ORIGINAL ARTICLE

Examine the Association of Proton Pump Inhibitors with Iron Deficiency Anemia

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ABSTRACT

Aim: To determine the association of iron deficiency anemia in patients with proton pump inhibitors therapy.

Study design: Retrospective/observational study

Place & duration: Department of Medicine, Shahida Islam Medical College Lodhran from 1st July 2018 to 31st December 2019.

Methods: One hundred and fifty patients of both genders with ages 20 to 70 years presented with gastrointestinal diseases and advised to use proton pump inhibitors therapy were enrolled in this study. Patients detailed demographic including age, sex and residence were recorded after taking informed written consent. Serum ferritin level and iron level were examined at the beginning and at 8 months of PPI therapy.

Results: Eighty six (57.33) patients were males while 64(42.67%) were females with mean age 42.15±12.38 years. Majority of patients 90(60%) had urban residency. At beginning of treatment mean serum ferritin level was 68.72±30.41ng/ml and at 8 months it was 27.45±16.26ng/ml, a significant difference was observed with p-value <0.001. Mean iron level at start of treatment was 18.28±6.54umol/l and at 8 months it was 15.86±5.72umol/l. Iron deficiency anemia was found in 38(25.33%) patients at 8 months follow-up.

Conclusion: Iron deficiency anemia is highly associated with proton pump inhibitors therapy. The frequency of iron deficiency anemia was high at the end of treatment.

Keyword: Gastrointestinal disease, Proton pump inhibitors, Serum ferritin level, Anemia

INTRODUCTION

Proton pump inhibitors (PPIs) represent the most widely prescribed antisecretory agents[1]. Prolonged PPIs use is not without consequences, however[1,2]. Concerns have been raised about a possible association between prolonged PPIs use and increased risk for vitamin and mineral deficiencies[3]. It has been suggested that their prolonged use may influence iron status due to potent suppression of gastric acid secretion by parietal cells, which could have important implications for clinical practice[4].

Iron deficiency is a common nutritional deficiency and the leading cause of anemia in the United States, where the prevalence in adult females is up to 9% in those aged 5069 years and 6% in those older than 70 years. Iron deficiency can result in multiple symptoms[5] including fatigue, impaired exertion, sleep disorders, and other complications[6]. Identifying modifiable factors that influence the risk for iron deficiency or impede its treatment, such as through impaired absorption, can significantly influence public health. Acid inhibitors are among the most commonly used pharmaceuticals in the United States: in 2012 alone, 14.9 million patients received 157 million prescriptions for proton pump inhibitors (PPIs)[7]. Gastric acid facilitates nonheme iron absorption by releasing iron from food particles and converting it from its ferrous form to the more absorbable ferric form[8,9]. Thus, PPIs suppress gastric acid production, can lead to iron malabsorption. Acid suppression is of interest as a potential primary risk factor for iron deficiency, as a contributing risk factor and as an impediment to iron-replacement therapy. The few earlier studies of acid suppression and iron deficiency have been largely limited to small case series (the largest found was 109 patients) or niche populations (e.g. patients with hemochromatosis); in addition, they have yielded inconsistent results[10-12]. The present study was conducted to examine the association between proton pump inhibitors and iron deficiency anemia in patients with gastrointestinal diseases.

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MATERIALS AND METHODS

This retrospective/observational study was conducted at Department of Medicine Shahida Islam Medical & Dental College Lodhran during from 1st July 2018 31st December 2019. A total of 150 patients of both genders with ages 20 to 70 years presented with gastrointestinal diseases and advised to use proton pump inhibitors therapy were enrolled. Patients detailed demographic including age, sex and residence were recorded. Patients with previous medical diagnoses known to increase the risk of iron deficiency or bleeding, patients with parenteral and/or oral supplements of iron, vitamin B12 and folic acid, respectively, as well as any of the antisecretory agents (including PPIs) during preceding at 8 months treatment were excluded.

