A sad portrait of congenital syphilis in the State of Rio de Janeiro. Case report with Polymerase Chain Reaction (PCR) of scrapings from skin lesions and placenta fragment positive for Treponema pallidum

Um triste retrato de sífilis congênita no estado do Rio de Janeiro. Relato de caso com reação em cadeia por polimerase (PCR) de raspado de lesões de pele e de fragmento de placenta positivos para Treponema pallidum

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ABSTRACT

Introduction: Congenital syphilis is a serious public health problem that causes high rates of intrauterine morbidity and mortality, revealing flaws and weaknesses in the health system. **Objective:** to report a case of congenital syphilis in a university hospital in the Center-South Region of the State of Rio de Janeiro, Brazil. **Case report:** A pregnant woman, aged between 19 and 23 years old, carrying a Pregnant Woman's Handbook with a record of seven prenatal consultations and a note of the serological reaction for positive syphilis, but without any treatment, hospitalized at the University Hospital of Vassouras (RJ), in labor, gave birth to a newborn (NB) with a clinical picture and serological test of congenital syphilis. The NB required care in an intensive care unit and was discharged 28 days after birth. Scraping of skin lesions of the NB and placenta was performed for analysis by molecular biology (PCR in house) and genetic material of *Treponema pallidum* was detected. **Conclusion:** Congenital syphilis is a serious outcome of syphilis during pregnancy, consuming high financial resources and significant emotional distress for the mother, father, the whole family, as well as for the health teams. Our case report was the first that we are aware of in Brazil with a diagnosis by PCR for positive *Treponema pallidum* of skin scraping and placental fragment. It also showed poor quality prenatal care, a common factor in most cases of CS in our reality.

Keywords: Congenital syphilis. Pregnancy. Prenatal. Molecular biology. PCR.

RESUMO

Introdução: A sífilis congênita é um grave problema de saúde pública, que causa índices elevados de morbimortalidade intrauterina, revelando falhas e fragilidades do sistema de saúde. **Objetivo:** Relatar caso de sífilis congênita em um hospital universitário da região centro-sul do estado do Rio de Janeiro, Brasil. **Relato de caso:** Gestante, com idade entre 19 e 23 anos, portando Caderneta da Gestante com registro de sete consultas de pré-natal e anotação de reação sorológica para sífilis reagente, mas sem qualquer tratamento, internada no Hospital Universitário de Vassouras (RJ), em trabalho de parto, pariu recém-nascido (RN) com quadro clínico e teste sorológico de sífilis congênita. O RN necessitou de cuidados em unidade de terapia intensiva e obteve alta hospitalar após 28 dias do nascimento. Foi realizado raspado de lesões de pele do RN e de placenta para análise por biologia molecular (reação em cadeia por polimerase — PCR *in house*), sendo detectado material genético de *Treponema pallidum.* **Conclusão:** A sífilis congênita é um grave desfecho de sífilis na gestação, consumindo altos recursos financeiros e gerando importantes desgastes emocionais para mãe, pai e toda a família, como também para as equipes de saúde. Nosso relato de caso é o primeiro de que temos conhecimento no Brasil com diagnóstico por PCR para *Treponema pallidum* positivo de raspado de pele e de fragmento de placenta. Mostrou ainda um pré-natal de má qualidade. Aliás, como é, em nossa realidade, a maioria dos casos de SC.

Palavras-chave: Sífilis congênita. Gravidez. Pré-natal. Biologia molecular. PCR.

INTRODUCTION

Syphilis is a systemic infection caused by the bacterium *Treponema pallidum* (*T. pallidum*) specific to humans. When not properly treated, it evolves into a chronic form and irreversible sequelae. It is predominantly sexually and vertically transmitted[1].

Congenital syphilis is a disease in which an infected mother (untreated or inadequately treated) transmits it to her child during pregnancy (vertical transmission). Milanez[2] discusses that the increase in the occurrence of syphilis during pregnancy and its serious repercussions for the fetus have been a matter of great concern for health professionals.

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It is a bacterial disease, transmitted from the mother to the baby, at any time during pregnancy, through hematogenous dissemination, the birth canal, amniotic fluid and breastfeeding in the case of infective lesions in the breast's areola[3].

