Sexually transmitted diseases: A significant complication of childhood sexual abuse

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D LINDSAY, J EMBREE. Sexually transmitted diseases: A significant complication of childhood sexual abuse. Can J Infect Dis 1992;3(3):122-128. The acquisition of one or more sexually transmitted diseases (STD) is a significant complication of sexual assault of children. The risk of infection by pathogens varies from less than 1 to 50% depending on the nature of the assault, the organism studied and the background prevalence of STD in the general community. The correct diagnosis of STD in children depends upon optimal collection and appropriate laboratory testing of clinical specimens. Diagnosing STD will allow for treatment and follow-up to ensure cure of these infections as well as to monitor for re-infection. It will also help confirm that sexual activity involving the child has occurred. This can be extremely important, particularly when there are minimal other physical findings of abuse or if the child has limited verbal skills and thus cannot provide a complete disclosure. All physicians who care for children should be knowledgeable about the methods of STD diagnosis and the currently recommended treatment regimens.

Key Words: *Sexual abuse, Sexually transmitted disease, STD diagnosis, STD prevalence, STD treatment*

Les maladies transmises sexuellement: Une complication importante chez l'enfant victime de sévices sexuels

RESUME: L'acquisition d'une ou de plusieurs maladies transmises sexuellement (MTS) est une complication importante des sévices sexuels infligés aux enfants. Le risque d'infection par les agents pathogènes incriminés varie de moins de 1 % à 50 % selon la nature des mauvais traitements, l'organisme étudié et la prévalence de MTS dans la collectivité en général. Le diagnostic correct de MTS posé chez l'enfant dépend d'un interrogatoire minutieux et les prélèvements doivent faire l'objet d'analyses de laboratoire appropriées. Tout en assurant la guérison par un traitement et un suivi adaptés, ce diagnostic permet de rester attentif à toute réinfection éventuelle. Il contribue aussi à confirmer toute activité sexuelle engageant l'enfant. Cette constatation peut s'avérer extrêmement importante, surtout quand les autres preuves physiques d'abus font défaut ou quand la capacité d'expression de l'enfant est limitée, excluant une divulgation complète. Tous les médecins qui traitent les enfants devraient connaître les méthodes de diagnostic des MTS et les traitements actuellement recommandés.

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SEXUAL ABUSE OF CHILDREN IS A DISTURBING SUBJECT TO most of us. The increasing awareness of this problem over the past two decades has led to numerous studies by medical, legal and related researchers concerning the prevalence of abuse, characteristics of offenders, victims and families, the physical findings in abused children, credibility of allegations, the legal issues pertaining to the child and court, and acquisition of sexually transmitted diseases (STD) by children through sexual abuse (1-8). In this article, the body of this knowledge will be reviewed as it relates to the acquisition, diagnosis and management of these infections in this population.

BACKGROUND

Sexual abuse refers to the sexual exploitation of a child by another person, and encompasses both direct physical acts, such as fondling and digital or penile penetration of the vagina, as well as nonphysical acts such as exhibitionism or procuring. The Badgely Commission Report released in 1984 (5) suggested that as many as one in two females and one in three males have been victims of a sexual offence at some time in their lives. Most offences occur prior to the age of 21 years; acts of exposure are the largest category of offences against youth. By the age of 16 years, however, as many as 5 to 9% of males and 15 to 20% of females have experienced some form of unwanted sexual touching, with intercourse occurring in 1 to 3%. Based upon reporting trends across North America over the past 10 to 15 years, the numbers of reported cases of child abuse, and the percentage which are sexual in nature, are increasing (1,7,9). At the Child Protection Centre in Winnipeg, Manitoba, the number of referrals for child abuse have increased from 372 in 1982 to 1157 in 1990, with an increase from 30.6 to 58.8% of cases being sexual in nature. This likely reflects an increase in both public and professional awareness resulting in a corresponding increase in recognition and reporting, since the actual number of cases in relation to population growth has remained at a relatively constant level (5).

