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Case report

Secondary syphilis in a 14-month-old girl and child-to-mother transmission

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ABSTRACT

Syphilis cases in childhood are usually associated with congenital transmission. Acquired transmission is uncommon, and primarily related to sexual abuse or close contact/nursing with infected family members. We here describe a case of syphilis in a 14-month-old girl resulting from intrafamilial infection, with a subsequent transmission to her mother.

Introduction

Syphilis remains a worldwide public health problem with an increasing number of cases each year. The burden of syphilis in developed areas is mainly attributable to increases in cases among MSM; however, case rates are also increasing among heterosexual people in recent years [1,2]. Syphilis usually spreads from person to person through direct sexual contact. Cases in children are commonly transmitted congenitally, which occurs when a mother with syphilis passes the infection on to her baby during pregnancy. Acquired syphilis in children is relatively rare, and is primarily related to sexual abuse or close contact/nursing with infected family members [3,4].

Herein, we describe a case of a 14-month-old girl who developed syphilis following an intrafamilial transmission, with a subsequent transmission to her mother through breastfeeding.

Case description

A 14-month-old girl was admitted to the pediatric dermatology outpatient clinic for a 1-month history of lesions on the vulva, the hands and the mouth.

She is the fourth of 4 siblings and was term-born to a 42-year-old mother. The pregnancy was marked by placental insufficiency in the context of smoking, but no infectious diseases were reported or suspected.

Three months earlier, she developed bullous impetigo on her shoulders, with a favorable course. Two months later, some lesions appeared on the vulva and hands, unsuccessfully treated with antiseptics and vaseline lotion. Her mother also reported a febrile episode the day before the visit.

On physical examination, four hypertrophic nodules with a central ulceration were observed on the vulva, as well as annular lesions on the tongue and palms of the hands. The examination also noticed xerosis (dry skin), oral leukoplakia on the lateral borders of the tongue, alopecia, and occipital and inguinal lymphadenopathy.

The overall clinical picture was suggestive of an infectious cause, and to a lesser extent, Langerhans cell histiocytosis. The child was admitted to the pediatric ward for further investigation.

The blood count revealed a lymphocytosis (67 % of WBC) with an increase of CD8 + T-cell and B-cell populations. The C-reactive protein level and the liver markers were normal.

The initial infectious diseases laboratory work-up is summarized in Table 1.

Of note, CMV DNA was detected in the blood and from the vulvar lesions. More interestingly, anti-treponema antibodies (Alinity Abbott®) were found positive at a high level (index: 20, cut-off = 1). In addition, the rapid plasma reagin (RPR, Biosynex®) test and Syphilis IgM antibodies (Biorad®) were strongly positive at 256 (cut-off = 1) and 11.7 (cut-off = 1.1), respectively. On the IgG immunoblot (Euroimmun®), all the bands were detected.

Furthermore, the vulvar biopsy sample was sent to the pathology department and the National Syphilis reference center for analysis. No

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Table 1
Initial infectious diseases investigations.

Assays	Sample	Result
Molecular assays		
CMV PCR (Altona Diagnostics)	Blood	**Positive**, viral load: 3.87 log copies/mL
EBV PCR (Altona Diagnostics)	Blood	Negative
Enterovirus RT-PCR (Altona Diagnostics)	Blood	Negative
CMV PCR (Altona Diagnostics)	Vulva skin biopsy	**Positive**
EBV PCR (Altona Diagnostics)	Vulva skin biopsy	Negative
Enterovirus RT-PCR (Altona Diagnostics)	Vulva skin biopsy	Negative
HSV 1 and 2 PCR (Altona Diagnostics)	Vulva skin biopsy	Negative
Neisseria gonorrhoeae PCR (Roche Diagnostics)	Vulva skin biopsy	Negative
Chlamydia trachomatis PCR (Roche Diagnostics)	Vulva skin biopsy	Negative
Serology		
HIV (Alinity Abbott)	Serum	Negative
HBV (Alinity Abbott)	Serum	Vaccination profile
HCV (Alinity Abbott)	Serum	Negative
HSV (Alinity Abbott)	Serum	Positive IgG Ab
CMV (Laison DiaSorin)	Serum	Positive IgG and IgM Ab
Parvovirus B19 (Laison DiaSorin)	Serum	Equivocal IgM Ab
Candida antigen (Biorad)	Serum	Negative
Anti-Treponema antibodies (Alinity Abbott)	Serum	**Positivea**

evidence of Langerhans cell histiocytosis was found. Spirochete immunostaining revealed the presence of multiple spirochetes invading the epidermis (Fig. 1), and the *Treponema pallidum*-specific PCR on the tissue was positive.

The diagnosis of syphilis was therefore obvious in this little girl. Further assessment of the disease included radiological, neurological and ophthalmological investigations.

The X-ray of long bones found features suggestive of syphilis: multiple periosteal appositions, alternating radiolucent and radiodense metaphyseal lines, and osteolytic lesions (Fig. 2). A lumbar puncture was performed, and no marker of meningitis was detected in the CSF. Anti-treponema antibodies and RPR test were also negative in the CSF. The ophthalmological examination didn't show any sign of syphilis complications.

