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Contents

Can Parasites Ameliorate or Prevent IBD and other Immune-mediated Diseases?

Robert W Summers
Department of Internal Medicine, Division of Gastroenterology and Hepatology, University of Iowa Carver College of Medicine, USA

See the article pages: 96-104

Background

The pathogenesis of inflammatory bowel disease appears to involve a dysregulated and destructive immune response to intestinal contents. The primary etiology remains unknown, but both genetic and environmental factors are likely to play a role. Crohn's disease and ulcerative colitis both occur in increased frequency in some families and numerous susceptibility genes are involved. However, it appears that the application of highly hygienic practices have been associated with the progressive increase of IBD prevalence and other immune mediated disease in many Western industrialized countries [1]. As parasites are being eradicated by rigorous hygienic practices and specific treatment, immune diseases are increasing dramatically around the world. These diseases include multiple sclerosis, psoriasis, allergic and asthmatic disorders and even type I diabetes mellitus [2]. Parasites coexist with their hosts through modification of their host's immune system. It has been hypothesized that the emergence of inflammatory bowel disease and other immune disorders occurs because of the loss of exposure to helminths and their resulting modulation of the immune system. This is being called the helminth hygiene hypothesis. Weinstock, Elliott and numerous other investigators have elucidated many of the helminth-induced immune regulatory pathways that suppress destructive and inappropriate intestinal inflammation[3].

Furthermore, several early clinical trials have suggested that introduction of helminths, such as *Trichuris suis* and *Necator americanus*, to persons with inflammatory bowel disease produces improvement in disease activity [4-7]. Additional clinical trials are in progress and others are planned to further investigate whether such therapy is safe and effective.

Summary of paper

The paper entitled "Impact of treatment of Intestinal parasites on the activity of Ulcerative colitis" approaches the IBD/parasite interaction by removing pre-existing parasites from ulcerative colitis patients instead of introducing them as therapy. The authors enrolled 20 patients with ulcerative colitis who had intestinal parasites. After baseline studies, specific antiparasitic therapy was given to ten of them, and the other ten remained untreated. All were evaluated in one month. In treated subjects, parameters deteriorated or remained unchanged while untreated patients they remained the same or improved. The results imply that removing the parasites was harmful and support the concept that the immune system in ulcerative colitis was adversely affected in the absence of parasites.

Comment on the study

Withdrawal of a potentially beneficial treatment is a valid and innovative design of clinical trials. Unfortunately, the number of patients in this study was too small to achieve statistical significance, but the results support a beneficial role of helminth-induced immunomodulation in an immune mediated disease. It is surprising that patients with single cellular protozoa such as *Entamoeba histolytica*, *Giardia lamblia* and *Blastocystis hominis* were included in the study, but removing them also seemed to have adverse effects on the colitis. Helminths exert multiple mechanisms in their host including induction of Th2 immune responses and directing immune responses away from Th1/Th17. They also induce production of IL-4, IL-10 and IL13 and inhibit IL-12 and TNF-α release. Perhaps the most important mechanism against immune mediated injury is promotion of regulatory circuits [8-9]. Eukaryotic protozoan pathogens also have evolved to evade immune defenses responses of their host, but through entirely

different mechanisms. A review describes how protozoa avoid immune attack by using humoral effector mechanisms through resistance of complement lysis, resistance to intracellular lysosomal enzymes and toxic metabolites and modifying antigen-presenting and immunoregulatory functions of dendritic cells [10]. There is almost no clinical or experimental evidence to support their role in ameliorating immune mediated disease. On the other hand, until their effects on immune mediated diseases are explored in more detail, their ability to ameliorate destructive immune and inflammatory processes remains possible. On the other hand, evidence supporting the use of helminths in immune mediated diseases is abundant in epidemiological studies, experimental animal disease models and early clinical trials [11-12].

Recommendations

The current study is interesting, innovative, and provocative. The effects of treating and abolishing parasites should be further explored in ulcerative colitis and other immune mediated diseases. Because the ways in which these two parasites evade the immune system of the host are quite different, helminths and protozoa should be investigated in separate cohorts and treatments should be administered using a double blind, placebo-controlled design. As immune-mediated diseases increase throughout the world, it is increasingly urgent to find measures to prevent and treat them. Re-introduction of old companions shows promise to provide relief.

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Listeria Monocytogenes : A Major Public Health Concern

Angela Revelas
Pathological Department of St.Nicolaos Hospital -Crete , Greece.

Corresponding Author:
Angela Revelas

E mail:
donnoiko@gmail.com

Listeria monocytogenes, an aerobic and facultatively anaerobic gram-positive bacillus, can be readily isolated from soil, dust, fertilizer, sewage, stream water, plants, and processed foods. The organism is also present in the intestinal tract of numerous mammals, birds, fish and crustaceans.

INTRODUCTION

Listeria monocytogenes (commonly called Listeria) named for Joseph Lister. *Listeria monocytogenes*, is the bacterium that causes the infection listeriosis. It is a facultative anaerobic bacterium, capable of graving and reproducing inside the host's cells, and is one of the most virulent food-borne pathogens of clinical infections resulting in death. Listeriosis is the leading cause of death among food-borne bacterial pathogens, with fatality rates exceeding even *Salmonella* and *Clostridium botulinum*.

Several foods, including corn, chocolate milk, shrimp and rice salad, have been reported as vehicles [1]. More commonly, however, *Listeria monocytogenes* causes no evident gastrointestinal lesions or symptoms but rather makes its presence known by severe, life-threatening symptoms involving the central nervous system or the unborn fetus of a pregnant woman.

Pregnant women with listeriosis may experience relatively mild flu-like symptoms themselves. *Listeria monocytogenes* can spread within their bodies and readily cross the placenta to infect the unborn child. Abscesses develop in the liver, lungs and other fetal organs, and frequently the result is spontaneous abortion or stillbirth. If the baby survives birth, it may be seriously ill with meningitis.

Meningitis is also common in adult victims of listeriosis. Most, but not all, serious cases of listeriosis occur in people who are pregnant, elderly, or have some underlying disease that depresses their immune function.

INTERNALINS

Listeria monocytogenes is taken into host cells by a process of phagocytosis. Some cells, such as macrophages, are professional phagocytic cells with normally engulf bacteria and dying cells, while other epithelial and endothelial cells are non-professional phagocytes. These cells do not normally phagocytize other cells, but they can be induced to do so. Internalin A was first identified as a listerial surface protein that is required for the penetration of *Listeria monocytogenes* into non-phagocytic cells, such as epithelial cells[2]. A related protein, internalin B, plays a role in invasion of hepatocytes in the liver [2-6].

Internalin A on the surface of listerial cells binds to a surface protein, E-cadherin, on the surface of host epithelial cells. This interaction stimulates the phagocytosis of *Listeria monocytogenes* cells [7].

