



Ophthalmia Neonatorum

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Abstract. to measure the frequency of ophthalmia neonatorum among all babies born in Nangarhar university teaching hospital, in one month's time. An observational study. All babies born from 1st to 30th November, 2020 in the Nangarhar university teaching hospital 1010 were included in the study All babies were examined for signs of conjunctivitis on days 1, 3, 7, 14, and 21 of life. Seventeen percent of the 1010 babies developed conjunctivitis

There was a high frequency of neonatal conjunctivitis . Poor hygienic conditions and practices could be an important risk factor in Afghanistan

Key words: Neonatal conjunctivitis. Ophthalmia neonatorum.

INTRODUCTION Ophthalmia neonatorum (ON) also known as conjunctivitis of the newborn was originally described in 1750 and is the most common eye infection occurring in the first 28 days of life.(1,2)It is characterized by purulent eye discharge, redness of conjunctiva, swelling of eyelids and corneal involvement with potential to cause blindness if left untreated.(3)Despite prophylaxis, it is a world wide problem with incidence varying from 2-23% in different countries. In India, the reported incidence is 0.5-33%, whereas in United States the incidence of neonatal conjunctivitis ranges from 1-2% depending on socioeconomic character of the area.(1,3,4) The neonatal conjunctivitis may be due to infectious or non-infectious (chemical) causes.(6,7)The infectious causes vary in different countries and include bacterial and viral infections. Chlamydia trachomatis and Neisseria gonorrhoea being commonly implicated micro- organisms.(6)However, in developing countries the most frequent micro-organism reported is Staphylococcus aureus with various prevalence rates in different countries e.g. in Argentina 27.6%, Hong Kong 34%, India 20-21%, Iran 31%.6-9 Escherichia coli, Klebsiella spp, Pseudomonas aeruginosa have also been identified as causative agents of ophthalmia neonatorum.(3) Amongst the viral causes,

Herpes virus and Human Immuno-deficiency Virus (HIV) can also cause conjunctivitis.(10) The predisposing risk factors for conjunctivitis include maternal vaginitis, presence of meconium at birth, premature rupture of membranes, prolonged labour, untrained birth attendant interference, low levels of lysozymes and immunoglobulins in neonatal conjunctiva, gestation less than 36 weeks, unhygienic practices and non-sterile environment.(1,3,11)Clinical presentations of conjunctivitis are not diagnostic of the cause, and microbiological workup with cytology and cultures is mandatory.(3) The treatment of ophthalmia neonatorum has to be adequate because systemic complication and severe visual loss can occur particularly with Chlamydia trachomatis and Neisseria gonorrhoea which are leading causes of sexually transmitted diseases.(1,12) To avoid these complications, routine prophylaxis with antimicrobial eye drops or ointments is practiced in many countries. No data is available from afghanistan regarding this important disease and there is no routine eye prophylaxis practiced immediately after birth. The objectives of the present study were to measure the frequency of ophthalmia neonatorum ,risk factors and suggest possible ways of prevention.

METHODOLOGY

This study was performed on all newborns who were delivered in the All babies born from 1st to 30th November, 2020 in the Nangerhar university teaching hospital, from 1st to 30th November 2020. All babies were examined on the first day of life and enrolled in the study after informed consent of mothers. Babies born with major congenital malformations were excluded from the study. Enrolled babies were re-examined on the third day of life for any sign of conjunctivitis like purulent eye discharge, chemosis, redness of eyes and systemic involvement, if any. Mothers/attendants were advised for follow-up examination. These examinations were carried out on 7th, 14th and 21st day of life in a specially arranged clinic on daily basis. In case of presence of clinical conjunctivitis, time of occurrence from date of birth was recorded. For all babies, necessary data such as date of birth, gestational age, weight, gender and meconium stained liquor were recorded. Data pertaining to maternal characteristics like gestational age, mode of delivery, risk factors such as prolonged rupture of membrane (PROM) more than 18 hours, history of urinary tract infection (UTI), fever and vaginal discharge was obtained. It was also recorded whether babies have received systemic anti-microbial therapy for risk factors and pre-term delivery as per protocol of Neonatology Department.. The data was analyzed using Statistical Package for Social Sciences (SPSS) version 10.0. The frequencies of neonatal conjunctivitis, and mean age at the time of conjunctivitis, mean weight and gestation of babies. Then the babies were divided in two groups with conjunctivitis and without conjunctivitis