Sexual abuse in children is a widespread problem; however, certain trends and generalities have been identified. Many victims have previously been living with nonbiological parents, in homes where alcohol and/or drugs are abused, in families already known to child welfare agencies or in families with a history of physical abuse (2,3). Family units in which adolescent males spend prolonged unsupervised time with young children are considered higher risk. A large percentage of victims are children of parents who were themselves the victims of childhood sexual abuse. The majority of children seen currently (80 to 90%) are female victims of male offenders; however, many retrospective studies have shown that a much larger number of males than expected describe sexual abuse in childhood (2,3,5). Usually offenders are known to the child either as a family member, friend or acquaintance, or guardian; only a small percentage (1 to 17%) are strangers (2,4,5). Most allegations are substantiated; false allegations which are often initiated by an adult make up 6 to 11% of unsubstantiated cases (5,10). Only approximately 40% of cases will result in charges being laid (5).

EPIDEMIOLOGY

The reported prevalences of the sexually transmitted pathogens found in abused children vary considerably (Table 1). This is partly due to differences in study population definition. Differences related to using an absolute age limit for prepubescence (hence including some early pubertal children) versus Tanner staging are important, since significant changes occur in the pathogenesis of many vaginal infections, in particular *Chlamydia trachomatis* and *Neisseria gonorrhoeae*, once puberty begins (11,12). The identity of the abuser is significant, as family members who do not engage in sexual activity outside the family are less likely to pass on STD. For example, the number of children diagnosed with gonorrhea is lower if the offender was the father or stepfather as opposed to another relative or a family friend (7). In families where there is drug or alcohol abuse, the risk is increased as STD are more prevalent in this adult population (12). The type of abuse also plays a role. Sexual activities such as exhibitionism are unlikely to lead to the transmission of STD since there is little opportunity for passage of infected genital secretions to the child. The risk of infection is greater with actual sexual intercourse, but penetration need not take place for STD transmission to occur. The sexual abuser who masturbates and ejaculates, and then fondles the child, may transmit the organism in that fashion. Victims of repeated episodes of abuse have a greater risk of infection than those experiencing only a single episode (8). There may also be clustering of STD if more than one child is sexually abused by an infected individual (13-16). The prevalence of STD varies from community to community. In communities where there is a high endemic rate of gonorrhea, there is an equally high rate of gonorrheal isolation among sexually abused children (7). Finally, many studies have not considered the full spectrum of etiological agents due to difficulty in collecting multiple, good samples from a female child, since prior to maturation of the genital tissue, the introitus is quite sensitive to touch.

Determining that an infection is sexually transmitted, isolated because of prolonged perinatal carriage, or acquired in a nonsexual fashion, may be difficult but is important. For example, *Gardnerella vaginalis* is not exclusively sexually transmitted in young children (17); thus, its isolation may not be indicative of sexual abuse if no other findings of abuse are present. Lack of suitable control populations have interfered with interpretation of the large studies designed to examine this problem. Control groups have often comprised clinic

TABLE 1
Reported prevalences of sexually transmitted diseases in abused children

Study (year) (reference)			Location	Prevalence (%)	
Neisseria gonorrhoeae					
Tilelli	(1980)	(1)	Minnesota, USA	3/113	(2.6%)
Khan	(1983)	(2)	Maryland, USA	14/71	(19.7%)
Grant	(1984)	(3)	Manitoba, Canada	12/157	(7.6%)
Rimsza	(1982)	(4)	Arizona, USA	21/285	(7.4%)
White	(1983)	(7)	North Carolina, USA	46/409	(11.2%)
DeJong	(1986)	(8)	Pennsylvania, USA	25/532	(4.6%)
Ingram	(1984)	(19)	North Carolina, USA	10/50	(20%)
Hammerschlag	(1984)	(47)	New York, USA	5/51	(10%)
Dattel	(1989)	(48)	California, USA	15/127	(12%)
Wald	(1980)	(29)	Maryland, USA	28/189	(14.8%)
Ingram	(1986)	(20)	North Carolina, USA	13/124	(10.8%)
Chlamydia trachomatis					
DeJong	(1986)	(8)	Pennsylvania, USA	1/438	(0.2%)
Ingram	(1984)	(19)	North Carolina, USA	3/50	(6%)
Hammerschlag	(1984)	(47)	New York, USA	2/51	(4%)
Dattel	(1989)	(48)	California, USA	18/127	(14%)
Ingram	(1986)	(20)	North Carolina, USA	10/124	(8%)
Fuster	(1987)	(49)	California, USA	8/47	(17%)
Porder	(1989)	(36)	New York, USA	0/65	(0%)
Trichomonas vaginalis					
White	(1983)	(7)	North Carolina, USA	4/409	(1%)
DeJong	(1986)	(8)	Pennsylvania, USA	2/438	(0.5%)
Hammerschlag	(1985)	(44)	New York, USA	1/31	(3%)
Ureaplasma urealyticum					
Hammerschlag	(1987)	(18)	New York, USA	21/47	(45%)
Mycoplasma hominis					
Hammerschlag	(1987)	(18)	New York, USA	18/47	(38%)
Nonspecific vaginosis					
Hammerschlag	(1985)	(44)	New York, USA	8/31	(26%)
Treponema pallidum					
White	(1983)	(7)	North Carolina, USA	6/409	(1.4%)
DeJong	(1986)	(8)	Pennsylvania, USA	1/532	(0.1%)

