CASE REPORT

Indonesia Journal of Biomedical Science (*IJBS*) 2019, Volume 13, Number 1: 36-41
P-ISSN.2085-4773, E-ISSN.2302-2906

Published by DiscoverSys

Vulvovaginitis gonococcal in a child: A case report

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ABSTRACT

Background: Gonococcal or gonorrhea infection is one of the most common sexually transmitted infections (STIs). This infection is caused by Neisseria gonorrhoeae, a Gram-negative aerobic diplococcus. Gonorrhea is transmitted primarily through sexual intercourse, especially in the sexually active age, between 15-29 years. Gonococcal vaginitis is the most common form of gonorrhea in children. The infection in children generally indicates the existence of sexual contacts that require proper management. Although infrequent, nonsexual gonorrhea transmission, either from vomit, physical contact or autoinoculation may occur in children.

Case: A vulvovaginitis was found in 7-year-old Balinese girl. She was diagnosed with gonococcal infection based on the anamnesis, physical examination and laboratory examination from vagina discharge with gram stain and culture. She was treated with oral Cefixime 200 mg tablet in a single dose and obtained clinical and laboratory improvement within the period of observation for eight days. Further examination and management of the patient's parents are also performed.

Discussion: Oral cefixime is preferred for children because the route of administration is not traumatic, and have a lower price with equally good effectiveness compared to injections. There were no signs of sexual violence, and no gonococcal infection was found in the family. It is suggested that it was transmitted from nonsexual contact from the patient's friend; however, the source of infection need to be further investigated.

Keywords: *Gonococcal Vulvovaginitis, children, cefixime tablet*

Cite This Article: Indira, I.G.A.A.E., Elvina, P.A., Puspawati, M.D., Wiguna, A.A.G.P. 2019. Vulvovaginitis gonococcal in a child: A case report. *IJBS* 13(1): 36-41. DOI:10.15562/ijbs.v13i1.186

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INTRODUCTION

Gonorrhea (GO) is one of the most common sexually transmitted infections (STIs). This infection is caused by Neisseria gonorrhoeae, a Gram-negative aerobic diplococcus bacteria which are typically found in pairs.[1] Gonorrhea is transmitted primarily through sexual contact that most likely to be found at sexually active ages between the ages of 15 to 29 years.[2]

The Centers for Disease Control and Prevention (CDC) data estimates that as many as 700,000 new cases of gonorrhea occur annually in The United States, making this infection the second largest STI after chlamydia.[3,4] The incidence rate in Indonesia is not known, however, in one study, gonorrhea was ranked highest among all types of STI.[5] The Hasan Sadikin Hospital in Bandung in 2006 found gonorrhea as the leading cause of STI, whereas Sanglah Hospital Denpasar in 2008 until 2010 found gonorrhea as the second largest STI case after condyloma acuminata. Then, further research in Sanglah Hospital in 2007 until 2011 found a total of 224 new cases of gonorrhea (1.7%) of all new cases in the dermatovenereology clinic or about 16.4% of total STI cases, and 3.1% of cases occurred in children aged between 0-15 years.

Sexually transmitted infections acquired in children can occur due to vertical transmission from mother to baby (congenital and perinatal), and to postnatal infections derived from inoculation as well as from sexual contact which is usually a case of sexual violence. Gonococcal infections acquired in children almost all indicate a sexual contact that requires good management.[3] Nonsexual gonorrhea transmission, either from vomit, physical contact or autoinoculation, may rarely occur in children and is difficult to prove scientifically.[10]

Gonococcal vaginitis is the most common form of gonorrhea in children after the neonatal period. This is related to the nature of the vaginal mucosal base of prepubertal girls who have not been affected by the estrogen hormone so that it can be colonized and infected by N. gonorrhoeae.[11] The data on the prevalence of gonorrhea in children is still limited.[9] While, the prevalence of gonorrhea due to sexual violence in children in the United States and the UK is 1.2% and 1.9%, respectively. Moreover, the study of 567 prepubertal girls in Rwanda who were referred for sexual assault or vulvovaginitis found that the leading cause of the vaginal discharge was N. gonorrhoeae (35.9%).[11] Furthermore, a survey in Jakarta in 2000 from a total of 274 street children aged 10 to 20 year found that the highest prevalence of STIs is gonorrhea at 7.7%.[12]

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Received: 2019-02-27
Accepted: 2019-03-18
Published: 2019-06-01

The case of gonococcal vulvovaginitis in a 7-year-old girl is reported because gonococcal infections in children are relatively rare and have a significant impact on children and their families. Thus, this requires more in-depth management of infection source investigation to exclude the possibility of sexual violence.