RESULTS

A total of 1015 babies were delivered in the Nangerhar university teaching hospital in November 2020. Five of them were transferred immediately to surgical department due to different malformations and not included in the study. The remaining 1010 babies

were examined on first day of their life and enrolled in the study. Maximum number of these babies i.e. 99.7% (n=1007) were re-examined on third day of life for signs of conjunctivitis while 89% (899) of all babies were again brought on 7th day of life for examination. Later 86% (n=869), 85% (n=859) and 84% (n=848) of enrolled babies were re-examined on 14th, and 21th days of life respectively in follow-up clinic for signs of conjunctivitis. There was a dropout of 14% (n=141) till the 21th day of life for various reasons. It also included babies admitted in hospital for different reasons and those who expired before completing 21 days of their lives. Eleven percent of study population was pre-term while 19% of these babies were low birth weight (with a weight range of 0.9 – 4.3 kg). There was no significant gender predominance in this study as males and females were almost equal i.e. 52% and 48% respectively while 30% of babies were delivered through caesarian section. A total of 173 i.e. 17% babies developed clinical signs of conjunctivitis as all of them had eye discharge, 99% had redness and 16.7% had chemosis as well. Only one baby had haemorrhage while pseudo-membrane was not seen in any case. Forty nine percent (n=49) babies had involvement of both eyes. The mean age at the time of conjunctivitis is 7.6 days with a range of 2-28 days. Fifty percent (n=87) of babies developed signs of conjunctivitis during first 5 days of life while another 22% presented on the 7th day of life. Ten percent (n=18) presented with clinical conjunctivitis on 14th day and remaining 17% (n=30) presented on the end of 3rd and 4th week. The maternal risk factors for conjunctivitis appearing in the first 5 days of life and demographic characteristics of all babies with conjunctivitis are shown in Tables I and II respectively.

Table I: Maternal risk factors for conjunctivitis in first 5 days of lif

	Conjunctivitis Positive	Conjunctivitis Negative
Prolonged rupture of membranes (PROM) Present (92) Absent (918)	9 (8.6%) 78 (8.5%)	83 (91.4%) 840 (91.50%)
Urinary tract infection (UTI) Present (37) Absent (973)	3 (8.1%) 84 (8.6%)	34 (91.9%) 889 (91.4%)
Vaginal discharge Present (32) Absent (978)	3 (9.4%) 84 (8.6%)	29 (90.6%) 894 (91.4%)

Meconium aspiration syndrome (MAS) Present (34)	8 (23.5%)	26 (76.5%)
Absent (976)	79 (8%)	897 (92%)
Fever Present (15)	2 (13.3%)	13 (86.7%)
Absent (995)	85 (8.5%)	910 (91.5%)

Table II: Demographic data of newborns with conjunctivitis (n=1010).

	Conjunctivitis Positive	Conjunctivitis Negative
Gestational period	24 (20.5%)	93 (79.5%)
Pre-term < 37 weeks (117)	149 (16.7%)	744 (83.3%)
Full term > 42 weeks (893)		
Birth weight Low < 2.5 kg. (195)	38 (19.5%)	157 (80.5%)
Normal (815)	135 (16.5%)	680 (83.5%)
Mode of delivery	97 (13.68%)	612 (86.2%)
Spontaneous vertex delivery (SVD) (709)	76 (25.24%)	225 (75%)
Caesarian section (301)		
Gender	95 (18.1%)	429 (81.9%)
Male (504)	78 (16%)	408 (84%)
Gender Male (504)		