patients felt not to have been sexually abused or previously abused patients, and so may not truly reflect the 'normal' population (18-20). Also, the numbers of children studied are often insufficient to show moderate differences in prevalence.

Duration of colonization of perinatally acquired STD is not known for the majority of pathogens. Perinatally acquired gonorrhea is not thought to persist past the neonatal period (15). Chlamydia was not detected in a sample of 131 children at one year of age who were born to culture positive mothers (21). However, untreated adult women may carry the organism for up to two years (12). *Trichomonas vaginalis* has only rarely been isolated after one month of age (22). While the prevalences of genital mycoplasmas are low in prepubertal age groups (range 4 to 22%), the duration of perinatal colonization is unknown (18,23). No genital mycoplasmas were isolated from children followed beyond one year of life in one study (24). The acquisition of anaerobic bacterial vaginosis at delivery by infants has not been studied.

Uncertainty concerning the frequency of duration of the latency period of human papillomavirus complicates the diagnosis of sexual abuse in the child who presents with condyloma acuminatum. Although an average latency period of three months has been quoted, incubation periods of longer duration are likely (25). Since the lesions may persist for many years without treatment, perinatal transmission could be the mode of acquisition in the older child (older than two years) who is found to have genital warts during a physical examination. However, this should not preclude evaluation for other evidence of sexual abuse (25,26).

Another controversy centres on nonsexual transmission of STD, in particular gonorrhea, after the perinatal period. Although gonorrhea has been isolated in fomites and on porcelain toilet bowls, this mode of transmission has never been implicated in the transmission of *N gonorrhoeae*. Most care givers assume that children acquire gonorrhea through sexual contact (27). This includes children who acquire gonorrhea from a sibling or playmate of the same age through

TABLE 2
Sites for specimen collection to diagnose sexually transmitted diseases in prepubertal children

Pharynx
Neisseria gonorrhoeae culture
Rectum
Neisseria gonorrhoeae culture
Chlamydia trachomatis culture
Herpes simplex virus culture
Urethra (males)
Neisseria gonorrhoeae culture
Chlamydia trachomatis culture
Herpes simplex virus culture
Urine
Examine for *Trichomonas vaginalis*
Vagina
Neisseria gonorrhoeae culture
Chlamydia trachomatis culture
Aerobic bacterial culture
Microscopic examination of wet mount preparation/ exudate for:
Trichomonas vaginalis
Clue cells
Yeast
Amine odour
Herpes simplex virus culture
Genital ulcers
Aerobic bacterial culture
Herpes simplex virus culture
Hemophilus ducreyi culture
Examination of exudate for *Treponema pallidum*
Genital warts
Clinical evaluation
Serological samples
Syphilis
Human immunodeficiency virus
Hepatitis B
Frozen sample to be saved

sexual play acting; one of the children has been sexually abused, although not necessarily the index child (13-16). A potential nonsexual transmission scenario has been suggested by Shore and Winkelstein (28) who investigated Inuit children in which all family members shared the same bed and in which gonorrhea was found in a very high proportion of the children. Based only on the lack of a history of sexual abuse Shore and Winkelstein concluded that sexual transmission was not the mode of gonococcal acquisition. Four of the infected children had gonococcal conjunctivitis which implied hand-to-eye transmission. However, the crowded conditions in this study are unique to the population studied, and the conclusions drawn by the authors, even if correct, cannot be generalized.