Janier et al.[4] point out that in the process of natural evolution of the disease "periods of activity occur with distinct clinical, immunological and histological characteristics, interspersed with periods of latency, during which the presence of signs or symptoms is not observed."

Syphilis is an important public health problem because it is infectious and also because it affects the body severely when left untreated, significantly increasing the risk of contamination by the HIV virus, since the entry of the virus is usually facilitated by the presence of syphilis lesions[1].

Milanez[2] points out that it is difficult to understand why congenital syphilis has not yet been properly controlled, since its etiological agent is well known, and it is highly susceptible to penicillin, a low-cost and easily accessible drug.

McIntosh[5] describes that there is no vaccine against syphilis, and infection with *T. pallidum* does not confer protective immunity; therefore, individuals can become infected every time they are exposed to the causative bacteria.

To define the diagnosis of syphilis, it is necessary to correlate clinical data, results of diagnostic tests, historiography of past infections and analysis of recent exposures[1].

The reason for this study is that syphilis, as already seen, is a serious pathology that compromises public health and, therefore, must be well known so that it can be properly combated, especially with regard to its vertical transmission, where both the mother and the baby are to risk, including the risk of lethality.

OBJECTIVE

To report a case of a pregnant woman assisted, while in labor, at the University Hospital of Vassouras (HUV), Vassouras (RJ), Brazil, and whose newborn had congenital syphilis with a severe clinical picture.

METHODS

It is an observational and qualitative study, to report a case that occurred in the HUV.

Data collection was carried out through document analysis of the medical records of a pregnant woman assisted at the HUV in February 2020. The discussion is based on congenital syphilis and its vertical transmission.

After being collected, the data were carefully analyzed according to their thematic content, and organized into systematic material, being classified according to the information by categories, in the registration unit. The analysis was processed in three phases: in the first one, the material was organized and the ideas were systematized; in the second, the information was classified into categories in a recording unit; in the third phase, reference was made to the treatment and interpretation of data based on the literature.

CASE REPORT

The case involved a pregnant woman aged between 19 and 23 years, primiparous, attended at the HUV, while in labor, in February 2020. She showed a VDRL result (10/23/2019) reactive 1:8 and FTA-Abs Reactive IgG and Non-Reactive IgM (10/24/2019). Nothing was written in the pregnant woman's book about being treated for syphilis, nor did the pregnant woman confirm any treatment with intramuscular penicillin. During the interview, the patient showed a result of VDRL 1:1 performed at the beginning of her pregnancy. She said that she presented it to the professionals at the "health center" who, according to her, said: "this is nothing."

At the beginning of the prenatal period, she was not submitted to a rapid test for syphilis with blood by digital puncture as the Basic Health Unit — UBS lacked it. She only had it for HIV, with

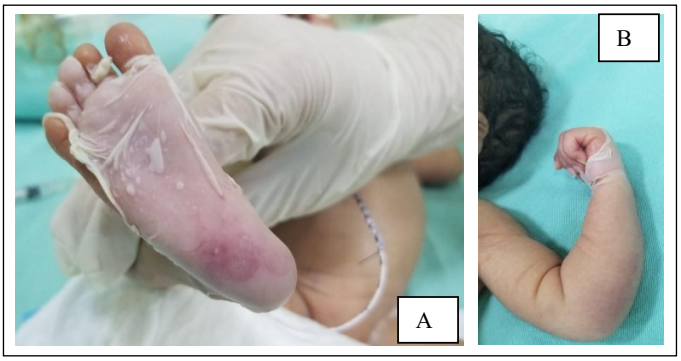


Figure 1A and 1B. NB's right foot, hand and left wrist showing scaly lesions typical of signs of congenital syphilis.

Figure 2. Newborn with CS with scaly lesions on the feet bilaterally and increased abdominal volume, in an infant radiant warmer in the neonatal ICU of the HUV.

a non-reactive result, according to information from the consultant. She denied genital or skin lesions. She was admitted to the maternity ward with eutocic delivery at 35 weeks and 1 day.

On the day of admission to the HUV, the mother's VDRL was reactive 1:32.