EPIDEMIOLOGY

Listeria can be phagocytosed by gastrointestinal cells, and macrophages, it can enter the host without disrupting the integrity of the gastrointestinal tract. Subsequently, *Listeria,* commandeers the host-cells contractile proteins actin, VASP, and profiling to spread from cell to cell and eventually enter the bloodstream either in monocytes and neutrophils or as free organisms after cell lysis. *Listeria*'s intracellular life cycle may explain the increased incidence of listeriosis, in immunocompromised patients, neonates, and pregnant women. Since *Listeria* manages to avoid the extracellular environment, immunoglobulins and complement would not be expected to have prominent roles in protecting the host against this pathogen. Patients with AIDS are most likely to contract *Listeria* infection when their CD4+T-lymphocyte counts fall below 40/cubic millimeter.

Listeria can cause a number of clinical syndromes, including sepsis and focal infections of the bones, joints, eyes, endocardium, spinal cord, peritoneum, and gall bladder. Two syndromes that may result in manifestations that are unique to listeriosis are meningitis-meningoencephalitis and granulomatosis infantiseptica.

TEMPERATURE

Listeriae can survive and grow at low temperatures (4-25^{0}C), but under these conditions listeriolysin O production is reduced or abolished. It takes only 2 hours at 37^{0}c for listeriolysin O to return to normal [8-10].

IRON

Growth in an iron-rich medium enhanced the invasiveness of *Listeria monocytogenes* for CaCo-2 cells by increasing the expression of internalin genes[11]. Availability of iron also affects expression of the Act A protein[12].

EFFECTS OF PREGNANCY

The fetus contains traits from the father that are antigenically foreign to the mother, and therefore her immune system should reject the fetus. Although the immunomodulation allows the fetus to survive, it also increases susceptibility to intracellular pathogens, that are normally attacked by the cellular immune system. *Listeria monocytogenes,* other intracellular pathogens such as *Coxiella burnetii, Toxoplasma gondii,* and hepatitis E virus may cause severe illness in pregnant women and/or their fetuses[13]. Infants also respond inadequately to listerial infection. Examination of the in vitro immune response to *Listeria monocytogenes* by one-year-old infants who previously had a severe listerial infection at birth revealed that they produced neither antibodies nor a cell-mediated response to *Listeria monocytogenes*. Their immune system had no memory of encountering this pathogen previously. The mothers of these infants did respond immunologically to a challenge with *Listeria monocytogenes*[11].

Some experiments with mice indicated that the immune response was impaired in the fetoplacental unit but in other tissues, such as liver and spleen[14]. Some monocytes and macrophages were observed in the placental region but they were not present at the foci of listerial infection and macrophages were not appropriately activated [15].

Immunochemical staining confirmed that macrophages were not present in the placenta proper nor were the macrophage inflammatory protein or the monocyte chemoattractant protein detectable in the placenta[16]. All of these deficiencies in immune function permit the growth of *listeria monocytogenes* in the placenta and fetus.

PATIENTS AND LISTERIA

Immunocompromised individuals are particularly vulnerable to this intracellular pathogen with Listeria infection underlying immonosuppresion [17]. Other groups of individuals at increased risk include those on drugs which reduce gastric acidity, patients with eithosis, hemochromatosis, and chronic renal failure patients with frequent transfusions. Clinical manifestations of invasive listeriosis are usually severe and include abortion, sepsis, and meningoencephalitis. Listeriosis can also manifest as a fibrate gastroenteritis syndrome. In addition to humans, *Listeriosis monocytogenes* affects many vertebrate species, including birds. Pathogenic *Listeria* enters the host primarily through the intestine. The liver is thought to be the first target organ after intestinal translocation.

ANTIBIOTIC TREATMENT

Bacteriostatic drugs, such as chloramphenicol and tetracycline, are associated with high failure rates in patients with listeriosis and therefore cannot be recommended. Ampicillin or penicillin

has generally been recommended as the treatment of choice. Nonetheless, in immunosuppressed patients, relapses have been reported after two weeks of penicillin therapy. The poor response to bacteriostatic drugs and the slow response to penicillin probably result from *listeria*'s ability to survive and grow within cells. The intracellular concentration of ampicillin or penicillin may not be sufficient for complete sterilization.

Immunosuppression reduces the host's ability to clear infected cells, allowing *listeria* to survive and spread for prolonged periods in a protected intracellular environment. Antibiotic treatment for three to four weeks is therefore recommended in immunosuppressed patients.

Antibiotics that penetrate cells poorly, such as aminoglycosides, may be synergistic in vitro but are unlikely to prove effective in the living host. Although some experts have recommended adding an aminoglycoside to ampicillin, *Listeria* continues to grow in cells despite extracellular concentrations of 10 to 20µg of gentamicin per milliliter. Aminoglycosides are therefore unlikely to be effective in the treatment of listeriosis and should certainly be avoided in treating kidney-transplant recipients and other patients with renal dysfunction.

Trimethoprim-Sulfamethoxazole, a drug combination that readily enters cells and kills listeria, may be the most effective treatment. This combination has proved effective in patients with listeriosis and hypersensitivity to penicillin. Ampicillin conbined with trimethoprim-Sulfamethoxazole is associated with a lower failure rate and fewer neurologic sequelae than ampicillin combined with an aminoglycoside.

LISTERIOLYSIN O

As *listariae* are engulfed, they are enclosed within a vacuole that is surrounded by a membrane. Professional phagocytic cells begin almost immediately to kill the *Listeriae* within the vacuoles, and survival of *Listeria monocytogenes* depends on escaping from the vacuole. Listeriolysin O, a bacterial pore-forming toxin, is essential for lysing the vacuolar membrane and allowing *listeria monocytogenes* to escape into the cytoplasm of the cell. Listeriolysin O is necessary for establishing infection in mice, and its activity is enhanced by the acidic pH in the vacuole[9,18-23].

Mutant *Listeria monocytogenes* that do not produce listeriolysin can survive within vacuoles of non-professional phagocytes for a while, but they do not multiply and go on to infect other cells because they cannot escape from the vacuoles. Analysis of the Listeriolysin O molecule revealed that it contains a series of 27 amino acids at one end that this sequence is very similar to PEST sequences often found on proteins in humans and other animals. In these organisms, the PEST sequence is a starting place for protein-protein interactions and, as such, often indicates proteins slated for degradation. It appears that once Listeriolysin O has done its job of perforating the vacuolar membrane, it is then recognized by enzymes in the cytoplasm of the cells and is destroyed before it can damage the cell membrane [23].

In addition to its pore-forming function Listeriolysin O participates in other reactions related to pathogenesis of *Listeria monocytogenes*. Infection of murine spleen and bone marrow dendritic cells by *Listeria monocytogenes* result in cell death by apoptosis. Mutant bacteria that do not produce Listeriolysin O do not induce apoptosis whereas purified Listeriolysin O can induce this programmed cell death [24]. Listeriolysin O also can act as an inflammatory stimulus by inducing endothelial cell activation [25,26] and neutrophil activation[27].