DIAGNOSIS AND MANAGEMENT

The diagnosis of STD in abused children is complicated by difficulty in obtaining the necessary specimens from prepubertal children, and the lack of sensitivity and specificity of tests used to detect or isolate the different pathogens. Ideally, the approach to diagnosis of STD should involve testing for *all* potential pathogens if sexual abuse of a nature allowing transmission of STD is suspected. The availability of laboratory facilities may limit this approach.

A careful genital examination, including STD testing, in a calm, relaxed child should cause little or no discomfort. Often, however, the abused child is afraid, anxious or uncooperative, resulting in an examination which is uncomfortable, particularly during specimen collection. Time spent in preparing the child for the examination will alleviate many of the anxieties and allow for an easier examination. At many sexual abuse clinics a child life therapist spends time with the patient prior to the actual examination. Simple things such as an explanation of equipment, allowing a child to examine a doll with medical equipment, and letting a child touch swabs (dry and wet) may alleviate some fears.

The actual examination should consist initially of maneuvres which are both familiar to a child and nonhurtful, such as listening to the chest. This enables the child to become familiar and comfortable with the examining procedures. The genital examination is best done with the child in the supine position, with the legs bent at the knee and abducted at the hip – the 'frog-leg position'. An alternate position is with the child on the parent's lap with the parent helping to abduct the legs. Slight traction of the vulva towards the examiner and slightly down will allow for the best visualization of the introitus. In the relaxed child, this position will enable the vaginal orifice to open. With care, a small moistened Calgi type I swab can then be inserted through the orifice. If the hymenal ring is not touched, there is usually little sensation associated with the swabs. A speculum examination is only rarely required and in this age group is best done under general anesthetic.

Sites which should be cultured for each STD are shown in Table 2. Because most prepubertal children are seen well after the episode(s) of abuse, a single sample taken for STD at the time of assessment will suffice. For children seen immediately after an acute episode, initial cultures may be negative and should be repeated in two to three weeks.

Neisseria gonorrhoeae: Asymptomatic infection with *N gonorrhoeae* frequently occurs; thus, reliability of vaginal, rectal or pharyngeal exudates as an indication of likely infection is poor (14,15,29,30).

Adequate specimens of exudate or swabs of mucosal surfaces should be obtained and plated immediately onto antibiotic-containing selective media (such as modified Thayer-Martin media) and incubated to maximize the chances of recovery of the organism. Several *Neisseria* species may be falsely identified as *N gonorrhoeae* and may thus lead to false allegations of sexual abuse (31). Isolates should be identified using more than one identification procedure and should ideally be fowarded to a reference laboratory for confirmation.

Empiric treatment for chlamydia infection may be warranted while awaiting results of culture, since as

many as one-third of cases of gonorrhea are complicated by concomitant infection with chlamydia (32).

Repeat cultures of infected sites for 'test of cure' are recommended for all patients with gonorrhea. Particular attention should be given to children with the organism isolated from the throat, as eradication of infection at this site is difficult. A throat swab for *N gonorrhoeae* should be included in the initial investigation of genital or rectal gonorrhea. The 'test of cure' cultures for gonorrhea should be done four to five days following completion of the antibiotic treatment course.

Chlamydia: Chlamydia may also be isolated from young girls with symptomatic vaginitis, but its role as a causative agent in this condition remains unclear (18,19,32-34). Currently, a controversy exists regarding the sensitivity and specificity of rapid diagnostic testing methods for *C trachomatis* when used in the abused child population. The successful use of enzyme assays or fluorescent antibody tests for rapid culture-independent diagnosis of chlamydia infections in adult patients led to testing of these products in children (35). There are significant problems when these tests are used for specimens obtained from the genitourinary tract or the rectum of children, due to false positive results when specimens contain other bacterial elements (36-40). Mathematical calculations based on the theoretical performance of existing tests on populations of low seroprevalence indicate that currently used tests have a positive predictive value of only 50% in situations of child abuse (41). Manufacturers of these products are examining laboratory manipulations such as blocking antibodies in the test system to obviate most, if not all, false positive reactions.

