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# Children with Condylomata Acuminata

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**Background.** The modes of transmission of genital human papillomavirus (HPV) infection in children are controversial. Studies have varied in reporting suspicion of sexual abuse in children with condylomata acuminata from zero to 90.9%. Possible modes of transmission include sexual, from mother to infant in utero, passage through an infected birth canal, infection of a nongenital type virus to the genital area, and nonsexual acquisition from a fomite.

**Methods.** Seven children, ranging in age from 2 to 12 years, who had genital HPV infections were assessed for sexual abuse. An interview with each child was conducted and an examination with a colposcope of the external genitalia was performed. A shave biopsy of a representative genital lesion was obtained. The tissue was sent for HPV typing.

**Results.** Six of the children had perianal warts; the seventh had a labial lesion. Five of the children (71%) had been sexually abused as determined by the history, physical examination, or an investigation by Child Protective Services. Five had HPV type 6 or 11, one had HPV type 16 or 18, and one had a novel HPV type.

**Conclusions.** Genital types of HPV (6 or 11, 16 or 18, and others) should alert the family physician to proceed with a careful assessment for sexual abuse. This study supports the findings of other reports that genital HPV infection can be the result of sexual abuse and points out the usefulness of HPV typing.

**Key words.** Papillomaviruses; condylomata acuminata, child; child abuse.

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Human papillomavirus (HPV) infections in children, as manifested by genital warts (condylomata acuminata), present difficult management issues for physicians in three respects: First, genital HPV in children may be the result of sexual abuse.<sup>1</sup> Second, the differential diagnosis of genital lesions is expansive, and the diagnosis of HPV may require tissue confirmation or DNA typing. Third, treatment of genital HPV infections in children can be challenging. In this report, seven children with genital HPV were assessed for sexual abuse, using the history, physical examination including assessment with a colposcope, and DNA typing of condylomata acuminata lesions.

## Methods

Patients were referred to the Family Practice Center at the University of New Mexico School of Medicine by family physicians, pediatricians, and other practitioners

throughout the state. Condyloma biopsy specimens were obtained from all seven children, whose ages ranged from 2 to 12 years. Four female and three male patients were evaluated.

The protocol for evaluation included an interview with the child alone, and then with the mother alone, the father alone, and/or other family members as appropriate. Areas covered during the interview are listed in Table 1. The physical examination included the anus, labia, hymen, and introitus in the female children, and the anus, penis, and scrotum in the male children. Examination was performed with a colposcope before and after application of 5% acetic acid (vinegar).

Tissue of the genital lesion was obtained by shave biopsy. The specimen was then sent to the University of New Mexico HPV laboratory to extract DNA for analysis by ViraPAP(R), Viratype(R), or polymerase chain reaction using probes for genital HPV (6 or 11; 16 or 18; 31, 33, or 35).

## Results

The results of the evaluation of seven children with genital HPV have been summarized in Table 2. It was concluded that five of the seven (71.4%) had been sex-

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Table 1. Physician's Checklist for Evaluating Children Suspected of Being Sexually Abused

History
Visits to emergency department
Hospitalizations
Inadequate medical care
Incomplete immunization status
Low scores on the Denver Developmental Screening Test
Behavioral changes (nightmares, sexualized play, extreme interest in genitalia, sleeping or eating problems, fear of a day-care center)
Family isolation
Nature of child's supervision
Observation of child with parent(s)
Hyperactivity
Withdrawal
Parental overreliance on the child
Physical examination
Genital warts
Genital ulcers (herpes)
Genital trauma (tears, scarring)
Discharge
Laboratory evaluation
Culture for <i>Neisseria gonorrhoeae</i> (pharynx, rectum, vagina)
Test for <i>Chlamydia trachomatis</i>
Wet-mount preparation
Rapid plasma reagin test
Test for herpes simplex
Test for human immunodeficiency virus
Typing of perianal or genital warts

Sources: Adapted from Sebachmer and Hankin,<sup>1</sup> Kessler and Hyden,<sup>2</sup> Herman-Giddens et al.,<sup>3</sup> American Academy of Dermatology Task Force on Pediatric Dermatology.<sup>4</sup>

ually abused as determined by the patient's history, physical examination, or an investigation by Child Protective Services. Five children had HPV type 6 or 11, one had a novel genital type (not yet identified), and one had type 16 or 18. The possible sources of abuse included a father, a boyfriend of a babysitter, an unknown assailant, a boyfriend of the mother, a day-care worker, and an unknown adult.

