

Relationship between Helicobacter Pylori Infection and Preterm Labor: A Case-Control Study

Mohammed Sayed Ali,^{*1} Ahmed Mahmoud Hussein,¹ Walid Abdelhady Ahmed,² and Ahmed Eid Zidan¹

¹Department of Obstetrics and Gynecology, Faculty of Medicine, Ain Shams University, Egypt

²Department of Clinical Pathology, Faculty of Medicine, Ain Shams University, Egypt

*E-mail: Ahmedeidzidan@gmail.com

Abstract: Helicobacter pylori (H. pylori), a Gram-negative bacteria and spiral-shaped bacterium occurring in the stomach, is proposed to be directly connected to various gastrointestinal diseases, such as gastric mucosal-associated lymphoid tissue lymphoma, gastric adenocarcinoma, and peptic ulcer disease. Moreover, preterm labor is the main reason of neonatal death and disabilities like deafness, blindness, cerebral palsy, and chronic lung complications. Herein, we established a case study aiming to investigate the relationship between helicobacter pylori infection and preterm labor. The study was carried out on one hundred pregnant women and took place at Ain Shams University Hospital. Finally, data analysis was performed using Statistical Package of Social Science (SPSS) software.

[Mohammed Sayed Ali, Ahmed Mahmoud Hussein, Walid Abdelhady Ahmed, and Ahmed Eid Zida. **Relationship between Helicobacter Pylori Infection and Preterm Labor: A Case-Control Study.** *Nat Sci* 2019;17(11):86-89]. ISSN 1545-0740 (print); ISSN 2375-7167 (online). <http://www.sciencepub.net/nature>. 11. doi:[10.7537/marsnsj171119.11](https://doi.org/10.7537/marsnsj171119.11).

Keywords: Helicobacter pylori, Preterm labor, Gram-negative bacteria, Spiral-shaped bacteria

1. Introduction

Pursuing the public health studies' observations, H. pylori was proposed to be correlated with many gastrointestinal diseases (Suzuki et al., 2011), hematological cardiovascular disease (Niccoli et al., 2010 and Franceschi et al., 2014), unexplained iron deficiency anemia, idiopathic thrombocytopenic purpura (Arnold et al., 2009), and neurological disorders (Roubaud-Baudron et al., 2012).

Recently, many researches on the obstetric field gave a considerable attention to potential influence of H. pylori infection in pregnant female. Interestingly, females who were experienced preeclampsia within pregnancy exhibited high prevalence of the H. pylori (Cardaropoli et al., 2011). Furthermore, a particular gastrointestinal symptom, hyperemesis gravidarum, was also connected to H. pylori (Cevrioglu et al., 2004).

Additionally, preterm labor is the major clinical problem facing modern obstetrics in developing countries as it is considered to be a high-risk pregnancy in which a regular uterine contractions (four or more in 20 minutes or eight or more in hour) and cervical changes (effacement equal to or greater than 1 cm) is occurred in women with intact fetal membranes and gestational age less than 37 weeks (Arias et al., 2008).

Among all deliveries worldwide, preterm labor occurs in 5-18 percent with many developed countries recording a steady increase of preterm labor incidence through the last 3 decades (March of Dimes Foundation, 2009). Most importantly is that the health care costs for preterm babies are extremely expensive for poor people and this is one of the main

causes for increasing the death mortality in developing countries (Bellad et al., 2009).

In developing countries, it is believed that every year there are more than nine million infants die in the first few weeks of life or before birth (World Health Organization 2006). In Egypt, the rate of perinatal mortality is around 45 per 1000 total births in comparison to 11 per 1000 in the developed countries. Noteworthy, complications related to delivery and pregnancy are responsible for most perinatal deaths (ElShabrawy et al., 2010).

Finally, it is hard to some extent to accurately predict preterm labor therefore many researches attempting to identify the main cause of preterm labor with paying special attention to infection with different agents that lead to the membranes separation as an outcome of infection. In this paper we established a case study trying to explore the relationship between H. pylori infection and preterm labor.