At present, the diagnosis of genital or rectal chlamydia infections in prepubertal children is dependent on isolation of the organism from the vagina, urethra or rectum. Dacron swabs may be toxic to chlamydia; therefore, Calgi swabs are used to collect cells from the lining of the vagina or urethra. Less invasive procedures such as early phase voided urine specimens or vaginal washes are under assessment. Samples should be placed in chlamydia transport media and transported on wet ice to the laboratory. Specific arrangements regarding appropriate handling of chlamydia culture specimens should be made with the laboratory if there will be a delay of greater than 4 h in specimen transport.

Vaginitis: Children who present with symptoms or signs of vaginitis such as vulvar or vaginal itching, urinary frequency or painful urination, vulvar or vaginal inflammation, or vaginal discharge, should be investigated for STD and non-STD pathogens (42,43). Samples of vaginal secretions can be obtained using a swab from the vagina suspended in saline or an aspirate of vaginal secretions (possibly diluted with sterile saline). These samples should be studied under the microscope for the presence of trichomonads, candida and 'clue cells'. Suspension of a drop of the sample mixed with 10% potassium hydroxide will give off a distinctive offensive fishy amine odour if anaerobic organisms producing vaginitis are present (44). The chocolate agar of the modified Thayer-Martin split plate often used for detection of gonococci should be adequate to isolate an aerobic non-STD bacterial cause of vaginitis such as streptococci, staphylococci or enterobacteriaceae. Candida may also be recovered from this culture.

Cultures for *N gonorrhoeae* and *C trachomatis* should be obtained as described previously. Examination for pinworm infection may be warranted. Treatment of non-STD aerobic organisms or candida will depend upon culture results and the patient's underlying condition.

Genital ulcer disease: If present, genital ulcers should be tested for detection of herpes simplex virus, *Treponema pallidum*, *Haemophilus ducreyi* (if chancroid is present in the community) and aerobic non-STD pathogens. The initial differential diagnosis will depend upon the appearance of the ulcer and the presence of pain or other symptoms. Classically, the primary chancre of syphilis is painless, whereas genital ulcers with other etiologies are usually extremely painful.

The ulcer base should be cleaned and swabs taken for the diagnostic specimen. Material should be sent in viral transport media to a virology laboratory for herpes simplex virus isolation and typing if possible. If syphilis is suspected, a swab of the base should be tested immediately by fluorescent darkfield examination. The diagnosis of *H ducreyi* involves the use of specialized media; the sample should be plated immediately on this media (45).

Genital warts: Diagnosis is by inspection of the genital area. The wart may be biopsied and DNA hybridization or polymerase chain reaction testing for STD strains performed if there is doubt concerning the type of wart. Treatment depends upon the location and size of the warts and may involve the use of topical agents such as podophyllin or liquid nitrogen, or may necessitate surgical removal (25,26). Podophyllin is often not well tolerated. Recurrences are frequent despite therapy. Use of interferon alpha-2b is currently under investigation (25).

Inapparent infections – Latent syphilis, HIV, hepatitis B: These infections are diagnosed using serological tests. Testing is at the discretion of the physician and is based upon the risk of acquisition of the illness. The risk of syphilis is estimated to be less than 1% in areas of low prevalence of this disease in the adult population, and only a few cases of human immunodeficiency virus (HIV) or hepatitis B transmission have been described (7,8,46). If testing is done, the rapid plasma reagin (RPR) or VDRL screening tests should be confirmed with an additional test (usually *T pallidum* hemagglutination). An initially positive HIV antibody test should also be repeated to confirm the diagnosis. Both syphilis and HIV

