Retinopathy of Prematurity among the Risky Neonates in Port-Said Governorate

Prof. Dr. Mohammad Mohammad El-Mazahy[1], Prof. Dr. Ehab Mahmoud Ghoneim[2], Marwa Nassim Hassan Eliwa[1]

[1]Pediatrics Department, Faculty of Medicine - Al-Azhar University (Damietta), Egypt
[2]Ophthalmology Department, Faculty of Medicine – Port Said University, Egypt
hysgerr2020@gmail.com

Abstract: background and objectives: Preterm birth is defined as delivery prior to 37 weeks of gestation. Preterm birth is associated with a high risk of neonatal morbidity and mortality, one of them is retinopathy of prematurity (ROP). ROP is a vaso-proliferative disease affecting the retina of premature infants. The manifestations of the disease range from a mild defect with no visual disorders to severe defects with new vessel formation that may progress to retinal detachment and blindness. This study aimed to detect the association between the preterm associated risk factors and occurrence of ROP and estimate the prevalence of ROP among pre-term infants at the NICUs in Port Said governorate within the period from October 2017 to September 2018. **Methods**: this study is a retrospective study with prospective ROP screening using binocular indirect ophthalmoscopy. **Results**: the prevalence of ROP is 6.9% of the (58) infants included in this study. The results also showed that there is association between many preterm associated risk factors and ROP.

1. Introduction:

Preterm birth is defined as delivery prior to 37 weeks of gestation, it is the most frequent cause of neonatal death, and the second most frequent cause of death in children aged below 5 years worldwide (Frey & Klebanoff, 2016). Prematurity is associated with multiple complications (Bronstein, 2016) in the form of respiratory (Flannery et al., 2016), cardiovascular (Emily & Colum, 2016), haematological, gastrointestinal (Fanaroff, 2012), metabolic, endocrinal (Afroz et al., 2017), renal, infectious, nervous including retinopathy of prematurity ROP, and long-term complication (Pappas et al., 2017) as cerebral palsy, visual and hearing defects, and learning difficulties. Retinopathy of prematurity (ROP) is a vasoproliferative disease affecting the retina of premature infants. The manifestations of the disease range from a mild defect with no visual disorders to severe defects with new vessel formation that may progress to retinal detachment and blindness (Rathie et al., 2016). Development and severity of ROP are most strongly correlated with some **Risk Factors** (Rathie et al., 2016)**:** Birth weight and gestational age, Oxygen Use and assisted ventilation, maternal age at time of delivery, maternal hypertension, multiple birth (Shulman et al., 2017), extreme ABG changes, umbilical catheter, brain insult, patent ductus arteriosus (PDA), apnea with bradycardia, necrotizing enterocolitis (NEC), sepsis, chest infection, pneumonia, and Red blood cells transfusion. ROP is a major cause of childhood blindness but is particularly important because visual disability can very largely be prevented by timely intervention. The therapeutic window is very short, and the treatment needs to be performed depends on the severity of ROP (Fielder, 2017). So, early screening and follow up is a very important avoidable method for the complications of ROP.

This study will examine the relationship between some preterm associated risk factors and the occurrence of ROP. also, estimate the prevalence of ROP, and if this catastrophic complication can be avoided.

Methodology:

Research design:

This study is a retrospective study that carried on preterm infants > 37 weeks GA admitted at NICUs in Port Said governorate, with prospective visual screening.

1.   **Participants:**

2.1 Inclusion criteria:

2.1.1 All preterm babies with a gestational age of 32 weeks or less.

2.1.2 Babies of gestational age more than 32 and less than 37 weeks with an unstable clinical course (as sepsis, ventilation, blood transfusion).

2.1.3 Babies with a birth weight less than 1500 g.

2.2 Exclusion criteria:

Babies with congenital anomalies, inborn errors of metabolism and with chromosomal abnormalities.

2.   **Sample:**

The sample collected from cases admitted at NICUs of Port Said governorate during the period

from October 2017 to September 2018. The total sample is 75 infants while the final research sample for statistical analysis that fulfilled the inclusion criteria is 58 infants.

3.   Data collection:
    Clinical data and daily interventions were collected retrospectively from each infant's sheet, also the lab investigations in the form of CBC, CRP, renal and liver function test, and radiological findings of the chest, heart, abdomen and brain were recorded.

4.   Intervention:
    Screening for ROP done by fundus examination with binocular indirect ophthalmoscopy and scleral depression after pupillary dilatation under local anesthesia within the first 12 weeks gestation.

5.   Data analysis:
    The data analyzed using SPSS V. 24 to measure the correlation between the risk variables and ROP using "Pearson's test" and the significant differences between infants with and without ROP regarding exposure to the risk variables using "Chi-square test".

Results:
    Prevalence of ROP in Port Said governorate within the period from October 2017 to September 2018 was 6.9%.

Results of the analysis:

Statistical differences regarding the potential risk factors

	variables	No ROP	ROP	p. value
1	Gestational age < 32 w.	9 (69.2%)	4 (30.8%)	0.002*
2	Birth weight < 1.2 kg.	14 (77.8%)	4 (22.2%)	0.007*
3	O_2 and assisted ventilation.	14 (77.8%)	4 (22.2%)	0.007*
4	ABG changes.	15 (78.9%)	4 (21.1%)	0.009*
5	Brain insult.	4 (50%)	4 (50%)	0.000*
6	Morbid PDA.	6 (60%)	4 (40%)	0.000*
7	Apnea with bradycardia.	13 (76.5%)	4 (23.5%)	0.006*
8	NEC.	1 (50%)	1 (50%)	0.134**
9	Sepsis.	21 (84%)	4 (16%)	0.030*
10	Multiple birth.	1 (50%)	1 (50%)	0.134**
11	Frequent blood transfusion.	22 (84.6%)	4 (15.4%)	0.035*

(*) a significant difference, (**) not a significant difference.

    The figure showing that all ROP cases were premature with gestational age <32weeks and birth weight <1.2 kg and exposed to O_2>40% with assisted ventilation >6 days. All cases also had extreme ABG abnormalities, brain insult, morbid PDA, apnea with bradycardia, sepsis and exposed to frequent blood transfusion. While 25% (one case) only of ROP cases were suffering from NEC. Also, one ROP positive case (25%) was twins. There were significant differences between ROP groups exposed to all risk factors apart from NEC and multiple birth.

Association between ROP and the risk factors

	variables	R (Pearson' test)	P. value
1	Brain insult.	0.680	0.000*
2	Morbid PDA.	0.596	0.000*
3	Gestational age < 32 w.	0.506	0.000*
4	Apnea with bradycardia.	0.423	0.001*
5	Birth weight < 1.2 kg.	0.406	0.002*
6	O_2 and assisted ventilation.	0.406	0.002*
7	ABG changes.	0.390	0.002*
8	Frequent blood transfusion.	0.375	0.004*
9	Multiple birth.	0.321	0.014*
10	NEC.	0.321	0.014*
11	Sepsis.	0.313	0.017*

(*) is significantly correlated with ROP.

The table shows that all risk factors are significantly associated with ROP. There is a moderate association between the risk factors (gestational age < 32 w, birth weight < 1.2 kg, O_2 and assisted ventilation, O_2 and assisted ventilation, brain insult, morbid PDA, and apnea with bradycardia) and ROP, while there is a weak association between the risk factors (ABG changes, NEC, sepsis, multiple birth, and frequent blood transfusion) and ROP.

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