A 4-day-old girl was brought to the emergency department (ED) for evaluation of a copious discharge from the right eye with associated swelling and redness of the eyelid (Figure 1). The discharge began 2 days earlier and had become profuse and yellow-green. Chemosis and injection of the conjunctiva of the right eye were also noted (Figure 2).

The patient’s vital signs were normal, and there were no other remarkable physical findings. There was no history of fever, fussiness, or change in feeding pattern or urinary output, and the patient had not been exposed to conjunctivitis. The infant was born by spontaneous vaginal delivery at 32 weeks’ gestation to a 17-year-old gravida 1, para 1 mother who had had only 2 prenatal visits. The mother was treated with metronidazole for an unspecified infection at her 24-week visit—the last visit before delivery. At that time, results of screening for group B streptococci, Chlamydia trachomatis, Neisseria gonorrhoeae, Treponema pallidum, and HIV infections and a rapid plasma reagin test were negative. Erythromycin ointment had been applied prophylactically to the infant’s eyes at birth.

Figure 1 – Swelling and purulent drainage are characteristic of gonococcal ophthalmia neonatorum.
Swabs of the right conjunctiva were obtained for *N gonorrhoeae* and *C trachomatis* cultures, and Gram stain and DNA amplification of the eye discharge were performed. Fluorescein examination revealed no corneal abrasion or ulceration. Gram stain of the discharge grew gram-negative intracellular diplococci within an hour. Cerebrospinal fluid (CSF) analysis revealed slightly xanthochromatic fluid, with 5 nucleated cells/L, a glucose level of 37 mg/dL, and a protein level of 93 mg/dL. The peripheral white blood cell count was 9900/L; the platelet count was normal. The infant was given a single intravenous dose of ceftriaxone in the ED and was then hospitalized. Intravenous cefotaxime was administered pending results of blood and CSF cultures. The right eye was irrigated hourly with saline until the discharge became scant. In addition, after an ophthalmological consultation, erythromycin ophthalmic ointment was applied to the right eye 4 times a day and oral erythromycin was given 2 times a day. Both the DNA amplification and conjunctival culture were positive for *N gonorrhoeae*. Cultures for *C trachomatis* were negative, as were blood and CSF cultures. By the third hospital day, the eye discharge had completely resolved, and there was minimal residual erythema and swelling of the eyelid. The patient required no further treatment. The mother was advised to seek medical treatment for herself and her partner.

*(Discussion on next page.)*

**GONOCOCCAL INFECTION: AN OVERVIEW**

Gonorrhea remains the second most commonly reported communicable disease in the United States, with an estimated incidence of 120.9/100,000. The gram-negative, nonmotile, non–spore-forming diplococci *N gonorrhoeae* are seen frequently within phagocytes in the Gram stain of clinical...
specimens (Figure 3). Humans are the only reservoir for gonococci. The main mode of transmission is through contact with the exudates or secretions from infected mucosal surfaces during sexual acts or vaginal birth and, rarely, from household surfaces in prepubertal children. The incubation period is usually 2 to 7 days.

Rates of infection are highest among young women 15 to 19 years of age—such as this patient's mother. Lower socioeconomic status, unmarried status, sexual activity at a young age, prostitution, injection drug use, and past gonococcal infections are risk factors for gonococcal infection. Inherited or acquired terminal complement deficiencies predispose patients to disseminated gonococcal infection. The rate of congenital gonococcal infection in neonates directly relates to that in the mothers and is highest in adolescent pregnancies. Among pregnant women with gonococcal infection, 13% experience septic abortion, 29% have premature rupture of membranes, and 20% deliver prematurely. Neonatal infection occurs via ascending infection, possibly secondary to chorioamnionitis; with ruptured membranes before delivery; or during passage through the birth canal. The most common infection in the neonatal period is gonococcal ophthalmia neonatorum (GON)—as in this patient. Other gonococcal infections in neonates include scalp abscesses, meningitis, and sepsis.

**POST-EXPOSURE PROPHYLAXIS FOR GONOCOCCAL INFECTION**

A single dose of parenteral ceftriaxone is recommended as postexposure prophylaxis to prevent disseminated infection in infants born to mothers with untreated gonorrhea. Prophylaxis for GON is required by law in all infants within 1 hour after birth. One percent silver nitrate solution, 1% tetracycline ointment, and 0.5% erythromycin ointment are considered equally effective—but not completely protective. A conjunctival infection develops in up to 10% of exposed infants who receive silver nitrate prophylaxis, compared with 2% to 48% of exposed infants who do not receive ocular prophylaxis. Erythromycin ointment is currently used in most hospitals.

**GONOCOCCAL OPHTHALMIA NEONATORUM**

Clinical characteristics. GON typically develops 2 to 5 days after birth; however, it may present as late as 2 to 3 weeks after delivery because of partial protection from prophylactic eyedrops. Hyperacute conjunctivitis with copious purulent discharge and significant lid swelling is characteristic. Infection is usually bilateral and associated with significant chemosis. GON is considered to be a medical emergency because corneal ulceration, perforation of the globe, and panophthalmitis with loss of vision can occur if treatment is delayed.

**Diagnosis.** The differential diagnosis for neonatal conjunctivitis includes chemical conjunctivitis and conjunctivitis caused by other organisms (such as *C trachomatis*; herpes simplex virus; *Streptococcus pneumoniae*; nontypeable *Haemophilus influenzae*; *Staphylococcus aureus*; and, rarely, enteric organisms, such as *Klebsiella pneumoniae* and enterococci). Chemical conjunctivitis usually appears within 6 to 24 hours of administration of prophylactic eyedrops and resolves within 24 to 48 hours; it is most commonly associated with silver nitrate drops. GON may be distinguished from other types of conjunctivitis by its severity and rapid progression, although there is some clinical overlap. Chlamydia conjunctivitis, for instance, has a longer incubation and manifests between 5 and 14 days after birth.

Order a Gram stain immediately for a neonate with purulent conjunctivitis. If risk factors for gonococcal infection are present, start therapy for GON while awaiting culture results. Testing for *Chlamydia* and other bacteria is also indicated. Giemsa staining that is positive for *Chlamydia* does not rule out concomitant gonorrheal infection. Nuclease amplification tests are as sensitive as cultures, have a high specificity, and can be used for screening. Culture of fluid from the infected eye remains the gold standard for GON diagnosis. Cultures of blood and CSF are also recommended when systemic gonococcal infection is suspected or proved in a neonate, although some experts maintain that evaluation for meningitis is unnecessary in a wellappearing infant.

**Treatment.** Neonates with suspected GON require hospitalization and an ophthalmology consultation. A single parenteral dose of a third-generation cephalosporin should be given. Hourly topical eye drops with saline decreases the organism load that has access to the cornea. The addition of erythromycin ointment is helpful in treating possible *Chlamydia* conjunctivitis. When *Chlamydia* is detected, a 14- to 21-day course of oral erythromycin is indicated to eradicate the nasopharyngeal carriage of this pathogen and to prevent *Chlamydia pneumonia*.  

**References: REFERENCES:**

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