

Evaluation of Vulvovaginitis in Prepubertal Girls Referred to Pediatric Nephrology Clinic

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بررسی علائم بالینی، اتیولوژی و درمان ولوواژینیت در دختران نابالغ

خلاصه

مقدمه و هدف: از آن جا که ولوواژینیت شایع ترین مشکل بیماریهای زنان در دختران قبل از بلوغ می باشد در این مطالعه علت، یافته های بالینی و پاسخ درمانی در کودکانی که دچار ولوواژینیت می باشند، ارزیابی می شود.

روش کار: در طی یک دوره پنج ساله ۱۵۷ دختر در محدوده سنی ۸-۲/۵ سال که با علائم ادراری تناسلی به درمانگاه بیماریهای کلیه و مجاری ادرار کودکان بیمارستان قائم (عج) مشهد مراجعه داشتند به طور پروسپکتیو مورد مطالعه قرار گرفتند. علائم بالینی، اسمیر و کشت از ترشحات مخاطی ناحیه وستیبول مهبل مد نظر قرار گرفتند و از داروهای موضعی و عمومی جهت درمان استفاده شد.

نتایج: یافته بالینی شامل سوزش ادرار، قرمزی، درد، خارش و ترشح از مهبل بود. در ۲۷٪ موارد باکتری های بیماری زا کشت شدند که استرپتوکوک پیوژن شایع ترین میکروب بود. باکتری های روده ای غیر عفونت زا در ۴۳٪ موارد جدا شدند و در ۳۰٪ موارد هیچ گونه میکروبی رشد نکرد ارتباط معنی داری بین رشد باکتریهای بیماریزا و ترشح چرکی از واژن وجود داشت ($P<0.001$). در بیمارانی که دارای کشت مثبت به ویژه از باکتری های غیر بیماری زا بودند عدم رعایت بهداشت موضعی به عنوان عامل مرتبط وجود داشت ($P=0.001$). وجود لکوسیت در اسمیر ترشحات با رشد باکتری های بیماریزا نیز مرتبط بود ($P=0.001$). در هیچ یک از بیماران، کاندیدا و میکروب های منتقل شونده از طریق تماس جنسی کشف نشد. چسبندگی لب های دستگاه تناسلی در تعداد قابل توجهی از بیماران روئیت شد. در بیمارانی که دارای کشت مثبت بودند آنتی بیوتیک موثر بود. در بقیه بیماران رعایت بهداشت موضعی و استفاده از کرم استروژن اثر بخش بود.

نتیجه گیری: معاینه فیزیکی ناحیه تناسلی در تمام دختران دچار علائم ادراری و تناسلی بایستی انجام شود. آنتی بیوتیک فقط در بیماران دارای کشت مثبت باکتری های بیماری زا ضرورت دارد. درمان با داروهای ضد قارچ موضعی به طور معمول جایگاهی ندارد. رعایت بهداشت موضعی و استفاده از استروژن موضعی در اکثر بیماران سبب بهبودی می شود. احتمال جسم خارجی در مهبل و سوء استفاده جنسی به ویژه در موارد عود کننده و مقاوم به درمان های معمول بایستی مد نظر قرار گیرد.

کلمات کلیدی: ولوواژینیت، واژینیت، دختران قبل از بلوغ، کودکان، ترشح مهبل.

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Introduction:

Vulvovaginitis is the most common gynecologic problem in prepubertal girls (1). Although actual incidence is unknown, it is commonly encountered in general practice (2). Thin and atrophic hypoestrogenic vaginal mucosa, poor hygiene, and more incidences of respiratory tract infections with secondary vaginal involvement by specific pathogens are the factors that explain the increased susceptibility of children to vulvovaginitis (1, 2, 3).

Most cases of vulvovaginitis are due to nonspecific etiology. However in some patients it is caused by infections with specific bacterial pathogens (4). Diagnosing infection is confounded by the overlap between normal flora and potential pathogens. The presence of an organism does not itself denote causation but the clinical picture as well as microbiology should be considered before infection is assumed (1, 4). Despite vulvovaginitis being a common problem, the initial management is mostly empirical, without searching for a specific bacterial etiology, and antibiotics commonly prescribed are unnecessary (5). Our impression was that most cases presenting with vulvovaginitis have good hygiene and usually do not responded to antimicrobial agents rather than requiring simple symptomatic management and local estrogen usage.