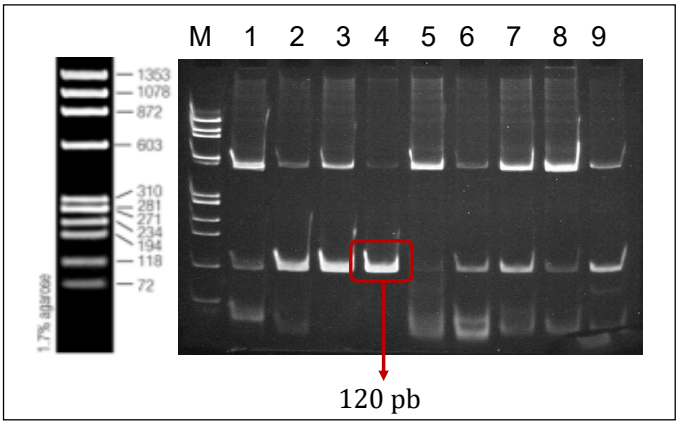
The female newborn (NB) had lesions on the palms of the hands, soles of the feet and skin of the legs, as can be seen in **Figures 1A, 1B** and **2**.

The NB's peripheral blood VDRL at birth was reactive 1:32. Cerebrospinal fluid exams did not show data compatible with neurosyphilis. The NB was treated with IV crystalline penicillin G in the scheme standardized by the Ministry of Health, in addition to all the support that patients need, and remained hospitalized in the Neonatal Intensive Care Unit for 28 days. She was discharged in good conditions, and had a high cost to the Unified Health System.

The histopathology of the placenta showed polymorphonuclear leukocyte infiltrate and arterioles showing lymphoplasmacytic infiltrate of the wall with a picture of acute chorioamnionitis, acute deciduitis and lymphoplasmacytic arteritis, with indications of infection by *Treponema pallidum*.

The tpp15 gene amplifies part of the gene that codes for a 15 Kilodalton (Kda) membrane protein specific for *Treponema pallidum* subspecies *pallidum*, which allows the differentiation of other treponematoses. With that, a molecular biology test known as Polymerase Chain Reaction (PCR in house) was carried out on a fragment of placenta, scraped from skin lesions of the NB with swab. All samples were amplified for the gene of interest (**Figures 3** and **4**).

Although the pregnant woman provided a home address in the city of Vassouras (RJ), during her stay in the maternity, after several telephone contacts and a visit to the declared address, it was detected that her prenatal care had been conducted another city in the region, where she also resided.



Marker øx174 DNA/Bsu (Invitrogen®); Pit 1: 04.1 (Placenta); Pit 2: 04.4 (NB scraping) Pit 3: B.S (Swab); Pit 4: 04.2 (Tissue); Pit 5: 14725 (Swab); Pit 6: 14303 (Swab); Pit 7: 14605 (Swab); Pit 8: 14637 (Swab); Pit 9:14687 (Swab).
(NB scraping) Pit 3: B.S (Swab); Pit 4: 04.2 (Tissue); Pit 5: 14725 (Swab); Pit 6: 14303 (Swab); Pit 7: 14605 (Swab); Pit 8: 14637 (Swab); Pit 9:14687 (Swab).
Source: Provided by the LABMAN (IOC/Fiocruz) laboratory.

Figure 3. Detection of treponemal DNA using the tpp15 gene in Swab, NB scrape and placenta samples.

The pregnant woman attended prenatal consultations in the municipalities of Barra do Piraí and Japeri, both cities located in the State of Rio de Janeiro, and neighboring Vassouras.

In one of the interviews, we received information that the mother had separated from the father of the NB with CS, that she no longer had contact with him, did not know where he lives, and had not notice wounds on his genitals while living with him. She also stated that she did not have any sexual relationship after the separation from her husband and that this happened around the fifth to sixth month of pregnancy. She also assured that, throughout the prenatal period, none of the professionals at the health unit, even with a positive test result for syphilis, had ever said anything about sexual partners, much less about instructions regarding the use of condoms.

She remembers that, in a consultation, she complained of burning, vulvar discomfort and vaginal discharge. Without being clinically examined or having genital material collected for laboratory tests, she received cream for vaginal application for a week from health professionals in prenatal care (she does not know the name). She said she showed improvement, without total remission of symptoms.

