Neisseria gonorrhoeae conjunctivitis in a prepuberal girl - a dilemma: sexual violence or non-sexual transmission?

Conjuntivite por Neisseria Gonorrhoea em menina prepubere – um dilema: violência sexual ou transmissão não sexual?

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ABSTRACT

Introduction: Sexually transmitted infections (STIs) are a public health issue of global concern and frequently lead to important sequelae if not diagnosed and properly treated. *Neisseria gonorrhoeae* (NG) infection is one of the most prevalent STIs worldwide and recently presents increasing incidence and antimicrobial resistance rates. Apart from the neonatal period, NG infection during childhood is considered evidence of sexual violence (SV). However, defining perpetration of violence can be challenging in clinical practice. **Objective**: To report a case of conjunctivitis due to NG in a prepuberal girl and discuss possible means of infection acquisition and medical forensic implications. **Case report:** A 7-year-old female Caucasian student from São Paulo was referred to the Rape Care Center (*Núcleo de Atendimento a Vítimas de Violência Sexual* – NAVIS) outpatient clinic to investigate sexual violence in September 2013. At admission, she reported right ocular hyperemia for 10 days with no response to tobramycin eye drops. Personal history: nothing noteworthy. She lived with her mother and grandmother and visited her father every two weeks. Physical and gynecological examinations were normal. Eye examination: Left eye — nothing noteworthy. Right eye — palpebral edema, conjunctival hyperemia with purulent exudate and upper corneal perforation. Bacterioscopy of conjunctival secretion was positive for Gram-negative diplococci and NG was isolated in culture. The patient was submitted to suturing of right eye perforation and received 1g intravenous ceftriaxone per day for 10 days. During investigation at the NAVIS outpatient clinic, the mother denied any SV episode or school behaviour change. Multidisciplinary psychosocial care was provided to the child and her mother for over 6 months, but SV could not be characterized. STIs investigation for HIV, hepatitis B and C infections and syphilis resulted negative. Based on the literature, a hypothesis of accidental intra-familial non-sexual transmission of NG was then considered. Endocervical, vaginal and urethral secretions were collected from the mother and yielded isolation of endocervical beta-lactamase producing NG. Hygiene measures and contact isolation were recommended and the mother underwent treatment with ceftriaxone single dose 1G. During follow-up the child developed corneal opacity in her right eye. **Conclusion:** In prepuberal children presenting with unusual but compatible clinical manifestations, STIs should always be considered and investigated to enable prompt treatment and avoid sequelae. If gonococcal infection is diagnosed, the possibility of sexual violence should be thoroughly investigated, preferably in a comprehensive multidisciplinary approach to rule out non-sexual contamination and avoid emotional damage to the child and family. Clearly defining SV and proposing proper interventions in these circumstances is, however, challenging for healthcare providers.

Keywords: Neisseria gonorrhoeae; conjunctivitis; disease transmission, infectious; sex offenses; rape; child.

RESUMO

Introdução: As infecções sexualmente transmissíveis (ISTs) são um problema de saúde pública global e com frequência deixam sequelas se não diagnosticadas e tratadas adequadamente. A infecção por *Neisseria gonorrhoeae* (NG) é uma das ISTs mais prevalentes em todo o mundo e, recentemente, tem apresentado crescentes taxas de incidência, além de resistência a antimicrobianos. Após o período neonatal, a infecção por NG na infância pode ser uma evidência de violência sexual (VS), no entanto a comprovação da violência é um desafio na prática clínica. **Objetivo:** Apresentar um caso de conjuntivite por NG em uma menina pré-púbere e discutir as possíveis vias de contaminação e implicações médicas forenses. **Relato de caso:** Trata-se de uma criança caucasiana de 7 anos de idade do sexo feminino, estudante, procedente de São Paulo, que, após uma internação, foi encaminhada ao Núcleo de Atendimento a Vítimas de Violência Sexual (NAVIS) para investigação de violência sexual, em setembro de 2013. Na admissão intra-hospitalar, houve relato de hiperemia ocular direita, iniciada havia 10 dias, sem resposta ao tratamento com colírio de tobramicina. Antecedentes pessoais: nada digno de nota. Ela morava com a mãe e a avó e visitava o pai a cada duas semanas. Os exames físico e ginecológico foram normais. Exame oftalmológico: olho esquerdo — nada digno de nota. Olho direito — edema palpebral, hiperemia conjuntival com exsudato purulento e perfuração da córnea superior. A bacterioscopia de secreção conjuntival foi positiva para diplococos gram-negativos e a NG foi isolada em cultura. A paciente foi submetida a sutura cirúrgica de perfuração do olho direito e, enquanto internada, recebeu 1 g de ceftriaxona endovenoso por dia, por um período de 10 dias. Durante a investigação no ambulatório de NAVIS, a mãe negou qualquer episódio de VS ou mudança de comportamento escolar. Foi oferecida assistência psicológica e social à criança e à mãe por mais de seis meses, mas a VS não pôde ser caracterizada. A investigação de IST para o HIV, infecções por hepatite B e C e sífilis resultou negativa. Com base na literatura, a hipótese de transmissão não sexual acidental de NG intrafamiliar foi então considerada. As secreções genitais da mãe (endocervical, vaginal e uretral) foram coletadas e o isolamento endocervical da NG produtora por betalactamase foi positivo. Medidas de higiene e isolamento de contato foram recomendados, além ser prescrito o tratamento com ceftriaxona em dose única de 1 g para a mãe. Durante o acompanhamento, a criança desenvolveu opacidade corneana em seu olho direito. **Conclusão:** Em crianças pré-púberes que apresentam manifestações clínicas incomuns, as ISTs devem sempre ser consideradas e investigadas para permitir o tratamento imediato e assim evitar sequelas. Se uma infecção gonocócica for diagnosticada, a possibilidade de (VS) deve ser minuciosamente investigada, de preferência com uma abordagem multidisciplinar abrangente para descartar a contaminação não sexual e evitar danos emocionais à criança e à sua família. Definir com precisão se houve VS e propor intervenções adequadas nessas circunstâncias mostra-se um desafio para os profissionais de saúde.