The aims of present prospective survey are reporting of clinical features, results of microscopic finding and bacterial culture of vaginal secretions, and response to management in girls with vaginitis or vulvovaginitis.

Materials & Methods :

Our cases were consecutive prepubertal virgin girls (Tanner stage 1) suspected to vulvovaginitis who were seen in the outpatient clinic for pediatric kidney and urinary tract diseases of Mashhad Ghaem Medical Center (IRAN). Between December 1998 and March 2004, 157 consecutive prepubertal girls aged 2.5-8 years old with genital complaint were allocated. The children presented to the clinic with symptoms of burning on

voiding, redness, soreness, itching, and abnormal discharge of genital area as malodor, discolored, and occasionally blood stained discharge. Exclusion criteria were urinary tract infection (ruled in by urine culture: colony count more than 10^5 bacteria in one ml of urine), hematuria, enuresis, encoprosis, specific skin disorder, current antibiotic usage, locally used steroid or antimicrobial or antimonial, and receiving locally or systemic antibiotic during the preceding two weeks.

Oral consent was obtained from the parents of the children who were entered in the study. Selected patients and their parents were interviewed, a detailed history with pertinent clinical data were obtained using a brief interview questionnaire. A full physical examination regarding to genital area was performed to assess perineal hygiene, erythema, discharge, excoriation of the genital and anal area, and the presence or absence of labial fusion.

After the inspection of perineal and genital area in frog leg position an initial impression for each child recorded based on the following criteria (6): Vulvitis was diagnosed if the labia major, clitoris and labia minor were inflamed. Vaginitis for inflammation of the introitus, hymen and inspectable lower part of the vagina. vulvovaginitis was diagnosed if both were present. Patients were categorized as being poor hygiene if they met two of the following three criteria (6): The mother record of hygiene, fecal material seen on inspection, and the resolving of complaint promptly after improvement of hygiene. (6) The patients with vaginitis or vulvovaginitis were referred to the microbiologic laboratory. Samples of vaginal secretion were obtained for evaluation under light microscope, Gram staining for bacteria and pus cell, and bacterial culture. Midstream urine was obtained from all patients for urinalysis and urine culture. Samples of vaginal secretions were obtained from vaginal introitus or vestibule by cotton tipped swabs moistened with sterile saline solution. Secretions were cultured into a number of media such as blood agar, chocolate agar, and MacConkey agar following standard microbiological

techniques and evaluated by standard procedures. Our patients were not suspected to sexual abuse and we are not able to search the viral and bacterial agents responsible for sexually transmitted diseases other than neisseria gonorrhoea and trichomonas vaginalis. However neisseria gonorrhoea is the most common sexually transmitted agent in prepubertal children based on does note in literature review (7). The early morning sellotape test for pinworm ova was taken in all children. Urinary tract ultrasonography was performed for those with abnormal urinalysis and urinary tract infection (UTI). Treatment was given according to clinical and laboratory findings. Selection of antibiotics was based on the susceptibility of isolated pathogenic microorganisms. All the patients were asked to return 1-2 weeks later for following the response to the management.

Parameters of clinical findings and laboratory results were compared using the chi-square test.

Results :

The age of 157 girls allocated in our study ranged from 2.5 to 8 years (mean 5.2 y/o). All girls were tanner stage 1 on examination. 22 cases were excluded because of UTI (n=13), no cooperation for doing laboratory tests, following up, and failure to meet enrollment criteria. Labial fusion was detected in seven children, 2 of them had UTI. 39 girls aged 2.5 - 4.3 y/o had vulvitis without vaginitis. 12 of these 39 cases (30.7%) had history of bedwetting, 2 encoprosis. All girls were toilet trained, and 31 (19.7%) need assistance with wiping. All of them improved after giving advice about good hygiene, techniques to promote drying, avoidance of irritative or nylon underwear, and locally use of combined hydrocortisone 1% with zinc oxide ointment. Chief complaint of these patients was itching of the genital area.