DISCUSSION

Syphilis can have serious consequences during pregnancy such as miscarriage, prematurity of the fetus, early or late manifestations and/or death of the newborn. In several countries, such as Brazil, there is concern about this infection, especially during pregnancy[1,3,6-8].

The rate of vertical transmission of syphilis to the fetus in pregnant women is 80% intrauterine[1]. This form of transmission can still occur during vaginal delivery, when the mother has some type of syphilis lesion[2,3,8,9]. Fetal infection is influenced by the clinical

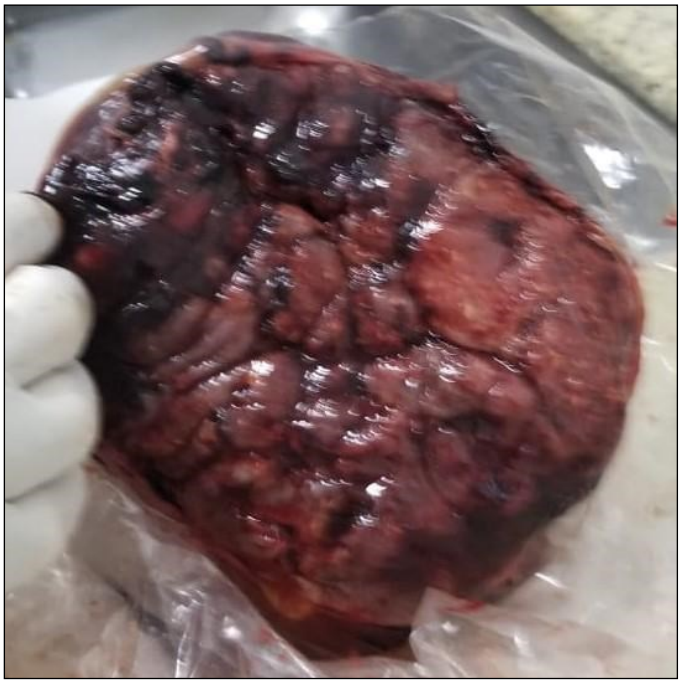


Figure 4. Placenta showing areas of necrosis/hemorrhage and whitish areas from which fragments were removed for laboratory analysis.

stage of the mother's disease, which tends to be greater in the recent phase (primary and secondary), and also by the length of exposure of the fetus[7,9-12]. This fetal involvement causes between 30 and 50% of intrauterine death, preterm delivery or neonatal death[1]. Vertical transmission can occur at any stage of pregnancy, as well as at any stage of the maternal disease[3,7,13,14]. Most cases occur because the mother was not tested for syphilis during prenatal care[1,2,6-9], or because she did not receive adequate treatment for syphilis before or during pregnancy[9,11,12].

According to the Ministry of Health[15], from 1998 to June 2019, 236,355 cases of congenital syphilis were registered in Brazil in children under one year of age. Between 2005 and June 2019, 384,411 cases of syphilis in pregnant women were reported in the Notifiable Diseases Information System — Sinan. In Brazil, from 2009 to 2019, there was a progressive increase in the incidence of congenital syphilis: the rate went from 2.1 cases/1000 live births in 2009 to 8.2 cases/1000 live births in 2019. Lermen et al.[16] point out that the city of Porto Alegre has an acquired syphilis coefficient four times higher than the national statistics.

Recent syphilis infections (primary and/or secondary and/or initial latent, that is, less than a year after contamination), if not properly treated, can cause deleterious effects in fetuses in the second or third gestational trimester[2,3,6,13,14,16,17]. In fact, more than 50% of pregnancies among women with active syphilis end up resulting in miscarriage, stillbirth, early neonatal death, premature and/or low birth weight newborn, severe neonatal infection[1,7,9-12].

Congenital syphilis is more difficult to diagnose than the syphilis that affects pregnant women. For this reason, every pregnant woman needs to be tested (search for antibodies in peripheral blood) for syphilis during prenatal care, with at least one test in the first trimester of pregnancy and another in the third trimester. The sexual partner(s) should also be tested, following prenatal guidelines "from the partner"[1,4,8,9,13,14,16]. In addition, an investigation for syphilis should be carried out as soon as the pregnant woman is hospitalized for delivery in the maternity ward, or in cases where miscarriages occur[10,11,16].

