J Pediatr Adolesc Gynecol (2007) 20:289–292

Original Studies

Bacterial Colonization In Suspected Sexually Abused Children

Petra Kohlberger, MD and Dagmar Bancher-Todesca, MD
Department of Gynaecology and Obstetrics, Medical University Vienna, Vienna, Austria

Abstract. *Objective:* Previous studies concluded that symptomatic prepubertal children with Gardnerella vaginalis infection should be investigated for child sexual abuse. Gardnerella vaginalis is only one out of a group of organism that cause bacterial vaginosis. The aim of the study was to report the frequency of bacterial colonization as well as sexually transmitted diseases and to correlate these data with patient characteristics.

Methods: Data were collected from 1996 to 2006. Medical records of 180 girls, median age at first sexual abuse 7.44 years (range 1–16, SD 3.937), have been evaluated retrospectively. SPSS software 12.0 has been used for statistical analysis.

Results: Only 18.3% of patients complained of vaginal discharge or pruritus. Sexually transmitted diseases were documented: Gonorrhoea 1 (1.8%, 56 tested), Chlamydia trachomatis 1 (1.6%, 62 tested), Syphilis 0 (0%, 5 tested), Trichomonas vaginalis 1 (0.7%, 136 tested) and HIV 0 (0%, 27 tested). Bacterial colonization were documented (121 tested): Gardnerella vaginalis 29 (24%), Enterobacteriaceae 50 (41.3%), Haemophilus influenzae 11 (9.1%), Streptococcus a haemolyticus 35 (28.9%), Streptococcus Group B 8 (6.6%), Staphylococcus Koag neg. 37 (30.6%), Staphylococcus aureus 10 (8.3%), Pseudomonas aeruginosa 4 (4.1%), Bacteroides 19 (15.7%), Prevotella 24 (19.8%), Klebsiella 4 (3.3%), Corynebacteria 20 (16.5%) and Ureaplasma 9 (7.4%).

Conclusions: Sexually transmitted diseases are infrequent in children suspected for child sexual abuse. Bacterial colonization is common, however, not correlated with clinical symptoms (except for Bacteroides) and hymenal/vaginal injuries.

Key Words. Child sexual abuse—Bacterial colonization—Sexually transmitted diseases

Address correspondence to: Petra Kohlberger, MD, Department of Gynecology and Obstetrics, Medical University Vienna, Waehringer Guertel 18-20, A-1090 Vienna; E-mail: petra.kohlberger@meduniwien.ac.at

1083-3188/07/$22.00
doi:10.1016/j.jpag.2006.11.004

Introduction

The definition of sexual abuse of the National Center on Child Abuse and Neglect[1] states: ''Contact or interaction between a child and an adult, when the child is being used for the sexual stimulation of that adult or another person.'' In most children the physical findings are normal and there is no evidence of trauma.[2] Even if the child is injured, in the next hours or days small superficial injuries will heal completely and a clinical sign will no longer be detectable. However, sexually transmitted diseases are still detectable. According to the guidelines for the evaluation of sexual abuse of children of the American Academy of Pediatrics, gonorrhoea, syphilis, HIV (if not perinatally or transfusion acquired) and Chlamydia (if not perinatally acquired) are diagnostic, Trichomonas vaginalis, Condyloma acuminatum (if not perinatally acquired) and Herpes genitals are suspicious and bacterial vaginosis is inconclusive for sexual abuse.[3,4] However, bacterial vaginosis is the most frequent cause of vaginal discharge characterized by an increase in anaerobes.[5,6]

To our knowledge, no reports concerning bacterial colonization in children suspected for sexual abuse have been published, except for mycoplasmas.[7–10]

The aim of this study was to document the frequency of bacterial colonization in children suspected for sexual abuse and to correlate patients characteristics and clinical findings.

Material and Methods

During the period 1996 to 2006, 180 patients suspected for sexual child abuse were examined by a gynecologists out of a group of five female specialists for children and adolescent gynecology at our outpatient department for children and adolescent gynecology. A general medical and gynecologic examination consisted of inspection of the labia majora and minora, the hymen, the perineum, and the anus.[11,12] Specimens were collected from the lower

Table 1. Bacterial Colonization and Clinical Symptoms (e.g. Vaginal Discharge, Pruritus)

n=121	Clinical Symptoms	Asymptomatic	Spearman Correlation Coefficient, Two-Sided (*P*-value)
Gardnerella vaginalis	7 (5.6%)	22 (18.2%)	0.002 (0.98)
Enterobacteriaceae	16 (13.2%)	34 (28.1%)	0.158 (0.084)
Haemophilus influenzae	4 (3.3%)	7 (5.8%)	0.092 (0.316)
Streptococcus a haem.	7 (5.8%)	28 (23.1%)	−0.059 (0.518)
Streptococcus group B	3 (2.5%)	5 (4.1%)	0.084 (0.358)
Staphylococcus Koag neg.	10 (8.2%)	27 (22.3%)	0.048 (0.604)
Staphylococcus aureus	2 (1.6%)	8 (6.6%)	−0.028 (0.761)
Pseudomonas aeruginosa	1 (0.8%)	4 (3.3%)	−0.019 (0.834)
Bacteroides	**8 (6.6%)**	**11 (9.0%)**	**0.183 (0.044)**
Prevotella	9 (7.4%)	15 (12.3%)	0.158 (0.084)
Klebsiella	1 (0.8%)	3 (2.5%)	0.004 (0.961)
Corynebacteria	7 (5.8%)	13 (10.7%)	0.115 (0.209)
Ureaplasma	4 (3.3%)	5 (4.1%)	0.136 (0.137)

