CLINICAL EVALUATION OF PREMATURE INFANTS FOR RETINOPATHY OF PREMATURITY IN MISURATA

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ABSTRACT

Retinopathy of prematurity (ROP) is a proliferative retinopathy affecting premature infants of very low birth weight, who have been exposed to high ambient oxygen concentrations. With improvement in neonatal care and advancement of oxygen therapy control, more preterm infants are surviving with a resultant increase in the number of ROP cases. The aim of the study is to determine the incidence and risk factors associated with ROP in low birth weight infants. This prospective study conducted in Albasar Ophthalmology Clinic from May 2015 to September 2016 and includes the result of fundus examination of 52 premature infants referred from Asalam Hospital (neonatology department) Misurata - Libya. All preterm infants received oxygen therapy by nasal tube or ventilator. 5 (9.6%) premature infants found to have ROP, all preterm infants were advised for a regular follow up. The age at first presentation varies from 3 to 13 weeks. Gestational age ranges between 27 to 31weeks. Birth weight ranges between 1000 to 1500 grams. Incubation period ranges from 2 to 45 days. Six babies were lost before completing the fundus examination. All the infants with the disease were more than 9 weeks old on first presentation and only one infant had birth weight more than 1250 grams. Two (3.8%) infants had severe ROP at least in one eye. It seems that this disease is a common problem in this city. Community education, government supply of diagnostic and therapeutic equipment will help early detection, proper management and reduce the incidence of the disease.

KEY WORDS: Retinopathy of prematurity, oxygen therapy, neonatology, incidence.

INTRODUCTION

Retinopathy of prematurity (ROP) is a proliferative retinopathy affecting premature infants of very low birth weight, who have been exposed to high ambient oxygen concentrations⁽¹⁾. It is one of the main causes of childhood blindness. Worldwide, there are more than 50,000 children blind due to $ROP^{(2)}$. The retina is unique among tissues in that it has no blood vessels until the fourth month of gestation and vascularization does not complete until about one month after delivery. Incomplete vascularized retina is particularly susceptible to oxygen damage in the premature infant. Vascular Endothelial Growth Factor (VEGF) is produced from the avascular retina which is the stimulus for vessel migration. Relative hyperoxia and increased metabolic demand of the growing eye allows excessive VEGF production, which leads to ROP. The disease is classified into five stages: stage 1 (Demarcation line), stage 2 (Ridge), stage 3 (Extraretinal fibrovascular proliferation), stage 4 (Partial retinal detachment) and stage 5 (Total retinal detachment). Plus disease signifies a tendency to progression and is characterized by failure of pupil to dilate associated with gross vascular engorgement of the iris, vitreous haze, dilatation of retinal veins and tortuosity of retinal arteries and increasing preretinal and vitreous haemorrhage. Threshold disease is defined as a five contiguous clock hours or eight cumulative clock hours of extraretinal neovascularization (stage 3 disease) in

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zone 1 or zone 2, associated with plus disease. It is an indication for treatment. Zone 1 is bounded by an imaginary circle, the radius of which is twice the distance from the disc to the macula. Zone 2 extends concentrically from the edge of zone 1; its radius extends from the centre of the disc to the nasal ora serrate. About 80% of cases of ROP regress spontaneously from vasoproliferative to fibrotic phase. About 20% of infants with active ROP develop cicatricial complications range from peripheral retinal pigmentary changes to complete ring of retrolental fibrovascular tissue with total retinal detachment. Screening program is not fixed worldwide and is advisable for babies born at or before 31 weeks gestational age, or weighing 1500 grams or less. Very low birth weight infants, especially those treated for ROP, are at high risk of developing strabismus and myopia than term infants and require follow-up till the age of visual maturity⁽¹⁾. Threshold ROP is treated with retinal photocoagulation, but newer treatments such as intraocular injections of anti-VEGF bevacizumab (Avastin) are being used alone or in conjunction with laser $^{(3)}$.

Aim of the study:

The aim of the study is to determine the incidence and risk factors associated with ROP in low birth weight infants.

MATERIALS AND METHODS

A prospective study conducted in Albasar Ophthalmology Clinic from May 2015 to September 2016 and includes the result of fundus examination of 52 premature infants referred from Asalam Hospital (neonatology department) Misurata - Libya. All pre-

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term infants received oxygen therapy by nasal tube or ventilator. 5 (9.6%) premature infants found to have ROP, all preterm infants were advised for a regular follow up. Detailed information including the age, sex, gestational age, birth weight and duration of incubation were collected from the history and from the infant's medical notes (discharge paper). Fundi were examined using indirect ophthalmoscope with 20 diopter lens and the pupils were dilated by a combination of 2.5% phenylephrine and 1% tropicamide (mydriacyl). Most of the infants were examined without anesthesia and some of them required short intravenous general anesthesia. Data were recorded and analyzed.

