ORIGINAL ARTICLE

Evidence for sexual transmission of genital herpes in children

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Introduction: Genital herpes in a prepubertal child presents a child protection clinician with a difficult problem: how likely is it that transmission occurred as a consequence of sexual abuse? Published guidelines on the management of sexually transmitted infections in children provide varying recommendations and refer to a limited literature.

Objective: To review the evidence for the likelihood of sexual transmission in a child with proven genital herpes.

Methods: Structured literature search for reports of series of children presenting with genital herpes where an assessment for possible sexual transmission or child sexual abuse had been made.

Results: Five suitable papers were identified. Although just over half of reported cases of genital herpes in children had evidence suggestive of a sexual mode of transmission, the quality of assessment of possible sexual abuse was too weak to enable any reliable estimation of its likelihood. Sexual transmission is reported more commonly in older children (aged ≥ 5 years), in children presenting with genital lesions alone and where type 2 herpes simplex virus is isolated.

Conclusions: Child protection clinicians should be aware of the weakness of the evidence on the likelihood of sexual transmission of genital herpes in prepubertal children. The US guidance that child sexual abuse is "suspicious" reflects the evidence better than the UK guidance that it is "probable". A larger, more up-to-date, methodologically sound, population based study is required.

Genital herpes in a child not sufficiently mature to engage in consensual sexual activity, proven with culture of herpes simplex virus (HSV), raises the question of whether sexual abuse may have been the mode of transmission. In most cases some form of multidisciplinary child protection investigation will be required. An essential medical contribution is to advise on the likelihood that the infection is sexually transmitted or whether transmission is possible by other means.

There is little evidence on which to base such advice. Culture and typing of the virus is important as rarely other genital lesions can be mistaken for herpes simplex. HSV type 2 in adults is strongly suggestive of sexual transmission, but we do not know whether this also holds true in children, and in the UK the majority of genital herpes infections are type 1 anyway.¹

Published guidelines on the management of sexually transmitted infections in children in the United Kingdom stress sexual abuse is a "probable" mode of transmission for genital herpes,² that is, an intermediate risk for sexual abuse between "possible" and "highly probable". However, this recommendation is derived from an earlier publication from the Royal College of Physicians in which there is inconsistency between the summary conclusion that sexual transmission is "probable" and the text which describes uncertainty in knowledge about modes of transmission.³ In the US, guidance from the American Academy of Pediatrics⁴ and the Centers for Disease Control and Prevention⁶ both state that sexual transmission is "suspicious" and describe other possible modes. The primary evidence is rarely cited and where it is, seems to depend largely on a single paper from 1968 reporting six cases.⁷ We have searched for and reviewed the evidence for the likelihood that transmission has occurred through sexual abuse for a child with proven genital herpes.

METHODS

Studies were identified in early 2004 and updated in November 2005. Medline (1966–2005), CINAHL (1982–2005) and Embase

(1980–2005) were the primary databases searched. Search terms included combinations of herpes simplex, genital, child, sex*, transmi*, abuse, incest, and rape. Using the search terms (herpes simplex), child*, and genital, yielded 265 records. Using (sex* transmi*), child*, and herpes yielded 210 records. Using (child abuse) and (genital herpes) yielded 24 records. Using genital and herpes and (child* or sex*) and (abuse or incest or rape) yielded 97 records. Using herpes and child* and genital yielded 380 records. In order to identify possible studies missed by our primary searches, we searched the social science database ASSIA (1975–2005) and the ISI Web of Science database using combinations of the above terms. We examined additional papers referenced by articles identified by the search strategy. No further relevant papers or studies were identified.

