 625 mg in 0.05 mL was injected into the mid vitreous. Moxifloxacin eye drops was prescribed for one week every 4-6 hourly. Follow up examinations were done on the first day and after one week. Further examinations were done every 2 to 3 weeks until the retina vascularized up to the temporal ora serrata. Laser treatment also carried out under topical anaesthesia.

Results

Total 363 babies were screened for ROP during the 18 months period by a single paediatric ophthalmologist. The sources of the referrals are included in Table 4. 106 babies (29.2%) had one or more screening examinations while they were in the neonatal intensive care unit (Table 3).

Table 3. The neonatology units visited by the author

Castle Street Hospital for Women
De Zoysa Maternity Hospital
Lady Ridgeway Hospital
Colombo South Teaching Hospital
Kothalawala Defense University Hospital
Homagama COVID Hospital

48 out of 363 babies needed treatment (13.2%). Treatment sessions were carried out for the indications shown in Table 5. 44 (91%) babies with severe ROP needed only one dose of IVB. Other 9% (4 babies) had primary 532nm Green laser according to the protocol followed up at the unit. During this period no recurrences of ROP was found. Tractional retinal detachment was also not seen during the study period.

Table 4. Sources of referral of the patients and the number and percentage of babies who received treatment

Source of referral	*Number*	*Treated (%)*
1. Castle Street Hospital for Women	116	12 (10.3)
2. De Zoysa Maternity Hospital	96	8 (8.3)
3. Lady Ridgeway Hospital	18	3 (16.6)
4. Colombo South Teaching Hospital	72	8 (11)
5. Other hospitals in Western Province	34	9 (26.4)
6. Other provinces	27	8 (30)
Total	363	48 (13.2)

Table 5. Treatment modality for each category of diagnosis

Diagnosis	*Treatment*	*Number (%)*
Zone 1 Stage 1 with plus disease	IVB	6 (13.7)
Zone 1 Stage 2 with plus disease	IVB	9 (19.1)
Zone 1 Stage 3	IVB	8 (20.7)
Zone 2 Stage 3	IVB	10 (17.3)
Posterior Zone 2 Stage 2 with plus disease	IVB	8 (15.5)
Zone 3 Stage 3	523nm Green Laser	4 (13.7)
Recurrent ROP	-	0
Stage 4/5	-	0
Total		48 (100)

The study population was divided into two categories. Firstly, the babies who developed severe ROP requiring IVB or laser treatment. Second group included the babies who never developed ROP and babies who developed mild degrees of ROP which subsequently regressed without and treatment or sequalae.

Mean birth weight of the babies who never developed ROP and babies with mild degrees of ROP which regressed spontaneously was 1402g.

- The babies who developed severe ROP needing IVB treatment had a mean birth weight of 1032g, the difference of 370g in between the two group is statistically significant.
- The mean gestational age at birth of the babies who developed severe ROP needing treatment was 28.6 weeks.
- Mean gestational age of the babies who never developed ROP or milder degrees of ROP was 31.1 weeks.

The difference of mean gestational age between the two groups was 2.5 weeks. The difference was not statistically significant.

Out of the total number of 363 babies screened during the 18 months period, 45 (12.4%) babies could not attend the clinic on the given date during the study period (Table 7). Majority (48.8%) families delayed less than a week. These families did not need any reminder from the hospital and they self-returned to the clinic follow up. Six families (13.3%) returned to the clinic after a one week reminder. 13 families (28.9%) needed more than 2 weeks to return to the clinic as they were on quarantine or treatment centers. Some of these families were referred to the local ophthalmology unit for the follow up. There were 4 families (8.9%) who did not turn up to the clinic despite repeat reminders. The efforts were not successful to refer these four families to the local ophthalmology clinics. But, after several weeks they eventually returned and fortunately, none of the babies had developed significant ROP.