TABLE 3
Treatment of sexually transmitted pathogens in children

Neisseria gonorrhoeae

If the organism has been isolated and found to be sensitive to penicillins, amoxicillin or ampicillin 100 mg/kg (maximum 3.0 g) per ora plus probenecid 25 mg/kg (maximum 1.0 g) per ora (single dose)

If penicillinase-producing *Neisseria gonorrhoeae* present in community or if unknown:

- Cefixime 8 mg/kg (maximum 400 mg) per ora
  or
- Ceftriaxone 250 mg intramuscularly
  or
- Spectinomycin 40 mg/kg (maximum 2.0 g) intramuscularly (not if pharyngeal infection present)
  or
- Erythromycin 40 mg/kg/day (maximum 2 g/day in divided doses) per ora for seven days

Chlamydia trachomatis

Erythromycin 40 mg/kg/day qid per ora (maximum 2 g/day) in divided doses for 14 days
or
Sulphamethoxazole 75 mg/kg/day bid per ora (maximum 1.0 g bid) for 10 days

Trichomonas vaginalis

Metronidazole 15 mg/kg/day (maximum 500 mg bid) per ora for seven days

Nonspecific vaginosis

Metronidazole 15 mg/kg/day (maximum 500 mg qid) per ora for seven days

Haemophilus ducreyi

Erythromycin 40 mg/kg/day (maximum 2 g/day) in divided doses per ora for seven days
or
Ceftriaxone 250 mg intramuscularly single dose
or
Amoxicillin-clavulanic acid 40 mg/kg/day per ora for three days

Herpes simplex virus

Symptomatic: acyclovir 5 mg/kg every 8 h intravenously for five days
Acyclovir 600 mg/m^2/dose per ora four times per day for 10 days (investigational)

Early syphilis (less than one year)

Benzathine penicillin G 100,000 units/kg (maximum 2.4 million units) intramuscularly once at two sites
or
Penicillin-allergic patients for whom desensitization is not possible, erythromycin 40 mg/kg/day (maximum 2 g/day) in divided doses per ora for 14 days (not as efficacious as penicillin therapy)

Latent syphilis (one year or longer)

Benzathine penicillin G 100,000 units/kg (maximum 2.4 million units) intramuscularly once weekly for three weeks plus probenecid 25 mg/kg per ora
or
Procaine penicillin 25,000 units/kg (maximum 600,000 units) intramuscularly once daily for 14 days
or
For penicillin-allergic patients for whom desensitization is not possible, erythromycin 40 mg/kg/day (maximum 2 g/day) in divided doses per ora for 28 days

Human papillomavirus

Podophyllin, liquid nitrogen, surgery
Interferon alpha-2b (investigational)

have latent periods, and so, in high risk situations, the tests need to be repeated if the initial one is negative (six weeks for syphilis, six months for HIV). Treatment for syphilis is dependent upon disease stage and requires follow-up serological testing at three-month intervals until the VDRL or RPR tests become nonreactive. Management of children with HIV infection involves emotional support, prevention of opportunistic infection, and administration of antiviral agents to delay progression of the illness once immune suppression occurs. There is no specific treatment for hepatitis B infection.

A summary of antibiotic treatment regimens for children is found in Table 3. In addition to the suggested therapies, tetracycline or doxycycline are alternative antibiotic treatments for syphilis, gonorrhea and chlamydial infections in children nine years or older. Empiric treatment for STD in instances of acute assault is at the discretion of the physician. If done, treatment should be directed against syphilis, gonorrhea and chlamydia. 'Test of cure' specimens should be obtained following this therapy.

SUMMARY

The importance of correct diagnosis of the presence of STD in abused children cannot be overemphasized, nor can the necessity of testing for additional STD pathogens following the identification of one STD be ignored. Of prime importance is that identification of STD allows for appropriate treatment and follow-up. As well the presence of one or more STD helps confirm that sexual activity has occurred. This may be extremely important, particularly in the child with minimal physical findings suggestive of abuse, or in the child with limited verbal skills who is unable to give complete disclosure. As knowledge of STD epidemiology, diagnosis and optimal management of infected children in the abused population grows, so will clinician ability to use this information to help unravel the often complicated problem of the diagnosis of sexual abuse of children.

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