The Role of Rotavirus in Exacerbated Ulcerative Colitis

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Abstract

The Ulcerative colitis disease course is characterized by exacerbations and remissions. Studies of the role of viral composition within patients with changing disease activity are currently deficient. The rotavirus gastroenteritis is an important cause of morbidity and mortality worldwide. This study aimed to identify the associated role of Rotavirus during exacerbation of ulcerative colitis. A Fifteen (50) stool and biopsy samples from patients with exacerbated colitis were collected at different age groups and gender. These samples were taken from Morjan Hospital Consultant Gastroenterology and Liver Center, and the lmam Sadiq Hospital during the period from October to April 2019. The stool samples were screened for Rotavirus by using Rapid CERtest Rotavirus Kit,PCR The occurrences of UC and age revealed that the age group <25 year show ten with UC 83% followed by the age group (26-35) which give seven with UC 70%. The relation between existence of UC and gender shown that the positive among male were (20) of patients UC 71% while negative (8) among female the positive were 17 (77%)the results statistically non- significant. The frequency of rotavirus positivity during exacerbated UC as tested by Rapid CER test at different age group the results gives (23) positive samples for Rotavirus 46% and negative (27) 54%. The Rotavirus existence in stool of patients with positive biopsy for ulcerative colitis by using chromatography test revealed that the number of positive were 20 out of 50 at a rate of 40%. While the RT-PCR product analysis of VP4 gene in Rotavirus from in RNA extracted from stool patients samplesthe positive were 24 out of 50 with rate of 48%.

Keywords: *Ulcerative colitis, Exacerbation, Rotavirus, Cer-test, PCR.*

Introduction

The Ulcerative colitis disease course is characterized by exacerbations and remissions. It is generally considered to arise from the interaction between host genetics, environmental factors, dysregulated immune responses and alterations in the intestinal microbiota composition. There are causative factors associated with the development of exacerbations. Many evidence suggests that gut microbe play a critical role in disease pathogenesis[1] while geographic[2] dietary and ethnic factors impact themicrobial composition. Most microbiota studies in UC have investigated the bacterial microbiota and alterations in fecal bacteria and fecal virome have been reported in patients with IBD. Patients with UC showed an expansion of *Caudovirales* bacteriophages and *Caudovirales* species richness in the stool. The gut microbial homeostasis between mucosa bacteria and viruses should be explored. Evidence of the prescence of some viruses like Epstein-Barr virus, HSV, Norovirus and CMV infections in the mucosal inflammatory cells of ulcerative colitis patients suggests a possible role of these virus in the causation of inflammatory bowel disease (IBD). However,[3] unclear. Limited studies have) any role for CMV in exacerbation of inflammatory bowel disease (IBD) remains examined the microbiota composition in ulcerative colitis patients developing an exacerbation. However[4] the importance of rotavirus, as an exacerbating factor of UC, has been neglected by many clinicians. Therefore, the aim of the present study was to explore the role of rotavirus in UC patients during exacerbation.[5] In the study of [6] On intestinal tissue, CMV genome was detected in 32.9% of patients with IBD and only in 2.4% of the controls; also a significant association was detected between CMV intestinal infection and either UC or CD, although the association was even stronger for patients with UC.[7]

Method

The current study was conducted in Marjan Teching Hospital Gastroentrology and liver Unite and Imam

Sadiq Hospital from October to April 2019 in which demographic, biopsy and feces samples were collected at outpatient visit and during an exacerbation. The diagnosis of UC was based on clinical and endoscopic examination by specialist physician. Fecal samples were collected at before endoscopy in each visit and stored at 4°C. Part was examined by Rapid Cer test for viral detection and the remaining part was stored for analyses by PCR. Exclusion criteria were pregnancy, use of rectal enemas, use of antibiotics. The study was approved by the Medical Ethics Committee of Iraqi MOH, and verbal consent was obtained from all subjects.

Results

Distribution of patients with UC during study period according to age. The association between occurrence of UC and age revealed that the age group <25 year show ten with UC 83% followed by the age group (26-35) which give seven with UC 70% .Other age group (36-45) UC were seven 77% and (46-55) were six 75% also the group (56-66) show four with UC 66% and the last age group show that (6) with UC% 66 (table-1).