CONCLUSION

The assembly of actin filaments clearly plays a central part in the ability to evade extracellular antibiotic, antibody, and complement action. By usurping the contractile system of the host cell, *Listeria* can survive and thrive within the host. Actin assembly is essential for the cell-to-cell spread of *Listeria*, and the oligoproline-containing protein. Act A is a primary factor in the virulence of listeriosis. The organism's ability to move through the cytoplasm of host cells and to be transferred from one host cell to another accounts for the increased incidence of infection in patients with defective cell-mediated immunity, as well as accounting for the following clinical characteristics : invasion of the gastrointestinal tract without erosive lesions; a monocytic response in the Cerebro-spinal fluid, with negative Gram's stains; invasion of the cerebral cortex; invasion of the placenta and fetus during maternal bacteremia; and persistent infection despite antibiotic treatment.

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Editor :Mohamad Emara; Lecturer of Tropical Medicine, Faculty of Medicine , Zagazig Universty , Egypt.

Impact of Treatment of Intestinal Parasites on the Activity of Ulcerative Colitis

El-Sayed A. Saad[1], Amr A. Mourad[1], Ahmad M. Mahmoud[1], Hala I. Hussien[1], Soha A. Elhawari[1], Mohamed H. Emara[1], Sabah M. A. Mohamed [2]

[1]*Tropical Medicine Departement, Faculty of Medicine,Zagazig University, Egypt*

[2]*Parasitology Departement,Faulty of Medicine, Zagazig University, Egypt*

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Corresponding Author
El-Sayed A. Saad

Mobile:
+2 01063135898

E mail:
say_ma2008@yahoo.com

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Background and study aim: Ulcerative colitis (UC) is common in Western industrialized countries, while it is uncommon in developing countries where helminthic infections are frequent. This study aimed to detect the impact of treatment of intestinal parasites on the activity of UC.

Patients and methods: Twenty patients with UC and intestinal parasitic infection were selected out of 57 patients with UC by 3 successive days of stool analysis and anal swabs. They were randomized into; group I (n=10) received treatment for their intestinal parasitic infection and group II (n=10) did not receive treatment. Patients were evaluated using simple clinical colitis activity (SCCA) index, laboratory investigations and colonoscopy, before and one month after treatment of intestinal parasites in group I, one month from the first visit in group II to evaluate the activity of the disease.

Results: Patients who were treated for intestinal parasites had statisticaly significant deterioration in bowel frequency/day (p=0.04), and bowel frequency/night (p=0.038) .On the other side, the untreated group showed non significant change in all parameters of SCCA index after one month, but overall, their bowel frequency/day, bowel frequency/night and the general condition were significantly better than those of the treated group. There was statistically significant deterioration in hemoglobin (p=0.049), WBC's (p=0.01) in the treated group, while erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) which remained unchanged in the treated group showed significant improvement in the untreated group in addition to improved hemoglobin levels after one month. WBC's and CRP were significantly lower in the untreated group in comparison with the treated group after one month. The treated group had more severe colonoscopic findings in comparison with the untreated group after one month (p=0.02).

Conclusion: Treatment of intestinal parasites deteriorates the clinical activity of the ulcerative colitis.

INTRODUCTION

Ulcerative colitis (UC) is a chronic inflammatory disorder of unknown cause affecting mainly rectum and colon [1].The current hypothesis of its pathogenesis suggests that UC results from an uncontrolled immune response to the normal gut flora [2]. Current treatment relies heavily on corticosteroids and broad spectrum immunosuppressives that have significant side effects [3].The prevalence of UC is not uniform worldwide; being most common in Western industrialized countries and uncommon in developing countries [4]. This suggests that environmental factors (proposed to be loss of helminths) favor the wider spread of UC in developed countries or protect from UC in less developed countries[5]. Helminths could be beneficial because of their unique capacity to decrease hyper reactive immune responses [6]. In support of this postulate, it was reported that exposure to helminths, in animal models of IBD, could protect or reverse colitis [7,8]. There are complex interactions between helminths and their hosts; successful parasite would suppress the host immune response for survival in their human host [9]. Helminths are known to be the most potent Th2-cell inducers in human and experimental models and this impedes the

devolpment of TH1- cells [10]. However, UC is associated with a modified Th2-cells response [11]. Thus, the response to a helminthic infection may impede inappropriate Th2 responses, thus provide suppression of UC activity [12]. Helminths induce regulatory T cells and promote the production of powerful immunomodulatory molecules such as IL-10 and TGF-β and this could underlie their broad-spectrum immunosuppression [13]. Also, parasitic immunomodulation involve excretory/secretory products actively exported through secretory pathways and those may diffuse or leak from the parasite stoma [14].

According to hygiene hypothesis failure to develop immunoregulatory pathways and hence increased incidence of UC is a consequence of diminished exposure to intestinal helminths [15]. So, the aim of the present study was to find out the impact of treatment of intestinal parasites on the activity of UC.

PATIENTS AND METHODS

This study was conducted at Zagazig University Hospitals, Zagazig, Egypt in the period from March 2011 to February 2013. Out of 57 patients known to have ulcerative colitis (by colonoscopy and histopathology), 20 patients with intestinal parasitic infection were selected after 3 successive days of stool analysis and anal swabs.

Patients were divided into:

Group I: Comprised 10 patients who were diagnosed to have UC and intestinal parasitic infection, they were treated for intestinal parasites; patients who had *Entamoeba histolytica* received Tinidazole 2g/day for two successive days and followed by diloxanide furoate 500 mg t.i.d for 10 days. Patients who had *Blastocystis hominis or Giardia lamblia* received Tinidazole 2gm single dose. Patient who had *Hymenolepis nana* was treated by praziquantel 25 mg /Kg single dose. Patients who had *Ascaris lumbricoides, Enterobius vermicularis, Trichostrongylus or Trichuris trichura* received Albendazole 400 mg single dose [16,17]. Patients were considered cleared from parasitic infection when no ova or intestinal protozoa were identified in their stool one month later (all were infection free one month after treatment).

Group II: Comprised 10 patients, who were diagnosed to have UC and intestinal parasitic infection, they were not treated for intestinal parasites. The following medications were allowed and continued at the same dose throughout the study for all patients: (1) oral sulfasalazine, mesalamine, or mesalamine derivatives (2) oral prednisone up to 25 mg/day and (3) azathioprine or 6-mercaptopurine.

The study protocol was approved by the Institutional Review Board of the Faculty of Medicine, Zagazig University, and informed consent was obtained from all participants

Exclusion criteria:

Patients were not enrolled **(1)** if they had fulminant colitis **(2)** if they were treated with cyclosporine, methotrexate, or immunomodulatory agents other than azathioprine/6 mercaptopurine in the last 12 weeks **(3)** if they had other clinically significant diseases that could interfere with protocol compliance or interpretation of the results **(4)** if they had hypersensitivity to the used anti-parasitic drugs.