2. Patients and Methods

One hundred pregnant women, who received regular antenatal examinations at Department of Gynecology and Obstetrics-Ain Shams University, were selected. Subsequently, these patients were divided into 2 groups where the first group (case group) includes 50 patients established preterm labor and the second one is the control group which includes 50 patients with normal pregnancy >37 weeks. For all these women we did the following; complete history taking (personal, present, past, obstetrical, and gynecological), general examination (pulse, blood pressure, temperature, respiratory rate),

abdominal and obstetrical examination to diagnose preterm labor, and finally obstetric ultrasound was performed to exclude any abnormalities.

After recruitment and consenting of patients, stool samples were collected in a clean specimen container to be tested for the presence of *H. pylori* Antigen in stool by lateral flow immunochromatographic assay (Intech, USA). The stool specimens were collected from mothers in clean and dry screw-top containers labeled with the mother's name and the patients were asked to use a bathroom few meters away from their rooms, in case of epidural anesthesia the specimen was collected from the mother in the bed. Finally, the specimens were stored in the freezer (no longer than 24 hours) in a sealed plastic bag and delivered to the laboratory to be examined for *H. pylori*.

Exclusion Criteria

In order to have concrete and consistent results, we excluded the following criteria; history of gastric surgery, peptic ulcer, preterm labor, and medical disorders such as diabetes mellitus and preeclampsia. In addition, patients who received *H. pylori*-eradication treatment such as antibiotics or proton pump inhibitor prescription were excluded along with patients with any ultrasound abnormalities like polyhydramnios, anencephaly, or fetal anomalies.

Data Management and Analysis

Data were collected and coded to facilitate data manipulation and double entered into Microsoft Access and data analysis was performed using Statistical Package of Social Science (SPSS) software version 18 in windows 7. Simple descriptive analysis in the form of numbers and percentages for qualitative data, arithmetic means as central tendency measurement, and standard deviations as measure of

dispersion for quantitative parametric data. Quantitative data included in the study was first tested for normality by One-Sample Kolmogorov-Smirnov test in each study group then inferential statistic tests were selected. Moreover, for quantitative data, in-dependent student t-Test was used to compare measures of two independent groups of quantitative data and for qualitative data while for qualitative data, Chi square test was utilized to compare two of more than two qualitative groups. Furthermore, level of significance, p-values, was expressed as following; p-value >0.05 was considered to be non-significant (NS), p-value <0.05 was named as significant (S), while p-value <0.01 was recognized as highly significant (HS).

3. Results and Discussion

In this case study two main outcomes were spotted, primary outcome which includes detection of *H. pylori* antigen among patients with preterm labor and secondary outcome which was divided into maternal and fetal. Maternal comprised time between admission and delivery and the need for blood transfusion for study group however fetal included APGAR score for preterm infants and the need for NICU admission.

As aforementioned patients were divided into two groups where case group includes 50 patients established preterm labor and control group includes 50 patients with normal pregnancy >37 weeks.

Table (1) illustrates that there is no statistically significant difference with p-value >0.05 between cases and controls regards to *H. pylori* infection; which indicated that there is no association between cases of preterm labor and infection with *H. pylori*.

Table (1): Comparisons of *H. pylori* outcomes in different study groups.

H. pylori infection	PTL Cases (n=50)		Control (n=50)		p-value	Sig.
	No.	%	No.	%		
Negative	33	66%	41	82%	0.1	NS
Positive	17	34%	9	18%		

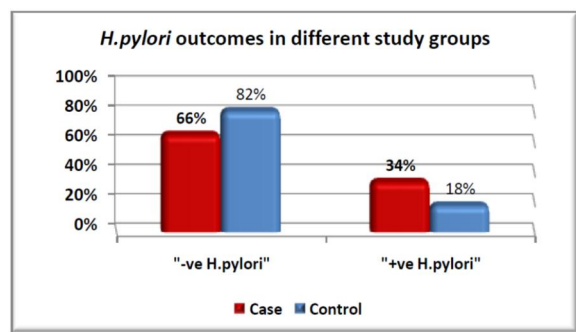


Figure (1): Column chart of *H. pylori* outcomes in different study groups

As depicted in Figure (1), for PTL group, 66% (33 cases) were not infected by *H. pylori* while *H. pylori* antigen was detected in the stool of 34% of cases (17 cases). On the other hand, 41 cases (82%) in the control group were not infected and only 9 cases (18%) were positive.

