

Assessment of Calprotectin Protein in H. Pylori Positive Persons

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Abstract

Background: Helicobacter pylori (H. pylori) is amongst the most infectious and almost half of the country's population is affected by a chronic bacterial infection. H. pylori evoke an inflammatory reaction of the host epithelium, leading to induction of immune cells which exhibit as gastritis. There is little knowledge of how H. pylori remain in the host's antimicrobial agents, such as calprotectin (CP), which is found through an immune response. **Objective: The purpose of this study was to evaluate** the role of fecal calprotectin (FC) in subjects with gastric ulcer and correlation of it with H. pylori.

Methods: 25 patients with gastric ulcer and 25 healthy controls were included in a prospective study. Samples of blood are taken IgG antibody H pylori and stool specimen for measured of calprotectin level.

Results: All gastric ulcer patients infected with H pylori. From a total of 25 patients participating in this study 8 were man and 17 women with the mean age 40.6±15.8. There was a statistically meaningful difference between the groups analyzed (p=0.0001) dependent on the calprotectin level. Also found significant association between sex and calprotectin level according to the positivity of H pylori. **Conclusion:** There's a significant statistical between fecal calprotectin level and H. pylori infection in gastric ulcer patients.

Key words: Gastric Ulcer, H. pylori, Fecal Calprotectin.

Introduction

Gastric ulcer is one of the most frequent chronic gastrointestinal diseases characterized by a serious mucosal barrier defect⁶. The gastrointestinal mucosa is covered by a single layer of epithelial cells accompanied by precarious elements of loose connective tissue laid under a thin layer of smooth muscle fibers. The gastric epithelium is not only exposed to its own acidic and enzymatic secretions in many people, but also to duodenal bile, highly prevalent Helicobacter pylori (H. pylori), frequently used non-steroidal anti-inflammatory drugs (NSAIDs) and alcohol intake¹⁻⁸. Gastric ulcers grow as a consequence of an inconsistency between harmful factors and gastric mucosa defense mechanisms⁷. A stomach ulcer is a localized deep necrotic lesion affecting the entire thickness of the mucosa and the muscle is mucosa⁵. Therefore, gastric mucosal damage is very common and can arise in so many patients as gastric ulcers⁹. H. pylori are a widespread bacterial

pathogen in the worldwide responsible for significant gastrointestinal morbidity¹⁰. Helicobacter pylori is optimal for living in the stomach's harsh, acidic environment. These bacteria have the ability to change their environment and reduce their acidity so they can survive. Whereas infections usually have no symptoms, they can proceed to other diseases, such as peptic ulcers and gastritis. Helicobacter pylori gastritis induces a combined acute and chronic inflammatory reaction that activates neutrophils and eosinophils, mast and dendritic cells. Calprotectin is a protein produced from endothelial cells following neutrophil inflammation and activation or attachment of the monocytes to endothelial cells. Calprotectin is an essential antimicrobial inflammatory factor, which is also an element of the host innate immune system. Calprotectin accounts for about 50% of the cytoplasmic protein content of the neutrophil and is a critical component of the host nutrient. Calprotectin plasma level is an important marker of inflammation. This protein is responsive to bacterial enzymes and

intestinal protease and can be used as a marker of inflammation of the gastrointestinal tract⁵. Calprotectin is bacterial deterioration resistant and stable in fecal samples for up to one week¹¹. In the gastrointestinal tract, some inflammation improves the mucosal permeability, resulting in large amounts of calprotectin being released into the stool. There is a significant correlation between fecal calprotectin levels and inflammation or infection severity⁵, therefore this research was just to determine calprotectin levels in patients with gastric ulcer infected with Helicobacter pylori.

