http://pmjournal.ir Original Article
Spring 2019, Volume 4, Issue 13 (10-13)

Clinical Significance and Seroprevalence of *L. monocytogenesin* in Pregnant Women with Spontaneous Abortion: Personalized Medicine to Improve Outcome (Diagnosis and Monitoring)

Mahsa Mozaffari [1], Mohamad Mozafari [2,*], Mahdi Mohebbi [3]

[1] Department of Pediatrics, Faculty of Medicine, Iran University of Medical Sciences, Tehran, Iran
[2] General Practitioner (GP), Tabriz University of Medical Sciences, Tabriz, Iran
[3] General Practitioner (GP), Shahid Beheshti University of Medical Sciences, Tehran, Iran

** Corresponding author: Mohamad Mozafari, General Practitioner (GP), Tabriz University of Medical Sciences, Tabriz, Iran. Tel: +98-9144816125; Email: mohamad2mzf@gmail.com*

DOI: 10.21859/pmj04014

Submitted: 2019/01/03
Accepted: 2019/02/04

Keywords:
Listeria monocytogenes
Abortion
Infection
Personalized Medicine
Immunofluorescence

Abstract

Introduction: Recent scientific promotion reveals that medicine is currently at a transition stage from programmatic to personalized handling on in infectious diseases.
Methods: Herrien, this research was performed to evaluation seropositivity for *L. monocytogenes* based on personalized medicine among the women with and without annals of miscarriage by indirect immunofluorescence test (IIFA). Moreover, the relationship of seropositivity with demographic factors was also investigated.
Results: Our outcome showed that 26.92% (35 cases) of women with an involuntary miscarriage were seropositive for *L. monocytogenes*, while 11% (11 cases) of healthy pregnant women were found positive for *L. monocytogenes* (P = 0.001). The most case of listeria has been found in age group of 30-35 years old, but no notable difference was found among different groups (P = 0.245). Moreover, there was a considerable association between listeria occurrence and history of abortion when compared with healthy pregnant women (P = 0.001). In addition, early abortion and the number of pregnancy were significantly linked to Listeria- seropositive in patients with spontaneous abortion (P = 0.041; P = 0.034).
Conclusions: Further researches are required to appraise the clinical importance of *L. monocytogenesin* in pregnant women with symptomatic and asymptomatic infection related to personalized medicine.

INTRODUCTION

Medicine is now at a transitional step among programmatic and personalized programs implications as well as there is powerful evidence that a personalized medicine approach in infectious diseases would be entirely effective [1, 2]. *Listeria monocytogenes* is a significant food born pathogen that is the causative factor of abortion. The disease primarily affects older adults, pregnant women, newborns, and adults with weakened immune systems. It can lead to encephalomeningitis, septicemias and gastroenteritis through its ability to cross the intestinal, blood–brain barriers and placental [2-5]. The prevalence of listeriosis in general population is 0.7 in 100000 but this prevalence is 12 in 100000 in pregnant women [6, 7]. In the case of outbreaks, mortality rate has been suggested to be more than 30%, and the rate could increase in some groups including pregnant women, newborns, and the elderly [8, 9]. Most cases of listeriosis lead to symptomatic complications, such as preterm labor, stillbirth, or neonatal infection, spontaneous abortion and latent listeriosis is associated with fetal complications such as habitual abortion, intrauterine death and malformation of fetus. [6]. the clinical syndrome in foetus can be linked to granulomatosis

infantiseptica [10]. Furthermore, listeriosis may present as a local infection including endocarditis, dermatitis, pericarditis, peritonitis, pneumonia, arthritis, hepatitis, and endophthalmitis [11-15].

Serologic diagnostic methods agglutination and the indirect immunofluorescence test are used in patients of latent listeriosis [11]. Different prevalence amounts of *L. monocytogenes* has been seen in different countries [12, 16, 17]. Furthermore, research into personalized medicine will serve as the foundation to progress cellular and immunotherapies specific for infectious pathogens [2]. In the present study, we conducted a serologic evaluation for *L. monocytogenes* infection based on personalized medicine among the women with and without a history of spontaneous abortion, to determine any association of seropositivity with abortion among the studied population.