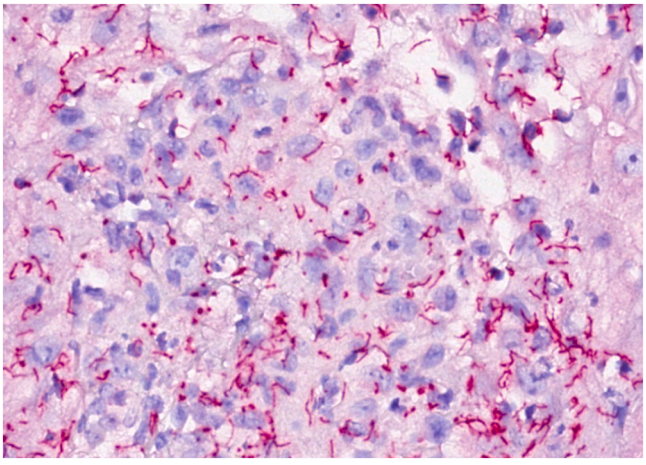

Fig. 1. Detection of spirochetes by immunohistochemistry in vulvar skin biopsy from the 14-month-old girl. Light microscopy of the vulva squamous epithelium showing an inflammatory infiltrate containing numerous spirochetes. The slide was labeled using anti-Treponema antibody (Biocare) with a red alkaline phosphatase revelation, and hematoxylin counter staining (X40 magnification).

Upon the serological results, treatment with penicillin G was initiated at 500,000 IU three times daily, for a total of 14 days. A local treatment with 3 % aqueous silver nitrate solution, and Aquacel® Ag surgical cover dressing, was also added.

The first hypothesis on the origin of the infection was congenital syphilis. Therefore, serological assays were performed to detect syphilis in the child's father and mother. Surprisingly, the results were negative in both parents. However, few days after, during the hospitalization, a lesion appeared on the mother's nipple. Given the clinical context, syphilis was suspected and the mother retested. A low positive reaction was found with the anti-treponema antibody assay (index at 2.5), and the RPR test was negative. The syphilis IgM assay yielded a positive result (Index at 7), and the PCR performed on the lesion biopsy confirmed an infection with *Treponema pallidum*.

The investigation into the initial source of contamination has been pursued with the other family members. The two older sisters aged 15 and 20, and the 10-year-old brother were also tested for syphilis. A positive result was found only for the 20-year-old sister, with an anti-treponema antibody index at 22, and a RPR titer at 64. *Chlamydia trachomatis* was also found on a vaginal swab, suggesting sexual transmission of syphilis. This sister is a student and lives with her mother and siblings. It's noteworthy that she had been suffering from asthenia and diffuse muscle and articular pain for a year. She also developed a mislabeled perioral rash, then oral aphthous ulcers, as well as a rash on her abdomen, which was thought to be associated with psoriasis. She is also currently experiencing recurrent headaches, eye fatigue, hypoesthesia and tingling in the upper limbs. She was then admitted to the hospital for latent syphilis and suspicion of neurosyphilis. The CSF analysis did not find any evidence of syphilitic meningitis. The patient was treated with 3 weekly doses of 2.4 MU of benzathine penicillin.

Discussion

Syphilis in early childhood, even beyond the neonatal period, is commonly associated with congenital transmission [5].

Post-birth acquired syphilis in children can be related to sexual contact or nonsexual transmission. As syphilis is primarily known as a sexually transmitted disease, child protection concerns make it compulsory to rule out sexual abuse when investigating a case of syphilis in early childhood [6].

In the case described here, no evidence of sexual abuse was found. To date, various cases of nonsexually acquired syphilis in children have been documented, resulting from intrafamilial transmission through nursing or common practices such as pre-chewing food or trying the food temperature before feeding infants. Suboptimal hygiene and crowded living conditions can promote the transmission to a child when a family member or a caretaker is infected [6–9].

Syphilis nonsexual transmission in young children is not rare. In a recent report, the rate was estimated at 63 % of acquired syphilis cases and the diagnosis mostly occurred during the secondary stage syphilis [4].

In our report, the infection was introduced in the household by the older sister, who was likely infected through sexual route. Her lesions were probably a source of infection by close and repetitive contact in the household, especially when taking care of her little sister. The mucocutaneous lesions during secondary syphilis are known to contain high number of treponemes, and can be highly contagious [4].

This case also highlights the diagnostic wandering which is still observed nowadays for a well-known and curable disease. It took more than a year to diagnose syphilis in the 20-year-old sister. Syphilis is commonly termed the "great imitator", as symptoms are often non-specific. Skin lesions of secondary syphilis can especially mimic other infectious or immune mediated conditions. Syphilis should then be suspected and screened in all sexually active patients presenting with a new skin, oral or genital lesion [10].