A study carried out at Antônio Pedro University Hospital, of Universidade Federal Fluminense, in the city of Niterói (RJ), analyzed notifications of congenital syphilis carried out by the Department of Epidemiological Surveillance of the hospital, and demonstrated that the majority of mothers of children with the disease had a mean age of 23.09 years and were brown (32.31%), while 13.85% did not complete the 5th to 8th grades, and 80% had prenatal care. However, less than half reported adequate treatment[18]. Another study, a systematic review, which aimed to identify whether prenatal care — absent or of poor quality — is one of the main problems for the occurrence/reporting of cases of congenital syphilis, concluded that the factors contributing to the high rates of CS in the Brazil involved the social context in which the pregnant woman is included, intercurrences in the diagnosis, treatment and care of pregnant women, deficiency in public policies, deficiencies in the notification system, and inefficiency of prenatal care. This indicates that, in addition to being a relevant health issue, the disease also permeates problems inherent in social, economic and political contexts[18,19].

The NB whose mother is diagnosed with syphilis during pregnancy, regardless of the history of maternal treatment, must undergo serological tests for syphilis. Umbilical cord blood should not be used, as this sample may contain a mixture of the mother's blood and the baby's blood. This may result in a false-reagent test result[20].

Generally, vertical transmission of syphilis happens more in the early stages of the disease. Thus, when a pregnant woman has syphilis and does not undergo any type of treatment, 70 to 100% of the fetuses become infected[3,8,12-14,21,22].

Because syphilis is easily diagnosed by non-treponemal VDRL or RPR serology and is effectively treated with penicillin, it is believed that when pregnant women do not undergo prenatal care, they are at serious risk of being infected and infecting the fetus[2,8,11,22]. Thus, when the mother, without any previous history of syphilis, undergoes screening for syphilis at the beginning of pregnancy and is seropositive, she must undergo immediate treatment with intramuscular benzathine penicillin, as well as proceed with due clinical follow-up, both serological and epidemiological[2,6,11].

Penicillin is the drug of choice for all manifestations of syphilis[1,2,4,5,11,14,16]. It is noteworthy that there are no reports of treponemal resistance to penicillin[1,11].

The sexual partners of pregnant women should also be duly consulted, tested, monitored and treated, if infected. Records from the Ministry of Health (MS) reveal that, in 2018, only 22% of the sexual partners of pregnant women with syphilis were seen by prenatal teams[15].

In quality care, consultation, testing and treatment of infected sexual partners are essential, with a view to interrupting the disease transmission process[1,2,6,8,11,15].

With regard to the child, early congenital syphilis can manifest up to the second year of life, therefore, its diagnosis must be carried out in a judicious way, including the evaluation of the epidemiological situation of the mother, laboratory evaluation, clinical evaluation, as well as imaging exams[1,6,11,23].

It should be noted that the diagnosis in children is a complex process, since most of them are asymptomatic at birth, and, in those that have some clinical expression, the signs and symptoms are usually discreet and/or not very specific[6,23].

As there is no complementary evaluation that accurately determines the child's diagnosis, Meireles et al.[23] point out that an association should be made between epidemiological, clinical and laboratory criteria.

A recent study carried out at Hospital da Criança Santo Antônio (HCSA), in Porto Alegre (RS), Brazil, used blood from newborns (NB) fixed on a card (SFC) to detect the presence of *Treponema pallidum* through PCR. 82 paired blood and CSF samples from 41 NBs were analyzed, of which 22 were positive and 19 negative. Test sensitivity was 63.3% and specificity was 100%[24].

These results indicate that, although molecular tests are not routinely used in laboratories, when applied to detect Treponema in CFS samples, as long as they are improved, they can enable the diagnosis of congenital syphilis (CS) and facilitate neonatal screening in Brazil. The availability of a PCR test to identify *Treponema pallidu*m directly in blood samples from newborns represents a valuable contribution in addressing this diagnostic challenge[24,25].

