

Vulvovaginitis: causes and management

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Abstract

Over a period of 33 months in a paediatric accident and emergency department, the clinical pattern and possible causes of vulvovaginitis were studied prospectively in 200 girls presenting with genital discharge, irritation, pain, or redness. The major causes were poor hygiene and threadworms. The suspicion of sexual abuse arose in a few girls but no organisms of sexually transmitted disease were found. Urinary symptoms were common but only 20 patients had a significant bacteriuria and 40 had sterile pyuria. Specific skin problems occurred in 28 cases.

Simple measures to improve hygiene and treatment of threadworms gave effective relief. Genital irritation caused urinary symptoms with no clinical evidence of infection, and it is advised that antibiotic treatment should await urine culture. Specific skin problems require help from a dermatologist. The possibility of sexual abuse must be considered especially if the vulvovaginitis is persistent or recurrent after adequate treatment.

The vaginal mucosa is affected by maternal oestrogens at birth; this gradually decreases until about 6 months of age. Thereafter until menarche the mucosa is thin and atrophic and vulnerable to infection.¹ In addition the vaginal orifice is less well protected by the labia in childhood, and its proximity to the anus combined with poor hygiene in small children adds to the risk of vulvovaginitis. Constipation and the leakage of faeces or flatus also leads to irritation and infection.

There is now increasing concern over sexual abuse of children. Among signs associated with sexual abuse by some are genital itching, soreness and vaginal discharge,^{2,3} although others have questioned the sensitivity and specificity of such a finding.^{4,5} There is some information available on vaginal discharge and vulvovaginitis in children in the USA^{1,6,7} but little or none from the UK.

We have undertaken a prospective survey of girls attending the accident and emergency departments of the Royal Liverpool Children's Hospital (Alder Hey and Myrtle Street branches) with the complaint of vaginal discharge and/or genital irritation or soreness, in order to obtain information on its epidemiology, microbiology, and clinical features.

Patients and methods

The Royal Liverpool Children's Hospital

accepts children from birth to 16 years, and the accident and emergency departments have an attendance rate of 68 000 new patients each year. From July 1987 to March 1990 all of the 200 girls presenting with a complaint of genital itching or soreness, vaginal pain, vaginal discharge or dysuria (without clinical evidence of urinary tract infection) were entered into the study. At the initial visit or at the first follow up they were each seen by a senior doctor in the department: usually (96%) a consultant experienced in both paediatric accident and emergency work and also in child sexual abuse. For each child a full medical and social history was obtained, and the possibility of child sexual abuse was considered.

A full medical examination was done, a midstream specimen of urine, and one or two swabs of either the vaginal introitus or the vestibule were obtained from each child where possible. (Even gentle swabbing of the vaginal area may cause discomfort and if the child objected we did not insist on a second swab.) In addition a Sellotape slide test to detect the presence of threadworms was done on each child (after the procedure had been explained to the mother) on the morning she was due to return for follow up.

Urine was examined for pus cells, protein, and bacteriuria according to standard methods, including urine culture.

A Gram film was made from the swabs and then the swabs were cultured on blood agar, chocolate agar, gonococci selective media, MacConkey agar, Sabouraud's agar, aerobically (with 10% carbon dioxide), and neomycin blood agar anaerobically. Thus the pathogens sought were staphylococci, streptococci, coliforms, gonococci, gardnerella, *Haemophilus influenzae*, and candida. For the first half of the survey the second swab was placed in *Trichomonas vaginalis* medium and in the second half this was replaced by a swab for the detection of *Chlamydia trachomatis*. This was done by both culture (McCoy cells) and antigen detection (Syva UK).

Treatment was given according to clinical and laboratory findings. Skin problems were referred to the dermatology clinic for diagnostic confirmation and treatment. Ultrasound examination of the urinary tract was performed if there was significant bacteriuria, and if symptoms persisted patients were referred to the renal clinic. Examination under anaesthesia was undertaken if the vaginal discharge was persistent, foul, or bloody.