Data from remaining 105 girls with vulvovaginitis, enrolled in the survey were analyzed. Table I summarizes the pertinent clinical findings of the patients.

Bacterial agents isolated from cultured vaginal swabs are presented in table 2.

Bacterial pathogens were detected in 29 of 105 (27.6 %) girls. Five patients had mixed culture. Escherichia coli, enterobacter, and staphylococcus aureus were found in mixed cultures. The bacteria were considered nonpathogen, based on those noted in literature, were isolated in 46 (43.8%) girls (Table 2).

In this study poor perineogenital hygiene was noted in 22 girls with vulvovaginitis. Culture results were nonpathogenic bacteria in 16 and pathogenic bacteria in 6 cases (table 3). All patients who were culture negative have good hygiene. There was significant correlation between poor hygiene and positive culture of vaginal secretion, ($\chi^2 = 13.26$, $df = 2$, $p = 0.001$). This difference is more due to high incidence of nonpathogenic bacterial vulvovaginitis in patients with poor hygiene.

No child had a positive result for Candida, neisseria gonorrhoea and trichomonas vaginalis. Culture results were negative in 30 patients; none of them had visible vaginal discharge. Vulvovaginal pathogenic bacterial infection was found in 17 of 21 (81%) girls with a complaint of vaginal discharge, and in 10 of 84 (11%) patients without discharge, with a statistically significant difference ($\chi^2 = 41.9$, $P < 0.001$).

Antibiotics were prescribed for those with cultured bacterial pathogens based on susceptibility of the isolated organisms in a ten day period. The symptoms and signs resolved in 67%, and no response was noted in remaining. The girls who have negative culture, mixed culture, non pathogen positive culture, and positive culture patients who were not responsive to antibacterial treatment were advised about hygiene measures, and locally conjugated estrogen usage 2 times a day for a ten day period. Resolving of symptoms and disappearing of the signs was recorded during a two week period after starting of the management.

Examination of the vaginal secretion under light microscope revealed leucocytes in 29 (27.4%) girls who were culture positive for bacterial pathogen, in 4 patients who were culture positive for nonpathogenic bacteria,

and in 3 cases who had no growth of bacteria. There was significant difference of observing WBC in vaginal swabs between those with pathogenic bacteria and patients who had no growth of pathogens ($\chi_2 = 42.8, P < 0.001$)

Pinworm ova were isolated in 5 girls who were culture negative for bacteria. Moreover, we had 2 patients with negative scotch tape test but thread like worm had been seen by the mothers. All patients with pinworm infestation were treated by single dose of 100mg mebendazol, repeated two weeks later.

Discussion:

Vulvovaginal inflammation is the most common gynecologic entity in the prepubertal girls (7). The vast majority of cases in the pediatric age group are cared by pediatricians and general physicians. Although most obstetrician gynecologists are quite experienced in caring for genital problems in women who are in their reproductive years, they often have limited exposure during their training to the evaluation and management of the children with vulvovaginitis. Gynecologists are likely to be consulted in those cases in which the child is not responding to treatment (7).

Vulvovaginitis is indeed very common in prepubertal girls. However there is obviously a spectrum of severity with asymptomatic or minor self limiting episodes at one end and prolonged or recurrent episodes at other end. Notable association discomfort presentation to medical services will also be influenced by the level of parental concern (1). In our study 67 girls had acute onset, and 38 had recurring episodes for several weeks. All girls had moderate to severe clinical presentation.

When evaluating vulvovaginitis it is very important to realize that pubertal development and its hormonal influences in addition to chronologic age. Our patients were children tanner stage 1 without hormonal influences on vaginal mucosa. A major question in the management of vulvovaginitis is whether bacteria isolated from the vaginal secretion are the actual

cause of the discomfort or are part of the normal genital flora. A similar situation exists on other mucosal surface such as in throat.

