CHANGING TRENDS IN THE EPIDEMIOLOGY AND MANAGEMENT OF GONOCOCCAL OPHTHALMIA NEONATORUM

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ABSTRACT

Between June 1985 and December 1988, 58 cases of gonococcal ophthalmia neonatorum were admitted to the neonatal unit at the University Hospital (USM). Of these, 15 (25.9%) cases were due to penicillin-resistant strains of Neisseria gonorrhoea. Of the 58 cases, 56 cases were treated effectively with a single dose of antibiotic given systemically. The mean period of recovery was shorter with spectinomycin in doses of 40mg/kg than with cefotaxime (100 mg/kg). There was no permanent sequelae in the treated cases. An increasing incidence of infection with penicillin-resistant strains of N. gonorrhoea has been observed in the area of study.

Keywords : Gonococcal ophthalmia neonatorum, penicillinase-producing N. gonorrhoea (PPNG)

SINGAPORE MED J 1992; Vol 33: 279-281

INTRODUCTION

Gonococcal ophthalmia neonatorum is a preventable complication of gonorrhoea. In recent years, there has been a surge in the incidence of this entity in many parts of the world[1]. Since 1976, when a penicillin-resistant variety of N. gonorrhoea infection was first described, there have been many case reports of neonatal ophthalmia caused by this agent. This problem seems to be particularly common in the South-East Asian countries[2-4]. An earlier study conducted in this hospital between 1982 and mid-1985 revealed 5 cases (6.4%) of infection with penicillin-resistant strains of N. gonorrhoea in the neonates out of a total of 78 cases[5]. This paper reports our further experience in this hospital of gonococcal ophthalmia neonatorum between mid-1985 and December 1988; we have attempted to discuss the epidemiological trends, clinical features, treatment alternatives and sequelae of these infections.

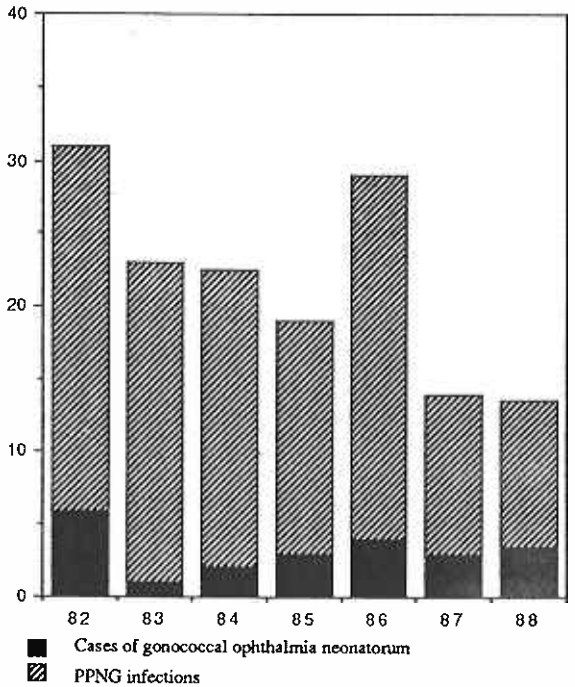
MATERIALS AND METHODS

Case records of gonococcal ophthalmia neonatorum admitted to the University Hospital from June 1985 to December 1988 were reviewed. During the above period, the hospital was the sole tertiary referral centre for all paediatric and neonatal cases for the states of Kelantan and northern Trengganu. In these cases, bacteriological diagnosis was made by smear and culture of the eye discharge. An immediate Gram stain was done in all these cases; chocolate agar and Thayer-Martin agar was used for inoculation of the materials for culture. The plates were incubated at 37°C in an atmosphere of carbon dioxide and were read at 24 and 48 hours. The initial treatment with the antibiotics was based on Gram stain identification of N. gonorrhoea. The colonies, in the meanwhile, were tested for penicillinase production. Antibiotic sensitivity was tested on chocolate agar using standard techniques. Smears were repeated from the neonates' eyes only in cases of persistent discharge in spite of antibiotic therapy beyond 4 days. The parents of the confirmed cases were referred to the Venereology clinic for investigations and management.