### Case Reports

**Case 1.** A 2-year-old Hispanic girl was referred by a rural physician for evaluation of perianal lesions. The lesions were noted by the mother 4 to 6 months before the visit. The parental family situation was unstable. The mother was worried that her husband would "bring something home" because he had been involved in a number of extramarital affairs and spent a lot of time "chasing women" in bars. The mother had questioned her 12-year-old daughter as to whether her father had sexually abused her. The 2-year-old child had recently been placing objects such as pencils in the front part of her diapers. The child was unusually cooperative during the examination, which revealed multiple raised, verrucous perianal lesions

and isolated HPV type 6 or 11. The same type of virus was found in a condylomatous lesion of the ventral aspect of the father's penis. Child Protective Services was consulted, and a judge ruled that sexual abuse had occurred. The child was treated with podophyllin.

**Case 2.** A 9-year-old Native American boy with perianal lesions was seen by a physician at an Indian Health Service clinic and was referred for evaluation. Although the boy had told the referring physician that "someone touched me," the child later denied the accusation and would not discuss the matter further. A biopsied perianal lesion was positive for HPV of a novel genital type. Child Protective Services investigated and decided that sexual abuse had occurred, probably outside of the home. The lesions were treated with podophyllin.

**Case 3.** A 3-year-old white boy was referred by a pediatrician for evaluation of perianal warts that were first noted by the mother 1 month before the consultation visit. The family situation included a recent divorce, a new boyfriend for the mother, and a recent behavioral change in the child, who, while at the child care center, suddenly became upset and would not return. The mother knew of a male caretaker at that facility, but she had already called the center and had been reassured that the caretaker "was never alone with the child." The child had perianal condylomata acuminata, positive for HPV type 6 or 11. The child was treated with podophyllin.

**Case 4.** A 2-year-old white girl was referred by a pediatrician for evaluation of lesions on the labia majora noted by the mother 1 month before the visit to the Family Practice Center. Child Protective Services investigated the boyfriend of a babysitter for alleged sexual abuse, but the final disposition of the investigation was not reported to the Family Practice Center. Tissue from one of the warts was positive for HPV type 6 or 11.

**Case 5.** An 8-year-old Hispanic girl was referred by a pediatrician for evaluation of perianal lesions first noted by her mother 3 years previously in Mexico. The patient and her parents had recently moved to the United States. The child denied any sexual contact. The family situation was stable. Because the warts had been present for more than 3 years, evaluation for sexual abuse was difficult. The tissue was positive for HPV type 16 or 18.

**Case 6.** An 11-year-old white girl was referred by a pediatrician for a perianal lesion noted 2 to 3 months before the clinic visit. She had been abducted and sexually assaulted on her way home from school 4 months before the office visit, but had been too afraid to tell anyone. Two weeks before the visit she told a friend about the abduction and sexual assault, and her friend convinced her to tell her parents and see a physician. The lesion was biopsied and was positive for HPV type 6 or 11.

Table 2. Results of Evaluation of Seven Children with Genital Warts

Case	Sex	Age (years)	Race/Ethnic Background	HPV Type	Treatment	Abuse Suspected	Possible Abuser
1	Female	2	Hispanic	6/11	Podophyllin	Yes	Father
2	Male	9	Native American	Novel type	Podophyllin	Yes	Unknown adult
3	Male	3	White	6/11	Podophyllin	Yes	Day-care worker or boyfriend
4	Female	2	White	6/11	Excision	Yes	Boyfriend of babysitter
5	Female	8	Hispanic	16/18	Podophyllin	Unknown	Unknown
6	Female	11	White	6/11	Excision	Yes	Abducted by unknown assailant
7	Male	12	Hispanic	6/11	Trichloroacetic acid Liquid nitrogen	No	(Consensual sexual relationship)

Case 7. A 12-year-old Hispanic boy was seen at the Family Practice Center for pain and bleeding associated with defecation, and for perianal itching. Examination revealed a large perianal condylomatous lesion. A careful history was obtained, and the boy admitted that he had been sexually active with a girl of similar age.