DISCUSSION

The World Health Organization (WHO) Vision 2020 “The Right to Sight, Global Initiative for the Elimination of Avoidable Blindness” has found that ophthalmia neonatorum among others is the major cause of blindness in low-income countries in Africa and other continents.¹³ In this study conjunctivitis affected 17% of neonates which is consistent with other reports from developing countries where the rates are higher. In Kenya incidence is 23%,³ Iran cites incidence ranging from 4.9% to 21.7%,^{4,6,14} in India it is 0.5-33%⁵ while in the UAE ophthalmia neonatorum is a prevailing problem but is seldom due to sexually transmitted diseases.⁽¹⁴⁾ Incidence of neonatal conjunctivitis is 1-2% in the USA,⁵ 2.6-12% in the UK, in Hong Kong it is 0.5-5%¹⁵ while in Norway it is 8%. The higher frequency in this

study is possibly due to low socioeconomic status, unhygienic environment, absence of eye prophylaxis and un-sterile handling of neonates by relatives. Risk factors for conjunctivitis were evaluated and known maternal risk factors like PROM, UTI, vaginal discharge and fever were not found to be significant in this study which is in contrast to data from other countries. This could be due to the use of systemic antibiotics for newborns for such high risk cases at the study setting. However, meconium excretion at birth had a significant association with ON (Table I), which is consistent with studies carried out in Kenya and Iran.^{3,4} Caesarian section has been found to be a significant risk factor in the present study (Table II). Twenty five percent of all babies delivered through caesarian section developed conjunctivitis while 15% babies delivered through

spontaneous vertex delivery had conjunctivitis. This can not be explained on the basis of maternal genital infections, but could be the result of unhygienic/unsterile handling of newborn by attendants after birth. Similar results have been reported from studies from Iran and India.⁽¹⁶⁾ Our demographic data of 173 babies with conjunctivitis had 55% males and 45% females similar to Iran with male predominance (62% vs. 38%),⁽¹⁵⁾ Norway (75% male neonates) and Saudi Arabia (63% males). In India, the proportion between male and female was 1.1:1 which is also similar to this study.⁽¹⁶⁾ The male gender as a risk factor for increased neonatal infection has been attributed to Y-gene.⁽¹⁷⁾ Pathogens responsible for conjunctivitis vary geographically due to difference in socioeconomic conditions, standard of maternal health care, prophylactic programme, hygienic conditions during labour and post-natal exposure to micro-organisms.^(1,18) In the present study, the most common microbial agent was *S. aureus*. This is in line with studies from different countries like Hong Kong (34%),⁷ Argentine (27.6%),⁹ Nigeria (67.9%),⁶ and Nordic countries.⁸ However, the role of *S. aureus* in neonatal conjunctivitis is controversial because it is frequently isolated from eyes of asymptomatic neonates.⁽⁶⁾ But, in the present study only neonates with signs and symptoms of conjunctivitis were evaluated. Other organisms were *Klebsiella*, *Escherichia coli* and coagulase negative *S. aureus*. *Klebsiella* and *Escherichia coli* conjunctivitis (early onset) was only seen in babies during the first 3-5 days of life, indicating maternal transmission during delivery. Whereas *S. aureus* was seen throughout the first month of life suggesting postdelivery exposure, poor hygiene, handling by relatives and colonization of newborns after birth. *Neisseria gonorrhoea* was not isolated in this study. All babies with conjunctivitis recovered completely with the use of locally applied antibiotic eye drops/ointments.. Present study shows a high frequency of neonatal conjunctivitis, with *S. aureus* as the most common causative agent. Poor hygienic conditions and practices could be an important risk factor in Afghanistan. *Neisseria gonorrhoea*, reported as a cause of ophthalmia neonatorum from other developing countries, was not isolated in this study. Similarly, none of the babies were treated for possible chlamydial eye infection. Considering the prevalence of ON throughout neonatal period, the

bacteriological spectrum and goal outcome, the recommendation of routine eye prophylaxis at the time of birth in Afghanistan is thus debatable. However, there is a need to have more stress on the principles of good hygiene and clean newborn care practices by mother and attendants. There is also a need for further studies on ophthalmia neonatorum particularly in the community for the burden of diseases and its implications.

CONCLUSION

There was a high frequency of neonatal conjunctivitis. Poor hygienic conditions and practices could be an important risk factor in Pakistan.

