

A four year retrospective & prospective study of ophthalmia neonatorum

Surohi Shah^{1,*}, Hemaxi Desai², Sanjeev Prasad³, Kupali Raol⁴

¹Assistant Professor, ²Associate Professor, ³Senior Resident, ⁴Ex-Senior Resident, Dept. of Ophthalmology,

***Corresponding Author:**

Email: surohishah@yahoo.com

Abstract

Introduction: Ophthalmia neonatorum is one of the most common infections occurring in the first month of life. Neonatal ocular infections have been largely associated with various poor perinatal outcomes. The purpose of this study is to describe the maternal and neonatal risk factors associated with the vertical transmission of neonatal conjunctivitis as well as examine treatment for neonates with this infection.

Materials and Methods: It is a prospective as well as retrospective study of 215 neonates visiting Ophthalmology OPD of our hospital with complaint of discharge from eye, out of which 100 neonates were taken retrospectively and 115 were taken prospectively. Thorough history was taken to identify risk factors. Conjunctival swabs were taken for culture sensitivity testing. The frequencies were calculated of various risk factors in neonates with ophthalmia neonatorum and their mothers.

Results: The commonest risk factor identified was had low birth weight (10%). The most commonly isolated organism was *Staphylococcus aureus* (46%).

Conclusion: Improving prenatal care to reduce sepsis and early diagnosis of STI with appropriate treatment may potentially reduce vertical transmission of neonatal conjunctivitis in this understudied population.

Keywords: Conjunctivitis, *Chlamydia trachomatis*, Neonatal ophthalmia

Introduction

Ophthalmia neonatorum is conjunctivitis occurring to neonates less than 1 month of age, associated with eyelid edema, erythema and purulent discharge from eyes. It is one of the most common infections occurring in the first month of life.⁽¹⁾

Neonatal ocular infections have been largely associated with various perinatal factors. Maternal factors include maternal anemia or nutritional deficiency during pregnancy, subclinical infections of the lower female genital tract during birth, premature rupture of membranes in preterm mothers,^(2,3) Fetal and neonatal factors include respiratory failure, intrauterine growth retardation, premature birth, neonatal sepsis from, premature rupture of membranes, placental abruption, postpartum sepsis and low birth weight.⁽²⁾

The most common microorganisms responsible for causing neonatal conjunctivitis are from maternal genitourinary tract (*Chlamydia trachomatis* and *Neisseria gonorrhoeae*),⁽³⁾ skin commensals (*Staphylococcus aureus*) and maternal gastrointestinal tract (*Pseudomonas sp.*)⁽⁴⁾

The incidence of gonorrhoeal conjunctivitis has significantly decreased after usage of Silver nitrate eye drops (Crede's method) for prophylaxis of newborn.⁽²⁾ *C. trachomatis* conjunctivitis (blenorrhoea) has become a major cause of neonatal conjunctivitis as it is not affected by silver nitrate prophylaxis.⁽²⁾ Silver nitrate also has a low tendency to cause chemical conjunctivitis. Because of these reasons, it has been replaced by 1% tetracycline, 0.5% erythromycin ointment or 2.5% povidone iodine drops as a prophylactic agent for ophthalmia neonatorum.⁽⁵⁾ These agents are equally effective for prophylaxis against

N.gonorrhoea. However, 0.5% erythromycin ophthalmic ointment is the only drug approved by the U.S. Food and Drug Administration for this indication.⁽⁵⁾

We have attempted to describe the maternal and neonatal risk factors associated with the occurrence of neonatal conjunctivitis as well as to evaluate treatment for the affected neonates. By describing the factors associated with neonatal conjunctivitis, interventions can be designed to reduce transmission of this preventable condition.