All patients were subjected to the followings at the beginning of the study and after one month in both treated and untreated groups:

- Full history taking and thorough clinical examination.
- Assessment of Simple Clinical Colitis Activity Index (SCCA) which was designed and validated by ***Walmsley et al.*** [18].
- Laboratory investigations; Complete blood count (CBC), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP).
- Stool analysis with different microscopic examinations and anal swabs were performed for detection of any helminthic eggs and intestinal protozoa (cysts or trophozoites).
- Colonoscopy to evaluate the activity of the disease. Endoscopic grading (scale of 0-3): 0=normal, 1=mild friability, 2=moderate friability, 3=exudation and spontaneous hemorrhage [19].

Statistical Analysis:

Data were analyzed with SPSS version 17 (statistical package for the Social Science, Chicago, IL). Qualitative data were expressed as number and percentage and were analyzed by Chi square (X^2) test for unpaired data. Fisher's Exact was recommended when expected value is less than 5. While Wilcoxon test was used to

analyze qualitative paired data. Quantitative data were expressed as mean±standard deviation (SD) and were analyzed by independent t test for unpaired data. Paired quantitative data were analyzed by paired t test. P-value was considered significant if <0.05 and highly significant if <0.001.

RESULTS

Characteristics of the patients were comparable in the two groups including types of isolated parasites (Table 1). Both groups showed non statistically significant difference in their base line data as regard parameters of simple clinical colitis activity (SCCA) index, laboratory tests and colonoscopic findings apart from significantly elevated ESR in the untreated group (p=0.02) (data not shown).

Patients who were treated for intestinal parasites had statisticaly significant deterioration in bowel frequency/day, and bowel frequency/night compared with their baseline data. On the other side, the untreated group showed non significant change in all parameters of SCCA index after one month in comparison with their base line data, but, their bowel frequency/day, bowel frequency/night and the general condition were significantly better than those of the treated group (Table 2, 3).

There was statistically significant deterioration in RBC's, MCV, hemoglobin, WBC's in the treated group, while ESR and CRP which remained unchanged in treated group showed significant improvement in the untreated group in addition to improved hemoglobin levels after one month. Finally, WBC's and CRP were significantly lower in the untreated group in comparison with the treated group after one month (Table 4,5).

There was statistically significant increased friability, exudation and spontaneous hemorrhage among the treated group without significant change in colonoscopic findings among the untreated group, the treated group had more severe colonoscopic findings in comparison with the untreated group after one month (Table 6,7).

Table 1: Characteristics of the patients including the isolated parasites.

	Treated group (N=10)		Untreated group (N=10)		P
	N	%	N	%	
Sex					0.650
Male	5	50	7	70	
Female	5	50	3	30	
Residence					1.000
Rural	5	50	6	60	
Urban	5	50	4	40	
Social state					0.842
Low	3	30	4	40	
Moderate	4	40	4	40	
High	3	30	2	20	
Smoking status					1.000
None-smoker	8	80	8	80	
Smoker	2	20	2	20	
Isolated parasites					0.647
Ascaris lumbricoides	1	10	1	10	
Blastocystis hominis	2	20	1	10	
Entamoeba histolytica	2	20	2	20	
Giardia lamblia	1	10	2	20	
Hymenolepis nana	1	10	1	10	
Trichostrongylus	1	10	0	0	
Trichuris trichura	1	10	1	10	
Enterobius vermicularis	1	10	2	20	

Table 2: Changes in the parameters of simple clinical colitis activity index one month after treatment in treated group versus changes in the parameters of untreated group after one month.

SCCA index parameters		Treated group (N=10)				P	Untreated group (N=10)				P
		Before treatment		After treatment			Base line data		After one month		
		N	%	N	%		N	%	N	%	
Bowel frequency/day	1-3	5	50	3	30	0.04	6	60	7	70	0.15
	4-6	4	40	1	10		3	30	3	30	
	7-9	1	10	3	30		1	10	0	0	
	>9	0	0	3	30		0	0	0	0	
Bowel frequency/night	0	3	30	0	0	0.03	2	20	4	40	0.15
	1-3	6	60	5	50		8	80	6	60	
	4-6	1	10	5	50		0	0	0	0	
Urgency of defecation	No	4	40	1	10	0.1	2	20	4	40	0.1
	Hurry	4	40	5	50		5	50	5	50	
	Immediately	1	10	1	10		1	10	0	0	
	Incontinence	1	10	3	30		2	20	1	10	
Blood in stool	No	3	30	0	0	0.13	2	20	3	30	0.18
	Trace	5	50	4	40		5	50	6	60	
	Occasionally frank	1	10	3	30		3	30	1	10	
	Usually frank	1	10	3	30		0	0	0	0	
General well-being	Very well	3	30	1	10	0.05	3	30	7	70	0.09
	Slightly below normal	5	50	4	40		4	40	1	10	
	Poor	2	20	3	30		3	30	2	20	
	Very poor	0	0	2	20		0	0	0	0	
Extra-colonic features	Non	8	80	6	60	0.18	6	60	6	60	0.56
	One	2	20	3	30		3	30	4	40	
	Two	0	0	1	10		1	10	0	0	

Table 3: Difference between treated group and untreated group after one month as regard the parameters of simple clinical colitis activity index.

SCCA index parameters		Treated group (N=10)		Untreated group (N=10)		P
		N	%	N	%	
Bowel frequency/ Day	1-3	3	30	7	70	0.04
	4-6	1	10	3	30	
	7-9	3	30	0	0	
	>9	3	30	0	0	
Bowel frequency/ Night	0	0	0	4	40	0.01
	1-3	5	50	6	60	
	4-6	5	50	0	0	
Urgency of defecation	Non	1	10	4	40	0.3
	Hurry	5	50	5	50	
	Immediately	1	10	0	0	
	Incontinence	3	30	1	10	
Blood in stool	Non	0	0	3	30	0.06
	Trace	4	40	6	60	
	Occasionally frank	3	30	1	10	
	Usually frank	3	30	0	0	
General well-being	Very well	1	10	7	70	0.037
	Slightly below normal	4	40	1	10	
	Poor	3	30	2	20	
	Very poor	2	20	0	0	
Extra-colonic features	Non	6	60	6	60	0.565
	One	3	30	4	40	
	Two	1	10	0	0	

Table 4: Changes in laboratory parameters one month after treatment in treated group versus changes in laboratory parameters in untreated group after one month

