Tehran University of Medical Sciences Publication
http://tums.ac.ir

Iran J Parasitol

Open access Journal at
http://ijpa.tums.ac.ir

Iranian Society of Parasitology
http://isp.tums.ac.ir

Case Report

Investigation of Strongyloidiasis Transmission from Infected Mother to Newborn Postpartum: A Case Report

Mahdieh Sorouri Majd [1,2], Eshrat Beigom Kia [1], Somayeh Mousavi Mobarakeh [1], Seyedeh Hajar Sharami [3], Azadeh Jafari [4], *Zohreh Fakhrieh-Kashan [1,2]

1. *Department of Medical Parasitology and Mycology, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran*
2. *Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran*
3. *Department of Obstetrics & Gynecology, Reproductive Health Research Center, Al-Zahra Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran*
4. *Department of Pathology, Reproductive Health Research Center, Al-Zahra Hospital, School of Medicine, Guilan University of Medical Sciences, Rasht, Iran*

Received 15 Aug 2025
Accepted 14 Nov 2025

Keywords:
Strongyloides stercoralis;
Pregnant women;
Neonate;
Iran

***Correspondence**
Email:
zfk579@gmail.com

Abstract

Strongyloidiasis is a disease caused by the soil-transmitted nematode *Strongyloides stercoralis*. It is considered a neglected disease that can lead to long-term disability, growth retardation in children, complications during pregnancy, and adverse effects on the fetus. In the present case report, we examined a case of strongyloidiasis in a newborn born to a mother with confirmed strongyloidiasis during pregnancy, diagnosed by serological, parasitological, and molecular methods. A 38-year-old woman at 35 weeks of gestation from a rural area in Rasht, Guilan Province, Iran, presented with gastrointestinal symptoms (diarrhea, abdominal pain) and severe dyspnea since the fourth month of pregnancy. Her medical history included hypothyroidism and a pituitary microadenoma. Laboratory findings revealed a peripheral blood eosinophil count of 2%. Stool examination (direct smear, formalin-ethyl acetate concentration, and agar plate culture) and serological testing (ELISA for *S. stercoralis* antibodies) confirmed strongyloidiasis, further validated by molecular methods. Due to potential risks of anti-helminthic drugs during pregnancy, treatment was deferred until one month post-delivery, after breastfeeding cessation. The newborn's stool and breast milk were tested parasitologically and molecularly one month after birth, with negative results, indicating no infection. Although mother-to-fetus transmission has not been definitively established, the fetus is considered a high-risk group. Pregnant women, due to their immunocompromised state, are also classified as a high-risk population and may develop disseminated strongyloidiasis or hyperinfection syndrome. Given the adverse effects of antiparasitic treatment during pregnancy, routine serological screening for *S. stercoralis* in women before pregnancy in endemic areas is recommended to enable early intervention and mitigate complications, safeguarding maternal and fetal health.

DOI: https://doi.org/10.18502/ijpa.v20i4.20469

Introduction

Strongyloidiasis is a disease caused by infection with the soil-transmitted nematode *Strongyloides stercoralis*. The WHO listed this disease among the neglected tropical diseases. This list includes several parasitic and bacterial infections that lead to long-term disabilities, growth retardation in children, complications during pregnancy, and ultimately a reduction in the productive capacity of affected countries (1,2). In Iran, the northern provinces (Guilan and Mazandaran) and southern provinces (Hormozgan and Khuzestan) are endemic for *S. stercoralis*. The unique ability of this nematode to replicate within the human host through autoinfection results in chronic infection that can persist for several decades (3-5). The most severe forms of strongyloidiasis are the hyperinfection syndrome and disseminated strongyloidiasis, which occur mainly in individuals undergoing long-term corticosteroid therapy or receiving immunosuppressive drugs (6).