CASE

A 7 years old Balinese girl referred to the Dermatovenereology outpatient clinic in Sanglah Hospital, Denpasar on October 8, 2015, for vaginal discharge examinations. The patient's complaint of an odorless and viscous white, yellowish vaginal discharge for four days. She felt pain during urination. There is no history of blisters, cuts or bruises on the genitals or other body parts. There is no previous history of vaginal bleeding or insertion. Midwives had treated the patient with no improvement before seeking a dermatologist. During this symptom, the patients remained to be active at school and no apparent changes in her behavior. There is no history of oil and any other topical application. Patients have never experienced these complaints before. There is no history of drug allergy and atopy. History of gonorrhea or genital discharge on the patient's parents is denied. The patient's friend has a similar whitish vaginal discharged complaint after the previous history of swimming, bathing and using the same towel together. The patient is the second child in the family and living with her conjugal family. The history of using a shared towel in the family was denied. Her parents worked as photographer and shopkeeper.

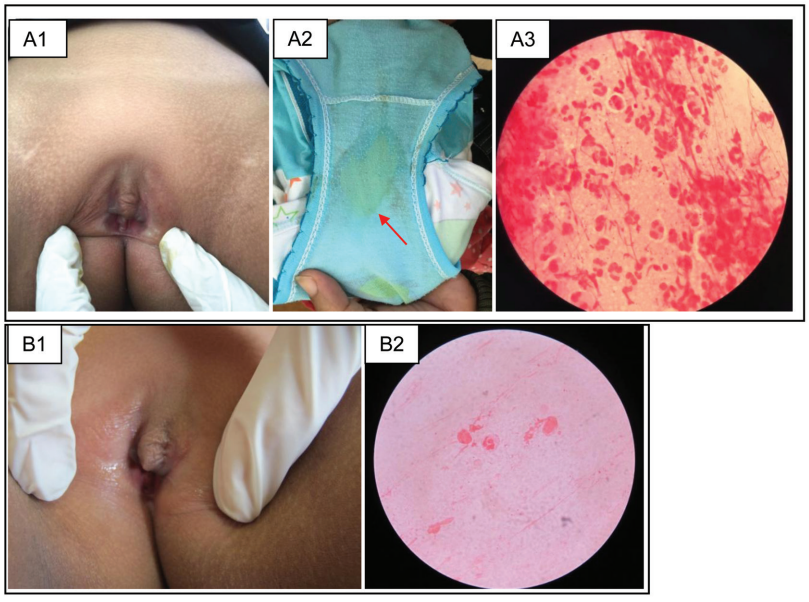

Figure 1 The vulvovaginal examination and microscopic examination of the vaginal discharge of the first (A) and fourth (B) day of the visit. The minimal erythema and purulent body in the vulvovaginal region (A1) and vaginal discharge on the underwear (A2, arrow) on the first day of visit and improvement of the erythematous vulvovaginal area with clear discharge (B1) on the fourth day. The microscopic examination from vaginal smear showed intra- and extracellular Gram-negative diplococci (A3) and markedly reduced in the number of extracellular Gram-negative diplococci (B2) on the first and fourth day of the visit, respectively.

The vital signs are normal. The vulvovaginal region shows minimal erythema with purulent discharge, yellowish white color, thick consistency, and large amount (Figure 1-A1). No bruises, edema, lacerations or erosions were found. Internal vaginal inspection examination is not performed. No enlargement of surrounding lymph nodes is observed. Moreover, a large amount but odorless yellowish discharge was found on the patient's underwear (Figure 1-A2).

The patient was tested for bacterial vaginosis and fungal infections using the amine test and the Potassium Hydroxide (KOH) staining. Both test results are negative. A wet preparation shows positive for leukocytes, but no trichomonas or candida was found. Microscopic examination with gram staining from vaginal smear shows leukocyte > 30 per large field with extra and intracellular Gram-negative diplococcus (Figure 1-A3). The patient is diagnosed with acute noncomplicated gonococcal vulvovaginitis and treated with a single oral dose of cefixime 200 mg. Specimens were collected for Gram stain and culture. The patient's and her parents were given education for vaginal hygiene and transmission prevention, and they provided consent for parents' examination to explore the possible source of infection. The parents' urinalysis were normal. The mother examination shows erythema with slight edema on the cervix. The microscopic examination from her vaginal discharge shows positive for basilococcus and no apparent gram-positive diplococci. She was diagnosed with non-gonococcal cervicitis and treated with oral single dose 1 gram of azithromycin, advised to avoid sexual intercourse within seven days or until the infection resolved. It is also advised to have the patient's friend be examined for GO. The patient was asked to revisit the clinic in on day 3, 7th and 14th after taking medicine.