Method and Patients

This case-control study applied on (50 subjects was divided in to 25 patients complain from gastric ulcer and 25 healthy control). Totally, 25 individual had gastric ulcer infected with H. pylori were diagnosed by specialists’ physicians in the Imam Hussein Medical City in Karbala. Two ml of blood sample has been taken from gastric ulcer patients and healthy control for examined the H pylori antibody. H pylori antibody was performed by rapid chromatographic method according to leaflet that provides with kit (CTK) Company. Stool samples collected from study group participants to assess the calprotectin level. Fecal calprotectin was evaluated by using a commercially available rapid chromatographic method according to the procedure that provided with kit (CerTes Biotec Spain) Company. Obtained data of

present research were analyzed statistically by using the SPSS version 18. The chi-square test was used for calculated mean, standard deviation and p value at 0.05 levels of data and compared between the studied groups.

Results:

The study population included 21 males and 29 females (gastric ulcer 8 males and 17 females, while males were 13 and females 12 for the healthy group) with the age range 15-71 years for the gastric ulcer patients, whilst healthy controls were 18- 70 years. Statistically, there was no significant difference between patients and healthy control groups according to the sex and age as illustrated in table (1), also no found any association between positivity of calprotectin level and age group of patients, whereas there was significant difference in patients according to positivity of calprotectin level and gender (P value= 0.0001) as in table (2).

Interestingly, in patients with gastric ulcer, the value of fecal calprotectin was increased compression with healthy control group. Likewise, the present study was revealed the level of calprotectin was positive in 15 cases infected with H.pylori and the remainder had negative results for calprotectin. There was a highly significant correlation between patients and healthy dependent on the levels of fecal calprotectin (P- value= 0.01) see in table (1).

Table 1: Fecal Calprotectin concentrations in healthy control and gastric ulcer patients with H pylori infection

Variables	Case	Control	P-value
Gender:			
Male	8 (32%)	13 (52%)	0.1
Female	17 (68%)	12 (48%)	
Age group:			
>25	5 (20%)	2 (8%)	0.4
25-50	13 (52%)	16 (64%)	
<50	7 (28%)	7 (28%)	
M±Sd	40.6±15.8	42.3±14.7	
Calprotectin Level:			
Positive	15 (60%)	0 (0%)	0.0001*
Negative	10 (40%)	25 (100%)	

Table 2: Comparison of Fecal Calprotectin in both age and sex groups in gastric ulcer patients.

Age group	Calprotectin Level		P- value
	Positive	Negative	
>25	3	2	0.7
25-50	7	6	
<50	5	2	
Gender			
Male	2	6	0.01*
Female	13	4	

Discussion

There are few studies in patients with gastric ulcer that assess the relationship between calprotectin and H pylori infection. The current study examined the level of calprotectin and determination the relationship between level of it and H pylori infection in patients suffering from gastric ulcer. Calprotectin is a calcium-binding neutrophil granulocyte protein that, when measured in feces, is well correlated with neutrophil infiltration of the intestinal mucosa, has antimicrobial activity and is resistant to both in vivo and in vitro enzyme degradation (Jellema P .et al, 2009) Calprotectin is an important regulatory protein in inflammatory reactions (Wang L. et al,2013 ; Eva Källberg. et al,2012)

Many Studies were performed on pediatric and adult patients with different gastrointestinal disorders have demonstrated a relation between fecal calprotectin concentrations and the severity of mucosal inflammation (Schoepfer AM. et al, 2009; Kolho KL. et al ,2006). Recently, Several studies found that FC levels in gastrointestinal disorders are statistically significantly higher compared to control (including gastritis, gastric ulcer, gastric carcinoma, duodenitis, ulcerative colitis, Crohn's disease, colorectal carcinoma, colorectal polyps and another bowel diseases) (Shaodong Wang. et al,2013 ; Burak ÖzGeker. et al,2016). This study correspond with recent work done by Pedram (Pedram Atae. et al, 2017) who found that the fecal calprotectin level higher in patients with colonization of H. pylori were compared in those without colonization. On the other hand, there was one study carried out by Montalto et al in 2010 (21),

(Montalto M. et al,2010). The current study concluded that the infection of H. pylori bacteria leads to increases in the fecal Calprotectin level. In addition, we believe the Calprotectin level can be useful for monitoring patients with H. pylori after its extirpation.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Department, Iraq and all experiments were carried out in accordance with approved guidelines.

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