RESULTS

There were a total of 58 confirmed cases of gonococcal conjunctivitis during the above period. Of these, 15 (25.9%) were due to penicillinase-producing N. gonorrhoea (PPNG) strains (Fig 1). Ten of these neonates were delivered in the University

Fig 1 - Cases of gonococcal ophthalmia neonatorum in state of Kelantan (1982-1988)



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Hospital. None of these 58 cases, including the ones delivered in the hospital, received any form of prophylaxis against gonorrhoeal infection during birth. The onset of symptoms in the affected cases varied from within 24 hours to a maximum of 23 days as shown in table I. The symptoms consisted of purulent or bloody eye discharges in all the cases. The discharge was unilateral in 10 (17.2%) cases. Five (8.6%) cases had associated systemic signs of generalised sepsis such as hypoglycemia (3.4%), poor feeding (3.4%) and excessive crying (1.7%). On examination, none of the cases had corneal involvement; 2 (3.4%) cases had conjunctival pseudo-membrane. In 7 (11.9%) cases, there was a history of vaginal discharge in the mother and in 9 (15.3%) cases, there was a paternal history of venereal exposure. Only in one case was there associated features of congenital syphilis, which was confirmed serologically. The systemic drugs used in the study were spectinomycin (40 mg/kg as a single intra-muscular dose) in 32 cases and cefotaxime(100 mg/kg single intra-muscular injection) in 24 cases. Two other patients received Inj aqueous penicillin G (50000u/kg/day for 3 days) and Inj cefuroxime (50/kg as a single dose) respectively. Local eye care provided for all the affected babies consisted of saline wash and hourly instillation of guttae chloramphenicol eye drops. Total recovery in these cases was defined as absence of eye discharge and congestion. The time taken for recovery is shown in table II. There were 2 cases of poor response to original antibiotics as defined by persistent eye discharge beyond 4 days. This was confirmed by repeating the eye swabs on day 4, which showed persisting N. gonorrhoeae. One of these cases was given spectinomycin initially and subsequently, the neonate responded to a single intra-muscular dose of cefotaxime (100mg/kg). The second case with poor response was initially given Inj aqueous penicillin G for 3 days (50000 u/kg/day) and subsequently responded to Inj cefotaxime (100 mg/kg as a single dose). Interestingly, the in vitro sensitivity studies done in the first case showed N. gonorrhoeae sensitive to both penicillin and spectinomycin and in the second case the organism was resistant to penicillin. None of the 58 cases had any permanent sequelae in the form of corneal opacities. There was no significant difference in the clinical presentation and the response to treatment between the penicillin-sensitive and penicillin-resistant group with the sole exception of the case reported above, which did not respond to initial therapy with penicillin.

Table I - Onset of Symptoms (n=58)

Time onset	No. (%) of cases
<24 hrs	10
24-48 hrs	15
48-72 hrs	14
> 72 hrs	19

Table II - Time Taken for Recovery

Drug used	No. of Cases	Mean Duration For Recovery (in days)
1. Spectinomycin (Single dose)	32	2.78
2. Cefotaxime (Single dose)	24	3.50
3. Penicillin G	1	4
4. Cefuroxime (Single dose)	1	3

None of the antibiotics used in the study produced any significant adverse effects.

DISCUSSION

The recommendations of the American Academy of Paediatrics and the National Society to Prevent Blindness Committee on ophthalmia neonatorum state that the acceptable prophylactic agents for N. gonorrhoeae include 1% silver nitrate solution, 0.5% erythromycin ointment or drops or, 1% tetracycline ointment or drops instilled under the lids after cleaning the skin with sterile cotton moistened with sterile water. Topical silver nitrate solution has been found to be equally effective against both penicillin-sensitive and PPNG strains and this is considered to be a distinct advantage over topical antibiotic drops which would be ineffective against PPNG strains[6]. In Malaysia, where routine prophylactic topical preparations are not used, the incidence of gonococcal ophthalmia neonatorum is possibly significantly high although the actual incidence is not known because of underreporting. A significant proportion of these cases is likely to be due to infection with PPNG strains. Early cases of infections with PPNG strains are believed to have originated from South-East Asia; in 1981 up to 48.9% of strains of N. gonorrhoeae isolated in Bangkok were reported to be PPNG[7].In a study conducted in Great Britain, during the period of 5 years from 1977 to 1981 inclusive, 47% of the imported cases of PPNG infections were reported to have arrived from Thailand[8]. The state of Kelantan, where our study was conducted, is geographically close to Thailand and has shown a high incidence of such infections in a previous study[5]. The present study shows that although the incidence of infections due to PPNG strains in recent years. Since neonatal ophthalmia can be viewed as a reflection of the prevalence of gonococcal infection in the community, this trend is disturbing.