Palavras-chave: Neisseria gonorrhoeae; conjuntivite; transmissão de doença infecciosa; delitos sexuais; estupro; criança.

INTRODUCTION

A laboratory confirmed sexually transmitted infection (STI) in a prepuberal child should be considered evidence of sexual violence (SV), according to international clinical guidelines and forensic

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medicine regulations[1,2]. According to the United Nations (UN) definition, childhood is considered as the lifetime from birth to 10 years of age, whereas in Brazilian legislation since 1990 — *Estatuto da Criança e do Adolescente* (ECA) —, childhood includes age groups from 10 to 12 years, the average age when menarche occurs[3,4]. However, it is not always easy to prove the perpetration of violence when physical evidence is lacking or when a statement by the victim cannot be obtained due to immaturity of poor understanding of the child. Under these circumstances, the decision-making process on how to intervene can be very challenging for healthcare providers. Not protecting children as suspected victims of SV may lead to severe deleterious consequences with effects that may last throughout their lifetimes[5,6]. On the other hand, removing suspected victims from their parents' company can also be harmful for the child's good development in case SV is eventually ruled out. We thus report a case of a child who presented conjunctivitis due to Neisseria gonorrhoeae (NG) infection and discuss the possible means of infection acquisition and the corresponding forensic medicine implications, so as to support healthcare providers in the proposal of proper interventions.

CASE REPORT

A 7-year-old female Caucasian student from São Paulo was referred to the Rape Care Center (*Núcleo de Atendimento a Vítimas de Violência Sexual* — NAVIS) outpatient clinic at Hospital das Clínicas in São Paulo, Brazil, in September 2013, to investigate SV. According to the mother, the child sought a pediatric emergency service with complaint of right eye hyperemia for 10 days and was prescribed tobramycin eye drops, without any improvement. No noteworthy information was detected in assessment of the child's personal history. She lived with her mother and grandmother and visited her father every two weeks. Physical and gynecological examinations were normal. Eye examination: Left eye — nothing noteworthy. Right eye — palpebral edema, conjunctival hyperemia with purulent exudate and upper corneal perforation. Bacterioscopy of conjunctival secretion was positive for Gram-negative diplococci and NG was isolated in culture (automated Vitek method; beta-lactamase producing NG). In addition, the secretion yielded no evidence of fungal infection. Vitreous and aqueous humor cultures resulted negative after first antibiotic dose, for aerobic and anaerobic bacteria and fungi. With diagnosis of corneal perforation secondary to gonococcal conjunctivitis, the patient was submitted to suturing of the perforation and received 1g of intravenous ceftriaxone per day for 10 days.

As part of the routine management of cases at the NAVIS outpatient clinic, the judicial system was notified of suspected SV. During investigation, the mother denied any intrafamilial SV episode or school behavior change. Multidisciplinary psychosocial care, consisting of psychotherapy and social counseling, was provided to the child and her mother for over 6 months. Adherence to follow-up consultations with an attending physician, a social worker and a psychologist was good. Although intensively investigated, the multidisciplinary team of care providers could not characterize SV.

Complementary clinical investigation for other STI, including HIV, hepatitis B and C infections and syphilis resulted negative. Based on the literature, a hypothesis of accidental intrafamilial non-sexual gonococcal transmission was then considered. Endocervical, vaginal and urethral secretions were collected from the mother and yielded isolation of endocervical beta-lactamase producing NG. The mother was appropriately treated with a single dose of 1g ceftriaxone. Hygiene measures and contact isolation were also recommended. Despite receiving systemic antibiotic therapy, the child developed unilateral visual deficit in her right eye during follow-up, probably due to the delay in establishing the etiological diagnosis of conjunctivitis and its proper therapy.

DISCUSSION

At first, this clinical case led us to hypothesize sexually transmitted gonococcal conjunctivitis. Bearing this in mind and taking the patient's age into account, based on international medical and forensic guidelines a suspicion of SV was raised, and the case accordingly reported to judicial authorities in charge of children's rights protection. However, SV could not be characterized in this case, despite a thorough investigation carried out by a skilled multidisciplinary care team. Vulnerability issues and alternative modes of acquisition of gonococcal infection should therefore be considered in this situation.