Table 1: Age distribution of patients with UC during study period

Age	No.	With UC	%	Without UC	%	X^2 0.05
1-25year	12	10	83.33	2	16.66	5.32
26-35	10	7	70.00	3	30.00	1.6
36-45	9	7	77.77	2	22.22	2.76
46-55	8	6	75.00	2	25.00	2
56-66	6	4	66.66	2	33.33	0.66
<67	5	3	60.00	2	40.00	0.2
Total	50	37	100%	13	100%	

Distribution of Ulcerative Colitis according to gender. The results of relation between occurance of UC and gender shown that the positive among male (20) of patients UC 71% while negative (8) among female the positive were 17 (77%) and the negative (5) (table 2).

Table 2: Distribution of cases of ulcerative colitis according to gender.

Sex	No.	No. of Patients UC			%	X^2 0.05
		+ve	%	-ve		
Male	28	20	71.42	8	28.57	5.14
Female	22	17	77.27	5	22.72	6.54
Total	50	37	100%	13	100%	

Frequency of Rotavirus positivity in patients during exacerbation of ulcerative colitis according to age. The frequency of rotavirus positivity during exacerbated UC as tested by Rapid CER test at different age group the results gives (7)positive samples for Rotavirus 46% and negative(8) 53% at the age group (1-25). The other group (26-35) show (6) positive 60% and the negative (4) 40%. A two positive 33% and four negative 66% in the group (36-45) followed by four positive 44% and five negative 55% at the (46-55) then positive(3)60% and negative(2)40% at (56-65) the last age group >66 show one positive 20% and negative(4) 80%

Table 3: The distribution of Rotavirus positivity in patients with exacerbation ulcerative colitis in relation to age of patients.

Age Group	No. of Tested Patients	No. of Positive		No. of Negative		X^2 0.05
		No	%	No	%	
1-25	15	7	46.66	8	53.33	0.06
26-35	10	6	60.00	4	40.00	0.04
36-45	6	2	33.33	4	66.66	0.66
46-55	9	4	44.44	5	55.55	0.55
56-65	5	3	60.00	2	40.00	0.2
<67	5	1	20.00	4	80.00	1.8
Total	**50**	**23**	**100%**	**27**	**100%**	

Rotavirus existence in stool of patients with positive biopsy for ulcerative colitis by using chromatography test. The existence of rotavirus in the stool samples of patient as examined by Rapid Certest according gender revealed that the Biopsy positive for UC were 12 (40%) male while female was eight (40%). The rotavirus positive after endoscopic gives (13)% 43 positive male while female have seven positive 35%. (table-4).

Table 4: The Rotavirus existence in stool of patients with positive biopsy for ulcerative colitis by using chromatography test.

No of Patients Examine		Biopsy Positive for UC				Stool Examination Rota Positive after Endoscopic				X^2 0.05 Biopsy	X^2 0.05 Stool
Sex	**NO**	**+ve**	**%**	**-ve**	**%**	**+ve**	**%**	**-ve**	**%**		
Male	30	12	40.00	18	60.00	13	43.33	17	56.66	1.2	0.52
Female	20	8	40.00	12	60.00	7	35.00	13	65.00	0.8	1.8
Total	**50**	**20**	**100%**	**30**	**100%**	**20**	**100%**	**30**	**100%**		

PCR test for Rotavirus of examined patients with Biopsy positive and stool positive. The molecular method used PCR results display that the biopsy positive (10) at 38.46% for male gender while in the stool examined positive after endoscopic(14) at 58.33% for female.

Table 5: The Rotavirus existence in stool sample of patients with positive biopsy for ulcerative colitis tested by PCR.

