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The relation between some parasitological parameters and inflammatory bowel disease infection

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***Abstract*---**The term inflammatory bowel disease (IBD) refers to several chronic and recurrent inflammatory gastrointestinal disorders.. This current study was included (180) patients aged (15-60) with inflammatory disease of the internal organs who attended Al-Ramadi Teaching Hospital in Anbar Governorate between September 1st of 2021 to the 1st of May 2022. Elected according to the diagnosis of a gastroenterologist. Three groups of samples were created. The first group (60 samples) from patients full of IBD and Lamblia protozoan infection, group II (60 samples) of patients with inflammatory bowel disease and *Entamoeba histolytica* - infection suffering, and group III (60 samples) for patients with inflammatory internal organ disease and *Helicobacter pylori* infection. While the control group consisted of (40) healthy individuals of different ages (15-60) years. They did not have a history of inflammatory bowel disease upon examination by gastroenterologist. The present study revealed a statistically significant difference between the cases (all three groups), and as a result, the p-value for the control group was(<0.05). The number of samples that

are positive for the primary mesenchymal cases was (46), the number of sample that are positive for the Entamoeba control group was (48), and the number of sample that are positive for the secondary mesenchymal cases was (11). while the number of samples that are positive for *Helicobacter pylori* cases was (50) samples. A comparison of 3 parasitic infection teams showed that the amount of *Helicobacter pylori* positive samples was significantly increased by for cases compared to different groups, p value < 0.05.

***Keywords*---**inflammatory bowel disease, Giardia lamblia, Entamoeba histolytic, Helicobacter pylori.

Introduction

The digestive system is a hollow tube with lumens of varying diameter, surrounded by a wall of four primary layers: mucous membrane, mucous membrane, muscularis, and serum. The entire digestive system exhibits some common structural characteristics. [1] Inflammatory bowel disease refers to a group of chronic, idiopathic, relapsing inflammatory illnesses, such as Crohn's disease and ulcerative colitis. IBD mostly affects the gastrointestinal system, which extends from the oral cavity to the ear, but it can also have an impact on the skin and blood vessels[2]. IBD is an autoimmune disease with unclear etiology[3] For many reasons, inflammatory bowel disease can form during disruption of this homeostasis including mucosal immune response, diverse genetic factors ,as well as the existence of multiple luminal flora and epithelial abnormalities, cause the activation of the immune system at specific sites . Moreover, the inner layer of the intestine serves for a longer period as a barrier to protect the host from dangerous pathogens, but also serves as a zone in which interactions with commensal microorganisms arise; These reactions are finely tuned with the help of the use of the intestinal immune system and contribute to immune homeostasis[4,5]. Recent study has demonstrated that the lack of helminthes contamination changes the composition of the intestinal bacterial macrobiotic, and that the presence and composition of the bacterial macrobiotic influence the colonization and persistence of helminths within mammalian hosts. Both intestinal parasites and positive bacterial macrobiotic species have been strong associated with immunomodulatory effects[6].The common parasite causes intestinal infection, which results in stomach pain, diarrhea, and activation of adaptive immunity, but only mild mucosal inflammation. The parasite lives in the small intestine but does not infiltrate the mucosa, suggesting that its placement in the lumen may allow it to affect host reactions [7]. At the site of infection, infection triggers both Th1 and Th17 responses; however, only IL-17-producing cells are necessary for parasite eradication. [8].

Giardia lamblia is microorganism and unicellular flagellated parasite that is infect the small intestine for human and other mammalians and causing gastrointestinal disease called giardiasis[9]. Giardiasis infections were related to consuming of contaminated water and the motion of people from a non-endemic place to a virus areas and socio-demography: terrible private hygiene and consuming of unwashed end result and vegetables, mistaken sanitation[10]. The

small intestine's luminal surface becomes colonized by Giardia trophozoites, which cling to the epithelial cells there. Current theories suggest that this condition is caused by damage to the epithelial barrier, which is mediated by the response of the immune system and the parasite, disruption of tight junctions, and shortening of the microvilli. Both, altered bowel motility and epithelial permeability were observed [11] cytokines in giardiasis, and it is widely agreed that IL-17 is crucial for building up defenses against infection [12] IL-17 was elevated when effector memory CD4+ T cells were restimulated in vitro with Giardia antigens in patients who had recovered from giardiasis.