One of the main consequences of chronic strongyloidiasis is malnutrition. Chronic infection with strongyloidiasis causes edema and inflammation of the small intestinal walls, thereby impairing nutrient absorption (7). Therefore, chronic strongyloidiasis is of particular concern in specific population groups that are vulnerable to the effects of malnutrition, such as pregnant women, infants, and children. Pregnant women are at increased risk of intensified infection and disseminated strongyloidiasis due to immune suppression, chronic nutritional deficiencies, and physiological changes during pregnancy (8, 9). Malnutrition in pregnant women infected with Strongyloidiasis can lead to intrauterine growth restriction and ultimately the birth of low birth weight infants (10, 11).Direct vertical transmission of *S. stercoralis* from mother to fetus has not been documented in the current scientific literature. While certain experimental investigations in animal models have substantiated this mode of transmission (12), other studies have refuted it (13). Additionally, there is evidence indicating the presence of antibodies against *S. stercoralis* in maternal milk (14).

During pregnancy, corticosteroid therapy is sometimes used to prevent preterm labor, which can lead to an increased risk of infection in patients with chronic strongyloidiasis. In recent years, multiple cases of strongyloidiasis in pregnant women have been reported, including maternal deaths following corticosteroid administration and subsequent exacerbation of strongyloidiasis infection (15). It should be noted that anti-*Strongyloides* sp. treatments have well-documented adverse effects on both the mother and fetus and are therefore only administered in emergencies (16).

Diagnosis of strongyloidiasis in parasitology laboratories relies primarily on parasitological methods (17); however, epidemiological studies and screening programs use serological tests due to their higher sensitivity (18). Molecular methods, which offer the highest sensitivity and specificity, are employed mainly in research settings (19).

To date, the transmission of *S. stercoralis* from pregnant mothers to their newborns has not been investigated through follow-up studies of infected mothers, and whether such transmission occurs in newborns remains unexamined. Consequently, upon identifying a mother with this infection, it became imperative to evaluate her newborn one month postpartum.

Case Presentation

A 38-year-old woman (first pregnancy) at 35 weeks of gestation, with no history of miscarriage, presented to Al-zahra Hospital in Rasht, Guilan Province, northern Iran, due to gastrointestinal and respiratory problems.

She consented to participate in a study approved under the ethics code IR.TUMS.SPH.REC.1404.215

The patient reported diarrhea, abdominal pain, and severe dyspnea since the fourth month of pregnancy. Her medical history included pituitary microadenoma diagnosed one year prior and hypothyroidism treated with 100 µg levothyroxine daily. Laboratory findings showed eosinophils at 2% and a white blood cell count of 9.2 × 10^3/µL. Serum was separated from 3 mL of blood and stored at -20°C for serological testing. Stool samples were examined using direct smear, formalin-ethyl acetate concentration, and agar plate culture. Serum and agar plates were analyzed at the Strongyloidiasis Laboratory, Tehran University of Medical Sciences. Serological testing for anti-*S. stercoralis* IgG using a Tec Nova ELISA kit (LOT: STRO-050N, Germany; sensitivity 89.47%, specificity 94.12%) revealed an optical density of 40.3 NTU (>11 NTU positive).

After 72 hours, agar plates showed trails and larvae, which were preserved in 10% formalin for morphological analysis and 70% ethanol for molecular studies, confirming *S. stercoralis* third-stage larvae. The morphology of the infective third-stage larvae (L3 larvae) was examined (Fig. 1). Due to advanced pregnancy, treatment was deferred until after delivery. Four weeks postpartum, breastfeeding was discontinued for two weeks, and ivermectin was administered for two days at the appropriate dose. Three infant stool samples and one maternal milk sample were tested using parasitological (direct smear, formalin-ethyl acetate and agar plate culture) and molecular methods (nested PCR targeting the *Cox*1 gene). DNA was extracted using the Favorgen kit.