Results

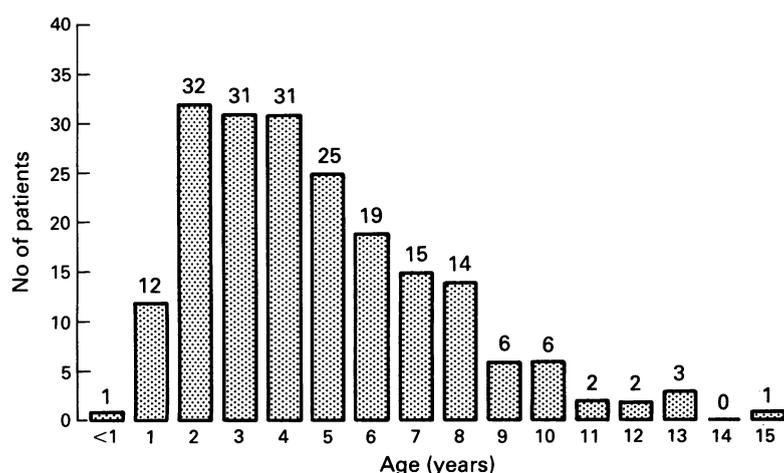
The age range of the girls was from 1 to 15 years

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Number of patients for each year of age at presentation.

(figure) but 138 (69%) were aged 2 to 6 years. Although 71 had an acute onset, 54 had a history covering more than six months, and 42 had recurring problems.

All the girls were asked to return for follow up and only two did not do so. They each had a brief history, were diagnosed as having thrush, and given treatment. The diagnosis was later

Table 1 Clinical features of children presenting with vulvovaginitis

Features	No (%)
Symptoms:	
Itch	81 (40)
Soreness	108 (54)
Bleeding	37 (19)
Discharge	104 (52)
Signs:	
Genital redness	167 (84)
Visible discharge	66 (33)
Perianal soiling	35 (18)
Specific skin lesion	28 (14)
None	5 (2.4)

Table 2 Number of patients investigated (n=190)

Investigation	No (% of total)	Abnormal result (% of tests)
Bacterial swab	160 (84)	88 (55)
Trichomonas swab	99 (52)	0
Chlamydia swab	23 (12)	0
Sellotape slide test or worms seen	133 (70)	43 (32.3)
Midstream urine		
Microscopy	167 (88)	40 (24)
Culture	167 (88)	20 (12)
Ultrasound of abdomen	32 (17)	3 (9.4)
Examination under anaesthesia	13 (6.8)	3 (23)
No investigation	10 (5)	

Table 3 Abnormal results of vaginal swab and coincident findings of threadworms and urine culture

Organisms cultured	No of positive cultures	Threadworms	Midstream urine	
			Positive culture	Sterile pyuria
<i>E coli</i> /faecal flora	23	6	3	3
<i>H influenzae</i>	20	5	3	7
<i>H influenzae</i> + <i>Proteus</i> sp	2	1	0	0
<i>S aureus</i>	14	5	0	3
Streptococci	17	2	2	3
Candida	7	0	0	2
Pseudomonas	1	1	0	0
<i>Klebsiella</i> sp	3	0	0	0
<i>Proteus</i> sp	1	0	1	0
Total	88	20	9	18

confirmed in one case when the swab result became known.

The presenting symptoms and findings on examination are shown in table 1. Secondary symptoms of abdominal pain in 51 (26%) and dysuria with or without frequency in 102 (51%) were seen. The findings of perianal soiling and visible discharge were more frequent in children presenting later in the day, for example after school, when their underwear had not been changed. Of the five girls in whom nothing abnormal was found on examination of the genitalia, three had threadworms, one was constipated, and one had poor hygiene.

