

Association of Helicobacter Pylori Infection and Serum Folate Levels in Sudan

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Abstract: Background: Folate is a water-soluble B vitamin that is naturally present in some foods, added to others, and available as a dietary supplement. The changes caused in gastric juice by *H. pylori*-induced gastritis, which can result in inadequate folate status.

Objective: The purpose of this study was to determine the association between *Helicobacter Pylori* infection and Serum Folate levels.

Materials and Methods: One hundred and twenty samples were included (60 samples of *h.pylori* infected individuals, and 60 samples of healthy individuals as control) all of them were evaluated to determine serum folate levels using Electrochemiluminescence immunoassay.

Results: Mean serum folate levels was significantly reduced among cases than the controls.

Conclusion: The findings indicate that serum folate levels decreased in patients with *H.pylori*.

Keywords: Serum folate, *H.pylori*, Sudan.

I. Introduction

Folate is a water-soluble B vitamin that is naturally present in some foods, added to others, and available as a dietary supplement^[1]. Folate functions as a coenzyme or cosubstrate in single-carbon transfers in the synthesis of nucleic acids (DNA and RNA) and metabolism of amino acids^[2]. When consumed, food folates are hydrolyzed to the monoglutamate form in the gut prior to absorption by active transport across the intestinal mucosa^[3]. Passive diffusion also occurs when pharmacological doses of folic acid are consumed^[4]. Folate deficiency is a low level of folic acid in the body. It is involved in adenosine, guanine, and thymidine synthesis (part of DNA synthesis). Signs of folate deficiency are often subtle. Anemia is a late finding in folate deficiency. Folate deficiency anemia is the term given for this medical condition. Characterized by the appearance of large-sized, abnormal red blood cells (megaloblasts), which form when there are inadequate stores of folic acid within the body^[5].

Helicobacter pylori (*H. pylori*) is a type of bacteria responsible for widespread infection with more than 50% of the world's population infected, even though 80% of those infected have no symptoms. Infection with *H.pylori* has been recognized as a public health problem worldwide and more prevalent in developing than the developed countries^[6]. Infection with *H. pylori* is a co-factor in the development of duodenal or gastric ulcers (reported to develop in 1 to 10% of infected patients), gastric cancer (in 0.1 to 3%) and gastric mucosa associated lymphoid tissue (gMALT) lymphoma (in <0.01%)^[7].

The changes caused in gastric juice by *H. pylori*-induced gastritis, and the bioavailability of folates. Reduced folate absorption can occur in an environment of increased gastric juice pH and/or decreased ascorbic acid. This can, relatively rapidly, result in inadequate folate status^[8]. The aim of this study was to determine the association between *Helicobacter Pylori* infection and Serum Folate levels.

II. Materials and Methods

This study is a case-control study, conducted in Khartoum, Sudan. 120 samples were included (60 samples of *H.pylori* infected individuals and 60 samples of healthy individuals as control) all of them were evaluated to determine serum folate levels.

Five ml of blood was collected from each subject by clean venous puncture, 3ml of which was placed into a plain container for the detection of serum folate levels, 2ml was placed in an EDTA container for complete blood count. This study was approved by ethical committee of ministry of health, and informed consent was obtained from each participant before sample collection. *H.Pylori* of the study participants was determined by using an immunochromatographic rapid test for the qualitative detection of *H.pylori* in human serum.

A competitive test principle using intrinsic factor (IF) specific for Folate was used. Folate in the sample competes with the added Folate labeled with biotin for the binding sites on the ruthenium-labeled IF complex.

The test procedure consists of three phases of incubation. In the first incubation phase, the sample is incubated with dithiothreitol, sodium hydroxide, and sodium cyanide. In the second incubation phase, the pretreated sample is incubated with ruthenium-labeled IF, and in the third incubation phase, sites on the ruthenium-labeled IF become occupied by ruthenium-labeled IF – Folate biotin complex. The entire complex becomes bound to the solid phase via the interaction of biotin and streptavidin, which is later aspirated to the measuring cell wherein the microparticles are magnetically captured onto the surface of the electrode. Application of a voltage to the electrode then induces the chemiluminescent emission which is measured by a photomultiplier.

III. Results

The data analyzed using SPSS21, with reference P-value .05. Descriptive statistics of quantitative variable (mean±SD) showed that the mean age among patients was (35.91±12.75), while the mean age among control group was (37.35±11.05), (the P-value of independent sample t-test=.360), while descriptive statistics (Frequency and percent) for qualitative variables showed that males were 25 (42%) in control group and females were 35 (58%), while in patients group the males were 31(52) and females were 29(48%). table 1 showed the comparison of the S. folate level between the males and females. table 2 showed the comparison of the S. folate level and the haematological values between the study group and controls.

Table 1. comparisons of S. folate level among males and females.

| | Male | Female | P value |
|--------------------|-----------|-----------|---------|
| Gender | 31(52%) | 29(48%) | |
| S.folate (Mean±SD) | 9.65±1.21 | 7.76±2.30 | 0.000 |

Table 2. comparisons of S. folate level andhaematological values among cases and controls.

| Parameters | Case (Mean±SD) N=60 | Control (Mean±SD) N=60 | P-value |
|------------|---------------------|------------------------|---------|
| Hb% | 13.11±1.58 | 13.40±0.90 | 0.220 |
| HCT | 40.91±5.57 | 40.52±3.08 | 0.636 |
| RBCs | 4.73±0.71 | 4.77±0.44 | 0.707 |
| WBCs | 6.25±1.81 | 6.54±1.78 | 0.386 |
| Plt | 272.20±76.24 | 275.75±72.04 | 0.794 |
| Folate | 7.76±2.30 | 9.65±1.21 | 0.000 |

P.value< 0.05 is significant.

Mean serum folate levels was significantly reduced among cases than the controls.

IV. Discussion

H.pylori infection may disturbs some function of mucosa and may lead to decrease in folate absorption causing megaloblastic anaemia, this study aimed to determine the association between H.pylori infection and S. folate level. The study included 60 H.Pylori infected patients their S. folate level and haematological parameters were determined and compared with 60 apparently healthy subjects as controls. Our results showed that serum folate levels were low among patients with H.pylori. Our result agrees with other done in Pakistan by Shahid Rasool et al^[9], they found that low levels of folate was detected in 34.6% of patients affected by H.pylori. Another study demonstrated a decreased secretion of ascorbic acid from gastric mucosa and inactivation of intrinsic factor, and possibly leading to a decrease folate absorption in patients who are harboring H. pylori infection^[10].

V. Conclusion

The findings indicate that serum folate levels decreased in patients with H.pylori.

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