[13]. Other cytokines' roles in the etiology of giardiasis are much less understood, though. [14,15]. Elevated populations of alternatively activated basophils, mast cells, eosinophils, and macrophages along with immunoglobulin G1 (IgG1), IgG4, and IgE are characteristic of multicellular parasitic infection [16]. Amoebiasis, is a ubiquitous parasitic contamination affecting about 10% of the world's populace and inflicting greater deaths each year (100,000 deaths) than another parasitic contamination, excluding malaria and schistosomiasis; Most regularly *E. histolytica* contamination is asymptomatic, however a few increase excessive invasive illnesses including amoebic dysentery. Extra-intestinal kinds blanketed pulmonary, cardiac or mind involvement, In continual cases, non-dysenteric syndrome of diarrhea, belly ache and weight reduction that could remaining for years and mimic IBD [17].Abdominal ache and diarrhea are sharing syndrome among sufferers with IBD and IBS, as a consequence IBD and IBS can not be separated from every different exclusively. Recently, colonoscopy turned into required to rule out IBD, as a end result bad endoscopy locating turned into recognized as IBS, while 1/2 of of sufferers with signs and symptoms suggesting IBD [18].The present study was designed to achieve the following aimed to assess some parasitological parameters in patients with inflammatory bowel diseases with focusing on relationship between this disease and some parasite such as *Giardia lamblia* , *Entamoeba histolytica, and Helicobacter pylori.*

Materials and Methods

Study design and subject

The study included (180) patients of different ages (15-60 years) suffering from inflammatory bowel disease, who were present at Al-Ramadi Teaching Hospital in Anbar Governorate during the period from September 1, 2021 to the first of this month. May 2022. Patient samples were selected according to the gastroenterologists' diagnosis. The samples divided in to three groups include group1 (60) patients who were have inflammatory bowel disease and *Giardia lamblia* infection **,** group2 (60) patients who they have inflammatory bowel disease and *Entamoeba histolytica* infection , and group3 (60) patients who were suffering of inflammatory bowel disease and *Helicobacter pylori* infection. While management enclosed (40) healthy persons in several age from (15-60) years. They were thought of as negative control cluster as they failed to show history of inflammatory gut wellness once investigation by gastroenterologists; Suitable amount from stool samples were collected then put in sterile plastic containers and sealed, and then transferred to the laboratory and conducted laboratory tests on after one hour of collection.

Parasite diagnosis

Macroscopic diagnosis

Macroscopic exam of parasite consists of observe stool consistency wherein it's far both strong , liquid , smooth or loozy , because the vegetative degrees of parasites may be determined in smooth samples and liquid , cysts may be determined in sturdy strong or semisolid samples, as well as an examination included a note whether the stool contains blood or mucus which indicates the presence of blood or mucus on the occurrence of infection , as well as note the color and smell of feces , which are moldy or rotten in nonstandard cases , as well as macroscopic examination includes detecting the presence of parasitic worms and to ensure the presence of parasitic worms mix stool with distilled water was filtered mediated gauze where related parasitic worms with gauze if it found [19].

Microscopic Examination

This examination conducted on each of stool samples , which it was prepared a clean glass slide and put a drop of normal saline on one halves slide and put a drop of Lugal›s iodine on other half, two swabs taken from stool samples by wood stick from different places of samples , where one swab mixed with Normal saline , as for the other swab mixed with Lugal›s iodine and covered by cover slide , then examined under microscope power 40x , where was observation trophozoites and cysts [20].

Statistical Analysis

Data obtained were subjected to analysis by using the statistical analyzing system (Graph pad prism). The results were expressed as mean ± standard deviation (SD) and considered statistically significant when the p value was ≤0.05 .

Results

The present study showed there was significant deference between cases(all three groups) and control .with p-value was (<0.05). the number of positive *Giardia lamblia* samples for cases was (46) samples and the number of positive *Entamoeba histolytica* samples for control was (48) samples while the number of *Helicobacter pylori* positive samples for cases was (50) samples. as shown in figures (1),(2),(3). A comparison between three groups of parasite infection with each other showed that there was significant increase in the number of *Helicobacter pylori* positive samples for cases compared with another groups with p-value <0.05. as shown in figures (3-4).

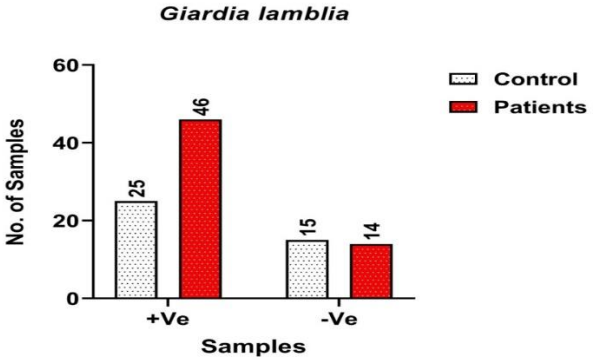

figure (1) The number of samples that are negative and positive for *Giardia lamblia* infection in patients and control group

