

Neonatal Conjunctivitis (A Pilot Study)

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ABSTRACT

Neonatal conjunctivitis has not been well studied in Saudi Arabia. This pilot study has been performed on 51 newborns, born in King Abdulaziz University Hospital to find out the main cause of neonatal conjunctivitis in this hospital. Symptomatic neonatal conjunctivitis was present in 9.8% of infants and Staph. Aureus was the most common cause. Chlamydia trachomatis was the most frequent (21.6%) cause of asymptomatic neonatal conjunctivitis. None of the affected infants were Saudi. A multicentre study of a large number of Saudi's newborns with adequate follow up is necessary to determine the prevalence of this disease in Saudi Arabia.

Neonatal conjunctivitis is the most frequent observed disease among newborns in the first month of life. It occurs in 1.6–12% of newborns. It is manifested by a variable degree of chemosis, periorbital oedema, conjunctival redness and ocular discharge. It has a varied aetiology, including antimicrobial drops, bacteria, chlamydia and viruses¹⁻³.

Chlamydia Trachomatis is the most common cause of ophthalmia neonatorum. The incubation period is usually 5-14 days and may not be manifested clinically until the infant is 2 months old. The course of the disease is usually benign, and tends to resolve spontaneously several weeks to several months after onset. Chlamydial conjunctivitis in the newborn may be complicated by chlamydial pneumonitis or otitis media¹⁻³.

Chlamydia Trachomatis is the major cause of sexually transmitted diseases in industrialised countries. In the USA, 2-18% of pregnant women have genital chlamydial infection and 20-35% of their infants develop symptomatic eye infection⁴.

The Microtrak chlamydia trachomatis direct specimen test (Syva Co. Palo. Alto, CA) is widely used to diagnose chlamydial infection. In this test, a monoclonal fluorescein labelled antibodies are used to detect the presence of the elementary and reticulate bodies of *C. trachomatis*. This test is highly sensitive and specific to *C. trachomatis*. A positive Microtrak *C. trachomatis* direct specimen test result agreed with the Microtrak *C. trachomatis* culture confirmation test result in 98% of all cases. A negative Microtrak direct test result agreed with the culture result 100% of time^{1,5}. The Microtrak direct test provides a rapid method of detecting both active and latent *C. trachomatis* infection⁶.

Neonatal chlamydial eye infection has been considered virtually non-existent in areas with endemic trachoma like Egypt and Saudi Arabia⁴.

In our hospital (King Abdulaziz University Hospital, Jeddah, Saudi Arabia) we are rarely called by Paediatricians to manage newborns with severe or resistant neonatal conjunctivitis. No prophylactic antimicrobial agents are routinely given to neonates.

This pilot study was conducted to find out the principle causes of neonatal conjunctivitis in King Abdulaziz University Hospital.

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METHODS

A prospective study was performed on 51 infants (selected randomly out of 200 infants), who were born during the month of October 1990 in King Abdulaziz University Hospital. The study aim ocular examination, lab tests, and follow up schedule were explained to the parents and their verbal consent to include their children in the study was obtained. The date of birth and examination, the sex of infant, mode of delivery and nationality were recorded.

The external and anterior segment of the eye were examined by Keeler indirect ophthalmoscope and (+) 20 D Nikon lens. Notes were taken about discharge (none, watery or purulent), conjunctiva (clear, red or chemotic) inflammatory membrane (present or absent) and cornea (clear or ulcerated). Initially none of the infants were receiving antimicrobial agents systemically or topically.

The infant was considered to have symptomatic neonatal conjunctivitis if he/she had ocular redness, discharge and positive Microtrak direct test or bacterial culture. The infant was considered to have asymptomatic neonatal conjunctivitis if he/she had only positive Microtrak direct test.