On the fourth day after taking medication, subjective complaints have been reduced, and no erythema and purulent vaginal discharge were observed. There is a minimal amount of clear vaginal fluid (Figure 1-B1). The follow-up examination of KOH staining found no fungus element and the wet preparations shows no leukocytes, trichomonas or candida. The Gram staining from the vaginal

Table 1 **Timeline of the patient's clinical course and interventions**

Dates	Relevant past medical history		
5-Oct-15	Past medical history: • Seeking treatment from a midwife with no improvement Social and Family history: • Friend with similar symptoms-sharing towels and common activities • No history of atopy or drug allergy • No history of GO or vaginal discharge in parents • No apparent behavioral changes or cognitive changes		
Dates	Summaries from Initial and Follow-up Visits	Diagnostic Testing	Interventions
8-Oct-15	• Present to dermatologist for vaginal discharge and dysuria. • Physical examination of vulvovaginal area: minimal erythema with purulent discharge, yellowish white color, thick in consistency. No enlargement of surrounding lymph nodes is observed • Contamination of patients' underwear with vaginal discharge • Mother diagnosed with non-gonococcal cervicitis	Microscopic examination: • Gram staining : positive for intra and extracellular gram-negative diplococcus • KOH : negative • Wet Prep.: positive for leukocytes, no trichomonas or candida	• Patient's Medication : single oral dose cefixime 200 mg • Culture was taken • Education about vaginal hygiene and transmission prevention : encourage patient's friend for treatment • Mother treated with 1 gram azithromycin oral single dose
12-Oct-15	• Symptoms reduced, no erythema and purulent discharge	Microscopic examination: • Gram staining : positive for extracellular gram-negative diplococcus with reduced number of leukocytes Cultures show no growth for N.gonorrhoeae	-
16-Oct-15	Symptoms resolved, normal physical examination result	Microscopic examination with Gram staining shows no intra or extracellular gram-negative diplococcus	-

discharge shows a reduced number of leukocyte 1-3 per fields with positive extracellular Gram-negative diplococcus (Figure 1-B2). The result of the culture from the first day of visit shows no growth of N. gonorrhoeae. The Gram stain examination shows positive (+3) for leukocyte, epithelium (+1) and, small trunk bacteria Gram variance.

The eighth day after the treatment visit, the patients have no complaint of vaginal discharge complaint and her physical examination are within normal limits. The wet examination is found no leukocytes, trichomonas or candida. The Gram staining shows no intra or extracellular gram-negative diplococcus.

DISCUSSION

Neisseria gonorrhoeae is a pathogen that is found only in humans and transmitted primarily through sexual contact and during the perinatal period. The acquisition of gonococcal infection in children after the neonatal period and before the onset of puberty can be an indicator of the occurrence of sexual violence.[11] N. gonorrhoeae infections generally involve mucous membranes lined with columnar epithelial cells, for example, the urogenital tract, cervix, rectum, oropharynx, and conjunctiva.[1,4] Adult women often have infections of the cervix and uterus, whereas in prepubertal children most infections occur in the vagina.[13] However, Gonococcal vaginitis is not found other than in prepubertal children or postmenopausal women because the vaginal epithelium in adult sexual age women does not support the growth of N. gonorrhoeae.[4] The prepubertal children are susceptible to gonococcal vulvovaginitis for the following reasons which the vulva has no protection of labial fat pads as in adults, so the labia minora tend to be open when the child is squatting; skin vulva thin, fragile and sensitive so easily exposed to irritation, infection, dryness, peeling and blistering; absence of mucus from the cervix; vagina is alkaline due to low levels of estrogen hormone at the age of prepubertal (vaginal pediatrics of prepubertal children is 6,5-7,5 while at puberty 3,5-4,5); the prepubertal vagina becomes a good culture medium for bacteria because of its alkaline nature, its warm, moist condition and has a more superficial epithelium;