Laboratory parameters	Treated group (N=10)		P	Untreated group (N=10)		P
	Before treatment	After treatment		Base line data	After one month	
	X±SD	X±SD		X±SD	X±SD	
RBC's $x10^6$/ mm^3	4.5±0 .2	4.0±0.3	0.01	4.3±0.4	4.4± 0.4	0.25
MCV fl	84.0± 9.2	79.9± 8.9	0.02	82.5± 8.0	83.5± 7.1	0.22
Haemoglobin (gm/dl)	12.2± 2	10.9± 1.2	0.04	11.4± 1.9	11.7± 1.6	0.02
WBC's $x10^3$/ mm^3	7.5± 2.2	11.0± 3.0	0.01	7.1± 2.2	6.3± 1.4	0.07
Platelets $x10^3$/ mm^3	359.6± 98.3	378.5± 99.3	0.56	401.7± 49.5	395.4± 48	0.06
ESR(mm)	25.1± 13.6	33.9± 16.1	0.18	42.6± 16.4	36.7± 12.6	0.01
CRP(mg/dl)	23.2± 12.3	34.9± 7.9	0.07	23.6± 7.6	19.6± 7.9	<0.001

Table 5: Difference between treated group and untreated group after one month as regard laboratory parameters

Laboratory parameters	Treated group (N=10)	Untreated group (N=10)	P
	X± SD	X± SD	
RBC's($x10^6$)	4.0±0.3	4.4± 0.4	0.047
MCV fl	79.9± 8.9	83.5± 7.1	0.33
Haemoglobin gm/dl	10.9± 1.2	11.7± 1.6	0.23
WBC's($x10^3$)	11.0± 3.0	6.3± 1.4	<0.001
Platelets($x10^3$)	378.5± 99.3	395.4± 48	0.63
ESR(mm)	33.9± 16.1	36.7± 12.6	0.67
CRP(mg/dl)	34.9± 7.9	19.6± 7.9	<0.001

Table 6: Changes in colonoscopic findings one month after treatment in treated versus changes in colonoscopic findings in untreated group after one month

Colonoscopic findings	Treated group (N=10)				P	Untreated group (N=10)				P
	Before treatment		After treatment			Base line data		After one month		
	N	%	N	%		N	%	N	%	
Normal	3	30	0	0	0.03	2	20	5	50	0.06
Mild friability	4	40	3	30		6	60	4	40	
Moderate friability	3	30	5	50		1	10	1	10	
Exudation and spontaneous hemorrhage	0	0	2	20		1	10	0	0	

Table 7: Difference between treated group and untreated group after one month as regard colonoscopic findings

Colonoscopic findings	Treated group (N=10)		Untreated group (N=10)		P
	N	%	N	%	
Normal	0	0	5	50	0.02
Mild friability	3	30	4	40	
Moderate friability	5	50	1	10	
Exudation and spontaneous hemorrhage	2	20	0	0	

DISCUSSION

Hygiene hypothesis suggests that failure to develop immunoregulatory pathways and hence increased incidence of UC is a consequence of diminished exposure to intestinal helminths [15]. In the current study, a suggested real life scenario, the impact of helminths infection in the suppression of IBD activity is elucidated.

In this study, it was documented that patients treated for intestinal parasites had significant deterioration of bowel frequency/day and bowel frequency/night compared to their baseline values. In concordance with this observation, Buning et al. [20]**;** reported a girl whose UC worsened after eradication of *Enterobius vermicularis*. In their study, a 12-year old girl was admitted with sporadically bloody stools, treated with rectal meslazine that was ineffective. Colonoscopy revealed discrete unspecific proctitis and numerous worms throughout the colon. Microscopically, faint characteristic signs of UC were reported as well as worm eggs detected in the lamina propria. Adult forms of *Enterobius vermicularis* and corresponding eggs were identified microbiologically. She was considered a latent UC that was rendered symptomatic due to worm invasion. Administered add-on treatment with Pyrantel pamoate made diarrhea subside. Six months later, the patient was admitted again suffering from abdominal pain and bloody diarrhea.

Colonoscopy revealed severe UC of the whole colon without detection of any worm. Histopathology, confirmed UC. The patient received steroid therapy and recovered. Consequently, it was suggested that treatment of intestinal parasites deteriorated UC in this patient.

In the present study, patients who were treated for intestinal parasites had non-significant deterioration in urgency of defecation, blood in stool, general well being and extracolonic features compared to their baseline data. Buning et al. [20]; reported significant bleeding per rectum in their case report, a condition that was not encountered in the present study. This may be attributed to the short duration of follow up in the current study; (one month versus 6 months in their case).

In this study, it was found that patients who were not treated for intestinal parasites had statistically non-significant change as regard bowel frequency/day, bowel frequency/night, urgency of defecation, blood in stool, general well being and extra colonic features compared to their baseline data. Although this, there was statistically non-significant difference between both groups as regard SCCA index parameters before treatment of intestinal parasites, while one month after treatment there was statistically significant higher bowel frequency/day, bowel frequency /night and poor general condition among patients of group I in comparison with group II. Such deteriorations may be attributed to lack of immunomodulatory and non-immunological mechanisms, secondary to loss of helminths that could interfere with the inappropriate and destructive immune response in UC [6]. These findings point to the potential usefulness of the presence of intestinal parasites for patients with UC.

This study shows that patients who were treated for intestinal parasites showed statistically significant deterioration of WBC's count, hemoglobin as compared to their baseline values. While patients who were not treated for intestinal parasites showed statistically significant improvement one month later as regard hemoglobin. Such changes of the activity indices reflect increased UC activity after eradication of intestinal parasites.

At the beginning of the study there was significant increased ESR in untreated group which showed statistically significant improvement, as well as CRP, one month later when compared to their baseline values. While there was statistically non significant deterioration of ESR and CRP among patients of treated group when compared to their baseline values. This may be attributed to short duration of follow up or the difference in the duration or load of infection among both groups [21].

In the current study, there was statistically non-significant difference between both groups before treatment of intestinal parasites as regard colonoscopy features; patients who were treated for intestinal parasites had statistically significant deterioration of colonoscopic findings as compared to their baseline values. Buning et al. [20]; in their case report have documented severe pancolitis after eradication of *Enterobius vermicularis*. On the other hand patients who were not treated for intestinal parasites had non-significant difference one month later as regard colonoscopic findings, when compared to their baseline values. These results suggest that eradication of intestinal parasites deteriorate the colonoscopic grade in patients with UC.

From the present study, although subgroups (helminths versus protozoa) were too small for statistical comparison, it can be concluded that intestinal parasites ameliorate the activity of UC. These results confirmed the results of Summers et al. [22]; who reported that *Trichuris suis* ova therapy administered every other week induces improvement in patients with active UC. *Trichuris suis* is considered as a therapeutic option with favorable characteristics and outcome [23]. It is not a natural human parasite but it has been shown experimentally to colonise humans briefly without causing disease [24]. Helminths exert multiple mechanisms in their host including induction of Th2 immune responses and directing immune responses away from Th1/Th17. They also induce production of IL-4, IL-10 and IL13 and inhibit IL-12 and TNF-α release. Perhaps the most important mechanism against immune mediated injury is promotion of regulatory circuits [25-26]. Eukaryotic protozoan pathogens also have evolved to evade immune defenses responses of their host, but through entirely different mechanisms. Sacks and Sher [27] described how protozoa can avoid immune attack by using humoral effector mechanisms through resistance of complement lysis, resistance to intracellular lysosomal enzymes and toxic metabolites and modifying antigen-presenting and

immunoregulatory functions of dendritic cells. This makes their ability to affect destructive immune and inflammatory processes possible.