third of the vagina and/or introitus. Swabs were submitted for examination under the microscope with Gram stain as well as for bacterial culture at the Department for Microbiology, General Hospital Vienna. Swabs for gonorrhoea and chlamydia were examined with polymerase chain reaction. All patients were treated interdisciplinarily, including psychological assessment if not already initiated prior to the consultation at our outpatient department. Screening for gonococcal infection was only performed when the victim was symptomatic with vaginal discharge. Because the rates of positive testing in abused children are $<3\%$,[13] the selective criteria have been used according to the recommendation of the American Academy of Pediatrics Committee on Child Abuse and Neglect and Siegel et al.[14]

Statistical data were analyzed with the software SPSS 12.0 for Windows.

Results

The perpetrator was a member of the family, e.g. the father or stepfather, in 38.3% of the cases. Of the examined victims, 76.1% showed no hymenal-vaginal tear and 91.1% no signs of extra-genital injuries. Only 18.3% of patients complained of vaginal discharge or pruritus. Sexually transmitted diseases were documented: Gonorrhoea 1 (1.8%, 56 tested), Chlamydia trachomatis 1 (1.6%, 62 tested), Syphilis 0 (0%, 5 tested), Trichomonas vaginalis 1 (0.7%, 136 tested) and HIV 0 (0%, 27 tested). Bacterial colonization were documented (121 tested): Gardnerella vaginalis 29 (24%), Enterobacteriaceae 50 (41.3%), Haemophilus influenzae 11 (9.1%), Streptococcus a haem. 35 (28.9%), Streptococcus Group B 8 (6.6%), Staphylococcus Koag neg. 37 (30.6%), Staphylococcus aureus 10 (8.3%), Pseudomonas aeruginosa 4 (4.1%), Bacteroides 19 (15.7%), Prevotella 24 (19.8%), Klebsiella 4 (3.3%), Corynebacteria 20 (16.5%) and Ureaplasma 9 (7.4%).

We found no correlation of clinical symptoms (e.g. vaginal discharge, pruritus) with the microbiologic report except for Bacteroides (Table 1). We found a significant correlation of the prepubertal status with the microbiologic report for Enterobacteriaceae and for the pubertal status for Gardnerella vaginalis and Ureaplasma (Table 2). Hymenal/vaginal tear and bacterial

Table 2. Bacterial Colonization and Prepubertal Status

n=121	Prepubertal	Total	Spearman correlation coefficient, two-sided (*P*-value)
Gardnerella vaginalis	**16**	**29**	**0.239 (0.013)**
Enterobacteriaceae	**44**	**50**	**−0.285 (0.003)**
Haemophilus influenzae	11	11	−0.151 (0.12)
Streptococcus a haem.	30	35	−0.181 (0.060)
Streptococcus group B	5	8	0.000 (1.0)
Staphylococcus Koag neg.	27	37	0.071 (0.463)
Staphylococcus aureus	10	10	−0.143 (0.140)
Pseudomonas aeruginosa	4	5	−0.088 (0.367)
Bacteroides	13	19	0.080 (0.413)
Prevotella	17	24	0.031 (0.747)
Klebsiella	3	4	0.044 (0.652)
Corynebacteria	16	20	−0.067 (0.493)
Ureaplasma	**3**	**9**	**0.405 (0.0001)**

Table 3. Bacterial Colonization and Hymenal/Vaginal Tear

n=121	Hymenal tear	Total	Spearman correlation coefficient, two-sided, (*P* value)
Gardnerella vaginalis	9	29	0.093 (0.311)
Enterobacteriaceae	11	50	−0.054 (0.554)
Haemophilus influenzae	2	11	−0.084 (0.598)
Streptococcus a haem.	8	35	−0.029 (0.775)
Streptococcus group B	1	8	−0.076 (0.409)
Staphylococcus Koag neg.	13	37	0.159 (0.082)
Staphylococcus aureus	2	10	−0.033 (0.717)
Pseudomonas aeruginosa	0	5	−0.119 (0.193)
Bacteroides	4	19	−0.037 (0.684)
Prevotella	7	24	0.050 (0.583)
Klebsiella	0	4	−0.106 (0.246)
Corynebacteria	5	20	0.002 (0.982)
Ureaplasma	4	9	0.129 (0.158)

colonization were not correlated (Table 3). The patient diagnosed with Trichomonas vaginalis and the patient positive for Chlamydia trachomatis presented with a hymenal tear. The patient positive for Gonorrhoea showed no hymenal injury.