Papers were deemed suitable for review if they described children under 18 years of age presenting with genital herpes simplex where the population included prepubertal children and in whom an assessment for either sexual abuse or sexual transmission had taken place. We included cohort studies, case-control studies, cross-sectional incidence studies and case series. Data on cases could be collected prospectively or retrospectively, as long as there was an attempt at complete ascertainment from a population over a time period, and a description of the population was given. In addition, we reviewed papers describing series of children presenting with suspected child sexual abuse in whom genital herpes infection had been considered either clinically or by viral culture. We excluded single case reports and reports of multiple cases in which there was no evidence that all cases presenting over a period of time had been ascertained.

We assessed the quality of included papers in terms of the thoroughness and reliability of the diagnosis of HSV and in terms of the standards for evaluating the mode of transmission. Indicators of high quality HSV diagnosis included viral culture and typing on all cases. Less good, but still adequate was paired type specific sera. Poor quality was indicated by cytology only or no confirmatory investigation and less than complete investigation in all potential

Table 1 Evidence of genital herpes among series of children assessed for child sexual abuse

Paper	Study group	Setting	Study type	Ages of children	Mode of HSV identification	Mode of CSA* ascertainment	No. identified with HSV and type
Rimsza and Niggemann, 1982 ⁸	311 children assessed for CSA over a 3.5 year period	Paediatric department and CSA referral centre, Phoenix, AZ, USA	Retrospective chart review of cases identified prospectively	0-18 years	Not clear, possibly only clinical examination. No details of virological investigations given	Clinical history, genital exam and social enquiry taken, but all children were assumed to have been sexually abused	2 with "signs of HSV", no details of HSV culture or typing
Grant, 1984 ⁹	157 children presenting with possible CSA to a child protection centre over 18 months	Child protection centre, Winnipeg, Canada	Prospective observational study	0-16 years	Viral culture not carried out routinely, only if clinically indicated	Clinical history, genital exam and social enquiry. Good quality ascertainment of CSA	1 child with HSV (not typed) and no age stated but showed no evidence of CSA
De Jong, 1986 ¹⁰	532 children assessed for CSA over a 4 year period	Paediatric department and CSA referral centre, Philadelphia, PA, USA	Prospective observational study	<14 years	Viral culture if clinically indicated, and only carried out on 3 cases	Clinical history, genital exam and social enquiry taken, but all children were assumed to have been sexually abused	1 child with HSV (type 2), age of child not stated
De Villiers <i>et al</i> , 1992 ¹¹	227 children attending a child abuse clinic over 1 year, 96.5% with alleged CSA	Child abuse clinic, Johannesburg, South Africa	Prospective observational study	All ages (124/227 <10 years)	All children had viral culture. This is the only study in this group where all cases had a viral culture	Clinical history and social enquiry	No cases of HSV isolated
Gardner, 1992 ¹²	209 sexually abused girls attending a child sexual abuse unit over 2 years and 108 non-abused controls having elective operations	Child sexual abuse unit in Perth, Australia	Case control study with prospective ascertainment of all cases presenting to unit	Ages 2-14 years (160/209 ≤ 10 years)	Undeclared. Extensive bacteriological work-up but no details given on criteria or methods of viral identification	Clinical history, genital exam and social enquiry	1 girl aged over 10 years from sexually abused group (type not reported)
Ingram <i>et al</i> , 1992 ¹³	1538 children attending a child sexual abuse assessment centre over 10.5 years	Child sexual abuse assessment centre, department of paediatrics, Raleigh, NC, USA	Prospective observational study	Ages 1-12 years (~90% ≤ 10 years)	Viral culture of "all suspicious papules or ulcers". Number of children who had viral culture is not reported	Clinical history, genital exam and social enquiry	2 girls. One aged 4 years (HSV type 2) gave no history of CSA, one aged 7 years (HSV type 2) gave history of CSA
Yordan and Yordan, 1992 ¹⁴	288 girls attending paediatric sexual abuse clinic over 3 years 5 months	Regional paediatric sexual abuse clinic, Hartford, CT, USA	Prospective observational study	Up to 18 years (184/288 ≤ 10 years)	Viral culture of "any genital ulcer". Number of children with viral culture is not reported but all had an extensive bacteriological work-up	History from referrer and child, genital exam and social enquiry	1 girl aged 17 years (type not specified) with a 4 year history of intrafamilial sexual abuse
Siegel <i>et al</i> , 1995 ¹⁵	855 children assessed for CSA over a 1 year period (704 girls, 151 boys)	Child abuse centre, paediatric department, Cincinnati, OH, USA	Prospective observational study	3 weeks to 18 years (no. ≤ 10 years but mean age = 7 years)	Clinical examination only. It is not clear whether viral culture would have been carried out but no cases had clinical signs	Clinical history, genital exam and social enquiry	No cases of HSV suspected