Materials and Methods

It is a prospective as well as retrospective study of 215 neonates visiting Ophthalmology OPD of our hospital with complaint of discharge from eye, out of which 100 neonates were taken retrospectively and 115 were taken prospectively. Thorough birth history was noted including time of labour, rupture of membranes, mode of delivery, maternal genitourinary tract infection, birth weight, APGAR score and neonatal septicemia. Regurgitation test was performed and patients having positive regurgitation test were excluded from the study. Conjunctival swab was sent for Gram and Giemsa staining and culture sensitivity test. Patients were treated empirically with topical Tobramycin (0.3%) eye drops. The antibiotic was changed when required after the culture sensitivity report. The frequencies were calculated of various risk factors in neonates with ophthalmia neonatorum and their mothers.

Results

A total of 215 neonates were included in the study. The average age at presentation was 11.2 days (3 days to 30 days). Out of them, 77 (35%) patients were males and 138 (65%) were females. 127 (60%) neonates were born through spontaneous vaginal delivery and the rest 88 (40%) were born through caesarian section. One mother had history of premature rupture of membranes (PROM). No mother had history of active sexually transmitted infection. Ninety six (45%) patients had unilateral and one hundred nineteen (55%) patients had bilateral ocular involvement. All neonates were full term except one, preterm. 22 neonates (10%) had low birth weight. Six neonates suffered from neonatal septicemia. One had history of meconium aspiration at the time of birth. None had low (<7) APGAR score.

Bacteria were isolated from 40% of conjunctival smears. Out of them 68% were Gram positive cocci and the rest 32% were Gram negative bacilli. *Staphylococcus aureus* was isolated in 40 (46%) cases out of which 4 (4.6%) were MRSA (Methicillin resistant *Staphylococcus aureus*), *Staphylococcus epidermidis* in 18 (20%) cases, *Pseudomonas aeruginosa* in 20 (23%) cases and other Gram negative bacilli in 8 (9%) cases. Fortunately, there was not a single case of *N. gonorrhoea* or *C. trachomatis*. (Fig. 1)

All the patients responded to the prescribed antibiotic and no complications were noted.

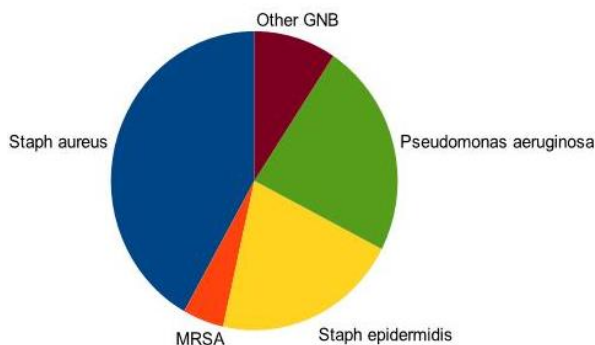


Fig. 1

Discussion

Ophthalmia neonatorum caused by *N. gonorrhoeae* and *C. trachomatis* is responsible for severe visual loss. Fortunately, their rates have declined significantly because of routine antenatal screening and treatment of sexually transmitted infections as well as decreased prevalence of these infections in the general population.^{6,7} In our study, neither of these two bacteria was isolated from the conjunctival smears. The leading risk factor for the neonates in our study was low birth weight. The infection was found to be commoner in those born through vaginal delivery than through caesarean section. ($P < 0.05$; Z test)

In the US, *N. gonorrhoeae* accounts for <1% of reported cases of neonatal ophthalmia, *Chlamydia*

trachomatis accounts for 2% to 40%, while *Staphylococcus* species, *Streptococcus* species, *Haemophilus* species and other Gram-negative bacterial species account for 30% to 50% of cases.⁽⁸⁾ An Indian study of 70 neonatal ophthalmia cases from 2002 isolated 57% *Staphylococcus epidermidis*, 24% *Chlamydia trachomatis* and the rest 35% other bacteria.⁽⁹⁾ Another Indian study of 58 neonates isolated *Chlamydia trachomatis* in 31% of neonatal conjunctivitis cases.⁽²⁾

At our hospital, all the mothers undergo regular antenatal visits with screening for STIs. Patients having leucorrhoea are investigated further and treated accordingly. However there is no protocol to give STI prophylaxis as a routine to all cases.