A number of studies (1, 6, 8) attempted to define the normal flora of the vaginal by performing cultures in asymptomatic girls with variable results. Other than sexually transmitted pathogens including neisseria gonorrhea, Chlamydia trachomatis, and trichomonas vaginalis the following microorganism are generally considered pathogens: Streptococcus pyogenes, Hemophilus influenza, Staphylococcus aureus, Moraxella catarrhalis, Streptococcus pneumonia, Neisseria meningitides, Shigella, Yersinia enterocolitica, and Klebsiella pneumonia (1, 4, 9, 10).

Although clear cut data on the microbial etiology of vulvovaginitis are lacking and frequently the pediatricians do not know pathogenic significance of isolated organisms in children with vulvovaginitis (8), several microorganisms that are part of the normal vaginal flora include: Staphylococcus epidermidis, Enterococci Escherichia coli, Enterobacter, Diptheroids, Anaerobic bacteria and less commonly lactobacilli (1, 6). However in many studies nonspecific vulvovaginitis with mixed bacterial flora, associated with poor hygiene and hypoestrogenic atrophic vaginal mucosa was also considered the commonest cause of vulvovaginitis in premenarcheal girls (2, 11). In 25-75% of girls with vulvovaginitis in a literature review, a specific pathogen is not isolated (3). In our study there were no pathogenic bacteria in about three fourth of cases.

A significant weakness of this study is that there is no control group. There were also the other limitations: although we attempted to enroll patients consecutively in to the study who presented with genital complains, some children may have been missed. For doing laboratory test our patients referred to different places rather than only one microbiologic laboratory.

The present study was limited to prepubertal girls (Tanner stage 1) as apposed to the other studies in which patients were categorized according to age or occurrence of menarche (1, 6, 11). The

age of our patients was less than 8 y/o. In similar studies (4, 8, 11) vulvovaginitis in this age range was related to poor hygiene and the more incidence of upper respiratory tract infection. In addition to these, the most possible explanation in our study is that the older girls prefer to refer to gynecologic clinic instead of the pediatric clinic. Although our patients were not screened for all sexually transmitted pathogens, there were not any cases involved to gonorrhea or trichomonas vaginalis. The reason may be due to religious and sociocultural status of the families in our people. Other studies have reported a significant number of girls with vulvovaginitis associated to neisseria gonorrhea and other sexually transmitted disease (12, 13). However sexual abuse should always be considered when a child presents with genital symptoms in the absence or presence of vaginal discharge, presence of rectal or genital bleeding, developmentally unusual sexual behavior (1,3,10,14). Behavioral changes, nightmares, tears, headache, enuresis, the presence of an organism associated with sexually transmitted disease, persistent or recurrent vaginal symptoms should arise possibility of sexual abuse. It should be noted chlamydia trachomatis and trichomona vaginalis in the vagina of infants can be due to perinatal maternal – infant transmission which may persist for over a year (14).

Foreign body in vagina should be suspected in children with vaginal blood discharge, foul smelling secretion or persistence of the symptoms despite an adequate antibacterial treatment. In this study there was not such a case. Foreign body is usually visible in frog-leg position because of childhood short vagina. Rectal examination or vaginoscopy under anesthesia may be necessary for detection of foreign body (9, 14). Shigella and hemophilus influenza are the other possible etiologies of recurrent or persistent symptomatic vulvovaginitis (15).

Our study similar to previous ones (1, 3) showed that vulvovaginitis due to nonspecific agents was more common than specific bacteria. In the current study a specific bacterial pathogen was found in 27.6% of 105 girls. Other studies have

reported variable rates (4, 6). Similar to previous study (1) our cases with infectious etiology tend to have more visible discharge and distinct redness of the genital mucosa. In this survey streptococcus pyogenes was the commonest bacterial pathogen. In other studies (1, 2, 4, 8, 12) it was also the most common pathogen responsible of vulvovaginitis in children. The higher incidence of streptococcal respiratory tract or skin infection among preschool and school age children may be a reason. In some studies (4, 8, 13) streptococcus group A β hemolytic, hemophilus influenza are thought to be pathogenic organisms and in another study (15) hemophilus influenza was commonest isolated pathogen. It is interesting in the present study; hemophilus influenza was a rare etiologic bacterium. Whereas there is not usage of vaccination against hemophilus influenza in our country, we found no explanation for lower incidence of hemophilus influenza infection in our children.