Specific skin lesions include 14 girls with labial adhesions, five of which were complete. They caused particular problems with dysuria and soreness. Lichen sclerosus et atrophicus accounted for five cases, warts for three, flexural psoriasis for two, flexural eczema three, and ammoniacal dermatitis one. The vulva of one child was replaced by a large haemangioma, causing pooling of urine in the vestibule and subsequent infection.

Table 2 shows the numbers of patients undergoing each investigation, and the number with abnormal results. No investigations were done on 10 girls because it was thought to be unnecessary. Treatment was given without prior investigation to three girls with complete labial adhesions. A further five were referred directly to the dermatologist, three with perianal warts, and one each with psoriasis and lichen sclerosis. The remaining two patients had clinical candida and scarlatina respectively, and treatment was started immediately.

The three abnormalities found on ultrasound were a ureterocele, ureteric reflux, and a mild dilatation of the right collecting system, and these children were referred to the appropriate clinic.

Examination under anaesthesia was undertaken if the discharge was recurrent and did not respond to treatment, or if there was significant bloodstaining. A small piece of paper was found in the vagina of each of two sisters. The younger child later had a recurrence of purulent discharge, further foreign bodies were found, and she was referred for psychological assessment. No other child had a foreign body but high vaginal swabs grew *H influenzae* in three cases, β -haemolytic streptococcus in one, and *Escherichia coli* or faecal flora in two.

MICROBIOLOGICAL RESULTS

No child had a positive result from the trichomonas or the chlamydia swabs. Of the 43 children with threadworms, 34 had ova on the Sellotape slide test, and threadworms were seen in nine children, either in the stools or on examination of the anus.

Table 3 shows the relationship between the organism found on bacterial swab culture, and the presence of threadworms, a positive urine culture, or sterile pyuria. Candida was found in seven children. Six were at extreme ends of the age range, two being less than 2 years and four pubertal, and the seventh child was 9 years old and had flexural psoriasis of the genital region.

Girls who had been given several courses of antibiotics before presentation and who continued to have problems responded to nystatin treatment, although *Candida albicans* was not found on culture. A herpetic rash of the vulva was seen in three patients, but virology swabs were negative in two of them. However, one of these children also had a 'cold sore' on her finger that responded to acyclovir, and the other grew β -haemolytic streptococcus in her bacterial swab. The third child was proved to have herpes simplex virus type 1. In the swab cultures *Staphylococcus aureus* was also grown with *Klebsiella* sp in one child and with β -haemolytic streptococci in five others. Of the 17 positive streptococcal cultures, 14 were β -haemolytic streptococcus group A, one was group B, and two were *Streptococcus pneumoniae*.

Sellotape slide test

The total number of children with proved threadworm infestation was 43, including nine who had no Sellotape slide test, but in whom adult worms were seen on examination or in the stools. In one child ova were seen on the slide and in the urine. All other tests were negative in 23 of those with threadworms. Organisms were grown in the vaginal swabs of 20 (46.5%) of the children with threadworms (table 3). In addition, six had sterile pyuria and six an *E coli* bacteriuria.

Urine microscopy and culture

A sterile pyuria was defined as a white cell count of at least $50 \times 10^6/l$ with no significant bacterial growth on culture. It was found in 40 patients, 17 of whom had cell counts greater than 200. Threadworms were present in six girls and 18 had a positive growth on vaginal swab culture (table 4). Among the girls with pyuria were two girls with an acute throat infection, five with constipation requiring treatment, and two with labial adhesions (not shown in table). The child with the ureterocele also had sterile pyuria.

Table 4 shows the symptoms and findings associated with these cases and with 20 whose urine had a significant bacteriuria. It will be noted that discharge and abdominal pain were more frequent complaints in the group with pyuria, while dysuria and frequency were more common in those with a bacteriuria. A high cell count was more common in the infected urines.