The most significant observation in this report is the child-to-mother

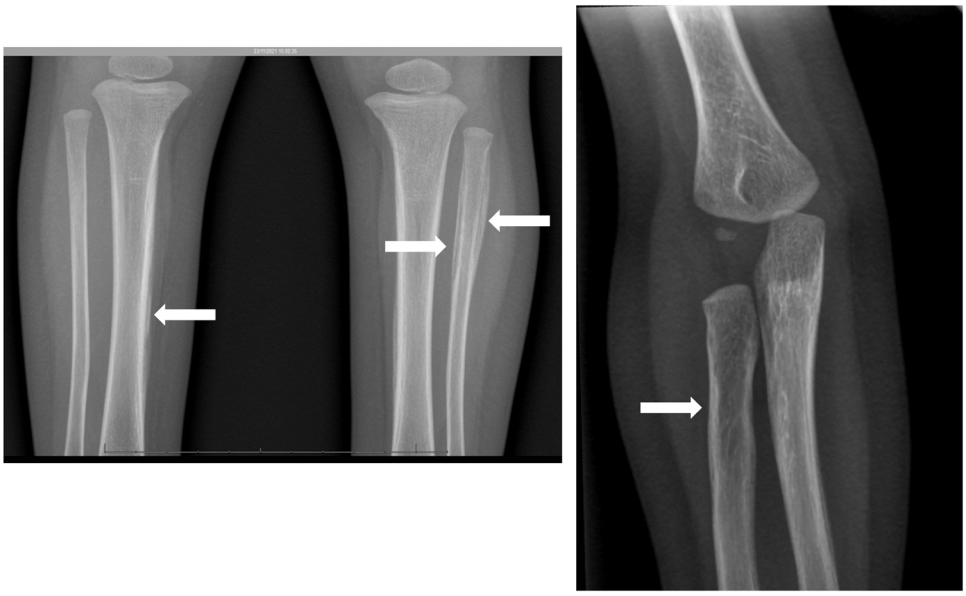

Fig. 2. X-ray of long bones. X-ray of lower limbs with arrows showing multiple periosteal appositions, alternating radiolucent and radiodense metaphyseal lines, and osteolytic lesions.

transmission, even if it wasn't surprising. To the best of our knowledge, no similar finding was reported in the literature. The chronology of events, and especially the seroconversion in the mother, supports a child-to-mother transmission. A positive serological result in the mother at the time of syphilis diagnosis in the infant might have supported the initial hypothesis of congenital syphilis.

The presence of lesions in the child's mouth and the occurrence of a lesion on the mother's nipple support a transmission through breastfeeding.

In conclusion, this case of secondary syphilis in a 14-month-old child is very instructive because the diagnosis facilitated the identification and treatment of the older sister (considered to be the source of the infection), and to easily detect a primary syphilis in the mother.

Consent

Patients consent for the use of anonymized data.

Ethical approval

Ethical committee approval not applicable.

Funding

None.

Competing interests

None.

Data Availability

Not applicable

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Authors' contributions

AR and EKA drafted the manuscript, AL, BC, CL, AW, NC, ML, AG, LB and DH contributed to data collection. All authors reviewed the manuscript.

References

[1] Centers for Disease Control and Prevention. Syphilis. Available at: ⟨https://www.cdc.gov/std/statistics/2020/overview.htm#Syphilis⟩ [Accessed 8 July 2022].
[2] Santé Publique France. Infections sexuellement transmissibles. Available at: ⟨https://www.santepubliquefrance.fr/maladies-et-traumatismes/infections-sexuellement-transmissibles/vih-sida/documents/bulletin-national/bulletin-de-sante-publique-vih-ist.-decembre-2021⟩ [Accessed 8 July 2022].
[3] Janier M, Unemo M, Dupin N, Tiplica GS, Potočnik M, Patel R. 2020 European guideline on the management of syphilis. J Eur Acad Dermatol Venereol 2021;(35):574–88.
[4] Moscatelli G, Moroni S, García Bournissen F, et al. Acquired syphilis by nonsexual contact in childhood. Pediatr Infect Dis J 2021;40:892–8.
[5] Kimball A, Bowen VB, Miele K, et al. Congenital syphilis diagnosed beyond the neonatal period in the United States: 2014-2018. Pediatrics 2021;148:e2020049080.
[6] Zhou P, Qian Y, Lu H, Guan Z. Nonvenereal transmission of syphilis in infancy by mouth-to-mouth transfer of prechewed food. Sex Transm Dis 2009;36:216–7.
[7] Long F-Q, Zhao L-S, Chen J. Acquired syphilis in a Chinese family among three generations. Chin Med J (Engl) 2018;131:1761–2.
[8] Long F-Q, Wang Q-Q, Jiang J, Zhang J-P, Shang S-X. Acquired secondary syphilis in preschool children by nonsexual close contact. Sex Transm Dis 2012;39:588–90.
[9] Hofmann B, Schuppe HC, Ruzicka T, Kuhn A, Lehmann P. Acquired syphilis II in early childhood: reappearance of syphilis brephotrophica. J Am Acad Dermatol 1998;38:638–9.
[10] Klausner JD. The great imitator revealed: syphilis. Top Antivir Med 2019;27:71–4.