METHODS

A total of 130 pregnant women with a spontaneous abortion who were referred to Hospitals of Tehran, Iran between 2011- 2014 for treatment were selected in the present study. Moreover, a control group was selected from healthy pregnant women (100 cases). The average the patients' age was 29.5 years in patients with involuntary miscarriage and 28.1 years in the control group. This investigation has been approved by the Ethics Committee of Hospital. All patients had provided consent in the sense that their blood samples could be applied for investigation. Written informed consents were collected from all participants involved in the study. All blood samples were centrifuged at 2,000g for10 min and the sera transport to micro tube to be stored at–20 °C. Furthermore, we used indirect immunofluorescence test (IIFA) to evaluated immunoglobulin G (IgG) levels of *L. monocytogenes* in serum samples. IIFA test was conducted by specific kit that had 1/2a, and 4b antigen, Substrate: bacterial smears (2 BIOCHIPs per field), (Order No: FI 2141-1005-1 G Euroimmun Medizinische Labordiagnostika AG, Germany).

Statistical Analysis

All data were statistically analysis using SPSS 16.0 software (SPSS Inc., Chicago, IL, USA). Differences between all variables were evaluated using Student's t-test and chisquare test. $P < 0.05$ was considered statistically significant.

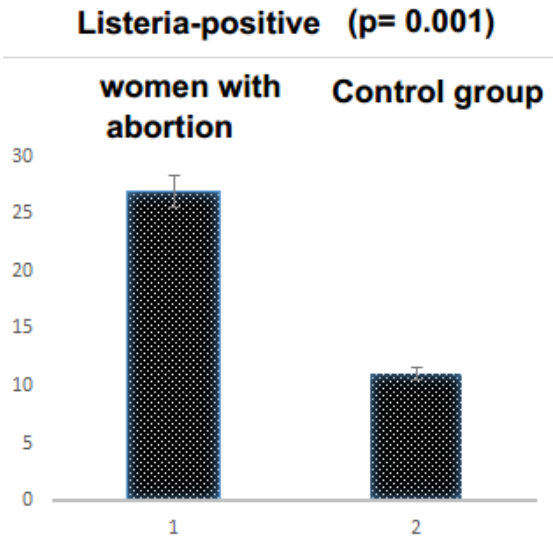

Figure 1: Seropositive for *L. monocytogenes* of Women

Table 1: The Association of Demographic Factors with Abortion

Variables	Number = 130	Listeria positive = 35	Listeria negative = 95	P value
Age groups				P= 0.215
20-25	43	8	35	
25-30	51	11	40	
30-35	36	16	20	
Contact with animal				0.421
Yes	55	16	39	
No	65	19	46	
Residence				0.273
City	72	21	51	
Village	58	14	44	
Abortion				0.031
Early (<10 wk)	71	25	46	
Late (10–20 wk)	59	10	49	
Number of pregnancy				0.037
1-2	55	6	49	
2-3	42	13	29	
>3	33	16	17	

RESULTS

Our findings indicated that 26.92% (35 cases) of women with a spontaneous abortion were seropositive for *L. monocytogenes*, while 11% (11 cases) of healthy pregnant women were found positive for *L. monocytogenes* (P = 0.001) (Fig 1).

The association of *L. monocytogenes* positive with demographic factors was showed in Table 1. The most case of listeria has been observed in age group of 30-35 years old, however, no notable difference was seen among different groups (P = 0.245). Moreover, there was a considerable correlation between listeria occurrence and miscarriage history compared with

healthy pregnant women (P = 0.001). In addition, early abortion and the number of pregnancy were significantly correlated with Listeria-positive in patients with spontaneous abortion (P = 0.031; P = 0.037), but no correlation was seen among other demographic parameters (Table 1).