*CSA, child sexual abuse; †social enquiry indicates some form of multidisciplinary child protection investigation.

cases.¹ Quality indicators for the assessment of mode of transmission were less easy to define. There is no gold standard for identifying child sexual abuse. We considered that reasonable standards should include a sensitive history, clinical genital examination, some form of social care assessment which may include information gathering and interviewing child and parent, and a multidisciplinary review of all this evidence. We assessed whether three components of this process (namely history, examination and social enquiry) were carried out and on what proportion of eligible cases. However, it was not possible to assess the depth, thoroughness or consistency of this process from the descriptions given in papers.

One author carried out the searches for abstracts, reviewed the abstracts and identified potential papers (YRE for the initial search, RR for the updated search). Both authors read the papers and selected papers for inclusion and exclusion by consensus. Disagreement was resolved by discussion. Assessment of quality was carried out initially by RR and agreed by discussion. Pre-agreed forms to score abstracts for eligibility and papers for quality were not used in view of the variable (and generally poor) quality of the evidence.

RESULTS

Of the abstracts retrieved, 13 papers were suitable to be included in the review. Of these, eight papers included series of children presenting consecutively for child protection assessments.^{8–15} One of these included comparative data from non-abused controls.¹² The other five were series of children with genital herpes infections presenting consecutively either to paediatric departments in hospitals or sexually transmitted infection clinics.^{7 16–19}

Series of children presenting for child protection assessments

The results of the eight papers are shown in table 1. The overall results suggest genital herpes is very uncommon in children being evaluated for sexual abuse (8/4117 children). In two of these eight cases no evidence for sexual abuse was found. The other six cases were from clinic populations in whom it was either explicitly stated or assumed that all children had been sexually abused. Hence, these data do not help address the likelihood of sexual transmission in cases of genital herpes because the numerator is heavily biased towards children who have been sexually abused.

Only the study by De Villiers *et al* routinely cultured samples from all cases for herpes virus. As the others cultured only when clinically indicated, and in some cases not at all, cases may have been missed. Most of the studies included adolescent children who may have been consensually sexually active as well as being abused. The clinical details and ages of the individual cases were often not described. Thus, although the prevalence of genital herpes in children who have been sexually abused is low, this may be over- or under-estimated by the data presented here.

Our search strategy only identified papers where herpes had either been looked for or found. We are aware of other studies where sexually transmitted infections were sought among children being assessed for child sexual abuse but where no mention of herpes was made.^{20–22}

Series of children presenting with genital herpes

We identified five studies of series of children presenting consecutively over a defined period with genital herpes (or who were part of larger clinical populations which would be reliably expected to include all children with genital herpes) in whom enquiries had been made about possible child sexual abuse

(table 2). AS two of these studies were from sexually transmitted infection clinics in India covering highly deprived populations including large groups of young adolescent boys involved in prostitution, it may not be appropriate to generalise the results to different populations. The other series are all small and old with poor quality diagnosis of sexual abuse. We identified one further paper from Chile which appeared to report on around 90 cases of children with genital herpes. However, as there was no information on mode of transmission and our attempts at contacting the authors were unsuccessful, this paper has been excluded from the review.²³

Among the studies included, details of the type of history, the quality of physical examination, standards for assessing physical findings, and the extent and nature of further social investigations are scanty. It is clear that these were not investigated systematically in any of the studies. There is no information on which types of sexual contact (ie, genital-genital, oral-genital, hand-genital or anal contact) were considered. The description of the physical findings which were taken to indicate abuse would not be seen as adequate or appropriate now (eg, “hymen was noted to be perforated”⁷). The paper by Kaplan *et al*¹⁶ has the most thorough and consistent reported assessments. We have provided a description of each study in table 3.

