NEONATAL GONOCOCCAL AND CHLAMYDIAL INFECTIONS

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[video transcript]

[00:00:06] We're going to talk about neonatal, gonococcal, and chlamydia infections. I have nothing to disclose. The objectives for this talk are to understand the role of maternal screening for both gonorrhea and chlamydia and how that affects the neonate, to recognize the clinical manifestations of these infections in a neonate, and know both prophylactic and treatment strategies for gonococcal and chlamydial disease in the neonatal period. As many of you probably know Neisseria Gonorrhoeae as a gram negative diplococcus viewed here, very pretty. And it's an infection that only occurs in humans meaning that it doesn't stay in other animals or the environment. So, it's spread from human to human and it lives on mucosal surfaces and that's where you see the predominance of disease show itself. And it's transmitted between the mucosal surfaces of people during intimate contact. It's the second most commonly reported STI in the United States. And when you see it in children outside of the neonatal period, you have to consider sexual abuse as the main reason that they could have that infection. It has an incubation period of several days and we'll see that reflected in the disease presentation. In pregnancy, there are very high rates in, so there are high rates in young women of gonorrheal infection and young women are main women of childbearing age who can become pregnant. It's associated with poor outcomes during pregnancy. This can be low birth weight, having premature delivery, or premature rupture of membranes which if prolonged can then expose the baby to other bacterial infections as well and it can cause infection up through the placenta that we called chorioamnionitis. So, screening is recommended for all women who would be considered high risk for infection.

[00:02:28] So, that's all pregnant women less than 25 years old and others whose behavior practices would put them at high risk for gonorrhoea in general, regardless of pregnancy. So, it's recommended to screen in the first trimester and then you would retest three months after treatment. In babies, the most common manifestation that you would see is a purulent conjunctivitis. So, this is the main etiology of what neonatologists or pediatricians would call ophthalmia neonatorum. So, it's conjunctivitis in a newborn baby. So, this can happen in around a quarter of infants if mothers are not treated during pregnancy, so they have active infection at the time of delivery, and it develops within a few days after birth. And we'll compare this to chlamydial conjunctivitis in just a second. And this can lead to blindness if left untreated going to be a very serious infection for these babies. Other places you can see it is as an abscess on the infant's scalp and this most commonly is associated with the use of a fetal monitoring electrode that's placed on the scalp, so it's an abrasion of the skin there already that becomes infected. Vaginitis and your urethritis is also possible, but it's seen much less commonly. And this compares the different main causes of neonatal conjunctivitis, so this is within the first four weeks, the first month of life. And you'll see here non STI bacterial infections will be the most common reasons and then chlamydia would be next most common, again chlamydia will be more common infection to have in pregnant women than gonorrhoea. And a chlamydial conjunctivitis occurs later, typically.
So, we normally think of it as after the one week mark and whereas the gonorrhea conjunctivitis occurs within the first few days of life and it's generally a much more severe or fulminant presentation. And looking at over time the rates of gonococcal and chlamydial infections have decreased, but specifically the gonorrhea conjunctivitis has not had a steady rate of decline compared to chlamydial. Other types of infections you can see would be a disseminated disease. So, just like gonococcal disease can disseminate in adults, it can also disseminate in these babies. So, they could have a bacteremia with arthritis, again like adults. One thing that's unique about infants is when they have a disseminated bacterial infection, it can also cause a meningitis. They have much less of a barrier into their CSF delivery barrier is more leaky, we say, in these babies. So, that's a unique consideration to think of. And you diagnosis this, the gold standard way would be through culture of body fluids. So, of the conjunctival fluid, synovial fluid if arthritis is present, CSF, and you would want to check that in any baby with disseminated disease or blood, as well as any tissue samples you might have. This will, just like an adult's, will allow you to test for antibiotic susceptibility and even if you don't get growth, if you see that characteristic diplococi and gram stain can be very helpful in figuring out the etiology of the conjunctivitis or other illness. There are some FDA approved nucleic acid test for conjunctival specimens only. And how do we prevent this in the baby? So, all babies receive prophylaxis against the eye infection, the conjunctivitis, by getting topical erythromycin ointment placed within an hour of birth.

We used to use silver nitrate, but that actually can cause a chemical irritation of the eyes. So, it's no longer used in this country. So that's all infants regardless of what you know about mom. If you do know that mom has a gonorrhea infection, then the baby will receive actual treatment as if they have eye disease and that's where the dose of ceftriaxone. And if you're using Ceftriaxone, the topical ointment doesn't really add much to the care. So, if the baby is infected, the treatment of infection requires hospitalization. So, you would want to see the extent of disease culturing the eye discharge, blood, and any other sites that you think may be infected. You would also want to test for other perinatal STI's. So, typically with a conjunctivitis, even though, like I said, gonorrhea occurs earlier chlamydia occurs later, you would test the conjunctival specimen for both. You would also want to make sure appropriate screening for HIV and congenital syphilis has been done. And treat the mother as you would outside of pregnancy as well. And to break down the treatment we divide it into the conjunctivitis and author disseminated disease like I mentioned earlier the treatment for conjunctivitis is a single dose of Ceftriaxone. Oftentimes you're evaluating the child for a disseminated disease, so you would continue Ceftriaxone until your evaluation is complete and you confirm that they don't have disseminated disease.