The results of this study suggest that finding of WBC in vaginal smear as an indicator for pathogenic bacteria had sensitivity 72.4% and specificity 90.8%. This means the presence of leucocytes does not imply the presence of bacterial infection, but when WBC are absent such as infection is less likely. There is another report (4) concerning this observation with sensitivity of 83% and specificity of 59% (4).

In one study in Bahrain the most common bacteria isolated from vaginal abnormal discharge of 50 virgin girls were S.aureus, E.fecalis and E.coli. In the present study E.coli, enterobacter were the common non pathogenic bacteria isolated from the patients.

In some studies (2, 6, 11) the poor hygiene found in many cases was considered as an important cause of vulvovaginitis in children, whereas in the other studies there was not significant difference in hygiene habits between those with pathogenic and non pathogenic vaginal involvement. In a longitudinal consecutive survey performed in a semirural area there had not been any correlation between vulvovaginitis and poor

hygiene (2). The comment from most mothers of girls was suggestive of persistence of the symptoms despite increased attempts at ensuring frequent bathing and good overall hygiene. In this study there was no history of exposure to potential irritants such as bubble bath and nylon underwear.

In our study candida albicans was not isolated in any of the girls. In many other studies (1, 4, 6) candida albicans detected in no or in a few prepubertal cases. Although candida was rarely found in asymptomatic and symptomatic preadolescent girls as a cause of vulvovaginitis (17), candida is seen more common in the presence of lactobacilli indicative of pubertal change in vaginal flora (1, 6). Candidiasis of genital organ may be seen in girls with predisposing factors such as a recent course of antibiotics usage, diabetes mellitus, immune dysfunction, and wearing of diapers. However the role of candida as a cause vulvovaginitis in prepubertal girls is controversial (5). White mucoid and odorless vaginal discharge not associated with inflammation in prepubertal and adolescent girls is suggestive of physiologic hormonal induced leucorrhea (14). Therefore it must not be mistaken with those of vaginal candidiasis.

Pinworm infestation should be considered in cases of clinical features suggesting infestation with thread worm such as pruritus of genitoanal area in night time particularly in children with lower health and socioeconomic status. It must be considered even if result of scotch tape test is negative. Sellotape slide test have relatively low yield (4). In our study ova of the parasite was isolated in 5 girls with non pathogenic bacterial positive culture. Vulvovaginitis in these children was not improved after treatment with mebendazol. Fusion of the labia minor is a common acquired occurrence in hypoenestrogenized young girls. In our study labial adhesion was a common occurrence. Therefore it must be considered in any girls with genital and urinary symptoms.

The findings of this study suggest that vulvovaginitis is not usually infectious and vulvovaginitis induced by pathogenic

bacteria is not necessarily related to poor hygiene. Nonspecific bacterial flora accounts for the majority of the cases with vulvovaginitis. There is statistically significant correlation between poor hygiene and nonpathogenic vulvovaginitis, ($\chi^2=13.26, df=2, P=0.001$).

In most studies it is recommended the girls suffering from vulvovaginitis caused by unknown etiology or by nonspecific or mixed nonpathogenic bacteria should observe hygienic measures such as avoiding tightly fitting clothing, elimination of potential irritants, front to back wiping after using the toilet, and use of protective ointments. Use of disinfection solutions, often irritative for vulvovaginal region is contraindicated. Systemic antibiotic should be used only if a pure or predominant growth of the pathogenic bacterium is identified. Local estrogen is suggested for those non responsive to mentioned measures. Estrogen cream is well tolerated and accelerated the healing process of vaginal mucosa. Systemic or local antibiotic usually is not necessary. Antifungal creams usually have no place in the initial management of childhood vulvovaginitis, since candida albicans is an unlikely pathogen in prepubertal vulvovaginitis.