Both the penicillin-sensitive and the resistant forms of infections had an onset ranging from 1 to 23 days of life. The late onset could be due to post-natal acquisition of the infection from either of the parents[8]. Lack of corneal involvement in the affected babies has been observed in other studies[5]; however, the postulation that PPNG has a lower tendency for invasion of comeal epithelium than non-PPNG strains has not been confirmed[5]. Although gonococcal ophthalmia in the neonate is a recognised cause of comeal perforation and opacity and permanent blindness[9], it is noteworthy that in the present study there was no permanent sequelae even in those babies where there was a delay in the institution of treatment. In all those regions where PPNG is prevalent, penicillinase-stable antibiotics have become the treatment of choice. In the present study, systemic spectinomycin was used as a single agent in 32 cases and cefotaxime in 24 cases. Both the drugs proved to be very effective when given as a single intra-muscular dose and were free of any side effects; the mean period for recovery with spectinomycin was 2.9 days (n=32, SD=0.73) and that with cefotaxime was 3.5 days (n=24, SD=0.84); this difference in means is considered statistically significant [t_{54}=3, ($p<0.01$) 2 tail, and Z ($p < 0.001$) 2 tail]. Spectinomycin has structural similarities to aminoglycosides but is not known to cause ototoxicity or renal dysfunction. The drug has often been considered as the drug of choice in PPNG infections in adults[8,10,11]. Although there was an initial reluctance to use the drug in neonates[2], studies done in this hospital over the last 8 years showed that the drug is effective and safe in neonates in doses of 40mg/kg given as a intra-muscular injections. However, long term adverse effects of the drug in treated infants have not been fully studied[5]. Cefotaxime has been used as a suitable alternative with a high success rate. Rajan et al recommended that a single intra-muscular injection of cefotaxime (100 mg/kg)is effective and safe[12]. In the present series cefotaxime proved to be effective in all the 24 cases where it

was used. A single intra-muscular injection of ceftriaxone in doses of 50 mg/kg was used in Thailand and was considered equally effective. Systemic aminoglycosides are now avoided in the neonates because of their potential toxic effects. The role played by the topical instillation of antibiotics in the treatment of gonococcal ophthalmia is not clear although it is considered that such a treatment in the absence of systemic therapy may not be able to control the infection effectively. Local irrigation of saline possibly plays a minor role by diluting or washing away penicillinase produced by the PPNG strains[8].

In view of the increasing incidence of the PPNG infections, routine prophylactic penicillin eye drops or even a single intra-muscular dose of 5000u of penicillin G given in the delivery room as recommended by Raucher et al[6] may not be useful in Malaysia. Topical silver nitrate preparations, on the other hand, are effective even in PPNG infections, but are technically difficult to instil in the eye of neonates, and often a part of the medication does not reach parts of the conjunctiva[8]. In addition, silver nitrate is ineffective against chlamydial eye infections and furthermore, chemical conjunctivitis often follows the use of these preparations. We recommend that in those regions of Malaysia where PPNG forms a significant proportion of gonococcal infections, spectinomycin or one of the penicillinase-stable cephalosporins should be routinely used systemically for treatment of gonococcal ophthalmia neonatorum. Local care including saline wash and topical instillation of antibiotics should be a part of the regimen. Further studies need to be done to determine ways and means of preventing neonatal ophthalmia preferably by improving the antenatal detection and management of affected parents.

ACKNOWLEDGEMENT

We wish to acknowledge the Medical Director of Hospital USM for his permission to present data and Dr Win Kyi, Department of Community Medicine , for her statistical assistance.

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