Table 4 Urine microscopy and culture in relation to symptoms and findings

	Sterile pyuria (n=40)	Positive culture (n=20)
Symptoms:		
Discharge	29	8
Dysuria	21	15
Frequency	4	5
Fever	4	3
Abdominal pain	18	6
Findings:		
White cell count $>200 \times 10^6/l$	17	12
Threadworms	6	6
Positive swabs	18	9
Labial adhesions	2	3
Skin problems	3	1

The organisms grown in the vaginal swabs of both groups are seen in table 3.

Significant bacteriuria was present in 20 cases (table 4), 15 of which grew *E coli* two *Proteus* sp, and one each *Staphylococcus epidermidis*, *H influenzae*, and β -haemolytic streptococcus. Of these children with positive urine cultures nine also had positive swab cultures, there were threadworms in six, three had labial adhesions and one child had lichen sclerosis. Of the cases of *Proteus* sp bacteriuria, one was associated with complete labial adhesions, and the other who had a haemangioma also had *Proteus* sp in the vaginal swab. The patients who grew *H influenzae* and β -haemolytic streptococcus in their urine each had the same organism cultured from their vaginal swabs. Ultrasound examinations on 11 of these girls were normal, and four who were referred to the urology clinic showed no renal abnormality.

SEXUAL ABUSE

The possibility of abuse was raised with all the parents and with the girls who were old enough. Many parents were already concerned about the subject and seemed relieved to discuss it. In most of the children there was no reason to suspect abuse. In two there had been previous abuse but no evidence of recurrence, and candida was grown in one girl who had had voluntary intercourse. There was no evidence of abuse in four others who were brought because their symptoms made adults suspicious. The diagnosis in these children was urinary infection in one, flexural psoriasis in one, and very poor hygiene in two cases. In four cases the doctor's suspicions were aroused. A 3 year old had an introitus which dilated to 1 cm in diameter but the hymen was intact. She had threadworms and the dilatation disappeared after treatment so it was, after consultation, felt to be probably within normal limits. Odd behaviour in one child, late reporting of an associated injury in another, and the child with the multiple foreign bodies in her vagina all gave cause for concern. In none of these was abuse substantiated after investigation. A vague history of touching was obtained in two small girls but examination was negative. Two children with recurrent discharge later disclosed abuse but their original presentation was not appreciably different from the rest of the children in the series.

Discussion

Vulvovaginitis has many causes in young girls especially in the 2 to 6 year age range when hygiene is poor. Soreness and itch leads to rubbing or scratching so adding infection to already compromised skin. Rubbing or fingering the area by an adult might be expected to cause similar problems but increased vascularity and erythema were found less in sexually abused children than in a symptomatic non-abused group by Emans *et al.*⁴ The poor hygiene found in many of our patients confirms the opinion of other authors who considered it to be an important cause of vulvovaginitis in children.^{1 7}

The microbiology of the paediatric vagina was studied in 100 healthy girls by Hammerschlag *et al.*⁶ They found diphtheroids and *S epidermidis* to be the most common organisms, and candida was found only in the infants or the pubertal children. Paradise *et al.*, in comparing children with vulvovaginitis and controls found candida only in pubertal girls but said convincing evidence of bacterial or candida infection was found in half of the patients with discharge and in none of those without.⁷ Very few isolates of *H influenzae* or β -haemolytic streptococci were found. In our series the cultures of candida were confined to infants and teenagers except for one child who had lichen sclerosis. We found no trichomonas, chlamydia, or gonococci in our investigations, although they have been found by others in a few cases.^{6,7}

H influenzae and β -haemolytic streptococci are thought to be pathogenic organisms in the vaginal region in children. Macfarlane and Sharma found *H influenzae* in children with vulvovaginitis but not in controls.⁸ This was the most common single organism in our series and was also found in the high vaginal swabs of three of the 13 girls who were examined under anaesthesia. Group A β -haemolytic streptococci were isolated in 14 of our cases. The literature reviewed by Straumanis and Bocchini, describing 27 patients, showed that the vulvovaginitis caused by this organism was acute in onset and often associated with an upper respiratory infection,⁹ this agrees with our experience.