Conclusion :

Our data suggest that vaginal swabs should be obtained for microbiological investigations particularly in those with vaginal discharge. Antibiotic should be prescribed only if a pure or predominant growth of a pathogen is identified. Antimonial agents usually have no place in the initial management of prepubertal vulvovaginitis. Observing hygiene measures and use of local estrogen causes improvement in all girls with non specific vulvovaginitis and those pathogenic cases who are not responsive to antibiotic. A well designed, adequately powered, high quality studies are essential to evaluate vaginal bacteria in healthy asymptomatic children and in those with complain of vulvovaginitis. At this time some organisms which are considered nonpathogen may have pathogenic role for induction of vulvovaginitis in girls.

Table I: Clinical findings of 105 girls presenting with vulvovaginitis referred to Ghaem Medical Center (1998-2004)

Symptoms	NO (%)	Sings	NO (%)
Burning on voiding	98 (93.3%)	Erythema	105 (100%)
Redness	22 (20.9%)	Visible discharge	19 (18%)
Soreness	42 (40%)	Perianal soiling	4 (3.8%)
Itching	73 (69.5%)	Poor perineal hygiene	18 (17.1%)
Malodor genital area	7 (6.6%)	Labial fusion	5 (4.7%)
Discolored discharge	21 (20%)		
Blood stained discharge	1 (0.95%)		

Table II: Microbiology of the vaginal secretions in girls with vulvovaginitis referred to Ghaem Medical Center (1998-2004)

Pathogen organisms cultured	No	Nonpathogen organisms cultured	No
Streptococcus pyogenes	14	E.coli	22
H. influenza	2	Enterobacter	7
Staplylococcus aureus	6	Enterococcus	4
Klebsiclla pneumonia	6	Pseudomonas aeroginosa	5
Shigella flexneri	1	Proteus	2
		Vividans streptococci	3
		Staplylococcus epidermidis	3

Cultures were negative in 30 (28.5%) girls with vulvovaginitis

Table3: Hygiene status of 105 girls with vulvovaginitis and culture results of the vaginal swabs referred to Ghaem Medical Center (1998-2004)

	Poor hygiene, No (%)	Good hygiene, No (%)
Growth of nonpathogenic bacteria	16 (72.7%)	30 (36.1%)
Growth of pathogenic bacteria	6 (27.3%)	23 (27.7%)
No growth	0 (0%)	30 (36.1%)
Total	22 (100%)	83 (100%)

$$X^2 = 13.26, df = 2, p = 0.001$$



Abstract

Objective: The aim of this study is evaluation of clinical findings, microscopic examination and culture of vaginal secretions, and response to treatment in prepubertal girls with vulvovaginitis.

Materials & Methods: Over a period of about 5 years in a clinic for pediatric kidney and urinary tract disease 157 girls aged 2.5 – 8 years with urogenital symptoms were studied prospectively.

Results: Dysuria, erythema, itching, soreness, and vaginal discharge were genital symptoms and signs. Pathogenic bacteria were isolated in 27% of cases and streptococcus pyogenes was a common agent. Nonpathogenic enteric flora was isolated in about 43%. There was no growth of bacteria in 30%. Poor hygiene was an associated risk factor in those with nonpathogenic positive culture ($p=0.001$). There was statistically significant difference of purulent vaginal discharge between cases with vulvovaginal pathogenic infection and those with negative culture ($P<0.001$). Also there was significant difference of observing WBC in vaginal smears between those with pathogenic bacteria and patients who had no growth of pathogens ($P<0.001$). Candida and sexually transmitted agents were not found in any of the girls. Labial fusion was not an uncommon abnormality. Simple measures to improve hygiene and use of local estrogen were effective in the patients with nonpathogenic and nonspecific etiology.

Conclusion: Physical examination of genital area should be done in all girls with genitourinary symptoms. Antibiotics should be prescribed based on bacteriologic culture of vaginal secretion. Advice about hygiene practices and local estrogen is the most effective policy in children with noninfectious vulvovaginitis. Anti fungal creams usually have not place in the initial management of childhood vulvovaginitis. The possibility of sexual abuse or foreign body in vagina must be considered particularly if the vulvovaginitis is persistent or recurrent after adequate treatment, but our data indicate they are not contributory factors.

Key Words: Vulvovaginitis, Vaginitis, Prepubertal, vaginal discharge, childhood.

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