REFERENCES

1. Malika PS, Asok T, Faisal HA, Aziz S, Tan AK, Intan G. Neonatal conjunctivitis: a review. *Malaysian Fam Physicians* 2008; 3:77-81.
2. Lambert SR, Taylor D, Hoyt CS. Conjunctivitis of the newborn: ophthalmia neonatorum. In: Wright KE, Spiegel PH, Hengst TC, editors. *Pediatric ophthalmology and strabismus*. Philadelphia: Elsevier's Saunders; 2005.p.146-8.
3. Iyamu E, Enabulele O. A Survey on ophthalmia neonatorum in Benin City, Nigeria: emphasis on gonococcal ophthalmia. *J Health Allied Sci* [Internet]. [cited 2003 Oct 17]; 2: [about 2 p.]. Available from: <http://cogprints.org/3230/>
4. Amini E, Zamani, Daneshjoo KH, Kafainejad A, Moradi R, Badami N, et al. Comparison of povidone iodine and erythromycin with control cases in prevention of ophthalmia neonatorum. *Acta Medica Iranica* 2002; 40:177-80
5. Jain R, Wadhvani M, D'Souza P, Beri S, Dutta R, Singh A. Conjunctival flora of the newborn - does the mode of delivery affect it! Bangalore: AOIC Proceedings; 2008.
6. Amini E, Ghasemi M, Daneshjou K. A five-year study in Iran of ophthalmia neonatorum: prevalence and etiology. *Med Sci Monit* 2008; 14:CR90-6.
7. Chang K, Cheng VY, Kwong NS. Neonatal haemorrhagic conjunctivitis: a specific sign of chlamydial infection. *Hong Kong Med J* 2006; 12:27-32. Comment in: *Hong Kong Med J* 2006; 12:247; author reply 247.
8. Normann EK, Bakken O, Peltola J, Andreasson B, Buhl S, Sigg P, et al. Treatment of acute neonatal bacterial conjunctivitis: a comparison of fucidic acid to chloramphenicol eye drops. *Acta Ophthol Scand* 2002; 80:183-7.

9. Di Bartolomeo S, Higa M, Janer M, Pennisi A, Balbin G, Priore G. [Neonatal conjunctivitis in a hospital at gran buenos aires - last 5 years up-date]. *Rev Argent Microbiol* 2005; 37:139-41. Spanish.
10. Gichuhi S, Bosire R, Mbori-Ngacha D, Gichuhi C, Wamalwa D, Maleche-Obimbo E, et al. Risk factors for neonatal conjunctivitis in babies of HIV-1 infected mothers. *Ophthalmol Epidemiol* 2009; 16:337-45.
11. Isenberg SJ, Apt L, Wood M. The influence of perinatal infective factors on ophthalmia neonatorum. *J Pediatr Ophthalmol Strabismus* 1996; 33:185-8.
12. Najafi RB, Samani SM, Pishva N, Moheimani F. Formulation and clinical evaluation of povidine-iodine ophthalmic drop. *Iranian J Pharma Res* 2003; 2:157-60.
13. Gilbert C, Foster A. Childhood blindness in the context of vision 2020 - The right to sight. *Bull World Health Organ* 2001; 79:227-32. Epub 2003 Jul 7.
14. Ghahramani M, Ghahramani AA. Epidemiological study of ophthalmia neonatorum and impact of prophylaxis on its incidence. *Acta Medica Iranica* 2007; 45:361-4.
15. Yip TP, Chan WH, Yip KT, Que TL, Lee MM, Kwong NS, et al. Incidence of neonatal chlamydial conjunctivitis and its association with nasopharyngeal colonization in a Hong Kong Hospital, assessed by polymerase chain reaction. *Hong Kong Med J* 2007; 13:22-6.
16. Soltanzadeh MH, Razavi J, Behzadifar A, Arbabi AH, Badami N, Maliehe Khodami M, et al. Epidemiological study of neonatal conjunctivitis [Internet]. 2002. [cited 24 Mar 2010]. Available from: www.professorsoltanzadeh.com/article/eng-maghale21.html
17. Hayme HE. Human genetics. In: Behrman RE, Kliegman RM, Jenson HB, editors. *Nelson textbook of pediatrics*. 17th ed. Philadelphia: Saunders; 2005.p. 376-81.
18. Ali Z, Khadije D, Elahe A, Mohammad M, Fateme Z, Narges Z. Prophylaxis of ophthalmia neonatorum comparison of betadine, erythromycin and no prophylaxis. *J Trop Pediatr* 2007; 53:388-92. Epub 2007 Nov 30.
19. Prentice MJ, Hutchinson GR, Taylor-Robinson D. A microbiological study of neonatal conjunctivae and conjunctivitis. *Br J Ophthalmol* 1977; 61:601-7.
20. 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.