Threadworms are said to be a common cause of vulvovaginitis,¹ and we found them in 32.3% of cases tested. Almost half of them were associated with a positive vaginal swab culture and some with a significant bacteriuria or sterile pyuria; thus, they are an important cause of morbidity in children.

Dysuria and frequency are often assumed to be due to a urinary tract infection and antibiotics given for it, sometimes repeatedly. In a review of 53 adolescent girls with dysuria only 17% were found to have a urinary tract infection, while 41% had vaginitis, and 25% other local causes.¹⁰ Dysuria and frequency were frequent complaints in our patients. In patients with significant bacteriuria, contributory factors such as threadworms, discharge, or local problems were present in 18 of 20 cases.

On physical findings alone, sexual abuse is difficult to distinguish from vulvovaginitis due to other causes, in the absence of other factors such as sexually transmitted organisms found on vaginal swab culture, concerns about behaviour or social conditions, or a disclosure by the child. However, if the discharge or vulvitis is persistent or recurrent in spite of

adequate treatment the possibility must be seriously considered. Genital warts are said to be diagnostic of sexual abuse and these cases require careful consideration, but the virus may be spread from warts on the hands of child or carers, especially if the genital skin is already compromised. As typing of the virus becomes more common the diagnosis of sexually transmitted wart infection will become easier.

Some practical lessons have been learned from this survey of children with vulvovaginitis. A full history and examination including an inspection of the genital area should be done on all girls complaining of soreness, itch, dysuria or discharge. With the help of a gynaecologist, we have produced a printed sheet with instructions on hygiene to be given to parents. If there is no clinical evidence of an acute urinary tract infection, treatment may be delayed until the laboratory results of urine and swab cultures and Sellotape slide test are obtained. Meanwhile simple hygienic precautions may considerably relieve the child's distress.

Antibiotics should be given if there is a growth of *H influenzae* or β -haemolytic streptococci. Threadworms or significant constipation should receive the standard treatment. Local skin problems are not uncommon in vulvovaginitis and help from the dermatologist should be sought promptly. A foreign body in the vagina is an uncommon finding but examination under anaesthesia is necessary if discharge is foul or bloodstained and persists or recurs after adequate treatment.

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- 1 Arsenault PS, Gerbie AB. Vulvovaginitis in the preadolescent girl. *Pediatr Ann* 1986;15:577-85.
- 2 Porter R, ed. *Child sexual abuse within the family*. London: Ciba Foundation, Tavistock Publications Ltd, 1984:5-6.
- 3 Bamford F, Roberts R. ABC of child abuse: child sexual abuse—1. *BMJ* 1989;299:321-3.
- 4 Emans SJ, Woods ER, Flagg NT, Freeman A. Genital findings in sexually abused, symptomatic and asymptomatic girls. *Pediatrics* 1987;79:788-5.
- 5 Hobbs CJ, Wynne JM. Child sexual abuse—an increasing rate of diagnosis. *Lancet* 1987;ii:837-41.
- 6 Hammerschlag MR, Alpert S, Rosner I, *et al.* Microbiology of the vagina in children: normal and potentially pathogenic organisms. *Pediatrics* 1978;62:57-62.
- 7 Paradise JE, Campos JM, Friedman HM, Frishmuth G. Vulvovaginitis in premenarcheal girls: clinical features and diagnostic evaluation. *Pediatrics* 1982;70:193-8.
- 8 Macfarlane DE, Sharma DP. Haemophilus influenzae and genital tract infections in children. *Acta Paediatr Scand* 1987;76:363-4.
- 9 Straumanis JP, Bocchini JA. Group A β -haemolytic streptococcal vulvovaginitis in prepubertal girls: a case report and review of the past twenty years. *Pediatr Infect Dis J* 1990;9:845-8.
- 10 Demetriou E, Emans SJ, Masland RP. Dysuria in adolescent girls: urinary tract infection or vaginitis? *Pediatrics* 1982;70:299-301.