Published by DiscoverSys | *IJBS* 2019; 13(1): 36-41 | doi: 10.15562/ijbs.v13i1.186

other than that the vaginal mucosa that does not get estrogen also becomes thin, atrophy and low glycogen.[13,14] Moreover, the low immunity factor and lack of personal hygiene in children is an additional reason for the occurrence of vulvovaginitis at the age of prepubertal.[11] Gonococcal vaginitis is usually mild as it is limited to the superficial mucosa. Infection is characterized by a thick purulent vaginal fluid that can contaminate underwear, with edema, redness, pruritus, and dysuria.[11,13] Infection of the endocervix, urethra, paraurethral, Bartholin glands and the upper genital tract is rare. In some cases of STIs in children, complaints can be very minimal with whiteness as the only manifestations found.[14] These characteristics were found in our case of gonococcal vulvovaginitis girls aged seven years old with the main complaint of white vaginal discharge that is realized by the patient's mother because of the discharge found contaminating the underwear. Moreover, the symptoms of dysuria and minimal erythema of vulvovaginal area without edema, accompanied by purulent vaginal discharge, white yellowish in color, thick consistency. Thus, these symptoms and signs are likely to lead to gonococcal infection.

The bacterial culture is a gold standard in the diagnostic test of gonococcal infection. Culture specimens in pre-pubertal children are sufficiently taken from the vagina.[11] The specimen should be handled with caution to obtain valid results. First, it should be placed immediately on preheated media. Second, N. gonorrhoeae organisms in children are usually small or a minority flora, so it takes two chocolate agar platters (one with antibiotics that inhibit the growth of contaminant organisms and others without antibiotics) to be appropriately grown. Third, the disk should be incubated at 36 ° C in a CO2-rich environment, such as a candle holder, as a transport medium.[11,15] Specimens should be taken using a rayon, Dacron or calcium alginate tool. Other materials such as wood and cotton can be inhibitory and toxic to organisms. Cultures are less than ideal for routine diagnostic testing because of the complex transport requirements and time-consuming. The important benefit of culture is its ability to know the types of isolates and to test for antibiotic susceptibility.[15] Our case reported that the culture was done. The vaginal smear in patients using chocolate medium without antibiotics and transport media of CO_2 lid container which is the standard media in Sanglah Hospital, but the result was no growth of N. gonorrhoeae. This may be due to the collection of specimens using a cotton end tool, and the medium has not been preheated, the small number of N. gonorrhoeae and the growth is covered by other organisms because the culture medium is not selective. Therefore, the negative result of the culture is highly likely to be falsely negative because of these factors.

The differential diagnosis of this case is candidiasis vulvovaginal which clinically characterized with thick and white vaginal discharge; resembled cheese curds accompanied with itchiness.[16] The KOH examination will show spores and hyphae.[16] The candida infections are rarely found in pre-pubertal children unless there is a history of long term use of antibiotics or corticosteroids.[14] In our case, a Candidiasis vulvovaginitis can be ruled out.

The possibility of sexual violence must be investigated carefully.[14] The existence of sexual abuse in children with suspected STIs can be obtained from several indicators as follows: unexplained lesion on the genitals, recurrent vulvovaginitis, pain, injury and bleeding in the anus and pregnancy.[17] Behavioral changes can occur, among others, such as wetting, regression controlling bladder, and bowel movements, deterioration in school performance and stage of development that has been achieved before, fussy and attachment to parents, sleep disturbances, nightmares, and impaired eating.[17,18] In this case, there are no signs of sexual violence from physical examination or behavioral observations. The history of abrasions, cuts, bruises, or removing blood from genitalia or other body parts does not exist. The patient is still active, go to school and play, as usual, without any change in her behavior. The patient is taken care of by her mother and never leave the house alone. The minimized risk of sexual violence in our patient leads to the suspicion of non-sexual transmission.

Most cases of gonococcal vaginitis in prepubertal children are sexually transmitted, but nonsexual transmission may also occur, although rarely and difficult to be scientifically proven.[10,13] Low hygiene and the susceptibility of the prepubertal genitalia allow for the transmission of gonorrhea through direct contact or shared personal hygiene equipment. The public baths, towels, rectal thermometers, and infected caregiver hands can be a source of transmission.[13] A case report in Sydney found the transmission of N. gonorrhoeae through a toilet seat to an 8-year-old girl.[10] It was reported that N. gonorrhoeae can still grow in culture after 24 hours was allowed to dry in the toilet seat, although there is still no evidence of transmission naturally can occur from a toilet seat or similar object. N. gonorrhoeae are sensitive to heating and will die at 55 ° C for 5 minutes. Gonococcus will also die in dry conditions but may persist in the pus attached to the damp cloth within days. It was found that as long as the pus has not dried, the towel and cloth containing the pus may be infectious and become the source of transmission.[13] In 1916, Leishman reported that gonococcal germs

could be grown from contaminated bathwater within 24 hours. Furthermore, Benson in 1992 reported that gonococci could be regenerated from the rabbit's skin, bed sheets, rubber, water, wood and iron that previously contaminated. Cultures cannot grow from soapy water, which indicates that washing with soap can prevent transmission of infection.[13] Our patient has a close female friend with similar vaginal discharge. There was a history of using toilets together without washing hands afterward, washing the genitals with toilet water, swimming and the use of a shared towel that supported the suspicion of nonsexual transmission in this case. The patients and families are provided with information on the likelihood of transmission, measures that can be taken to prevent recurrence of the infection and to suggest that the patient's friends participate in the examination.