In the same context, Table (2) illustrates that there is statistically significant difference with p-value <0.05 between cases and controls regards to complications as NICU admission and fetal death with higher percentage of these complications were noted among cases of preterm labor. On the other hand there is no statistically significant difference

with p-value >0.05 as regards need for blood transfusion.

In preterm labor cases group and on fetal level, only 9 cases didn't admit to NICU while the majority of premature babies (82%) were admitted to NICU Figure (2). In contrarily and with respect to control group, the number of cases that they were normal and didn't admit to NICU was 42 cases with 84% while the number of cases admitted to NICU was only 8

cases Figure (2). Accordingly, the recorded percentage of fatal death in preterm labor cases group was high (34%) in comparison to control group which showed no mortality Figure (2). The need to blood transfusion is another maternal outcome that was investigated in this case study to find that there was almost no observed difference between both preterm labor cases group and control group Table (2).

Table (2): Comparisons of complications in different study groups.

Variables	PTL Cases (n=50)		Control (n=50)		p-value	Sig.
	No.	%	No.	%		
NICU admission						
No	9	18%	42	84%	<0.001	HS
Yes	41	82%	8	16%		
Fetal death						
No	33	66%	50	100%	<0.001	HS
Yes	17	34%	0	0%		
Blood transfusion						
No	47	94%	50	100%	0.1	NS
Yes	3	6%	0	0%		

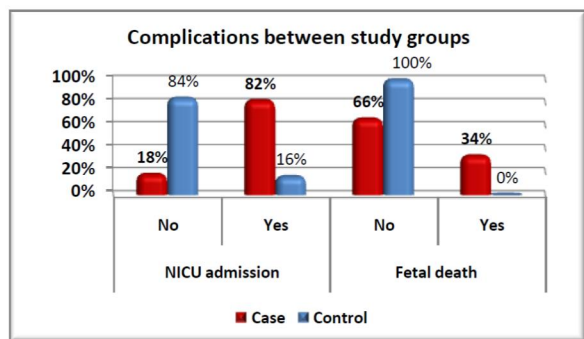


Figure (2): Column chart of complications in different study groups

Finally to have a clear perspective, the relation between H. pylori infection and NICU admission was studied. Table (3) illustrates that there is no statistically significant difference with p-value >0.05 in each study group cases and controls as regards NICU admission in relation to H.pylori infection;

which indicated that no association between NICU admission and infection with H.pylori.

As it was previously reported in (Table 2) we had 41 premature babies, from the 41 premature babies who were admitted to NICU, H. pyloriantigens in mothers' stool were detected in only 14 cases (34.1%) while 27 cases (65.9%) were negative (Table 3). The same behavior, with almost comparable percentage, was observed for the 9 cases that didn't admit to NICU, as in 6 cases (66.7%) H. pyloriantigens were not detected in mothers' stool but 3 cases (33.3%) showed positive results (Table 3). In case of control group and from 42 normal babies who didn't need NICU, H. pyloriantigens could be located in mothers' stool of only 9 cases (21.4%), however 33 cases (78.6%) were negative. Finally in control group, H. pyloriantigens could be detected in mothers' stool of the 8 babies were admitted to NICU.

Table (3): Comparisons of NICU admission with H. pylori outcomes among each study group.