Furthermore, it is important to emphasize the need for a more comprehensive approach that goes beyond the simple registration of CS cases. Individualized epidemiological surveillance and detailed analysis of each case are fundamental to know, understand and remedy missed opportunities in the diagnosis and treatment of congenital

syphilis, as presented in this case report. These measures are especially relevant in view of the difficulties in obtaining complete information about pregnant and parturient women. Thus, the use of PCR in samples of skin lesions and/or placenta fragments from newborns to detect treponemal DNA using the tpp15 gene, which is a specific gene for identifying *Treponema pallidum* subspecies *pallidum* represents an important advance in the diagnosis of congenital syphilis and in the possibility of improving epidemiological surveillance and care for pregnant women, contributing to the fight against this reemerging infection in Brazil[25,26].

As with everything bad, it can get worse, especially when there is a lack of commitment and good attitudes. At the end of this text we researched data on the website of the Brazilian Ministry of Health (indicadoressifilis.aids.org.br) and found that, in 2021, there are 27,019 registered cases with a detection rate of 9.9. These numbers are higher than those recorded in 2012, 2019 and 2020[27].

Finally, it is still up to the prenatal professional to evaluate, with clinical exams (and laboratory tests, if necessary), any complaints reported by pregnant women. So, it comes to mind: could the complaint of burning, vulvar discomfort and vaginal discharge mentioned by the pregnant woman during a medical consultation be a case of syphilis lesion that was "masked" with the application of cream on the genitals?

There is no need for approval by the Ethics and Research Committee for this procedure, as it is a case series. All three patients signed an informed consent form[28].

Strengths

In addition to serological data on the mother and newborn, this case was documented with a molecular biology test (PCR), detecting the presence of genetic material from the bacterium *Treponema pallidum* subspecies *pallidum*, which causes congenital syphilis in a fragment of the placenta. On the other hand, the epidemiological surveillance of the case documents the importance of moving forward in the recognition of missed opportunities, with regard to congenital syphilis.

Limitations

Even though it is just a case report, it serves to indicate the need for confirmation by molecular biology of similar cases. While stating that subspecies present in the studied samples (scraping of skin lesions and fragment of placenta) is the subspecies *pallidum* that causes congenital syphilis, we still face some limitations for carrying out the molecular characterization in order to identify the allelic profile of these cases, as this depends on the amount of treponemal DNA present in the clinical specimen, the protocol used for DNA extraction, storage time and temperature used to store the biological material and the protocol adopted to amplify the genes of interest. Even interviewing the mother, we were unable to reach her sexual partner, or the professionals who performed the prenatal care.

CONCLUSION

Congenital syphilis is a serious outcome of syphilis during pregnancy, consuming high financial resources and significant emotional distress for the mother, for the father, for the whole family, as well as for the health teams. Our case report, the first that we are aware of in Brazil, was diagnosed by PCR for *Treponema pallidum* subspecies *pallidum* positive in a fragment of the placenta and scrapings from skin lesions of the NB. It also showed poor quality prenatal care, as in most cases involving SC.

Participation of each author

FDLP: Conceptualization, Formal Analysis, Investigation, Methodology, Writing – original draft. ACG: Conceptualization, Formal Analysis, Investigation. Methodology, Supervision, Writing – review & editing. AGM: Conceptualization, Formal Analysis, Investigation, Methodology, Supervision, Writing – review & editing. RQV: Formal Analysis, Investigation, Methodology, Supervision, Writing – review & editing. ICR: Resources, Supervision, Validation, Writing – review & editing. RSC: Resources, Supervision, Validation, Writing – review & editing. FRAF: Resources, Supervision, Validation, Writing – review & editing. JSSM: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. CVLP: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. PVLP: Conceptualization, Formal Analysis, Investigation, Methodology, Resources, Writing – original draft, Writing – review & editing. MQPL: Formal Analysis, Funding acquisition, Investigation.

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Conflicts of interest

The authors have declare no conflicts of interest.

