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Original Research Article

Incidence and profile of *Helicobacter pylori* infection among HIV positive patients

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ABSTRACT

Background: People having HIV infection present with a number of symptoms related to gastrointestinal tract like dyspepsia. HIV itself as well as opportunistic infections is responsible for such symptoms. Notably is *Helicobacter pylori* infection causes variety of such symptoms. The objective of the present research was to study incidence and profile of *Helicobacter pylori* among HIV positive patients.
Methods: A hospital based cross sectional study was carried out over a period of two years among 101 HIV positive patients in the Department of General Medicine, Madurai Medical College, Madurai in collaboration with Department of Medical Gastroenterology and also Department of Venereology and Leporology. Rapid urease test was done. HIV status was confirmed by ELISA test. Data was analysed with the help of EPI statistical software.
Results: Majority (40.6%) had CD4 count of 200-500. It has been observed that incidence of *Helicobacter pylori* was low in groups with low CD4 count. It was also observed that those with higher CD4 count had higher incidence of RUT positivity. This association was found to be statistically significant. The incidence of *Helicobacter pylori* positivity was not significantly different among those patients who were on ART (18%) and those who were not on ART (21%).
Conclusions: The incidence of *Helicobacter pylori* infection was less in HIV positive patients. Those with CD4 cell count less than 100 had lower incidence of *Helicobacter pylori* infection than those with CD 4 cell count more than 500. Incidence of *Helicobacter pylori* infection was not affected by ART.

Keywords: CD4 count, HIV positive, Rapid urease test

INTRODUCTION

Even today pandemic of HIV is going on. This situation is notable as 30 years have passed after the discovery of HIV virus. As per UNAIDS estimates, globally 78 million population is affected by HIV till date. Around 36 million are the "people living with HIV/AIDS".[1]

People having HIV infection present with a number of symptoms related to gastrointestinal tract like dyspepsia. HIV itself as well as opportunistic infections is responsible for such symptoms. Notably is *Helicobacter pylori* infection causes variety of such symptoms. It can also affect the outcomes of "highly active antiretroviral therapy (HAART)."[2]

Helicobacter pylori plays an important role in the disease process of peptic ulcer, gastritis of chronic origin, MALT lymphoma, cancer of stomach and manifestations other than gastrointestinal tract. It has been estimated that *Helicobacter pylori* affects more than half of the population globally. Thus, is the most prevalent pathogen

which affects the general population. Even today it is not very clear as how the *Helicobacter pylori* are transmitted and what are its risk factors. But studies focus on low social class as its prime risk factor especially if it is present during the childhood. This has been attributed to easy transmission from one person to other among people of lower social classes.[3,4]

Helicobacter pylori infection prevalence ranges from 10-76% among "people living with HIV/AIDS." This variation in prevalence is due to the varying characteristics of population, place of residence and the time period.[4] Previous studies reported this rate as lower but newer studies gives this co-infection prevalence almost equivalent to that seen in the general population.[5]

This association between *Helicobacter pylori* and HIV infection has interested the work of many authors. Various studies have shown a low prevalence of *Helicobacter pylori* and this is not expected at all. Not expected as *Helicobacter pylori* are a chronic infection and chronic diseases are common in HIV infection. These unexpected results from these studies may be due to limitations of these studies like lesser sample size, not considering confounders etc. But as mentioned above, newer studies are showing higher prevalence of *Helicobacter pylori* infection among "people living with HIV/AIDS." "Gastrointestinal tract plays an important role in the pathophysiology of HIV/AIDS. Chronic immune activation, associated with intestinal barrier dysfunction, has been identified as central patho-mechanism in HIV disease."[6] "*Helicobacter pylori* colonize the gastric and duodenal mucosa and induce a specific local and also systemic immune response, involving, among others, CD4+ T cells, dendritic cells, regulatory T cells (Treg) and Th17 cells, with all of these also playing a role in HIV pathogenesis."[7]

With this background present study was carried out to study incidence and profile of *Helicobacter pylori* among HIV positive patients.

METHODS

A hospital based cross sectional study was carried out over a period of two years among 101 HIV positive patients in the Department of General Medicine, Madurai Medical College, Madurai in collaboration with Department of Medical Gastroenterology and also Department of Venereology and Leporology.

The study proposal was submitted to the Institutional Ethics Committee and after its approval the actual study was initiated. Individual informed consent was obtained from each and every patient before including them in the present study.