Our study has its limitations. Firstly, the small number of patients recruited, but this may reflect the declining prevalence of parasitic infestation in our community due to many reasons including health education and proper sanitary environment. Also, this supports the hypothesis of low incidence of UC with active intestinal parasitic infection. Secondly, inclusion of protozoa in the final analysis, protozoa may have a different immunological response than helminths. This is mainly due to geographical distribution, our community is a subtropical zone and protozoa are highly prevalent in these communities and hence commonly encountered in daily medical practice and those patients may seek medical advice and sometimes go to self medication by the anti-parasitic drugs. Both groups involved in this study had no statistical difference at the beginning of the study, so the tested variable here is the treatment, and not the type of organism. However, analysis of the impact of different types of intestinal parasites and their treatment is an interesting issue for research in a future study with larger number of patients.

Consequently, further trials that involve longer duration of follow up, histopathological and molecular studies to evaluate the activity of UC at different levels and to determine the critical duration and load of infection which affect the activity of UC are warranted.

CONCLUSION

It can be recommended not to treat tolerated intestinal helminths in ulcerative colitis patients as they may be beneficial because of their unique capacity to decrease hyper reactive immune responses.

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Peer reviewer: Robert W. Summers Department of Internal Medicine, Division of Gastroenterology and Hepatology, University of Iowa Carver College of Medicine, USA; **Mohamed N El-Khashab** Professor of Tropical Medicine and Hepato-Gastroenterology, Faculty of Medicine , Zagazig Universty , Egypt.
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The Prevalence of Hepatitis G Virus Infection among Hemodialysis and Chronic Hepatitis Patients

Nagwa M.Shawky[1], Tarek Ibrahim[2], Ashraf Metwally[3]
[1]*Clinical Pathology Department, Faculty of Medicine,Zagazig University,Egypt.*
[2]*Internal Medicine Department, Facukty of Medicine,Zagazig University ,Egypt.*
[3]*Tropical Medicine Department, Faculty of Medicine,Zagazig University,Egypt.*

Corresponding Author
Ashraf Metwally

Mobile:

+201148434300
E mail:

ametwally75@yahoo.com

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Background and study aim: HGV is a type of hepatitis viruses discovered in 1995. HGV is transmitted through parenteral route and seldom seen alone. The clinical course is usually subclinical anicteric and spontaneous clearance of virus particles is common after two years with appearance of anti-HGV antibodies. The aim of this study was to assess the magnitude of HGV infection problem and the impact of HGV infection on the affected patients.

Patients and methods: 64 patients were included in this study, 22 hemodialysis patients, 22 chronic hepatitis patients as well as 20 healthy control subjects. RT PCR was done for HGV RNA to all subjects as well as routine laboratory investigations and anti HCV Ab and HBsAg.

Results: HGV was positive in 5% of healthy controls, 50% of hemodialysis patients, and 36.4% in chronic hepatitis patients. The prevalence of HGV mono-infection was 9.1% in all patients and prevalence of HGV co-infection with HCV and/or HBV was 36.4%. There were no significant differences between HGV positive and negative subjects as regard age, gender distribution, clinical or laboratory measures.

Conclusion: HGV has high prevalence among hemodialysis and chronic hepatitis patients. HGV infection doesn't have an impact on patients clinical or laboratory parameters.

INTRODUCTION

Hepatitis G virus (HGV) is a new type of hepatitis virus which was first identified by Simons et al, 1995 and Linnen et al, 1996 [1,2]. It has been shown that HGV is a single stranded RNA virus with positive polarity which has world-wide distribution, and spread by parenteral transmission [3].

Infection with HGV is common in the world. The detection rate of HGV in the population averages 1.7%. HGV, like other parenteral hepatitis viruses, occurs universally, but no uniformly [4].

HGV virus has clearly established transmission modes, which include mainly blood contamination and occasionally sexual transmission [5,6]. It is frequently found among transfused patients, [7] intravenous drug abusers, hemodialysis (HD) patients, and vertically from infected mother to children [8].

The incubation period of acute viral hepatitis G averages 14-20 days. The clinical picture of HGV infection is commonly similar to that of the subclinical and anicteric types of hepatitis with normal or low aminotransferase activities [9].

The outcome of acute hepatitis may be: (1) recovery with the disappearance of serum HGV RNA and the emergence of anti-E2; (2) development of chronic hepatitis with serum HGV RNA being persistently detectable; (3) presence of HGV RNA without biochemical or histological signs of liver disease [10].

Following clearance of HGV viraemia, most individuals develop conformation dependent antibodies to the envelope glycoprotein E2, and thus E2 antibody serves as a marker of prior infection [11].

In HGV mono-infection liver histopathology shows moderate or mild focal portal hepatitis was prevalent with slight periportal infiltration and lobular components being found in single cases, [12] biliary epithelium desquamation, [13]

periportal fibrosis, [14] and steatosis [15]. There's also evidence that HGV may play a role in the production of lithogenic bile and in the development of cholelithiasis [16].

Patient with HCV/HGV co-infection are treated with pegylated interferon without any impact of HGV viremia on the HCV response to therapy. The HGV viremia usually becomes undetectable after cessation of interferon therapy [17].

Aim of the study: this study aims at measuring the prevalence of HGV infection among hemodialysis patients and chronic hepatitis patients in Zagazig University Hospitals and study the impact of HGV infection on clinical and laboratory parameters of the patients.

PATIENTS AND METHODS

This study was conducted in Tropical Medicine, Internal Medicine and Clinical Pathology departments, Zagazig University Hospitals, between January and March 2012 on sixty four subjects.

The subjects were divided into three groups:

- Group I: Control group included 20 healthy persons.
- Group II: Haemodialysis group included 22 hamodialysis patient.
- Group III: Chronic hepatitis group included 22 patients with chronic viral hepatitis with or without cirrhosis with any Child's grade.

All patients were subjected to:

1. Full medical history.
2. Thorough clinical examination.
3. The following investigations:

- Pelvi-Abdominal ultrasound.
- Routine laboratory investigations including: Complete blood picture by Dyn 1700, Liver function tests by integra 400 analyzer: Total bilirubin, direct bilirubin, total protein, serum albumin, aspartate aminotransferase (AST), alanine aminotransferase (ALT)).
- Anti-HCV antibodies was detected by ELISA (Diasorium KitDiasorium SR, Italy).
- HBsAg
- RT-PCR for HGV-RNA this was done by Easy-to-use Reaction Mix for One-Step RT-PCR, using the LightCycler Carousel-Based System (LightCycler RNA Master SYBR Green 1).

Statistical analysis:

Data were expressed as mean ± SD for quantitative data and number and percentage for qualititative data and comparison was done by paired t test and ANOVA for the former and corrected X^2 for the latter.