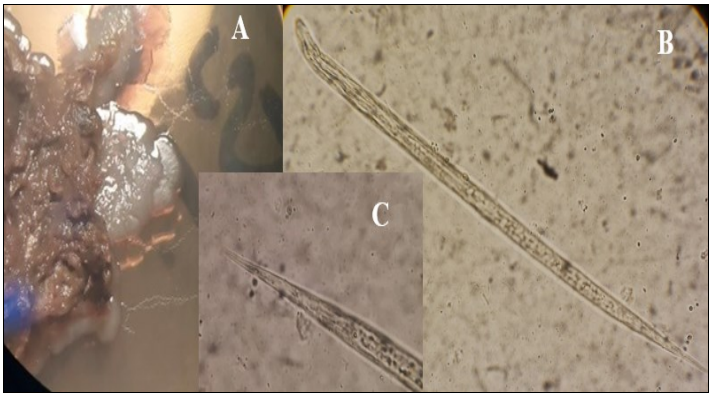

Fig. 1: A: Tracks of *S. stercoralis* larvae on the surface of an agar plate after washing the plate's surface B: Filariform larvae of *S. stercoralis* (10 x, C: Cut end of filariform larvae of *S. stercoralis* (Original)

PCR1 amplified a ~650 bp fragment using primers TJ5207/TJ5208(20), and PCR2 amplified a ~509 bp fragment using primers *Cox*F/*Cox*R (4)(Table 1)—products visualized on a 1.5% agarose gel. Positive and negative controls ensured reliability. Maternal stool confirmed *S. stercoralis* infection. Three infant stool samples, collected one month postpartum, and one maternal breast milk sample were tested using parasitological methods (direct smear, formalin-ethyl acetate and agar plate culture) and molecular methods (nested PCR targeting the *Cox*1 gene).

However, infant stool and maternal milk tested negative (Fig. 2). This case highlights the importance of considering strongyloidiasis in pregnant women with gastrointestinal and respiratory symptoms, particularly in endemic areas with occupational soil exposure. Postpartum treatment with ivermectin was effec-

tive, and no evidence of transmission to the infant was found; treatment continued until after delivery, along with temporary cessation of breastfeeding.

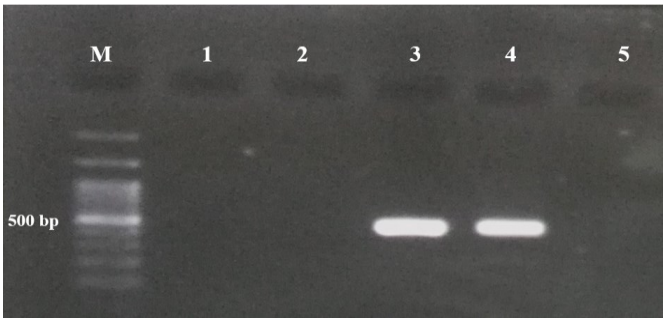

Fig. 2: M: Ladder / 1: Breast milk / 2: Infant stool sample / 3: Mother's stool / 4: Positive control / 5: Negative control

Table 1: Primers Used in Nested PCR for the Detection of *Strongyloides stercoralis*

*Cox*1			
PCR_1	Fw TJ5207	5'- TTTGATTGTTACCTGCTTCTATTTT- 3'	**650 bp**
	Rev TJ5208	5'- TTTTACACCAGTAGGAACAGCAA- 3'	
PCR_2	*Cox* F	5'- GGCTATTTTTAGTTTACATCTTTC- 3'	**509 bp**
	Cox R	5'- GGACAGCAATCACTATGG- 3'	

Discussion

Strongyloidiasis is an emerging public health concern in developing countries, driven by factors such as increased immigration, international travel, and a growing population of immunocompromised individuals, including those on immunosuppressive therapies (21). Pregnant women in endemic regions are particularly vulnerable due to pregnancy-related immunosuppression, which heightens the risk of severe disseminated infections and mortality (22). While transplacental transmission of *S. stercoralis* has not been reported, it has been documented for *Strongyloides fulleborni and S. fulleborni kellyi* (23, 24). Animal studies have yielded conflicting results, with some refuting (13) and others confirming this mode of transmission (12). Additionally, one study has reported the presence of antibodies against *S. stercoralis* in breast milk (14). This route of transmission has also been documented for other nematodes via lactation (25). This case report underscores the diagnostic and clinical challenges associated with strongyloidiasis in high-risk groups, emphasizing that the death of a pregnant mother equates to the loss of two lives, and highlights the need for improved diagnostic strategies.