## Discussion

Over 1.5 million children were reported as abused or neglected in the United States in 1986, a 74% increase from 1980.<sup>2</sup> Of this number, more than 100,000 were sexually abused.<sup>1</sup> Whether the increase reflects better awareness of the problem or a greater incidence of sexual abuse is not clear. Often, the sexual abuse of a child is perpetrated by a family member or relative (usually the father). One study found that only 18% of sexually abused children were assaulted by a stranger.<sup>5</sup> Gonorrhea, syphilis, and other sexually transmitted diseases are widely accepted by the medical and legal community as evidence of sexual abuse. As genital warts increase in prevalence in the adult population as a sexually transmitted disease, it is expected that more sexually abused children will develop genital warts. The family physician must be aware of the subtle signs of physical and sexual abuse in children, and should be able to properly assess and treat children with genital warts.

More than 60 varieties of HPV have been typed, but only one third infect the anogenital area.<sup>6</sup> Human papillomaviruses tend to be site-specific DNA viruses infecting epidermal and mucosal surfaces. Any new isolate with less than 50% homology by hybridization with existing members is designated as a novel type and numbered in the order of discovery. HPV 1 and 4 are found in plantar warts, and HPV 2 in common warts of the limbs (*verrucae vulgaris*). Types 6 and 11 are highly

related viruses that infect the genital tract and appear to be of low oncogenicity. Types 16 and 18 are associated with high-grade genital intraepithelial neoplasia and carcinoma.<sup>6</sup>

Transmission of genital warts in adults has been extensively studied. It is the most common sexually transmitted virus, and the incidence seems to be increasing.<sup>7,8</sup> In children, the possible modes of transmission include the following:

*Sexual transmission.* Genital warts in children less than 12 years of age are often due to sexual abuse.<sup>1,3,4</sup> In older children, a consensual relationship with another child is another possible source of transmission.

*Transmission to infant from an infected mother.* Transmission in utero of an anogenital condyloma has been described.<sup>9-11</sup> Although it rarely occurs, infants passing through an infected birth canal can later develop laryngeal papillomatosis. These papillomas have been HPV type 6 or 11.<sup>12</sup>

*Transmission of a nongenital type of virus to the genital area.* Several studies report HPV 2 in genital warts, the wart type associated with common warts of the hand.<sup>13-15</sup> Transmission of the hand wart to the genital area apparently occurred. This seems to be a relatively rare occurrence as HPV types tend to be site specific.<sup>6</sup>

*Nonsexual transmission.* Investigation for sexual abuse in children with genital warts or other signs of sexual abuse is often inconclusive. Thus, many authors have postulated a nonsexual means of transmission of genital warts. One recent report<sup>14</sup> found nongenital types of HPV in several children and no evidence of sexual abuse in any of the 32 children with condylomata acuminata that were evaluated. The authors concluded that the transmission was either from close nonsexual contact such as bathing, or by fomite transmission such as from bath towels. However, no published studies have proven

Table 3. Studies of Children with Genital Warts Who Show Evidence of Sexual Abuse

Primary Author	Number of Children with Genital Warts	Evidence of Sexual Abuse	Comment
Neinstein <sup>17</sup>	37	9	10 not investigated
Shelton <sup>18</sup>	26	8	
Herman-Giddens <sup>3</sup>	11	10	
Society of Pediatric Dermatology <sup>1</sup>	—	(40%–80%, estimated)	
American Academy of Dermatology <sup>4</sup>	—	(50%, estimated)	
Obalek <sup>14</sup>	32	0	In 1 case, sexual abuse could not be excluded
Rock <sup>16</sup>	5	3	
Fleming <sup>13</sup>	1	0	
Vallejos <sup>21</sup>	8	3	
McCoy <sup>28</sup>	4	3	1 case not investigated for abuse
Seidel <sup>29</sup>	4	3	
Cohen <sup>15</sup>	73	6	
Derksen (present study)	7	5	1 case consensual relationship; 1 case unable to determine