The reported modes of transmission from these five studies is described in the right hand columns of table 2. Because of the heterogeneity of populations, the age of the studies and the generally poor quality of methods, we have not included a summary meta-analysis. Extreme caution should be used in interpreting these results, but with this caveat, sexual transmission has been reported more commonly when HSV type 2 has been isolated, in older age groups and when only genital lesions occur. Where both oral and genital lesions occur, especially if in a younger child, the suggestion is that either autoinoculation occurs in the context of a primary infection, or that intimate child care such as nappy changing by an infected adult occurs.

DISCUSSION

This review confirms the association of genital herpes in children with sexual contact. While a diagnosis of sexual abuse cannot be made on one finding alone, any case of genital herpes should usually result in a multidisciplinary child protection investigation. As part of this process, the child protection clinician will inevitably be asked about the likelihood of sexual transmission. In adults, genital herpes is thought to be transmitted sexually in almost all cases, either by an oro-genital or a genito-genital route.¹ However, in adults genital herpes is common, sexual activity nearly ubiquitous, and difficult questions about how the infection was contracted can legitimately be answered by the fact that herpes can be clinically asymptomatic in either partner for long periods. In contrast, among children genital herpes is rare, there may be frequent non-abusive contact with children's genitalia by adults during child care, and there is the theoretical possibility of autoinoculation from an oral lesion during a primary attack. Furthermore, clinically apparent genital herpes in a child may be the result of a primary attack years previously which may or may not have been sexually transmitted.

In this review, we have shown two main findings. First, genital herpes is rarely reported among children being assessed for possible, probable or known sexual abuse. However, few studies universally tested for herpes simplex, so we have no way of knowing how common asymptomatic infection may be. In a review of the transmission of infection after sexual abuse, Hammerschlag called for a large study using sensitive methods of virus identification and non-abused controls.²⁴

Table 2 Studies evaluating sexual transmission in series of children identified with genital herpes simplex

Paper	Study group	Setting	Study type	Ages of children	Mode of HSV identification	Mode of CSA ascertainment	No. of cases with HSV*	HSV type*		Age range*		Co-occurrence of other herpetic lesions*	
								HSV1	HSV2	<5 years	5–9 years	Genital lesions alone	Oral and genital lesions
Nahmias <i>et al</i> , 1968 ⁸	All children presenting over a 3 year period with genital herpes – 6 cases in total	Hospital paediatric department, Atlanta, GA USA	Retrospective cross-sectional study	3–12 years	Cytology, viral culture and viral typing	Clinical history and clinical examination. Poor quality assessment of CSA	6 (4)	2 (0)	4 (4)	1 (0)	4 (3)	1 (1)	3 (1)
Kaplan <i>et al</i> , 1984 ⁶	All children with culture proven genital herpes over a 9 year period – 6 cases in total. Case ascertainment from lab reports only – possible cases without viral culture may have been missed	Children's hospital Philadelphia, PA, USA	Retrospective cross-sectional study	0–12 years	Viral culture and typing	Clinical history, clinical examination, and social enquiry in some cases only. Exclusion of CSA by clinical history alone in other cases	6 (4)	5 (3)	1 (1)	2 (0)	3 (3)	1 (1)	4 (4)
Taieb <i>et al</i> , 1987 ¹⁷	All 50 children presenting with a primary herpes infection over a 10 year period	Paediatric dermatology department, Bordeaux, France	Prospective cohort study	11 months to 11 years	Viral culture and viral typing	Clinical history alone. Poor quality assessment of CSA. Main focus of paper was epidemiology and virology of primary herpes infections, brief details only for cases with genital lesions	3 (1)	2 (1)	1 (0)	2 (0)	0	1 (1)	1 (1)
Pandhi <i>et al</i> , 1995 ⁸	58 children attending a sexually transmitted infection clinic over 18 months. Highly disadvantaged population, many involved in prostitution	STD clinic, New Delhi, India	Retrospective cross-sectional study	0–14 years	Cytology (Tzanck smear), no virology. Cytology has low sensitivity for identifying herpes	Clinical history. Assessment of sexual transmission of low reliability. Although 2/4 cases with HSV gave no history of sexual contact, the authors imply that sexual contact was likely		Not typed	0	0	4 (2)	Not reported	
Pandhi <i>et al</i> , 2003 ¹⁹ Note, different authors, setting and study group to paper described above	127 children attending a sexually transmitted infection clinic over 6 years. Highly disadvantaged population, many living in poorly managed children's homes with high prevalence of homosexual abuse	STD clinic, New Delhi, India	Retrospective cross-sectional study	0–14 years	Cytology (Tzanck smear), no virology. Cytology has low sensitivity for identifying herpes	Clinical history. Assessment of sexual transmission of low reliability		Not typed	2 (2)	3 (3)	6 (6)	Not reported	