Discussion

Suspicion of child sexual abuse is the fourth most common diagnosis at our outpatient department for pediatric and adolescent gynecology. Children of every age and socioeconomic class are affected. There is no doubt that the number of reported incidents of child sexual abuse represents only a portion of the actual number.

Retrospective studies have shown an incidence of sexual abuse in women under the age of 18 of 38%.[15] However, exact numbers can only be estimated.

Physical examination is in most cases not diagnostic because physical findings are absent.[16] However, genital infections can be detected.[17]

Previous studies concluded that symptomatic prepubertal children with Gardnerella vaginalis infection should be investigated for child sexual abuse.[18] Gardnerella vaginalis is only one out of a group of organism that cause bacterial vaginosis. Diagnostic for bacterial vaginosis is the presence of clue cells in a Gram-stained specimen with gram-negative rods. However, in prepubertal children the absence of gram-positive Lactobacilli is physiological and so the diagnosis of bacterial vaginosis is often difficult.[19,20]

Our data confirm sexually transmitted diseases to be infrequent in children suspected for sexual abuse.[14] Bacterial colonization is common in children suspected for sexual abuse; however, it is not correlated with clinical symptoms (e.g. vaginal discharge, pruritus) except for Bacteroides and is not correlated with a hymenal or vaginal tear. In this retrospective study the frequent rate of bacterial colonization in children suspected for sexual abuse encourages us to plan a prospective case-control study with children without suspicion for sexual abuse as the control group.

References

1. National Center on Child Abuse and Neglect (NCCAN): Child sexual abuse: incest, assault and exploitation. Special report. Washington, HEW, Children's Bureau, 1978
2. Adams JA, Harper K, Knudson S, et al: Examination findings in legally confirmed child sexual abuse: It's normal to be normal. Pediatrics 1994; 94:310
3. American Academy of Pediatrics, Committee on Child Abuse and Neglect. Guidelines for the evaluation of sexual abuse of children: subject review. American Academy of Pediatrics Committee on Child Abuse and Neglect. Pediatrics 1999; 103:186
4. Centers for Disease Control and Prevention: Workowski KA, Berman SM. Sexually transmitted diseases treatment guidelines 2006. MMWR Recomm Rep 2006; 55:1
5. Spiegel CA: Bacterial vaginosis. Clin Microbiol Rev 1991; 4:485
6. Hammerschlag MR, Cummings M, Doraiswamy B, et al: Nonspecific vaginitis following sexual abuse in children. Pediatrics 1985; 75:1028
7. Hammerschlag MR, Doraiswamy B, Cox P, et al: Colonization of sexually abused children with genital mycoplasmas. Sex Transm Dis 1987; 14:23
8. Hammerschlag MR, Alpert S, Rosner I, et al: Microbiology of the vagina in children: normal and potentially pathogenic organisms. Pediatrics 1978; 62:57
9. Hammerschlag MR, Alpert S, Onderdonk AB, et al: Anaerobic microflora of the vagina in children. Am J Obstet Gynecol 1978; 131:853
10. Bartley DL, Morgan L, Rimsza ME: Gardnerella vaginalis in prepubertal girls. Am J Dis Child 1987; 141:1014
11. Muram D: Classification of genital findings in prepubertal girls who are victims of sexual abuse. Adolesc Pediatr Gynecol 1988; 2:149

12. Adams JA, Harper K, Knudson S: A proposed system for the classification of anogenital findings in children with suspected sexual abuse. Adolesc Pediatr Gynecol 1999; 5:73
13. Ingram DL, Everett D, Lyna PR, et al: Epidemiology of adult sexually transmitted disease agents in children being evaluated for sexual abuse. Pediatr Infect Dis J 1992; 11: 945
14. Siegel RM, Schubert CJ, Meyers PA, et al: The prevalence of sexually transmitted diseases in children and adolescents evaluated for sexual abuse in Cincinnati: rationale for limited STD testing in prepubertal girls. Pediatrics 1995; 96:1090
15. Muram D: Child sexual abuse. In: Sanfilippo JS, Muram D, Dewhurst J, Lee PA, editors. Pediatric and Adolescent Gynecology. Philadelphia, Saunders, 2001, pp 399−414
16. McCann J, Voris J, Simon M: Genital injuries resulting from sexual abuse: a longitudinal study. Pediatrics 1992; 89:307
17. Schwarcz SK, Whittington WL: Sexual assault and sexually transmitted diseases: Detection and management in adults and children. Rev Infect Dis 1990; 12:S682
18. Argent AC, Lachman PI: Sexually transmitted diseases in children and evidence of sexual abuse. Child Abuse Negl 1995; 19:1303
19. Schwebke JR, Hillier SL, Sobel JD, et al: Validity of the vaginal gram stain for the diagnosis of bacterial vaginosis. Obstet Gynecol 1996; 88:573
20. Hammerschlag MR: The transmissibility of sexually transmitted diseases in sexually abused children. Child Abuse Negl 1998; 22:623