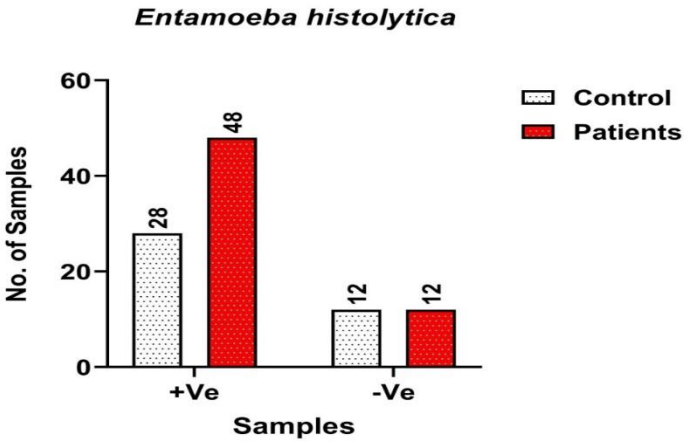

figure (2) The number of negative and positive samples for *Entamoeba histolytica* infection in patients and control group

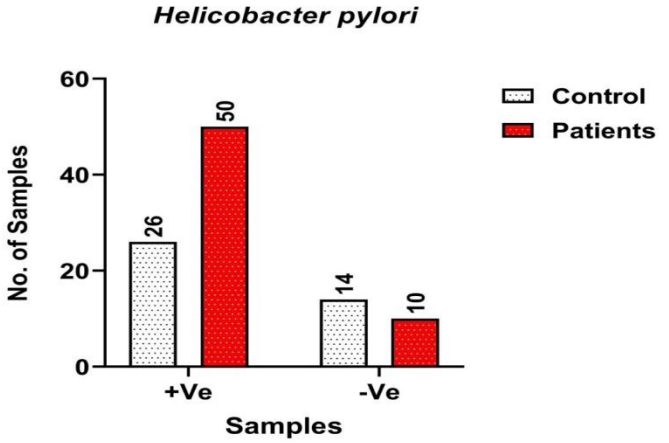

figure (3) The number of negative and positive samples for *Helicobacter pylori* infection in patients and control group

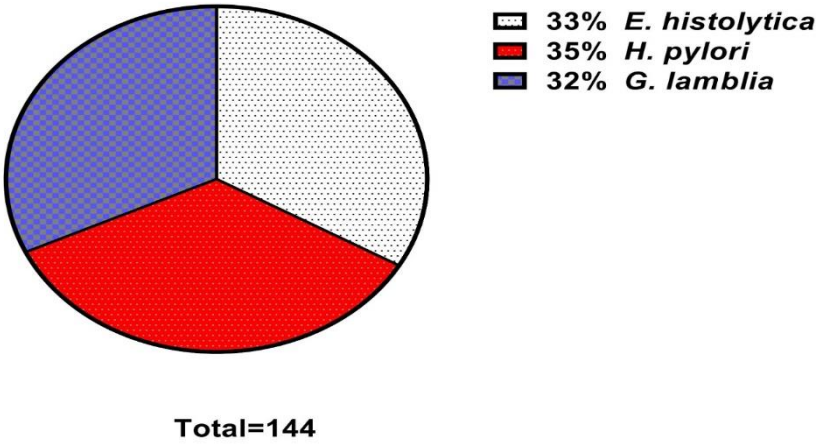

figure (4) A comparison between three groups of parasite infection with each other

Discussion

Parasitic infections have a significant impact on the gastrointestinal tract, especially when the causative agent is an invasive parasite like *Entamoeba histolytica*. This parasite can invade mucosa and reach the lateral portion of the sub mucosa of the intestine, causing flask-shaped ulcers. It was mostly associated with blood and mucus, with secondary bacterial infection playing a role[21] It is necessary to consider parasites. Its risks can include colon inflammation, perforation, or even peritonitis, as they exhibit stomach, diarrhea, or bloody diarrhea and pain. Its diagnosis is based on the presence of cysts or trophozoites in the stools when examined below a the microscope [22].