You also want to flesh out the eye as much as possible, but that could just be done with saline. You don't need to also use a topical antibiotic. For disseminated disease, you would continue the same Ceftriaxone for seven days and even longer if they have meningitis. And there is really no data for the use of dual therapy or gonococcal disease in infants. Now onto chlamydia and a little background that most of you probably are already familiar with; it's and intracellular bacteria and there are many different subtypes. It is the most commonly reported STI, so something to think about in your pregnant
women. And there can be a variety of manifestations in the baby and even in adults as well. And it has a more variable deletion period than gonorrhoea and part of that is it also has variable symptoms, so it's not harder to pick up. So, again, like gonorrhea, there are high rates of infection in woman of childbearing age. Depending on risk factors it can be up to 20 percent of pregnant adolescents. It's also associated with poor pregnancy outcomes many of the similar outcomes, premature rupture of membranes, preterm labor, and even miscarriage. There is a very high rate of transmission onto the infant during vaginal delivery. Infants typically will get either of these infections by passing through the infected birth canal. So, certainly much higher in vaginal deliveries than in C-sections, particularly if there hadn't been ruptured membrane prior to the C-section. So, over half of babies will get colonized or infected with chlamydia if Mom's untreated at the time of vaginal delivery. And most commonly it will infect throughout the nasopharynx. They can also colonize and infect the conjunctiva, vagina, and rectum, and this is based on cultures culturing different sites of babies. So, again, this is recommended to be screened for in all pregnant woman in less than 25.

[00:11:21] And others consider to be at high risk for having infection. And any positive strain should receive treatment with a tested cure or on a month after treatment, and again retesting and making sure that the mom has received testing during her third trimester is closer to delivery. If she, even if she tested positive and was treated earlier during pregnancy to make sure she hasn't become reinfected. And this routine screening and treatment has led to significant decreases in neonatal chlamydial disease. So, this also produces a conjunctivitis as we brought up earlier and this can happen in up to a half of infected infants but generally has a slightly lower rate than that. And the presentation is a little more variable than the gonorrhea. Again, developing up to weeks after birth and it can show up rather similarly to the gonococcal eye disease with a purulent conjunctivitis, swelling of those membranes. But, it's not generally as severe. Unfortunately, the use of topical erythromycin does not prevent the chlamydia conjunctivitis, or further, chlamydial infections, it only prevents the gonococcal conjunctivitis. The other classic infection that you can see from chlamydial disease in infants is pneumonia. And so, this too, can develop in a quarter up to half of infected infants of untreated mothers. And this happens much later, so after the conjunctivitis period with a range of around 2 to 20 weeks after birth. So, this is kind of in the months range. And it can have a pretty insidious onset. So, the babies often don't have fevers. It's a relatively mild pneumonia. So, it doesn't show up like more classic bacterial infections in infants. The baby can have this kind of halting staccato cough, can just be breathing fast you might hear other signs on exam like rales.

[00:13:41] What's important to note is that babies usually don't wheeze with this unlike with RSV, which is a common viral infection that infants of this age could get and be quite sick with. They may have some URI symptoms as well, though. And this is an example of an X-ray of a baby with a chlamydial pneumonia and you can see just some hazy areas kind of throughout the lungs. Another hallmark is that you may see eosinophilia in their CBC and that would be pretty unique to chlamydia in terms of the infections that could occur in this age group, and the course can be somewhat relapsing, can be difficult to completely get over. So, how do we diagnose chlamydia in babies? Again, the gold standard would be
culture of the organism from the conjunctiva, from nasopharyngeal samples, like mp swabs, tracheal aspirate if the babies intubated, or even a lung tissue sample, if that's performed for diagnostic purposes. And you really need, since this is an intracellular bacteria, you need to get the actual cells of the babies so not just fluid that's leaking out of the eye really of the conjunctiva cells themselves. There is fluorescent antibody tests approved, but it has lower sensitivity and specificity, that may be available to you. Serology is also possible a positive IGM, defined by a tighter greater than 1 to 32, would be considered diagnostic of the pneumonia. Again, this often doesn't, none of these often come back in a clinically useful time frame. So, it is important to establish the diagnosis in the long run and certainly for surveillance purposes, exgeanealogic purposes, and making sure that the mother is treated an appropriate contacts are investigated. This,

[00:15:50] it's a difficult disease to have a firm diagnosis at the time that you want to consider treating the infant. And it's also important to know that the nucleic acid tests are not approved for diagnosing of chlamydial infection in neonates. So, as I mentioned the erythromycin used for gonococcal prophylaxis, does not work against chlamydial conjunctivitis, and prophylaxis is not recommended. Even though, as I mentioned there can be a very high risk of transmission to babies from expectant mothers. The efficacy is just unknown. So, infants should be watched closely. There are some situations where clinicians might decide to treat the baby particularly if they're worried about follow up, if the babies is not remaining in the hospital and their worried about the family's ability to bring the baby back in. But, as we'll talk about there is potential risk to the baby with the treatment. So, this decision always has to be weighed carefully. And in the case we had discussed, corresponding to this talk, that was a difficult decision that had to be made by the baby's treatment team. So, when you're treating either the conjunctivitis or the pneumonia, you need to give systemic therapy so you do not give a topical therapy for the conjunctivitis, particularly because you expect the baby to also be colonized in the nasopharynx, and that would not work there. So, classically this has been with erythromycin for 14 day treatment course. But, with the availability of azithromycin that's now what's given more routinely and that's only a three day course. So, the same medication is used for adults but a slightly different treatment course.

[00:17:55] So, again, as I alluded to, this is often being done empirically, so when you suspect disease but don't have the firm diagnosis yet. And it's about 80 percent effective. So, even if you treat these babies, they still do need to be followed closely and they may in certain circumstances require a second course. There's an association between erythromycin use and less, to a lesser degree, but also with azithromycin, use and pyloric stenosis in babies and that can require surgery as an intervention. So, that's why we prefer if possible to really watch the babies closely to see if they develop disease and treat only when needed rather than providing prophylaxis to all babies who might possibly become infected.

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