No of Patients Examined		Biopsy Positive				Stool Examined Positive after Endoscopic				X^2 0.05 Biopsy	X^2 0.05 Stool
Sex	**NO**	**+ve**	**%**	**-ve**	**%**	**+ve**	**%**	**-ve**	**%**		
Male	26	10	38.46	16	61.53	15	57.69	11	42.30	1.38	0.6
Female	24	14	58.33	10	41.66	11	45.83	13	54.16	0.66	0.166
Total	50	24	100%	26	100%	26	100%	24	100%		

RT-PCR results of stool samples from exacerbated ulcerative colitis

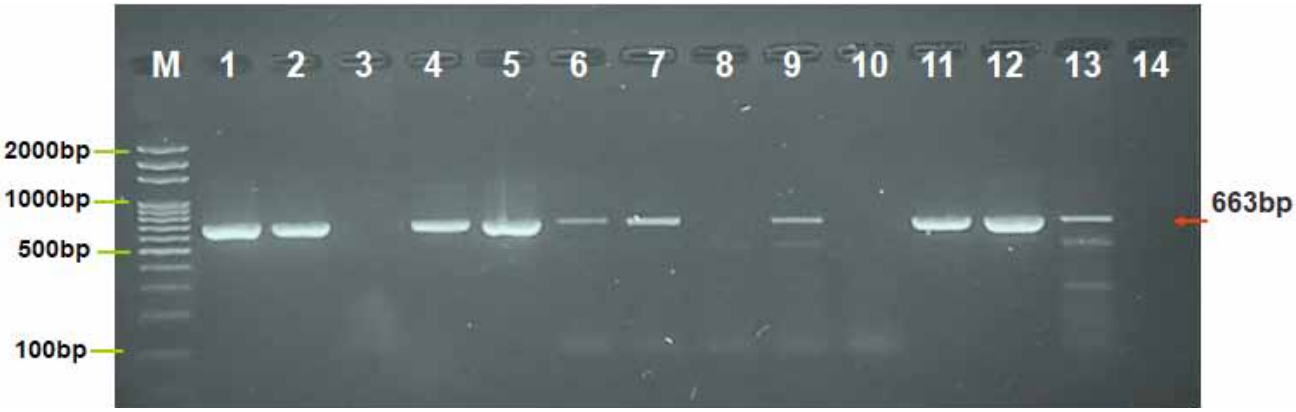

Figure 1: RT-PCR for the samples from exacerbated Ulcerative colitis.

Agarose gel electrophoresis image that showed the RT-PCR product analysis of VP4 gene in Rotavirus from in RNA extracted from stool patients samples, where ladder (2000-100bp), lane (1-14) some samples with positive VP4 gene in Rotavirus at (663bp) PCR product size.

Discussion

Although the pathogenesis of inflammatory bowel disease remains unclear, several studies have suggested that the onset and development of inflammatory bowel disease require the interaction between genetic susceptibility,stimulation by luminal bacterial antigens and adjuvants, and episodic environmental triggers which break the mucosal barrier.In therapy-refractory and fulminant cases of ulcerative colitis infectious causes have to be kept in mind. Numerous viral and bacterial agents have been associated with complicated or therapy-refractory course of ulcerative colitis especially in immunocompromised patients. Most of these viruses are bacteriophages, including those found in the gut, and insert genes into the bacterial DNA. The close relationship between gut bacteriophages and bacteria raises the possibility that there could also be a relationship between these resident viruses and UC, although this connection is only beginning to be explored. [8].Viruses Complicating Ulcerative colitis Several viruses with a facultative intestinal organotropy such as cytomegalovirushuman parvovirus B19,Epstein-Barr virus and herpes simplex virus have been reported. However, the absolute numbers have not been investigated thoroughly, comparative analyses are lacking so far. [1]The presence of norovirus in stool and/or rectal swab samples, as determined by an enzyme-linked immunoassay, was assessed. In addition, sex, age, type of IBD, presence or absence of diarrhea, hematochezia, and the need for hospitalization were determined. The Khan *etal.*(2009) concluded that norovirus may be associated with exacerbations of IBD. The results of this study consistent with the observation of[9] that up to 40% of the exacerbations were associated with symptoms of antecedent or concurrent infection, most commonly involving the respiratory tract. Rubella virus, Epstein-Barr virus, and adenovirus were associated with acute exacerbations. Till our knowledge no data available about the association of rotavirus with ulcerative colitis. The rotavirus may be associated with exacerbations and play a role in complicating ulcerative colitis.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science for Women and all experiments were carried out in accordance with approved guidelines.

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