REFERENCES

1. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Doenças de Condições Crônicas e Infecções Sexualmente Transmissíveis. Protocolo clínico e diretrizes terapêuticas para atenção às pessoas com infecções sexualmente transmissíveis – IST. Brasília: Ministério da Saúde; 2020.
2. Milanez H. Syphilis in pregnancy and congenital syphilis: why can we not yet face this problem? Rev Bras Ginecol Obstet. 2016;38(9):425-27. https://doi.org/10.1055/s-0036-1593603
3. Lopes IMD, Lopes AD, Santos RS, Lima SO, Reis FP. Congenital syphilis in a philanthropic maternity of the State of Sergipe: still a challenge. DST J Bras Doenças Sex Transm. 2018;30(2):41-6. https://doi.org/10.5533/DST-2177-8264-201830202

4. Janier M, Unemo M, Dupin N, Tiplica GS, Potočnik M, Patel R. et al. 2020 European guideline on the management of syphilis. J Eur Acad Dermatol Venereol. 2021;35(3):574-88. https://doi.org/10.1111/jdv.16946
5. McIntosh EDG. Development of vaccines against the sexually transmitted infections gonorrhea, syphilis, chlamydia, herpes simplex virus, human immunodeficiency virus and Zika virus. Ther Adv Vaccines Immunother. 2020;8:2515135520923887.
6. Rawstron SA, Hawkes SJ, Treponema pallidum (syphilis). In: Long SS, Pickering LK, Prober CG, editors. Principles and practice of pediatric infections diseases. Edinburgh: Elsevier Saunders; 2012. p. 941.
7. Farias RO, Lopes IMD, Santos LG, Dantas ASC. The reality of 13 years of prenatal care to pregnant women with syphilis in Sergipe state (2007–2019). DST J Bras Doenças Sex Transm. 2020;31(4):123-30. https://doi.org/10.5327/DST-2177-8264-201931404
8. Nonato SM, Melo APS, Guimarães MDC. Sífilis na gestação e fatores associados à sífilis congênita em Belo Horizonte-MG, 2010–2013. Epidemiol Serv Saúde. 2015;24(4):681-94. https://doi.org/10.5123/S1679-49742015000400010
9. Andrade ALMB, Magalhães PVVS, Moraes MM, Tresoldi AT, Pereira RM. Late diagnosis of congenital syphilis: a recurring reality in women and children health care in Brazil. Rev Paul Pediatr. 2018;36(3):376-81. https://doi.org/10.1590/1984-0462/;2018;36;3;00011
10. Lopes Filho JR, Silva Neto LS. Relação entre mortalidade infantil e escolaridade materna no Estado do Tocantins de 2010 a 2015. Revista de Patologia do Tocantins. 2018;5(4):5-11. https://doi.org/10.20873/uft.2446-6492.2018v5n4p5
11. Rezende JF, Montenegro CAB. Rezende: obstetrícia fundamental. Rio de Janeiro: Guanabara Koogan; 2019.
12. Lopes IMD, Lopes AD, Santos RS, Lima SO, Reis FP. Congenital syphilis in a philanthropic maternity of the state of Sergipe: still a challenge. DST J Bras Doenças Sex Transm. 2018;30(2):41-6. https://doi.org/10.5533/DST-2177-8264-201830202
13. Andrade IGM, Valentim RAM, Oliveira CAP. The influence of the No Syphilis Project on congenital syphilis admissions between 2018 and 2019. DST J Bras Doenças Sex Transm 2020;32:e203205:1-6. https://doi.org/10.5327/DST-2177-8264-20203223
14. Domingues CSB, Pinto VM. Congenital syphilis in the 21st century: how to overcome the challenges? DST J Bras Doenças Sex Transm. 2019;31(3):77-8. https://doi.org/10.5327/DST-2177-8264-201931301
15. Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. Boletim Epidemiológico Especial. Sífilis [Internet]. 2019 [cited on 2022 Sept 12]. Available from: https://portaldeboaspraticas.iff.fiocruz.br/biblioteca/boletim-epidemiologico-sifilis-2019
16. Lermen GH, Acosta LMW, Santos FF, Oliveira JNG. Analysis of monitored cases of acquired syphilis in Porto Alegre, Rio Grande do Sul. DST J Bras Doenças Sex Transm. 2019;31(2):45-9. https://doi.org/10.5533/DST-2177-8264-201931203