RESULTS

The patients of the three studied groups had no significant differences as regard age and gender distribution as shown in Table 1. Males and females are almost equally represented in each group.

The incidence of HBV, HCV and HGV infections in each studied group is represented in Table 2. The serological markers for HBV (HBsAg) and HCV (anti HCV Ab) were used in diagnosis of chronic HBV and HCV hepatitis. All patients of the control group had negative markers for HCV and HBV. Patients in group II (hemodialysis) had equal incidence of HCV and HBV. All patients in group III (chronic hepatitis) had HBV and/ or HCV infection with obvious predominance of HCV (90%). Real time PCR was used to diagnose HGV infection. The incidence of HGV was 5% in healthy controls, 50 % in group II and 36.4% among patients with chronic viral hepatitis as shown in Table 2.

The rate of HGV mono-infection was 9.1% and combined HGV infection with HCV and/or HBV was 36.4% among the whole number of patients (group II and group III) included in the study as shown in Table 3.

There were no significant differences between HGV positive and negative patients in group II and III as regard age and gender distribution as shown in Table 4, it was clearly manifest that HGV infection had no significant impact on the patients liver condition. There were no significant differences between HGV positive and negative patients in groups II and III as regard any of the laboratory parameters enlisted in Tables 5 and 6. There was no significant difference between the HGV positive and negative patients in group III as regard grade of hepatic decompensation and Child grade presented in Table 7.

It became clear that the longer the duration of dialysis the higher the risk of infection in group

II. As shown in Table 8, the duration of dialysis was significantly longer in the HGV positive patients. It's also clear that blood transfusion is a risk factor for HGV transmission as the incidence of positive history of blood transfusion was significantly higher in HGV positive patients.

Table (1): Demographic data in different groups.

	Group I N=20		**Group II N=22**		**Group III N=22**			**P**
Age (mean±SD)	39.65±13.61		40.4±8.18		47.27±14.86		F=2.42	0.09 NS
Gender	No	%	No	%	No	%	X^2	
Males	10	50	10	45.5	11	50	0.12	0.94 NS
Females	10	50	12	54.5	11	50		

NS: non-significant.

Table (2): The incidence of different viral hepatitis infections among the studied groups.

	Group I N= 20		**Group II N= 22**		**Group III N= 22**		X^2	**P**
	No	%	No	%	No	%		
Hepatitis B								
Positive	0	0	7	31.8	6	27.3	7.55	0.023 S
Negative	20	100	15	68.2	16	72.7		
Hepatitis C								
Positive	0	0	7	31.8	20	90.9	36.97	<0.001 HS
Negative	20	100	15	68.2	2	9.1		
Hepatitis G								
Positive	1	5	11	50	8	36.4	10.28	<0.001 HS
Negative	19	95	11	50	14	63.6		

S: significant, HS: highly significant

Table (3): The incidence of HBV, HCV and HGV mono- and multiple infections in whole number of patients in the study.

Viral infection	**N**	**%**
Non	5	11.4
HGV alone	4	9.1
HBV alone	3	6.8
HCV alone	15	34.1
HGV+HBV	7	15.9
HGV+HCV	8	18.2
HCV+HBV	1	2.3
HGV+HCV+HBV	1	2.3
Total	44	100%

Table (4): Distribution of different viral hepatitis infections among all patients groups.

	HGV positive		HGV negative			P
Group II	**N=11**		**N=11**			
Age	39.1±9.55		41.7±6.75		t= 0.74	0.96 NS
Gender	No	%	No	%	cX^2	
Males	6	54.5	7	63.6	0.18	0.68 NS
Females	5	45.5	4	36.4		
Group III	**N= 8**		**N=14**			
Age	44.75±12.87		47.71±16.6		t=0.59	0.56 NS
Gender	No	%	No	%	cX^2	
Males	3	37.5	8	57.1	0.2	0.65 NS
Females	5	62.5	6	42.9		

NS: non-significant

Table (5): Comparison between HGV positive and negative hemodialysis patients as regard laboratory investigations.

	HGV PCR Negative N=11	HGV PCR positive N=11	t	P
Total protein (g/dl)				
Mean±SD	7.76±0.58	7.19±.0.95	1.69	0.105 NS
Albumin (g/dl)				
Mean±SD	4.27±065	3.90±0.96	1.05	0.30 NS
Total bilirubin (mg/dl)				
Mean±SD	0.68±0.23	0.63±0.22	0.48	0.63 NS
ALT (IU/ml)				
Mean±SD	68.9±39.36	42.81±32.92	1.68	0.10 NS
AST (IU/ml)				
Mean±SD	50.18±25.27	38.81±13.89	1.30	0.20 NS
HB (g/dl)				
Mean±SD	11.26±1.32	12.27±1.12	1.92	0.06 NS
RBCs ($x10^6$cell/ mm^3)				
Mean±SD	3.68±0.83	3.60±0.36	0.29	0.76 NS
WBCs (x 10^3cells/ mm^3)				
Mean±SD	5.72±2.25	6.5±1.51	0.96	0.34 NS
PLT (x 10^5 / mm^3)				
Mean±SD	216.18±65.85	202.36±50.13	0.55	0.58 NS

NS: non-significant

Table (6): Comparison between HGV positive and negative chronic hepatitis patients regards laboratory investigations.

	HGV PCR Negative N=14	HGV PCR positive N=8	t	P
Total protein (g/dl)				
Mean±SD	5.89±0.81	6.15±1.16	0.609	0.54 NS
Albumin (g/dl)				
Mean±SD	3.04±0.65	3.20±1.06	0.433	0.669 NS
Total bilirubin (mg/dl)				
Mean±SD	3.75±2.97	3.71±2.15	0.037	0.97 NS
Direct bilirubin (mg/dl)				
Mean±SD	1.74±1.60	1.96±1.154	0.308	0.761 NS
ALT (IU/ml)				
Mean±SD	68.9±39.36	42.81±32.92	1.68	0.10 NS
AST (IU/ml)				
Mean±SD	50.18±25.27	38.81±13.89	1.30	0.20 NS
HB (g/dl)				
Mean±SD	9.90±2.7	9.61±2.87	0.23	0.81 NS
RBCs (x10^6cell/ mm^3)				
Mean±SD	3.30±0.81	3.30±1.10	0.00	1 NS
WBCs (x 10^3cells/ mm^3)				
Mean±SD	7.67±1.10	6.5±1.51	0.461	0.65 NS
PLT (x 10^5 / mm^3)				
Mean±SD	121.57±80.37	116±56.53	1.48	0.15 NS

NS: non-significant

Table (7): Frequency of HGV in relation to Child grade of chronic hepatitis patients group.

	HGV-RNA Negative N=14		HGV-RNA Positive N=8		X^2	P	Significance
	N	%	N	%			
Child grade							
A	4	28.5	2	25	0.1	0.75	NS
B	5	35.7	3	37.5	0.14	0.7	
C	5	35.7	3	37.5	0.14	0.7	

NS: non-significant

Table (8): Frequency of HGV in relation to duration of dialysis and history of blood transfusion in haemodialysis patients group.