RESULTS

52 preterm infants referred to Albasar ophthalmology clinic between May 2015 and September 2016 from Asalam Hospital (neonatology department). Six babies were lost before completing the fundus examination and excluded from the study. Male female ratio was 1.08. The age at first presentation varies from 3 to 13 weeks. 69% of the infants were presented at age of 3 to 7 weeks. Age and sex at first presentation is illustrated in (table 1).

(Table	1)
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Age at first presentation	Number of preterm infants	Males	Females
3 to 5 weeks	32	17	15
>5 to 7 weeks	4	2	2
>7 to 9 weeks	6	4	2
>9 to 11 weeks	6	2	4
>11 to 13 weeks	4	2	2
Total	52	27	25

Nearly equal male to female ratio.

Gestational age ranges between 27 to 31weeks. (Table 2) shows the distribution of gestational age.

(Table 2)

Gestational age	Number of preterm infants
27 weeks	1
28 weeks	2
29 weeks	13
30 weeks	26
31 weeks	10
Total	52

75% of preterm infants delivered between 29 and 30 weeks.

Birth weight ranges between 1000 to 1500 grams. About 17% of the preterm infants were below 1250 grams. The distribution of birth weight is illustrated in (table 3).

(Table 3)

Birth weight	Number of preterm infants
1000 to 1100 grams	4
>1100 to 1200 grams	3
>1200 to 1300 grams	18
>1300 to 1400 grams	12
>1400 to 1500 grams	15
Total	52

The maximum weight is 1500 grams. Incubation period ranges from 2 to 45 days. The distribution is shown in (table 4).

(Table 4)

Incubation period with oxygen supply	Number of preterm infants
2 to 12 days	40
13 to 23 days	6
24 to 34 days	4
35 to 45 days	2
Total	52

More than 75% of preterm infants incubated for less than 2 weeks.

Of 52 preterm infants, 5 (9.6%) found to have ROP. Male female ratio was 0.67 (2males and 3 females). All of them presented for the first time at or after age of 10 weeks. 4 of them weighing less than 1250 grams. Gestational age was between 29 and 31 weeks and most of them stayed for prolonged incubation. Two (3.8%) infants had severe ROP at least in one eye. (Table 5) illustrate the distribution of the affected infants.

(Table 5)					
Age at first presentation	Sex	Gestational age	Birth weight	Incubation period with oxygen supply	Fundus findings
13 weeks	Female	30	1200	35	Tractional retinal
		weeks	grams	days	detachment in both
					eyes
11 weeks	Male	30	1300	28	Right eye threshold
		weeks	grams	days	disease, left eye ridge
13 weeks	Female	31	1240	21	Right eye normal,
		weeks	grams	days	left eye ridge
10 weeks	Female	29	1100	16	Right eye vitreous
		weeks	grams	days	haze, left eye
					dragged blood ves-
					sels
12 weeks	Male	30	1050	42	Right eye vitreous
		weeks	grams	days	hemorrhage, left eye
					traction detachment

Subtotal retinal detachment seen in two patients.

DISCUSSION

With improvement in neonatal care and advancement of oxygen therapy control, more preterm infants are surviving with a resultant increase in the number of ROP cases⁽⁴⁾. In this study , out of 52 preterm infants, 5 (9.6%) had ROP. The incidence in a study done in Singapore⁽⁵⁾ was 29.2% and in Canada⁽⁶⁾ was 40.4%. The low incidence in our study may be related to the short duration of incubation and oxygen exposure as 75% were incubated for less than 2 weeks. Other causes of low incidence may be related to the gestational age in which infants more than 31 weeks were not appeared in the study and also the upper limit of birth weight was 1500 grams and still ROP can be seen in preterm infants above these figures. In general more than 50% of preterm infants weighing less than 1250 grams at birth show evidence of ROP and about 10% of infants develop stage 3 ROP⁽⁷⁾. In this study, 9 infants were below 1250 grams, 4 (44%) of them had the disease. Low gestational age, low birth weight and oxygen therapy are recognized as risk factors for the development of ROP. In our study all these risk factors are obvious. Other indirect risk factors related to the causes of preterm delivery should be determined and prevented. Screening program is not fixed worldwide, in a study done in India⁽⁸⁾ concludes, the screening for ROP should be performed in all preterm neonates who are born <34 weeks gestation and/or <1750 grams birth weight; as well as in babies 34-36 weeks gestation or 1750-2000 grams birth weight if they have risk factors for ROP. We recommend screening for all incubated preterm infants regardless the birth weight as one of affected preterm infant weighing 1300 grams. Finally community education, government supply of diagnostic and therapeutic equipment will help early detection, proper management and reduce the incidence of the disease.

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