Inclusion criteria

- Patients aged 18 years and more
- Patients with complaints of dyspeptic symptoms
- Confirmed HIV positive cases.

Exclusion criteria

- Patients not willing to participate in the present study
- Pregnant patients
- Patients with severe systemic illness.

After laying out detailed plan and proforma as mentioned above, actual data collection was started. Detailed history and thorough clinical examination were carried out and recorded in a pre-designed, pre tested, semi structured questionnaire. Baseline investigations were carried out to rule out major systemic illness. HIV status was confirmed with ELISA test. CD4 estimation was done with flow cytometry.

Rapid urease test was done with freshly prepared 2% urease solution in sterile distilled water. One ml of urease solution was taken. After placing the gastric mucosal sample, 1 ml of phenol red indicator was added to test the presence of alkaline ph. The purpose of this test was to identify the presence of urease enzyme produced by *Helicobacter pylori* which hydrolyses urea in the solution to ammonia. This creates an alkaline solution which is identified by phenol red indicator which changes from yellow to pink in alkaline medium. One antral sample is placed in the urease solution and observed for color change over a period of 12 hours. If no color change is seen, till 12 hours, then the test is supposed to be negative. This test is 90% sensitive and 100% specific for *Helicobacter pylori*. The test is inexpensive, easily available and easily done. The results are quicker. The disadvantages of this test are that it requires an invasive procedure of endoscopy and hence cannot be used as a community screening test. False negative results are common when *Helicobacter pylori* are patchy in the gastric mucosa.

Statistical analysis

The data was entered in the EPI statistical software. Using this software range, frequencies, means, percentages, standard deviation, chi square and p value were calculated. Kruskul Wallis chi square test was used to test the significance of difference between quantitative variables and Yates correction was applied for qualitative variables. A p value of less than 0.05 was taken to denote significant relationship

RESULTS

A hospital based cross sectional study was carried out over a period of two years among 101 HIV positive patients in the Department of General Medicine, Madurai Medical College, Madurai in collaboration with Department of Medical Gastroenterology and also Department of Venereology and Leporology. Rapid

urease test was done. HIV status was confirmed by ELISA test. Data was analyzed with the help of EPI statistical software.

Maximum patients were found in the age group of 30-39 years (47.5%) followed by 18-30 years (22.8%). Only two cases were there in the age group of 60 years and above. Majority were males (67.3%) i.e. two thirds and only one third were females.

Table 1: Drug profile among HIV patients.

Drug profile	Number	Percentage
ART	46	45.5
Ranitidine	05	05
Cotrimoxazole	29	28.7
Fluconazole	27	26.7
Anti tuberculosis drugs	12	11.9
Total	101	100
ART not given	55	54.5

Table 1 shows drug profile among HIV patients. 45.5% of the cases were on ART. 11.9% were found to be anti-tuberculosis drugs. 26.7% were taking fluconazole. 28.7% were taking cotrimoxazole.

Table 2: CD4 count status among HIV patients.

CD4 count	Number	Percentage
< 100	16	15.8
100-200	22	21.8
200-500	41	40.6
> 500	22	21.8
Total	101	100
Range	14-1197	
Mean±SD	347±282	

Table 2 shows CD4 count status among HIV patients. Majority (40.6%) had CD4 count between 200-500. 21.8% had healthy CD4 count of more than 500. But 15.8% had very low CD4 count of less than 100.

Table 3: Association between CD4 count and RUT positivity.

CD4 count	RUT positive		RUT negative	
	No.	%	No.	%
< 100	03	18.8	13	81.3
100-200	06	27.3	16	72.7
200-500	16	39	25	61
> 500	14	63.6	08	36.4
Range	61-1080		14-1199	
Mean±SD	446.5±297.6		284.4±254.2	
P value	0.003 (Significant)			

Table 3 shows association between CD4 count and RUT positivity. It has been observed that incidence of *Helicobacter pylori* was low in groups with low CD4 count. It was 18% in patients with CD4 count less than 100 and increased to 27% in patients with CD4 count of 100-200. It was also observed that those with higher CD4 count had higher incidence of RUT positivity. This association was found to be statistically significant.

Table 4 shows association between ART therapy taken and the RUT positivity. The incidence of *Helicobacter pylori* positivity was not significantly different among those patients who were on ART (18%) and those who were not on ART (21%).