The diagnosis of *S. stercoralis* infection remains challenging due to the low sensitivity of conventional methods like single stool microscopy, which detects larvae in only 30–50% of cases due to intermittent larval shedding (26). This limitation necessitates multiple stool samples or specialized techniques, such as the Baermann method or stool culture, which require skilled technicians to reduce false-negative results (1). In the present case, the diagnostic process was complicated by these limitations, prompting the use of advanced methods to confirm the infection. The application of nested PCR targeting the cytochrome c oxidase (*Cox*1) gene proved instrumental in this case, offering high sensitivity and specificity for detecting *S. stercoralis* DNA in fecal samples, even in low-burden infections (4,27). This molecular approach minimizes non-specific amplification, making it a

valuable tool for confirming infections in challenging clinical scenarios.

Serological testing also played a critical role in this case. The use of the Novatech ELISA kit, incorporating recombinant antigens such as St-NIE and St-IR, provided high sensitivity and specificity while reducing cross-reactivity with other soil-transmitted helminths (27). This is particularly relevant in endemic areas where co-infections are common, complicating serological diagnosis. Additionally, the detection *of S. stercoralis* antibodies in breast milk, as reported in a 2009 study from Brazil (14), raises concerns about potential transmission risks to infants in endemic settings, warranting further investigation in pregnant and lactating women.

Conclusion

Strongyloidiasis in pregnant women is considered one of the most important high-risk groups due to the immunosuppression that occurs during pregnancy. Disseminated strongyloidiasis carries a significant risk of mortality in this population. It should be noted that antiparasitic treatments carry known risks for both the mother and the fetus. Therefore, despite the critical importance of saving two lives during pregnancy, it is recommended that, given the diagnostic challenges and the number of stool samples required, serological screening using recombinant antigen-based ELISA tests (which do not cross-react with other soil-transmitted nematodes) be employed as a highly sensitive and specific method for screening women before pregnancy in endemic areas. It is recommended that newborns undergo follow-up for several months after completion of maternal treatment, while larger cohort studies are required to clarify the dynamics of maternal–neonatal transmission and inform effective prevention strategies.

Ethics approval and consent to participate

The present study was approved by the Ethics Committee of the School of Public Health, Tehran University of Medical Sciences, under code IR.TUMS.SPH.REC.1404.215 Informed consent for the publication of this case report and any associated images was obtained from the patient.

Acknowledgements

Financial support for the study was provided by the Student's Scientific Research Center, Tehran University of Medical Sciences, Tehran, Iran. The authors would like to thank the participant and her family.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Olsen A, van Lieshout L, Marti H, et al. Strongyloidiasis–the most neglected of the neglected tropical diseases? Trans R Soc Trop Med Hyg. 2009;103(10):967-72.
2. World Health Organization. Ending the neglect to attain the sustainable development goals: a road map for neglected tropical diseases 2021–2030. Geneva: World Health Organization; 2022.
3. Sharifdini M, Kia EB, Ashrafi K, Hosseini M, Mirhendi H, Mohebali M, Kamranrashani B. An Analysis of Clinical Characteristics of *Strongyloides stercoralis* in 70 indigenous patients in Iran. Iran J Parasitol. 2014 Apr-Jun;9(2):155-62. PMID: 25848380; PMCID: PMC4386034.
4. Sharifdini M, Kia EB, Ashrafi K, et al. Molecular diagnosis of strongyloidiasis in a population of an endemic area through nested-PCR. Gastroenterol Hepatol Bed Bench. 2018;11(1):68-74.
5. Grove DI. Human strongyloidiasis. Adv Parasitol. 1996;38:251-309.
6. Keiser PB, Nutman TB. *Strongyloides stercoralis* in the immunocompromised population. Clin Microbiol Rev. 2004;17(1):208-17.
7. Milner PF, Irvine WJ, Milner PF. Intestinal malabsorption in *Strongyloides stercoralis* infestation. Gut. 1965;6(6):574-581.