Some of research confirmed there has been excessive incidence of protozoan contamination in ulcerative collites sufferers, therefore, speedy remedy and early detection of protozoan infections can enhance the medical route of sufferers with Ulcerative Colitis [23]. Alterations in gut microbiota are associated with and contribute to gut inflammation, hence hyperactivity of the mucosal immune system to intraluminal antigens in IBD, where parasites may be involved in initiating or maintaining the immune response [24]. Epithelial damage and enterocyte apoptosis are linked to *Giardia* metabolites, cytokines, and cytotoxic T cell responses [25,26].Our have a look at is steady with that of Jolene et al.[27] as people with giardiasis had been approximately four instances much more likely than the ones with out giardiasis to be recognized with irritable bowel syndrome. Another study showed Parasite-associated colitis is rather rare in clinical exercise of Ulcerative Colitis [28].This contradicts the findings of the current study. The cause of Giardiasis in patients with IBD is unknown, but it is thought to be related to environmental factors such as improved hygiene and dietary changes [29].

The present study is concordant with the study of Ali *et al.*,[30] which showed *Entamoeba histolytica rate is high in patients of IBD.* The high rate of positive IBD

positives for intestinal amebiasis in patients may be related to environmental factors, stress and other gastrointestinal co-infections and the co-influences of the environment, in addition to the elderly being susceptible to infection due to immunosuppression and diablitiang diseases[31,32].

The current study also agrees with Babic et al., [33] who found that Ameba infections are more prevalent in patients with ulcerative colitis and Crohn's disease than in the general population. By changing intestinal and/or stomach permeability or by inducing immunological disturbances that result in the absorption of antigenic material and the development of autoimmunity via many immunological pathways,H. pylori infection may play a role in the onset of IBD [34]. Helicobacter species are classified as either gastric Helicobacters, like the H.pylori, or enterohepatic Helicobacters , which primarily colonize the intestine and the hepato-biliary system and associated with chronic liver and intestinal diseases [35]. The helical form, unusual motility, and microaerophilic metabolism of Helicobacter species make them easily able to infiltrate the surface of the gastrointestinal tract. However, H. pylori DNA has also been found in the colon [36] and feces of infected people [37], in addition to the surface epithelium of the stomach where it typically lives. Inflammatory factors are known to rise as a result of an increase in type 1 T helper lymphocytes (Th1) and/or T helper17 cells (Th17) in IBD [38]. Additionally, Crohn's disease patients are more likely to selectively activate Th1- and Th17-associated cytokines, which likely explains why H. pylori has a stronger protective effect in Crohn's disease than ulcerative colitis. *[39] . Despite the fact that multiple research have looked into the relationship between H. pylori infection and IBD* [40]. A causal link between *H. pylori* infection and IBD has yet to be demonstrated, and there is conflicting evidence about the potential causative and protective roles of *H.pylori* infection in IBD [41]. *H.pylori* infection is much higher in individuals with IBD who get conventional treatment, despite research demonstrating that 5-aminosalicylates or sulphasalazine inhibit *H.pylori* adhesion to the mucosa and so impede its multiplication [42]. According to several research, H. pylori infection has a preventative effect against the development of IBD and that the differences between IBD subtypes vary by geographic location. The RR was 43% higher for Mediterranean regions compared to East Asian regions, and 28% higher for *ulcerative colitis* than *Crohn's disease* [40].Previous meta-analyses have revealed that *H. pylori* has a larger defensive effect on the incidence of IBD in eastern populations than in western populations. The increased relative abundance of the seropositive H. pylori pressure in East Asian populations as opposed to Western populations is a plausible justification [40,44]. According to certain reports, higher levels of have the potential to promote the production of beta-defensins, which are thought to prevent the pathogenesis of IBD [40]. Another hypothesis is that the presence of the strain affects the type 2 (Th2) cytokine response of the T helper 2 (Th2) cell during H. pylori infection. In fact, it has been demonstrated that this particular reaction can prevent intestinal inflammation [44,45].

Conclusion

Because of the protozoan infections majority in this study ,as well as the precise role of parasites in the pathogenesis of IBD is unknown, it appears essential that patients with IBD suffer routine parasitological investigations. whereas the

findings of our present analysis showed significant deference in, *H. pylori, Giardia lamblia* and *Entamoeba histolytica* infection between cases and control , with p-value was (<0.05). the number of positive *Giardia lamblia* samples for cases was (46) samples and the number of positive *Entamoeba histolytica* samples for control was (48) samples while the number of *Helicobacter pylori* positive samples for cases was (50) samples; As well as the rate of *H. pylori* infection is high in patients with IBD compared with other parasite infection in present study with p-value <0.05.

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Conflicts of interest

The authors declare no conflict of interest in preparing this article.

Authors contributions

TMM designed outlines and drafted the manuscript. HMS and HRAA performed the experiments and analyzed the data. TMM and HMS wrote the initial draft of the manuscript. HRAA, HMS, HRAA and DASreviewed the scientific contents described in the manuscript. All authors read and approved the final submitted version of the manuscript.

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