37% of the babies who defaulted clinic visits did not develop significant ROP. All the babies who had severe form of ROP and did not attend the clinic on the given date were able to re-start clinic visits after 2-4 weeks of delay. 40% of the defaulted patients reasoned out their delay was due to the country wide lock down and lack of public transport. Another 26.7% of babies could not attend the clinic as the whole family or caretakers being sent to quarantine centers. These families attended the clinic once the quarantine period was over. Only few patients (8.8%) mentioned they were scared of coming to a hospital due to the fear of contracting COVID-19 infection. 6.7% patients gave reasons unrelated to the pandemic situation which prevented them from coming to the hospital in time.

Table 6. Comparison of gestational age at birth and the birth weight of babies who developed severe ROP needing treatment and the babies who never developed ROP or babies with milder degrees of ROP did not need treatment

Characteristic	*Mean*	*Range*
Gestational age at birth	28.6	25-32
Babies needed treatment	31.1	26-35
Babies did not develop ROP or did not require treatment		
Birth Weight		
Babies needed treatment	1032	500-1635
Babies did not develop ROP or did not require treatment	1402	830-2380

Table 7. The patients who defaulted clinic visits

Time period of delay in clinic visit	*Number (%)*
< 1 week	22 (48.8)
1 - 2 weeks	6 (13.3)
2 - 4 weeks	13 (28.9)
> 4 weeks	4 (8.9)
Total	45 (100)

Table 8. diagnosis of babies who defaulted the clinic visit

Characteristics of defaulted families	*Number (%)*	*Before treatment*	*After treatment*
Zone 1 ROP	1 (4.3)		1
Zone 2 ROP	5 (28)	2	3
Zone 3 ROP	2 (5)		2
No ROP	37 (11.7)	-	-
Total	45 (12.4)		

Reason to Default	*Number (%)*
1. COVID Illness in the family	3 (6.7)
2. Family being quarantined	9 (20)
3. Area lock down	18 (40)
4. Country lock down	8 (17.8)
5. Fear of coming to a hospital	4 (8.8)
6. Reasons unrelated to pandemic	3 (6.7)
Total	45 (100)

End-point of ROP examinations for the treated babies were complete retinal vascularization upto temporal ora serrata. Mean duration of follow up of these these babies was 53.6 weeks gestational age (48-67 weeks).

Discussion and conclusions

ROP can cause irreversible blindness. Screening of premature babies is aimed at prevention of tractional retinal detachment by detecting ROP early and giving the appropriate therapy early. Timely examinations by an ophthalmologist who is competent in diagnosing ROP is of paramount importance. Development of practical screening protocols and rational treatment protocols are important equally. This study shows a considerable number of babies at risk of developing this condition could not attend to the clinic due to lack of transport and due to illness in the family directly related to the pandemic. Babies with very low birth weight have increased risk of developing severe ROP. Hence, babies with very low birth weight should be examined carefully and more frequently to detect severe ROP.

In this study 44 babies with severe forms of ROP were treated with one injection of intravitreal bevaci-zumab and none of the babies developed tractional retinal detachment or recurrence of ROP. Properly maintained data base including the caregivers' contact numbers is of high importance to maintain the integrity of the follow up of these children. One to one discussion with the families is necessary regarding the transport method once the baby is discharged from the hospital.

References

1. American Academy of Ophthalmology. 2020, March 27 List of urgent and emergent ophthalmic procedures. Available from: https://www.aao.org/headline/list-of-urgentemergent- ophthalmic-procedures. Accessed June 09, 2020.
2. Sengupta S, Honavar SG, Sachdev MS, Sharma N, Kumar A, Ram J, et al. All India Ophthalmological Society – Indian Journal of Ophthalmology consensus statement on preferred practices during the COVID-19 pandemic. *Indian J Ophthalmol.* 2020; **68**: 711-24.
3. Gupta V, Rajendran A, Narayanan R, Chawla S, Kumar A, Palanivelu MS, et al. Evolving consensus on managing vitreoretina and uvea practice in post-COVID-19 pandemic era. *Indian J Ophthalmol.* 2020; **68**: 962-73.