The inferior and superior palpebral conjunctiva of each eye was scraped with a sterile dacron swab after the instillation of topical Benoxinate (Oxybuprocaine HCL) 0.4% drops. Two dacron swabs were used; one to inoculate chocolate agar plate and the other was rolled onto 8 mm well of Microtrak chlamydia trachomatis direct specimen test microscope slide (Syva, Co. Palo Alto, CA), air dried and then fixed with acetone. The slides were then

refrigerated (2°–8°C), stained within a week of collection and viewed with Leitz fluorescent microscope (Ernest Leitz, Wetzlar, Germany). All slides were read by (F G), who was unaware of the clinical diagnosis.

If the clinical examination suggested severe infection; two slides were immediately sent for Gram and Giemsa stain. Viral culture was done if clinically suggested.

Infants with no conjunctivitis (or asymptomatic conjunctivitis) were immediately discharged and the parents were instructed to bring the infants immediately to the eye clinic if he/she developed conjunctivitis; while infants with conjunctivitis were treated and discharged after cure. All infants were scheduled for clinical check up at two and four weeks. The Microtrak direct test was repeated at four weeks.

RESULTS

Fifty one infants (29 females and 22 males) were included in this study. None of them had been given antimicrobial agents before inclusion in the study. Five infants were examined on the day of birth, 31 infants at 24 hours, 9 infants at 48 hours, 5 infants three days old and one infant six days post delivery.

Five (9.8%) infants (4 males and one female) developed mild neonatal conjunctivitis. Two infants developed conjunctivitis of both eyes, two of the right eye and one of the left eye. In all cases the infection developed before the 10th day of life. Staph. aureus was isolated from two (22.2%) eyes and pseudomonas and Klebsiella Oxytoca were isolated from one eye each (Table 1).

Table 1
Summary of the 5 cases of neonatal conjunctivitis

Case No	Sex		Age at onset of infection (days)	Involved eye		Bact. Culture Isolated	Initial Microtrak test Results
	M	F		RE	LE		
2a	+		3	+	-	S. Aureus	?+
13b	+		4	+	+	S. Aureus	-
19	+		7	+	-	S. Epidermidis	+
39	+		6	+	+	RE. K. Oxytoca LE. S. Epidermidis	-
45		+	9	-	+	Pseudomonas Aeruginosa	-

a: Developed symptomatic chlamydial conjunctivitis after 2 months

b: Developed symptomatic chlamydial conjunctivitis after one month

Fourteen (27.5%) infants had positive Microtrak direct test results on initial and/or one month test. Three of the 14 infants had questionable results on initial examination due to low numbers of infected epithelial cells on the smear. Two of those three infants became positive and one negative on the final tests. Eleven of the 14 infants were asymptomatic and three (case Nos. 2,13,19) had symptomatic conjunctivitis. Case Nos. 2 & 19 had coexistent positive bacterial cultures and case No 13 had bacterial conjunctivitis, but a negative Microtrak direct test initially, then he developed symptomatic chlamydial conjunctivitis after one month. Three (case No 37,43,51) of the 14 infants had positive Microtrak direct test results on initial and final tests. Three (case Nos. 9,17,44) of the 14 infants had positive Microtrak direct test results initially but negative ones on final tests. One (case No 19) of the 14 infants had positive Microtrak direct test result initially but did not show for follow up. Four (case Nos. 7,13,20,31) of the 14 infants had negative Microtrak direct test results initially and became positive on final tests.

Bacteria were isolated from 22 eyes. None of these eyes developed neonatal conjunctivitis on follow up. Table 2 shows the microorganisms isolated from the infants eyes in the conjunctivitis and non conjunctivitis groups. Staph. epidermidis was the most common isolated organism followed by Staph. aureus. S. epidermidis was more common in the non conjunctivitis group, and S. aureus in the conjunctivitis group.