In this regard, it is important to point out that the incidence of gonococcal infection, which remained stable in previous decades, has been rising in both sexes, especially among men who have sex with men (MSM) since 2010 in several countries[7,8]. In addition, recent evidence has shown that asymptomatic individuals may carry NG in the oropharynx, resulting in increased risk of transmission through oral and genital contact, more often reported among MSM[9]. Increased gonococcal antimicrobial resistance may have contributed to increased transmission[7,8], once that single-dose antibiotic therapy regimens have been shown ineffective in eradicating oropharyngeal NG. Oral antiseptic use is therefore being studied for oropharyngeal decontamination[9]. In a context of increased NG infection prevalence, unusual clinical presentations and alternative modes of transmission may occur.

Particularly among prepuberal children, gonococcal infection is described more often in girls, and is usually presented clinically as vulvovaginitis, with no evidence of endocervical or internal genitalia involvement, in contrast to what is described among female adolescents or adult women. At older age, NG infections, due to its protracted course and frequent asymptomatic presentation, may lead to pelvic inflammatory disease and, subsequently, to infertility[1,7]. It is important to highlight, among prepuberal girls, that gonococcus may also be isolated from oropharynx and anorectal swabs[7]. According to the literature, the lack of genital estrogen renders prepuberal girls significantly more vulnerable to NG acquisition. Immature development of the outer lips in younger girls provides more intense vaginal exposure in the absence of growth of protective bacterial flora. Genital infection may thus occur in these girls without any physical lesion, i.e., even in the absence of hymnal rupture[10,11].

Regarding the clinical presentation of the present case, gonococcal conjunctivitis has been previously described in prepuberal children of both sexes[10-13], alone or associated with genital infection. Its occurrence is of major clinical and epidemiological concern among newborns, in whom ocular infection constitutes the most common clinically recognized manifestation of neonatal infection (*ophtalmia neonatorum*) and a significant cause of blindness in developing countries[7,10]. Routine recommendation of prophylactic

ocular silver nitrate solutions or erythromycin (0.5%) ophthalmic ointment at birth for all neonates has been shown as an efficient and safe measure[7,10].

Although the overriding risk factor for acquiring NG infection is having sex with an infected partner, non-sexual transmission of this agent should not be disregarded. Goodyear-Smith[10] reported that gonococcus can survive up to 48 to 72 hours on moistened towels or surfaces, being able to grow after inoculation of contaminated material in experimental animals. Moreover, gonococcal infection outbreaks described in prepuberal institutions in the late 19th century were considered dependent on the shared use of rectal thermometers and towels, and could be contained with implementation of hygiene measures and contact isolation. Even though sexual transmission cannot be completely ruled out in retrospective studies, the fact that they resulted in ocular infection only, with no increased occurrence of genital infection, strongly suggests non-sexual transmission. It is noteworthy that children aged 0 to 4 years have a 27-fold higher risk of eye infection due to NG than adults[10]. In the case presented here, NG isolation from an endocervical sample of the child's mother, in the absence of any symptoms, raised the possibility of sustained exposure to intrafamilial transmission.

According to international guidelines, nucleic acid amplification test (NAAT) in vaginal secretions, urine or endocervical samples are sufficiently sensitive and specific to provide an adequate approach to diagnose adolescents and adults, enabling appropriate therapeutic interventions to be made[1,7]. However, when it comes to prepuberal children, or in the context of suspected SV, it is necessary to obtain gonococcal isolation in culture for differentiation of NG from other Neisseria isolates. Moreover, NAAT is not validated for the diagnosis of gonococcal infection in anorectal and oropharyngeal sites, and NG isolation in culture allows for the assessment of drug sensitivity, before new molecular techniques for detection of antimicrobial resistance are developed[7,8]. In the reported case, gonococcal isolation and drug sensitivity assessment were obtained from both the child and the mother, and enabled successful therapy with ceftriaxone. In fact, the frequency of gonococcal resistance to extended-spectrum cephalosporins in Brazil is still below 0.1%[5,8]. Nevertheless, the unusual presentation of NG infection in this 7-year-old girl hindered early diagnosis and therapy, which may have contributed to the development of permanent visual impairment as sequel.

Finally, one must also consider the emotional impact and psychosocial consequences of this 7-year-old girl's family having experienced the suspicion of SV. In previously reported cases, gonococcal infection was diagnosed in the absence of further evidence of SV, leading to separation of the suspected under aged victims from their parents and families and consequently triggering secondary emotional losses that could otherwise have been averted[6,7,9]. Joint assessment and counseling by a well-trained multidisciplinary team of care providers encompassing the evaluation of the structural dimensions of the child's vulnerability, particular behavioral issues of those involved, assessment of the psychological suffering of the child and its caregivers is crucial in these cases, to allow investigation of suspected SV perpetration with a nonjudgmental attitude as to mitigate harm.

Conflict of interests

The authors declare no conflict of interests.

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