*Number thought due to child sexual abuse in brackets. CSA, child sexual abuse.

Table 3 Details of studies reporting investigation of cause in series of children with genital herpes

Paper	Review
Nahmias <i>et al</i> , 1968 ⁷	This is the most quoted study; 6 children with genital herpes, with relatively poor reference standards for the identification of abuse, formed the retrospective cohort. Four had type 2 infections, one based on serology results. Of these, 1 had been sexually exposed, 1 molested, and 2 had a perforated hymen (1 also isolated herpes from the mouth). One with type 1 herpes had gingivostomatitis and genital lesions, with no history of venereal contact, and an intact hymen. A 3 year old boy with type 1 genital infection but no concurrent oral lesions, had had gingivostomatitis previously and had herpes virus cultured from the mouth. It is unclear whether a history of abuse was considered. In view of the age of the study it is unclear how well evidence of sexual abuse was collected.
Kaplan <i>et al</i> , 1984 ¹⁶	Records of children with culture-positive genital herpes (under 13 years, excluding neonates) were reviewed to determine how acquisition was documented and whether sexual abuse had been investigated. Four out of 6 children had evidence of abuse (three on clinical history, one after social enquiry), two had infection suggestive of autoinoculation (sexual abuse excluded on clinical history in these two). The study cohort is small and fairly old, but reference standards for herpes virus identification were good. Child protection assessments were variable: in some cases detailed multidisciplinary social enquiries were carried out, in other cases only clinical history and examination were undertaken. Nevertheless, evidence was presented to show that the possibility of sexual transmission had been considered by clinicians in each case and some justification was provided for the decisions on how extensively to pursue this.
Taieb <i>et al</i> , 1987 ¹⁷	50 children with culture-positive primary herpes infections were studied. Of these, 3 had genital herpes. One 44 month old girl had type 1 herpes isolated from genital, orolabial and cutaneous lesions, but the source of infection was unknown. A 25 month old had type 2 herpes isolated from orolabial and genital lesions. It was suggested the probable source of infection was from a sibling with gingivostomatitis. The 3rd case was that of an 11 year old girl with type 1 genital herpes. Although the authors suspected venereal transmission, genital examination was not performed and the history was inconclusive. Overall, the reference standards were poor and evidence for sexual abuse was not consistently investigated.
Pandhi <i>et al</i> , 1995 ¹⁸	58 children under 14 years age reporting to the dermatology and sexually transmitted diseases department of a Delhi hospital over a 20 month period formed the retrospective cohort. Reference standards for documenting infection were moderate (Tzanck smear identifies multinuclear giant cells, but this does not have a high sensitivity). Reference standards for the possibility of sexual abuse were moderate, and depended on clinical history alone. 4 boys, all aged 11–14 years, had genital herpes, 2/2 gave a history of sexual contact. All these boys were sexually mature and from an extremely disadvantaged background with a high prevalence of prostitution involving young boys. This combination of factors suggests the findings may not be transferable to children typically seen in developed nations such as the UK and could only be transferred to the small group of children involved in prostitution who, by definition, would be sexually abused.
Pandhi <i>et al</i> , 2003 ¹⁹	127 children (under 14 years) who attended the sexually transmitted infection (STI) clinic of a tertiary hospital in India over 6 years, formed the retrospective cohort. Reference standards for documenting infection were moderate (Tzanck smear identifies multinuclear giant cells, but this does not have a high sensitivity). Reference standards for the possibility of sexual abuse were moderate, based on clinical assessment alone. 11 had genital herpes with documented sexual transmission (7 girls after abuse, 2 boys after sodomy, 2 boys after voluntary heterosexual contact). The cohort was highly disadvantaged; over 60% were illiterate, over 70% were from low socioeconomic backgrounds and 17% were from remand homes. Syphilis was the most common infection, seen in 25%, followed by 14% with genital warts. There was a high incidence (70%) of homosexual abuse in the boys presenting with STIs. As with the previous study from India, this combination of factors suggests these findings may not be transferable to children typically seen in developed nations such as the UK. There is no overlap with the previous study (different authors, clinic and population) despite similarities of author names, city and layout of report.