DISCUSSION

Listeria monocytogenes is an important food born pathogen that causes infection (Listeriosis) in man and animals. The disease primarily affects older adults, pregnant women, newborns, and adults with weakened immune systems. Most foods are transmitted through raw contamination to food milk, raw vegetables, fish, poultry, and beef by *L. monocytogenes* [18]. Different incidence rates of *L. monocytogenes* has been reported in different countries [7, 12, 16-20]. Aljicević et al, [21] conducted a study to evaluate *L. monocytogenes* seropositive levels in patients with involuntary miscarriage in Bosnia by the agglutination method. They report that 18 (60%) of the case group and eight (26.7%) of the control group was seropositive for *L. monocytogenes*. Pujol et al, [22] reported that the seroprevalence of infections of this microbe without clinical symptoms in the pregnant women population of the Reus region was 12%. In Iran, Jamshidi et al. [19] carried out a study on two groups of women with and without a history of spontaneous abortion. They reported that 35.6% of women were seropositive for *L. monocytogenes*, whereas only 17.5% of women in the control group were seropositive. In the present study, our result suggested that 26.92% of women with a spontaneous abortion were seropositive for *L. monocytogenes*, while 11% of healthy pregnant women were found positive ($P < 0.05$). Difference between findings of our research with else researches in another countries may be due to difference in diet habit and some other parameters.

In current study, it was reported that *L. monocytogenes* may be one of abortion causative factor in pregnant women. The most case of listeria has been found in age group of 30-35 years old, but no notable difference was seen among different groups. Tahery et al, reported that higher age positively correlated with listeria infection [23]. It has been showed that the creating of interaction of immunologic response of these bacteria with them is possible due to similarity between *L. monocytogenes* and some other bacteria. In addition, it has been showed that contact of persons with these bacteria can produce antibody against *L. monocytogenes*. Furthermore, there was a considerable association among Listeria occurrence and history of abortion when compared with healthy pregnant women. It can be explained that increase in number of pregnancy can be related to production of antibody against Listeria [23]. It has been found that pregnancies with triplet gestations can be correlated with higher risk of Listeriosis (risk ratio, 38.4; 95% CI, 9.6–153.3), [24]. In our study, the number of pregnancy was significantly correlated with Listeria-positive in patients with spontaneous abortion that is agreement with previous studies [19, 23, 24].

In conclusion, science is presently at a transitional stage among programmatic and personalized management concepts and in parallel, there was a significant correlation between Listeria occurrence and history of abortion in patients with spontaneous abortion when compared with healthy pregnant women based on personalized medicine. Therefore, further researches are required to appraise the clinical importance of L. monocytogenesin in pregnant women with symptomatic and asymptomatic infection.

Conflict of Interests

None to declare for the contributing authors

Acknowledgment

None.

REFERENCES

1. Jensen SO, van Hal SJ. Personalized Medicine and Infectious Disease Management. Trends Microbiol. 2017;25(11):875-6. doi: 10.1016/j.tim.2017.09.006 pmid: 28969882
2. Al-Mozaini MA, Mansour MK. Personalized medicine. Is it time for infectious diseases? Saudi Med J. 2016;37(12):1309-11. doi: 10.15537/smj.2016.12.16837 pmid: 27874145
3. Lecuit M. Understanding how Listeria monocytogenes targets and crosses host barriers. Clin Microbiol Infect. 2005;11(6):430-6. doi: 10.1111/j.1469-0691.2005.01146.x pmid: 15882192
4. Neuhaus K, Satorhelyi P, Schauer K, Scherer S, Fuchs TM. Acid shock of Listeria monocytogenes at low environmental temperatures induces prfA, epithelial cell invasion, and lethality towards Caenorhabditis elegans. BMC Genomics. 2013;14:285. doi: 10.1186/1471-2164-14-285 pmid: 23622257
5. Painter J, Slutsker L. Listeriosis in Humans. Boca Raton, Florida: Taylor and Francis Group; 2007. 85-109 p.
6. Mylonakis E, Paliou M, Hohmann EL, Calderwood SB, Wing EJ. Listeriosis During Pregnancy. Medicine. 2002;81(4):260-9. doi: 10.1097/00005792-200207000-00002
7. Kaur S, Malik SV, Vaidya VM, Barbuddhe SB. Listeria monocytogenes in spontaneous abortions in humans and its detection by multiplex PCR. J Appl Microbiol. 2007;103(5):1889-96. doi: 10.1111/j.1365-2672.2007.03414.x pmid: 17953598
8. Carminati D, Perrone A, Giraffa G, Neviani E, Mucchetti G. Characterization of Listeria monocytogenes strains isolated from Gorgonzola cheese rinds. Food Microbiol. 2004;21(6):801-7. doi: 10.1016/j.fm.2004.01.011
9. Donato R, Sacco C, Tiscione E, Galassi L, Scarpellini A, Ademollo B. Comparison between plate count agar and milk plate count agar in evaluation of total bacterial charge in pasteurized milk [Italy]. Latter (Italy). 1994:19-24.
10. Klatt EC, Pavlova Z, Teberg AJ, Yonekura ML. Epidemic perinatal listeriosis at autopsy. Hum Pathol. 1986;17(12):1278-81. pmid: 3793087
11. Silver HM. Listeriosis during pregnancy. Obstet Gynecol Surv. 1998;53(12):737-40. pmid: 9870235
12. Jackson TL, Eykyn SJ, Graham EM, Stanford MR. Endogenous bacterial endophthalmitis: A 17-year prospective series and review of 267 reported cases. Surv Ophthalmol. 2003;48(4):403-23. doi: 10.1016/s0039-6257(03)00054-7
13. Kida K, Osada N, Isahaya K, Mikami T, Yoneyama K, Kongoji K, et al. Listeria endocarditis with acute thoracoabdominal aortic dissection. Intern Med. 2007;46(15):1209-12. pmid: 17675771