8. Robinson DP, Klein SL. Pregnancy and pregnancy-associated hormones alter immune responses and disease pathogenesis. Horm Behav. 2012;62(3):263-71.
9. Mor G, Cardenas I. The immune system in pregnancy: a unique complexity. Am J Reprod Immunol. 2010;63(6):425-33.
10. Aderoba AK, Iribhogbe OI, Olagbuji BN, et al. Prevalence of helminth infestation during pregnancy and its association with maternal anemia and low birth weight. Int J Gynaecol Obstet. 2015;129(3):199-202.
11. Fairley JK, Bisanzio D, Ondigo BN, et al. Birthweight in offspring of mothers with high prevalence of helminth and malaria infection in coastal Kenya. Am J Trop Med Hyg. 2013;88(1):48-53.
12. De Liberato C, Iatta R, Scarito MA, et al. *Strongyloides stercoralis* in a dog litter: evidence suggesting a transmammary transmission. Acta Trop. 2022;231:106465.
13. Shoop WL, Michael BF, Eary CH, Haines HW. Transmammary transmission of *Strongyloides stercoralis* in dogs. J Parasitol. 2002 Jun;88(3):608-9.
14. Mota-Ferreira DM, Gonçalves-Pires Mdo R, Júnior AF, et al. Specific IgA and IgG antibodies in paired serum and breast milk samples in human strongyloidiasis. Acta Trop. 2009;109(2):103-7.
15. Akers AN, Mohan S, Oke V, et al. *Strongyloides stercoralis* Hyperinfection Syndrome in Pregnancy. Cureus. 2023; 15(8):e43977.
16. Westlake CS, Aronoff DM. Evaluating the risks of systemic maternal ivermectin exposure during pregnancy in human and vertebrate animals: a scoping review. Curr Drug Saf. 2021;16(3):299-308.
17. Montresor A, Mupfasoni D, Mikhailov A, et al. The global progress of soil-transmitted helminthiases control in 2020 and World Health Organization targets for 2030. PLoS Negl Trop Dis. 2020;14(8):e0008505.
18. Kalantari N, Ghaffari S, Bayani M, et al. Prevalence and associated risk factors of *Strongyloides* sp. infection in diabetic patients in the central part of Mazandaran, northern Iran. Arch Clin Infect Dis. 2019; 14(4):e94158.
19. Verweij JJ, Canales M, Polman K, et al. Molecular diagnosis of *Strongyloides stercoralis* in faecal samples using real-time PCR. Trans R Soc Trop Med Hyg. 2009; 103(4):342-6.
20. Jaleta TG, Zhou S, Bemm FM, et al. Different but overlapping populations of *Strongyloides stercoralis* in dogs and humans—Dogs as a possible source for zoonotic strongyloidiasis. PLoS Negl Trop Dis. 2017;11(8):e0005752.
21. Puthiyakunnon S, Boddu S, Li Y, et al. Strongyloidiasis—an insight into its global prevalence and management. PLoS Negl Trop Dis. 2014;8(8):e3018.
22. Wikman-Jorgensen P, Requena-Méndez A, Llenas-García J. A review on strongyloidiasis in pregnant women. Res Rep Trop Med. 2021;12:219-225.
23. Ashford RW, Barnish G, Viney ME. *Strongyloides fuelleborni kellyi*: infection and disease in Papua New Guinea. Parasitol Today. 1992;8(9):314-8.
24. Brown RC, Girardeau HF. Transmammary passage of Strongyloides sp. larvae in the human host. Am J Trop Med Hyg. 1977;26(2):215-9.
25. Nwosu AB. Human neonatal infections with hookworms in an endemic area of Southern Nigeria: a possible transmammary route. Trop Geogr Med. 1981;33(2):105-11.
26. Ericsson CD, Steffen R, Siddiqui AA, et al. Diagnosis of *Strongyloides stercoralis* infection. Clin Infect Dis. 2001;33(7):1040-7.
27. Chan AHE, Thaenkham U. From past to present: opportunities and trends in the molecular detection and diagnosis of Strongyloides stercoralis. Parasit Vectors. 2023;16(1):123.