Table 2
Bacteria isolated in the Conjunctivitis and non-conjunctivitis groups

Bacteria isolated	Conj.group (7 eyes)		Non-Conj.group (95 eyes)	
	RE	LE	RE	LE
Staphylococcus Aureus	2	1	0	1
Staphylococcus Epidermidis	1	1	9	5
Staphylococcus Albus	0	0	1	1
Streptococcus Viridans	0	0	1	1
B-haemolyticus Strepto. (group C)	0	0	1	1
Klebsiella Oxytoca	1	0	0	0
Branhamella Catarrhalis	0	0	1	0
Pseudomonas Aeruginosa	0	1	0	0
Normal Flora	0	0	2	2
No Growth	0	0	31	38

Sixteen infants were Saudi, none of them developed clinical conjunctivitis.

DISCUSSION

Neonatal conjunctivitis has not been well studied in Saudi Arabia. Two previous studies have shown, as in our study, that Staph. aureus is the commonest cause of neonatal conjunctivitis in Saudi Arabia^{7,8}. Chlamydial, neonatal conjunctivitis and cervicitis in pregnant women were not studied in Saudi Arabia. The prevalence of chlamydial infection of newborns in Saudi Arabia determined by testing the presence of chlamydial antibody in umbilical cord blood was 31.37% in Jeddah⁹.

This pilot study has shown that 16 (31.4%) infants had eye infections, 5 (9.8%) infants had symptoms, and 11 (21.6%) infants were asymptomatic. Asymptomatic, subclinical or latent C. trachomatis eye infection was observed by Insler, et al in clinic for sexually transmitted diseases and Dannevig, et al in ophthalmia neonatorum survey^{10,11}. Insler, et al reported eight cases of asymptomatic chlamydial eye infection; all had positive Microtrak direct test, but only two had positive culture. Dannevig, et al reported 2 infants with asymptomatic chlamydial eye infection, diagnosed by culture. One of the two infants became symptomatic after 24 hours and the other 6 months after sampling. Two (case Nos. 2 & 19) of the five infants in our symptomatic group had symptoms due to Staph. infection initially and after one month he developed symptomatic chlamydial eye infection. Two infants (case Nos. 2 & 43) developed symptomatic chlamydial conjunctivitis after two and six months respectively. So at least three of our asymptomatic group became symptomatic on long follow up.

Four infants had a negative Microtrak direct test initially and became positive after one month. These cases may have been initially tested during the infection's incubation period.

Four infants with a positive Microtrak direct test initially which became negative after one month may represent cases of spontaneous remission, which are known to occur within a few weeks to several months after infection³.

The accuracy of the Microtrak direct test depends on the presence of enough infected epithelial cells in the specimen. To obtain an adequate sample, the swab should be applied firmly to the conjunctiva¹². Three of the infants had initially questionable positive Microtrak test due to gentle application of the swab. The firm application of the

swab will ensure securing enough cells but may cause bleeding and scarring of the conjunctiva as it happened in some of our cases. The scar occurred within two weeks of sampling in the application area. These complications mandate that another (simple and safer) method to obtain an adequate sample should be investigated.

A striking finding in this study was the absence of neonatal conjunctivitis in the Saudi's infants. This could be due to the small number of infants studied, the better standard of living of parents, the regular check up of mother in the obstetric clinic or non existence of neonatal chlamydial eye infection in areas with endemic trachoma⁴.

Attendance at follow up was poor, as 12 (23.5%) infants did not turn for follow up. Neonatal conjunctivitis is probably under estimated in this study due to the latter factor. Follow up is a constant problem for clinical studies in developing countries and should be compensated for by studying large numbers of cases⁸.

Another striking finding in this study was the absence of cases of Neisseria Gonorrhoea. If the frequency of such infection is low, a large number of patients would be necessary to ascertain the prevalence of this infection in the population.

To find the prevalence of neonatal conjunctivitis in Saudi's infants, we recommend a multicentre long term prospective clinical study of a large number of infants. The prevalence of chlamydial cervicitis in pregnant women could also be studied in conjunction with this study.

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