14. Cardoso C, Cremers I, Oliveira AP. Spontaneous bacterial peritonitis caused by Listeria monocytogenes: a case report and literature review. Ann Hepatol. 2012;11(6):955-7. pmid: 23109462
15. Vargas V, Aleman C, de Torres I, Castells L, Gavalda J, Margarit C, et al. Listeria monocytogenes-associated acute hepatitis in a liver transplant recipient. Liver. 1998;18(3):213-5. pmid: 9716234
16. Stepanovic S, Vukovic D, Djukic S, Cirkovic I, Svabic-Vlahovic M. Long-term analysis of Listeria monocytogenes vaginal carriage frequency in Belgrade, Serbia (short communication). Acta Microbiol Immunol Hung. 2007;54(2):195-9. doi: 10.1556/AMicr.54.2007.2.9 pmid: 17899798
17. Haghroosta A, Shakh AF, Shooshtari MM. Investigation on the seroprevalence of Listeria monocytogenes in women with spontaneous abortion. Comp Clin Pathol. 2014;24(1):153-6. doi: 10.1007/s00580-013-1876-4
18. McLauchlin J. Listeriosis. BMJ. 1992;304(6842):1583-4. pmid: 1628083
19. Jamshidi M, Jahromi AS, Davoodian P, Amirian M, Zangeneh M, Jadcareh F. Seropositivity for Listeria monocytogenes in women with spontaneous abortion: a case-control study in Iran. Taiwan J Obstet Gynecol. 2009;48(1):46-8. doi: 10.1016/S1028-4559(09)60034-6 pmid: 19346191
20. Lida L. Prevalence and antimicrobial resistance profiles of Listeria monocytogenes in spontaneous abortions in humans. Afr J Microbiol Res. 2011;5(14). doi: 10.5897/ajmr11.498
21. Aljicevic M, Beslagic E, Zvizdic S, Hamzic S, Mahmutovic S. [Agglutination as screening test in routine diagnostic of listeriosis]. Med Arh. 2006;60(2):93-5. pmid: 16528925
22. Pujol I, Vidal A, Joven J. [The seroprevalence of Listeria infections without clinical sign in a population of pregnant women from the Reus area]. Rev Clin Esp. 1990;187(4):175-7. pmid: 2128653
23. Tahery Y, Kafilzadeh F, Momtaz YA. Listeria monocytogenesis and abortion: A case study of pregnant women in Iran. Afr J Microbiol Res. 2009;3(11):826-32.
24. Mascola L, Ewert DP, Eller A. Listeriosis: A previously unreported medical complication in women with multiple gestations. Am J Obstet Gynecol. 1994;170(5):1328-32. doi: 10.1016/s0002-9378(94)70151-2