Table 4: Association between ART taken and RUT positivity.

ART taken	RUT positive		RUT negative	
	No.	%	No.	%
Yes	18	39.1	28	60.9
No	21	38.2	34	61.8
P value	0.6143 (Not significant)			

DISCUSSION

Helicobacter pylori have been implicated as the most common agent causing gastritis in general population.[8,9] But the incidence of *Helicobacter pylori* infection in HIV positive patients has been controversial. While there are studies stating that there was no significant difference in HIV patients from the general population, there are also studies stating that the occurrence of *Helicobacter pylori* infection is lesser in HIV patients.[10-12] Present study revealed similar observations.

The RUT test is a specific test for H. pylori. In the present study, out of 101 HIV positive patients, 39 patients (38.6%) were RUT positive. In a study conducted at Kenyatta National Hospital, Nairobi by Ali Mohammed F et al, similar results were obtained, they showed a lower incidence of *Helicobacter pylori* within HIV group (84%) when compared to the HIV negative control group in whom it was 95%.[11]

A much lower incidence of *Helicobacter pylori* in HIV positive patients was demonstrated by Luo XI et al who used RUT and biopsy studies.[12] In their study, *Helicobacter pylori* positivity was as low as 22.1% in HIV positive patients and the incidence of *Helicobacter pylori* in non-HIV patients was 44.8%.

The exact cause for this low prevalence of *Helicobacter pylori* among the HIV positive patients was not known but hypothesized to be impaired acid secretion in AIDS hypochlorhydria which prevents the initial colonization of *Helicobacter pylori* in gastric mucosa.[13]

But the study done by Battan R et al, showed a different result. Battan R et al, used staining and culture for *Helicobacter pylori* and have shown that 40% of patients with HIV had *Helicobacter pylori* had *Helicobacter pylori* positivity and 39% of HIV negative patients were

Helicobacter pylori positive.[10] Thus they concluded that there was no difference among *Helicobacter pylori* prevalence in HIV and non-HIV patients.

In studied patients, the incidence of *Helicobacter pylori* positivity (RUT) was higher among patients with higher CD4 cell counts, when compared to patients with low CD4 cell counts, in HIV group. In present study, the incidence of *Helicobacter pylori* positivity was only 18% in patients with CD4 cell count of less than 100 whereas among patients with CD4 count of 200-500 it was 39% and it increased to 63.6% among patients with CD4 count of more than 500.

Skwara P et al, conducted a study in 94 HIV patients using RUT and HPE and divided them into two groups based on CD4 cell count of less than 200 and more than 200.[14] They also observed that *Helicobacter pylori* positivity was 40% among group with CD4 cell count of less than 200 compared to 72% among those with CD4 cell count of more than 200.

Mohammed A et al, study also concluded that the prevalence of *Helicobacter pylori* decreased with decreasing peripheral CD4 cell count.[11]

Also, Luo LF et al, concluded that the histopathological findings positive for prevalence of *Helicobacter pylori* displayed a direct correlation with CD4 cell count stratification in HIV positive patients.[12]

In the present study, there were 46 HIV patients who were on Anti Retro Viral Therapy and 55 HIV patients who were not on Anti Retro Viral Therapy. Out HIV patients who were on Anti Retro Viral Therapy showed no significant difference from the patients who were not on the Anti Retro Viral Therapy as far as the Rapid Urease Test positivity was concerned. 39.1% of the patients on Anti Retro Viral Therapy were Rapid Urease Test positive compared to 38.2% who were not on the Anti Retro Viral Therapy were also positive. Thus, authors observed that Anti Retro Viral Therapy had no influence over the *Helicobacter pylori* infection among HIV positive patients. Mach T et al, conducted a study among HIV positive patients using Rapid Urease Test and biopsy for *Helicobacter pylori* and other infections in HIV positive patients.[15] They observed that while the prevalence of gastric mucosal changes was not different between the patients treated and not treated with Anti Retro Viral Therapy, *Helicobacter pylori* infection was less frequent in HIV infected patients treated with Anti Retro Viral Therapy.

CONCLUSION

The incidence of *Helicobacter pylori* infection was less in HIV positive patients. Those with CD4 cell count less than 100 had lower incidence of *Helicobacter pylori* infection than those with CD 4 cell count more than 500. Incidence of *Helicobacter pylori* infection was not affected by ART.

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