that genital HPV has been acquired through fomite contact.<sup>1–4,9,16–18</sup>

Children with genital HPV should receive a thorough assessment for sexual abuse. Studies have varied in reporting suspicion of sexual abuse in children with condylomata acuminata from zero to 90.9% (see Table 3). Early reports of prepubertal girls with anogenital warts did not include investigation for evidence of sexual abuse, and nonsexual transmission was postulated.<sup>16,19,20</sup> In another study,<sup>21</sup> investigators performed HPV typing on biopsied tissue from eight children with genital warts. Seven of the eight specimens combined genital HPV types (6, 11, 16, or 18) and one specimen was negative. Three cases were referred for sexual abuse. The authors state that in all other cases, the parents, when available, denied any history of sexual contact. However, this was not adequate to determine if sexual abuse had occurred. Other recent studies<sup>1,7,8</sup> emphasize the importance of

competent evaluation of children with genital warts including careful investigation for evidence of sexual abuse.<sup>1,3,4</sup>

The seven patients reported in this study were 2 years old or older. All lesions were perianal, except for one labial lesion. The perianal lesions were all within 1 to 2 cm of the anus. All were positive for genital HPV types. Five of the seven (71.4%) had evidence of sexual abuse as determined by the history, the physical examination, or an investigation by Child Protective Services.

This study confirms that sexual abuse must be thoroughly investigated in children with genital HPV. Typing of HPV, when done by a reliable laboratory, is a useful test in assessing these children. Since physicians often testify in child abuse cases, the ability to provide HPV typing data is useful since these results can often determine if the wart is a common hand wart (HPV 2) or of another nongenital HPV type. Age less than 1 year and lesions not in close proximity to the genital or anal area indicate the possibility of nonsexual transmission.<sup>16</sup>

Assessment of children with genital HPV typing can be conducted by a family physician trained in colposcopy. More family practice residencies are providing colposcopy training and more family physicians are assessing patients for HPV, cervical dysplasia and carcinoma, and penile lesions.<sup>22</sup> Use of 5% acetic acid (vinegar) and magnification aid in the assessment of genital warts. While treatment with podophyllin liquid nitrogen, trichloroacetic acid, or 5-fluorouracil have relatively similar efficacy, podophyllin causes less pain and is better tolerated by the pediatric patient.

It is difficult to speculate on the wide variation in the literature of genital HPV and its association with sexual abuse in children. As HPV is studied and its epidemiology better understood, the determination of whether sexual abuse has occurred may be simplified. It is important to remember that the presence of other sexually transmitted diseases (STDs) in children, such as gonorrhea,<sup>23–25</sup> trichomonas,<sup>26</sup> and genital herpes,<sup>27</sup> has been similarly debated as to whether the disease could be contracted from a fomite, such as a toilet seat, or whether sexual contact occurred. Currently, the presence of an STD in a child is widely accepted by the medical and legal community as evidence of sexual abuse.

The issue of sexual abuse in children and its association with HPV has been widely debated in the medical community. In the article by Herman-Giddens et al<sup>3</sup> careful investigation showed that 10 of 11 children with genital warts had been sexually abused. On the other hand, in a study done in Paris, Obalek et al<sup>14</sup> did not find evidence of sexual abuse in any of 32 children with genital warts. The language of the conclusion in this study is telling: “sexual abuse could not be excluded” in

only one case. If the criteria to determine that sexual abuse has occurred are too stringent, few cases will be resolved. For example, if conviction of a perpetrator were the ultimate criterion for establishing that sexual abuse had occurred in children with HPV, very few cases would ever be confirmed. In addition, the very real issue of denial must be addressed. Few parents believe that sexual abuse could occur. A spouse does not believe that his or her partner is capable of sexually abusing their child. A physician does not believe that his or her patient could do such a thing to a child. Society does not believe that sexual abuse occurs. Often if the child is less than 5 years old, a history is extremely difficult to obtain. If a child is able to verbalize what has occurred, fear of disclosure, reprisal, or abandonment can prevent the child from seeking help.<sup>5</sup> In addition, the legal system has extreme difficulty successfully prosecuting perpetrators.

Physicians play a crucial role in investigating, assessing, and treating children who have been sexually abused. The family physician is often the first to suspect the sexual abuse of a child. In other situations, the physician is consulted to investigate whether sexual abuse has occurred. Few situations place the physician in such an awkward, emotionally charged, ambivalent state as evaluating a child for evidence of sexual abuse. Laws have been enacted in all states that require physicians or other health care workers to report suspected abuse. Genital HPV infection in children should alert the family physician to proceed with a careful and complete assessment for sexual abuse.

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