17. Wijesooriva NS, Rochat RW, Kamb ML, Turlapati P, Temmerman M, Broutet N, et al. Global burden of maternal and congenital syphilis in 2008 and 2012: a health systems modelling study. Lancet Glob Health. 2016;4(8):e525-33. https://doi.org/10.1016/S2214-109X(16)30135-8
18. Gonçalves AM, Fernandes CB, Messias IR, Barcante S, Morais JSS, Camacho JSF, et al. Análise das notificações de sífilis congênita em um hospital universitário da cidade de Niterói de 2016 a 2020. DST J Bras Doenças Sex Transm. 2021;33:e213321:1-5. https://doi.org/10.5327/DST-2177-8264-20213321
19. Morais JSS, Passos MRL, Eleutério Junior J. Sífilis congênita, uma enfermidade associada a um pré-natal ineficiente? J Bras Ginecol. 2022;132:e2200079. https://doi.org/10.5327/JBG-0368-1416-202200079
20. Bala M, Singh V, Muralidhar S, Ramesh V. Assessment of reactivity of three treponemal tests in non-treponemal non-reactive cases from sexually transmitted diseases clinic, antenatal clinic, integrated counselling and testing centre, other different outdoor patient departments/indoor patients of a tertiary care centre and peripheral health clinic attendees. Indian J Med Microbiol. 2013;19(31):275-9. https://doi.org/10.4103/0255-0857.115638
21. Kizam ASL, Coutinho FM, Marvão MCR, Geha YR, Nogueira TLP, Gomes CVC, et al. Epidemiological profile of cases of congenital syphilis in Belém City, Pará State, from 2009 to 2018. DST J Bras Doenças Sex Transm. 2020;32:e203227:1-6. https://doi.org/10.5327/DST-2177-8264-20203227
22. Silva PS, Vieira CSA, Gomes LMX, Barbosa TLA. Gestational and congenital syphilis in a municipality in Brazil between 2014 and 2018. DST J Bras Doenças Sex Transm. 2019;31(4):112-7. https://doi.org/10.5327/DST-2177-8264-201931402
23. Meireles ACV, Souza LC, Oliveira WA, Silva DMS, Ribeiro VF, Fernandes DMSS, et al. Epidemiological profile of congenital syphilis in the municipality of São Luis, 2008–2017. DST J Bras Doenças Sex Transm. 2020;32:e203207:1-9. https://doi.org/10.5327/DST-2177-8264-20203207
24. Grassi VMT, Melo RCC, Grassi LT, Silva MSN, Rossetti MLR. Detecção de *Treponema pallidum* em amostras de sangue fixadas em cartão para diagnóstico de sífilis congênita. Res Soc Dev. 2021;10(10):e511101019151. http://dx.doi.org/10.33448/rsd-v10i10.19151
25. Marra C, Sahi SK, Tantalo LC, Godornes C, Reid T, Behets F, et al. Enhanced molecular typing of treponema pallidum: geographical distribution of strain types and association with neurosyphilis. J Infect Dis. 2010;202(9):1380-8. https://doi.org/10.1086/656533
26. Pillay A, Liu H, Chen CY, Holloway B, Sturm AW, Steiner B, et al. Molecular subtyping of Treponema pallidum subspecies pallidum. Sex Transm Dis. 1998;25(8):408-14. https://doi.org/10.1097/00007435-199809000-00004
27. Brasil. Ministério da Saúde. Departamento de HIV/Aids, Tuberculose, Hepatites Virais e Infecções Sexualmente Transmissíveis. Indicadores de inconsistências de sífilis nos municípios brasileiros [Internet]. 2020 [cited on 2023 July 20]. Available from: http://indicadoressifilis.aids.gov.br/
28. Goldim JR, Fleck MP. Ética e publicação de relatos de caso individuais. Revista Brasileira de Psiquiatria. 2010;32(1):2-3.

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On page 1 it was included:

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On page 3 where to read:

Source: Adapted from Gafrée e Guinle University Hospital (2020).
Figure 3. Detection of treponemal DNA using the tpp15 gene in Swab, NB scrape and placenta samples.

On page 3 it should read:

Source: Provided by the LABMAN (IOC/Fiocruz) laboratory.
Figure 3. Detection of treponemal DNA using the tpp15 gene in Swab, NB scrape and placenta samples.

On page 5 it was included:

Participation of each author

MQPL: Formal Analysis, Funding acquisition, Investigation.

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