H. pylori infection	NICU admission				p-value	Sig.
	No		Yes			
	No.	%	No.	%		
PTL Cases (n=50)						
-veH-pylori	6	66.7%	27	65.9%	0.9	NS
+veH-pylori	3	33.3%	14	34.1%		
Control (n=50)						
-veH-pylori	33	78.6%	8	100%	0.3	NS
+veH-pylori	9	21.4%	0	0%		

Conclusion

This case study was performed to investigate the association between *H. pylori* infection and preterm labor. One hundred pregnant women at Ain Shams University Hospital were selected then were divided into two groups case group, includes 50 patients established preterm labor, and control group, includes 50 patients with normal pregnancy >37 weeks. Different variables like NICU admission, fetal death, and blood transfusion were studied aiming to have a thorough understanding to indicate the type of correlation between *H. pylori* infection and preterm labor. Data were collected and the analysis took place via Statistical Package of Social Science (SPSS) software version 18 in windows 7. In conclusion, this study indicated that there was no relation between *H. pylori* infection and preterm labor.

References

1. F. Arias, S. N. Daftary, A. G. Bhide, Text book of practical guide to high-risk pregnancy and delivery, A South Asian Perspective (3ed). 194-261, Elsevier, A Division of Reed Elsevier India Pvt, Ltd. 2008.
2. D. M. Arnold, A. Bernotas, I. Nazi, R. Stasi, M. Kuwana, Y. Liu, J. G. Kelton, M. A. Crowther "Platelet count response to *H. pylori* treatment in patients with immune thrombocytopenic purpura with and without *H. pylori* infection: a systematic review," *Haematologica*, 94(6), 850-856, 2009.
3. M. Bellad, H. Dhumale, J. C. Shrivage, "Preterm Labor: A Review," *South Asian Federation of Obstetrics and Gynecology*, 1(3):1-4, 2009.
4. S. Cardaropoli, A. Rolfo, A. Piazzese, A. Ponzetto, and T. Todros, "Helicobacter pylori's virulence and infection persistence define pre-eclampsia complicated by fetal growth retardation," *World Journal of Gastroenterology*, 17(47): 5156-5165, 2011.
5. A. S. Cevrioglu, M. Altindis, M. Yilmazer, I. V. Fenkci, E. Ellidokuz, and S. Kose, "Efficient and non-invasive method for investigating Helicobacter pylori in gravida with hyperemesis gravidarum: Helicobacter pylori stool antigen test," *Journal of Obstetrics and Gynaecology Research*, 30(2): 136-141, 2004.
6. E. M. El Shabrawy, M. R. El Rafei, R. A. Aziz, S. S. Elsonosy, "Perinatal Morbidity and Mortality in Rural Community in Beni-Suef Governorate "Upper Egypt"," *World Journal of Medical Sciences*, 5(1): 1-6, 2010.
7. F. Franceschi, G. Zuccalà, D. Roccarina, A. Gasbarrini, "Clinical effects of Helicobacter pylori outside the stomach," *Nature reviews Gastroenterology and hepatology*, 11(4):234-242, 2014.
8. March of Dimes Foundation, *March of Dimes White Paper on Preterm Births: The Global and Regional Toll*, March of Dimes Foundation, White Plains, NY, USA, 2009.
9. G. Niccoli, F. Franceschi, N. Cosentino, B. Giupponi, G. De Marco, G. Merra, M. Conte, R. Montone, G. Ferrante, M. Bacà, A. Gasbarrini, N. Silveri, F. Crea, "Coronary atherosclerotic burden in patients with infection by Cag A-positive strains of Helicobacter pylori," *Coronary Artery Disease*, 21(4): 217-221, 2010.
10. C. Roubaud-Baudron, P. Krolak-Salmon, I. Quadrio, F. Mégraud, and N. Salles, "Impact of chronic Helicobacter pylori infection on Alzheimer's disease: preliminary results," *Neurobiology of Aging*, 33(5): 1009.e11-1009.e19, 2012.
11. H. Suzuki, F. Franceschi, T. Nishizawa, and A. Gasbarrini, "Extragastric manifestations of Helicobacter pylori infection," *Helicobacter*, 16(Suppl. 1), 65-69, 2011.
12. World Health Organization: "Causes of stillbirths and early neonatal deaths: data from 7993 pregnancies in six Developing Countries," 84(9): 699-705, 2006.

8/4/2019