	HGV PCR Negative N=11		HGV PCR positive N=11		t	P
Duration of dialysis in months	9.54 ±2.98		15.0 ±6.54		2.59	0.01 S
History of Blood transfusion	No	%	No	%	c X^2	
Negative	10	71.4	4	28.6	4.91	0.02 S
Positive	1	12.5%	7	87.5%		

S: significant

DISCUSSION

From the results of our study it is clear that the rate of HGV mono-infection is far less than HGV co-infection with HCV, HBV or both (9.1% vs 36.4 %). This is consistent with what was found in many previous studies [10,18]. The rate of co-infection (HGV+ HCV and/ or HBV) in the previous studies varied greatly according to the place where the study toke over, it range between 5- 24.5% [19,20].

The rate of infection with HGV in healthy controls in our study was 5%. The prevalence of HGV mono-infection in healthy population and blood donors was estimated in many previous studies among different population worldwide. The results of these studies were as follows arranged from lowest to highest estimated prevalence: 1% in UK, [21] 3% in Iran, [22], 4% in Turkey and Egypt, [23,24], 6% in India, [18] and 18.2% in South Africa [25].

The prevalence of HGV viremia in hemodialysis patients in our study was 50%. This prevalence is highly variable in the previous studies according to the place the study was done. The results of the previous studies were as follows arranged from lowest to the highest: 17.7% in Iran, [22], 19.6% in Germany, [26] and 20% in Italy. [27] This very high prevalence compared to the previous studies may be due to the lack of awareness about the HGV by the infection control programes in Zagazig University Hospitals. The patients with hemodialysis are at higher risk of contacting HGV infection because of the need for repeated transfusion and multiple medical procedures [28,29]. This is consistent with what we found in our study that the patients with positive HGV PCR of the hemodialysis had signficantly higher duration of dialysis in months and significantly higher rate of exposure to blood transfusion.

There was no significant difference between HGV negative and positive patients in hemodialysis and chronic hepatitis groups as regards age and gender distribution. This is against what Loginov et al reported that the HGV positive patients were younger [30]. However, in our study they seam to be insignificantly younger.

There was no significant difference between HGV positive and negative patients as regard all laboratory parameters including liver function tests, ALT level and hematological parameters. This agrees with what was found by Alter, 1996 and Arican et al., who said that HGV infection runs a subclinical anicteric clinical course, with low enzymes and normal biochemical parameters [9,31]. These findings were supported by other studies that suggested that HGV may not be purely hepatotropic [32,33].

The comparison of Child grades in patients with HGV positive and negative PCR in patients in the chronic hepatitis group revealed no significant differences. This is supported by the findings in Bychenko et al., study who said that HGV co-infection with HCV and /or HBV doesn't affect the severity of hepatic disease [34].

CONCLUSION

HGV infection has high prevalence among hemodialysis patients and patients with chronic hepatitis attending Zagazig University Hospitals. The HGV positivity doesn't have any impact on the patients' clinical condition or laboratory parameters.

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Peer reviewer: Ahmed I El-Maaddawy, Consultant Hepaologist, Kafr El-Shiekh Liver Research Centre; **Mahmoud A Abdel-Hamid**, Assistant professor of Tropical Medicine and Hepatogastroenterology, Faculty of Medicine, Mansoura University, Egypt.
Editor: Mohamed H Emara, MD, Lecturer of Tropical Medicine and Hepatogastroenterology, Faculty of Medicine, Zagazig University, Egypt.

Video Case: Fascioliasis: Uncommon cause of Recurrent Biliary Colic

Mohamed Emara, Mohamed I Radwan, Ibrahim M Ibrahim
Tropical Medicine Department, Faculty of Medicine, Zagazig University, Egypt

Comment

We reported a 48 – year-old female patient with recurrent biliary colic .On abdominal ultrasound examination the common bile duct was dilated to 12 mm and an echogenic about 16 mm structure was seen at its lower end and was thought to be a stone. During ERCP an adult *Fasciola* worm was extracted with its head and suckers were prominent.

Image Case: Solitary Rectal Ulcer Syndrome in a 10 Years Old Boy

Tarik Zaher
Tropical Medicine Department, Faculty of Medicine, Zagazig University, Egypt

Solitary rectal ulcer syndrome (SRUS) is an uncommon but troublesome and easily misdiagnosed condition of childhood [1]. It is often related to prolonged excessive straining or abnormal defecation and clinically presents as rectal bleeding, copious mucus discharge, feeling of incomplete defecation, and rarely rectal prolapse. SRUS is diagnosed based on clinical symptoms and endoscopic and histological findings [2].

In this case a 10 years old Egyptian boy presented by bleeding per rectum and was examined by colonoscopy which revealed solitary rectal ulcer , hyperemic rectal mucosa , superficial ulceration and hypertrophied rectal folds (SRUS is a misnomer).The boy was treated by laxative and oral mesalamine .

The current treatments are suboptimal, and despite correct diagnosis, outcomes can be unsatisfactory. Some treatment protocols for SRUS include conservative management such as family reassurance, regulation of toilet habits, avoidance of straining, encouragement of a high-fiber diet, topical treatments with salicylate, sulfasalazine, steroids , sucralfate, and surgery[2].

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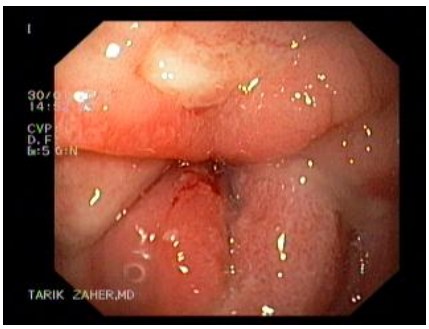

Figure 1: Solitary rectal ulcer

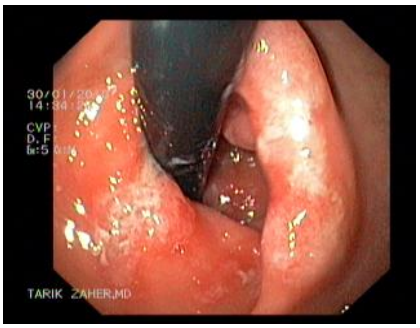

Figure 2: Hypertrophied rectal folds with hyperaemia and superficial ulcers

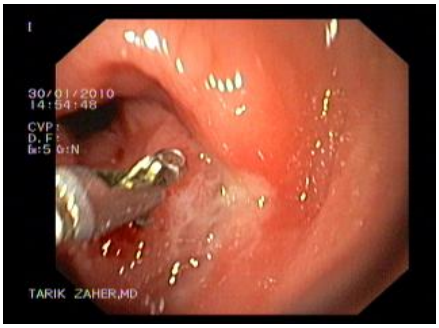

Figure 1: Biopsy of the rectal lesions