The test used to identify *C. trachomatis* in our study was Giemsa staining for identification of inclusion bodies. This test although having high (97%) specificity, has low sensitivity (38%).⁽¹⁰⁾ The unavailability of other tests like DIF (Direct immunofluorescence) and PCR (Polymerase Chain Reaction) is a limitation of our study.

Currently, there is controversy regarding regular use of prophylactic topical antibiotics for Ophthalmia neonatorum worldwide. Topical erythromycin, tetracycline and povidone iodine can be used for the prophylaxis. However, these agents are found effective only for gonococcal ophthalmia and not against *Chlamydia*.⁽⁸⁾ *Darling et al* found no significant difference in the efficacy of silver nitrate, topical erythromycin and no prophylaxis in preventing ophthalmia neonatorum.⁽⁶⁾ Instead of prophylaxis, prenatal recognition and prompt treatment and follow-up of those found to be infected may prevent the development of the disease. Mothers who were not screened previously, should be tested at the time of delivery and their infants should be given ceftriaxone if their mothers are found having gonococcal infection. Infants exposed to chlamydia at delivery should be followed closely for signs of infection. Proper antenatal care to reduce low birth weight babies as well as educating hygiene protocol to healthcare staff and caretaker of the neonate can reduce hospital acquired infection.

In conclusion, improving prenatal care to reduce sepsis and early diagnosis of STI with appropriate treatment may potentially reduce vertical transmission of neonatal conjunctivitis in this understudied population. Proper antenatal care to reduce low birth weight babies as well as educating hygiene protocol to healthcare staff and caretaker of the neonate can reduce hospital acquired infection.

References

1. Scott R Lambert. Philadelphia; Elsevers Saunders: 2005. Conjunctivitis of the newborn (Ophthalmia Neonatorum) pp. 146-8. David Taylor & Creig S Hoyt. Pediatric Ophthalmology and Strabismus.

2. Kakar S, Bhalla P, Maria A, Rana M, Chawla R, Mathur NB. Chlamydia trachomatis causing neonatal conjunctivitis in a tertiary care center. Indian J Med Microbiol. 2010;28:45–7.
3. Bergstrom S. Infection-related morbidities in the mother, fetus and neonate. J Nutr. 2003;133(5 Suppl):1656S–60.
4. Akera C, Ro S. Medical concerns in the neonatal period. Clinics in Family Practice. 2003;5((2)):265–92.
5. Rogers LK, Baker CJ, Kimberlin DW, Long SS. Red Book 2009 Report of the Committee on Infectious Diseases. 28th ed. Elk Grove Village, ILL: American Academy of Pediatrics; 2009. pp. 827–9.
6. Darling EK, McDonald H. A meta-analysis of the efficacy of ocular prophylactic agents used for the prevention of gonococcal and chlamydial ophthalmia neonatorum. J Midwifery Womens Health. 2010;55(4):319–27.
7. Gray J. Executive Director, Canadian Medical Protective Agency. June 2013. Personal communication.
8. Prevention of neonatal Ophthalmia. Pickering LK, Baker CJ, Kimberlin DW, Long SS, editors. Red Book: 2012 Report of the Committee on Infectious Diseases. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012. pp. 880–2.
9. Mohile M, Deorari AK, Satpathy G, Sharma A, Singh M. Microbiological study of neonatal conjunctivitis with special reference to *Chlamydia trachomatis*. Indian J Ophthalmol 2002;50:295-9.
10. Fahimeh Asadi-Amoli, Zohreh Nozarian, Vahid Mehtash, Hooshang Beheshtnejad and Avishan Shabani. Comparison of Direct Immunofluorescence and Giemsa Staining in Chlamydia trachomatis Follicular Conjunctivitis. Zahed An J Res Med Sci. 2015 October; 17(10).