CASE REPORT

Serratia marcescens conjunctivitis due to nasolacrimal duct obstruction

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ABSTRACT

A case of a 3-month-old child with conjunctivitis subsequent to nasolacrimal duct (NLD) obstruction is reported. *Serratia marcescens* (*S. marcescens*) was cultured from the discharge from the left eye; the child was treated and cured effectively with appropriate antibiotics.

Key words: Conjunctivitis, nasolacrimal duct (NLD), *Serratia marcescens* (*S. marcescens*)

INTRODUCTION

Serratia marcescens (*S. marcescens*) is a ubiquitous opportunistic nosocomial pathogen causing a variety of infections in all age groups including neonates with high mortality rates and is resistant to most of the conventional antibiotics. Outbreaks of *S. marcescens* meningitis, wound infections and arthritis have occurred in paediatric wards.[1]

In the eye, it may cause conjunctivitis, keratitis, endophthalmitis and tear duct infections.[2] Conjunctivitis develops in neonates because of their immature lacrimal duct systems, immature immune systems and because colonisation of the conjunctivae can occur during neonatal care.[3] All strains of *S. marcescens* are considered intrinsically resistant to Ampicillin, macrolides and first-generation Cephalosporins. Aminoglycosides have shown consistent efficacy *in vitro*. Fluoroquinolones, third-generation Cephalosporins, Trimethoprim/sulfamethoxazole, Tetracycline and synthetic penicillins show variable activity.[4]

CASE REPORT

This male baby born by lower segment caesarean section (LSCS) at term, in a private hospital, had discharge from both eyes from the third day of birth and was treated with tobramycin eye drops. At 35 days of birth, the child was diagnosed with urinary tract infection and was treated at two private hospitals and finally got admitted at Sree Avittom Thirunal Hospital (SATH), Medical College, Thiruvananthapuram, Kerala, India for further investigations and management. The child was then referred from SATH to the Regional Institute of Ophthalmology (RIO) for complaints of discharge and lacrimation of both eyes. On examination, the child had nasal block and congenital NLD obstruction. Ear, nose and throat (ENT) consultation showed no local cause for the obstruction.

Gram stain of discharge from the eyes showed plenty of pus cells and gram-negative bacilli. The child was given Ofloxacin eye drops with advice to come the following day for follow-up. Pus culture on blood agar (BA) showed pure growth of colonies that had a slight pink colour when viewed at an angle. MacConkey agar grew pale lactose-fermenting colonies. To further investigate the nature of the pigmentation noticed, sub cultures were done on nutrient agar the same day and kept at room temperature. The very next day these colonies developed a light orange-pink colour that on further incubation changed

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to dark orange-red colour. Direct sensitivity testing on Mueller-Hinton agar gave colourless colonies sensitive to Ciprofloxacin, Ofloxacin, Gatifloxacin, Gentamicin, Amikacin and third-generation Cephalosporins but resistant to Ampicillin.

The organism was a gram-negative bacillus that was catalase-positive, oxidase-negative, utilised citrate, Voges-Proskauer (VP)-test positive and reduced nitrate. Indole and Methyl-Red tests were negative. There was acid production from glucose, maltose and mannitol

The identity of the organism was confirmed as *S. marcescens* by Vitek 2 system (bioMérieux) at the State Public Health Laboratory, Thiruvananthapuram, Kerala, India.

According to the sensitivity report, the organism was sensitive to Ofloxacin, hence the eye drops were continued. The child gradually improved and a repeat culture of conjunctival swab after a week was sterile. Urine culture done at RIO was sterile as well.

DISCUSSION

S. marcescens is a motile, facultative anaerobic gram-negative rod of the Enterobacteriaceae family that includes *Escherichia coli* and *Salmonella* as well. *Serratia* is well-known for its production of a reddish-orange pigment called prodigiosin. This organism's virulence in the cornea stems in part from its production of proteases and bacterial endotoxins.[4] It mainly infects the respiratory and urinary tracts and is responsible as well for 2% of nosocomial infections.[5] The reservoir of *S. marcescens* is usually the urinary tract, throat and nose and mode of spread is hand-to-hand transmission.[1,3]

Serratia infections in neonates are frequent (11-15% in neonatal intensive care unit) and may include bloodstream infection (42%), conjunctivitis (26%), pneumonia (13%), urinary tract infection (8%), meningitis (7%) and surgical site infections.[1,6]

Nasolacrimal duct (NLD) obstruction, whether congenital or acquired, predisposes lacrimal drainage system (LDS) to secondary bacterial infection due to stagnation of the tear within the lacrimal sac (LS). Congenital nasolacrimal duct obstruction (CNLDO) has been reported in up to 6% of newborn infants.[5] The lacrimal ducts are not patent in 20% of full term neonates; additionally, nonpatent lacrimal ducts allow bacteria, tears and other debris to pool on the surface of the eye and provide a medium for bacterial growth.[3] A functional lacrimal system produces tear components, opening and closing of the eyelids act as a pump to facilitate tear distribution across the surface of the eye and the lacrimal ducts act as a drainage system that carries away tears, epithelial debris and bacteria.

Here, the NLD obstruction would have attributed to the infection along with an immunocompromised state of the infant, as evidenced by repeated and prolonged urinary tract infection not responding to treatment in the early stages.

Frequent LS massage and topical antibiotics are considered a conservative method of treatment that is most effective during the first year of life. Otherwise, surgical probing or silastic intubation is performed to overcome the unresolved obstruction. Different microorganisms were correlated with the severity of NLD obstruction observed during surgical intervention. The success rates of probing and silastic intubation as a primary procedure for each identifiable microorganism were documented. Infections due to *S. marcescens* and *Staphylococcus aureus* were more prevalent in cases of tight CNLDO. *S. marcescens* infections had 100% successful silastic intubation. Identification of the pathogen may be used to predict tight CNLDO and helps in choosing the most successful treatment option. In a study done in Saudi Arabia, CNLDO with *Staphylococcus* infection and *S. marcescens* were more likely to have tight NLD obstruction and silastic intubation had better outcomes.[5] Isolation and identification of *S. marcescens* is important to start appropriate treatment, especially in neonatal conjunctivitis.

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Conflicts of interest
There are no conflicts of interest.

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