Second, among groups of children identified with genital herpes, it is suggested that sexual transmission occurs in just over half the cases (table 2). However, this evidence is weak. The series are all small. The reliability of ascertainment of sexual abuse was variable and would not be accepted by current standards. In some studies only clinical history was taken and no reference was made to multidisciplinary social enquiries, while in others there seems an assumption that sexual transmission occurred unless there was convincing evidence otherwise. It is possible that there has been publication bias in favour of studies reporting an association between childhood genital herpes and sexual abuse. Therefore, the overall figure for the likelihood of sexual transmission could be either over- or underestimated.

The poor quality of this evidence means it is not possible to estimate the likelihood of sexual transmission in children presenting with genital herpes. This is a much weaker evidence base than that available for gonorrhoea for example, where larger series and a better understanding of the natural history of the disease mean we can be more certain it is sexually transmitted. The US guidance in this respect, reflects the evidence more reliably, where gonorrhoea is described as “highly suspicious” of sexual abuse, while genital herpes is “suspicious”.^{4–6} We propose that the current UK recommendation should be changed to “possible abuse”.

When genital herpes occurs in children, we support the view that a multi-agency enquiry is required to exclude sexual abuse in the absence of another credible explanation. Both clinically and for research purposes, herpes should be included in any situation where a sexually transmitted infection screen is carried out in children. Although this may be considered over-investigation clinically, a carefully conducted study of genital

examination and genital viral culture in any child presenting with a primary herpes infection elsewhere would help answer many questions about the frequency of autoinoculation, asymptomatic infection and incidental isolation of the virus. A larger, methodologically robust and more up-to-date study of children presenting with genital herpes is required in order to be more certain of the implications in a child who is not mature enough to engage in consensual sexual relations. In the meantime this review provides doctors with the evidence on which to base their judgment.

What is already known about this topic

- Genital herpes in a child raises the question of sexual abuse.
- The likelihood of sexual transmission in children is unclear.
- Published guidelines are inconsistent.

What this study adds

- Available evidence is too weak to allow an estimation of the likelihood of sexual transmission.
- Sexual transmission has been reported more commonly in children over 5 years of age where genital lesions alone occur and where type 2 herpes simplex virus is isolated.

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