Urine sediment and gram smear staining examination are performed on both parents to ensure that there is no transmission occurs in family members. The father shows no sign of gonococcal infection; however, the mother is diagnosed with non-gonococcal cervicitis. Cervicitis is often asymptomatic, a small proportion of cases complain of vaginal discharge and vaginal bleeding outside menstruation. Leucorrhoea (> 10 leukocytes per field view on microscopic examination of vaginal fluid) was associated with both chlamydia and gonorrhea infection of the cervix.[19] Criteria using increased leukocyte counts at endocervical swab were not standardized and could not be used because of their low positive predictive value.[19] The leading causes of cervicitis in adult women are chlamydia and gonorrhea infections. Both of these organisms infect the columnar or transitional epithelium of the urethra and endocervix, which can extend to the endometrium, salphynx, and peritoneum. In general, the chlamydial infection has an unexplained onset, asymptomatic or only mild symptoms compared with gonorrhea. Clinical features may be obtained by both mucopurulent vaginal discharge and cervical abnormalities of edema and bleeding.[20] Based on history, physical and laboratory examination excludes suspected transmission of gonococcal infection from mother to patient.

Early management for cervicitis according to CDC guidelines 2015 is 1-g dose azithromycin or a single dose of twice daily 100 mg orally for seven days. Patients are advised not to have sex for seven days and until complaints are resolved.[19] National guidelines for STI management by the Ministry of Health of the Republic of Indonesia adopted the CDC guidelines for treatment of nongonococcal cervicitis and erythromycin four times a day 500 mg orally for seven days alternatively.[21] The patient's mother was treated with 1 g of single-dose azithromycin and improvement was observed on follow up.

The treatment of non-complicated gonococcal infections in children <45 kg based on CDC guidelines is ceftriaxone 25-50 mg/kg intravenous (IV) or intramuscular (IM), single dose, a maximum dose of 125 mg. The National guidelines in Indonesia recommend a single oral dose as the first choice in the treatment of gonococcal infections.[19] Cefixim, the third generation cephalosporins, have excellent activity against N. gonorrhoeae. Plourde et al. found that oral cefixime of 400 mg of a single dose was as effective as ceftriaxone injection intramuscular 250 mg single dose in the treatment of uncomplicated gonorrhea in adolescents and adults.[22] The safety and effectiveness of oral cefixime for gonococcal infections in children have not been widely investigated. Single-dose cefixime is recommended for children according to Canadian Guidelines guidelines on Sexually Transmitted Infections.[23] The oral cefixime is preferred to be administered to children because of its less traumatic than injection, its lower price with equal effectiveness.[23] Recommended doses in children is 8 mg / kg / day peroral in 1 or 2 divided doses.[24] The patient received cefixime 200 mg single oral dose with clinical and laboratory improvement within eight days. Vaginal discharge was almost resolved, and the Gram smears show no intra and extracellular Gram-negative diplococcus.

The untreated gonococcal infections may cause local, ascending and disseminated complications. Difficulties in adolescents or younger ages may involve both the fallopian tubes and the pelvis, leading to perihepatitis and pelvic inflammatory disease (PID) resulting in infertility.[11] Disseminated complications can cause septic arthritis, as well as life-threatening meningitis and endocarditis. The prognosis of gonorrhea is good when treated promptly with the appropriate antibiotic.[4] In this case, the prognosis was good because the infection received adequate treatment, showed healing in 8 days observation and there were no complications.

CONCLUSION

This was a case report of uncomplicated gonococcal vulvovaginitis in a 7-year-old girl with vaginal discharge, vaginal redness, and observed intra- and extracellular Gram-negative diplococcus on microscopic examination. There were no signs of sexual violence, and no gonococcal infection was found in the family. The transmission is thought to come from no sexual contact of a close friend of the patient. The patients were treated with single-dose cefixime and found improvement in 8 days observation although follow up were still needed

on day 14th. The patients and families have been given information on the disease, a possible source of transmission from friends as well as measures to prevent reinfection. The prognosis in the case is excellent.

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