5ml blood samples were taken at the beginning and at final follow-up at 8 months from all the patients and sent to laboratory to examine the serum ferritin level and serum iron level. Compare the findings pre and post treatment. Serum ferritin level <12ng/ml was considered as iron deficiency anemia. Frequency of iron deficiency anemia was examined at final follow-up. Follow-up was taken at 8

months. Data was analyzed by SPSS 24. Chi-square test was applied to compare pre and post treatment values of serum ferritin level and iron level. P-value <0.05 was taken as significant.

RESULTS

Out of 150 patients 86 (57.33%) patients were males while 64(42.67%) were females with mean age 42.15±12.38 years. Majority of patients 90 (60%) had urban residency while 60(40%) patients had rural residency (Table 1). At beginning of treatment mean serum ferritin level was 68.72±30.41ng/ml and at 8 months it was 27.45±16.26ng/ml, a significant difference was observed with p-value <0.001. Mean iron level at start of treatment was 18.28±6.54umol/l and at 8 months it was 15.86±5.72umol/l, significant difference was observed (p=0.001) [Table 2].Iron deficiency anemia was found in 38 (25.33%) patients at 8 months follow-up while 112(74.67%) patients had not found iron deficiency anemia (Fig. 1).

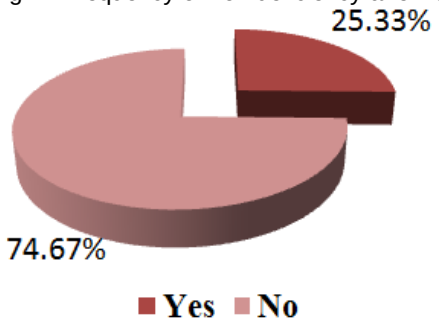
Table 1: Demographics of all the patients

Variable	No.	%
Age (years)	42.15±12.38	
Gender		
Male	86	57.33
Female	64	42.67
Residence		
Urban	90	60.0
Rural	60	40.0

Table 2: Association of iron deficiency anemia with PPI user

Variable	Pre-treatment	Post Treatment	P-value
Serum ferritin level (ng/ml)	68.72±30.41	27.45±16.26	<0.0001
Serum Iron (umol/l)	18.28±6.54	15.86±5.72	0.001

Fig. 1: Frequency of iron deficiency anemia



DISCUSSION

Iron deficiency anemia is one of the most common clinical disorders found all over the world. It is considered one of the leading causes in developing severe life threatening complications[13,14]. Proton pump inhibitors are widely used for the treatment of gastrointestinal diseases. Many of studies demonstrated that chronic use of proton pump inhibitors increases the risk of minerals and vitamins inadequacy[15]. The present study was conducted to examine the association between iron deficiency anemia and proton pump inhibitors therapy in patients with gastrointestinal diseases. In this study mostly 57.33% were males while females were 42.67% and the mean age was 42.15±12.38 years. These results were similar to many of previous studies in which male patients were predominant 55% to 68% as compared to females and the majority of patients were ages above 40 years[16,17].

In present study at beginning of treatment mean serum ferritin level was 68.72±30.41ng/ml and at 8 months it was 27.45±16.26ng/ml, a significant difference was observed with p-value <0.001. Mean iron level at start of treatment was 18.28±6.54umol/l and at 8 months it was 15.86±5.72umol/l, significant difference was observed (p=0.001). A study conducted by Qorrajet al[18] reported that statistical analysis showed significant changes within PPIs group and specific PPIs subgroups between the two-time points in serum ferritin and vitamin B12 levels, respectively, while no significant changes in serum iron and homocysteine levels were shown. Another study conducted by Douwes[19] regarding use of PPIs and iron status in renal transplant patients and the reported chronic use of PPIs significantly decreases serum ferritin and iron level and excessive PPIs use significantly increase the prevalence of iron deficiency anemia.Several previous studies demonstrated that patients with proton pump inhibitors therapy were on high risk for developing iron deficiency anemia[20-22].

In our study we found that 38 (25.33%) patients at 8 months follow-up had develop iron deficiency anemia while 112(74.67%) patients had not found iron deficiency anemia. These results were comparable to many of previous studies[23,24].

CONCLUSION

Iron deficiency anemia is highly associated with proton pump inhibitors therapy. The frequency of iron deficiency anemia was high at the end of treatment.

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