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Abstract

AIM: To investigate the prevalence of giardiasis in patients with dyspeptic symptoms.

METHODS: Clinical records of consecutive patients who attended Gastroenterology Department at Aga Khan University Hospital from January 2000 to June 2003 and had esophagogastroduodenoscopy (EGD) with duodenal biopsies and international classification of diseases 9th revision with clinical modifications (ICD-9-CM) coded with giardiasis were studied.

RESULTS: Two hundred and twenty patients fulfilled the above criteria. There were 44% (96/220) patients who were giardiasis positive, 72% (69/96) of them were males and 28% (27/96) of them were females. There were 65% (81/124) males and 35% (43/124) females who were giardiasis negative. The mean age of patients with giardiasis was 28±17 years, while that of giardiasis negative patients was 40±18 years (P<0.001). In patients with giardiasis, abdominal pain was present in 71% (68/96) of patients (P = 0.02) and diarrhea in 29% (28/96) (P = 0.005); duodenitis in 25% (24/96) on EGD (P = 0.006) and in 68% (65/96) on histopathology (P = 0.002).

CONCLUSION: Giardiasis occurs significantly in young people with abdominal pain, while endoscopic duodenitis is seen in only 25% of giardiasis positive cases, which supports routine duodenal biopsy.

Key words: Abdominal pain; Giardiasis; Stool examination; EGD; Duodenal biopsy

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INTRODUCTION

Giardia lamblia is the most common protozoan isolated from the gastrointestinal tract[1]. Worldwide incidence is believed to range from 20% to 60%[2]. The incidence rate is 2-7% in industrialized nations[3]. Patients with giardiasis typically present with diarrhea, vague abdominal discomfort, nausea and distention together with mild weight loss and lassitude. The absence of these symptoms may result in a low clinical index of suspicion for the diagnosis. Giardiasis is diagnosed by signs and symptoms, as well as the presence of giardia cysts and trophozoites in the stool. Stool examination can be unreliable, as organisms may be excreted at irregular intervals which can produce a false negative test result[4]. There is no gold standard for the diagnosis of giardiasis. The initial method of diagnosis is by demonstration of the trophozoite or cysts of *G lamblia* in the stool by microscopy or stool antigen detection by ELISA. Other methods of diagnosis include examination of duodenal contents by aspiration or biopsy with endoscopy. A definitive diagnosis may require repeated stool examinations, fecal immunoassays, or even sampling of the upper intestinal contents. Two stool examinations can detect 80-90% of infections, while three samples detect >90%[5]. About 20% of infestations are symptomatic, and do not continue for more than 3 mo along with the passage of cysts[2]. Difficulties are often encountered in finding the underlying cause of recurrent abdominal pain. Giardiasis is considered as an infrequent cause of dyspepsia[6], but this might not be true in a third world country. Prevalence of giardiasis is the highest in areas of poor sanitation and drinking water treatment. It is transmitted by eating and drinking contaminated food and water or fecal-oral contact. In immunocompetent patient, small bowel biopsy may show normal histology or villous architecture, but increased intraepithelial lymphocytes and plasma cells in the lamina propria or villous atrophy and inflammatory cells[7]. Giardia trophozoites can be found on the surface or penetrating the epithelium down to the lamina propria[7]. The aim of this study was to investigate the prevalence of giardiasis in patients with dyspeptic symptoms.

MATERIALS AND METHODS

Patients

We carried out a retrospective analysis of medical records of all the patients who attended endoscopy unit of gastrointestinal section at the Aga Khan University Hospital from January 2000 to June 2003 consecutively for dyspeptic symptoms. They had an esophagogastrodu odenoscopy (EGD) with duodenal biopsies after routine examination including stool examination. The giardiasis negative group consisted of the patients who had a stool examination and an EGD with duodenal biopsy and were not diagnosed as giardiasis. The giardiasis positive group consisted of the patients who had positive EGD with duodenal biopsy and stool examination for giardia cysts or trophozoites. Clinical symptoms at the time of presentation, diagnosis, drug treatment dosage and duration, past history of giardiasis, neutrophil and lymphocyte counts from complete blood picture, random blood glucose and stool examination were noted. Patients with diagnosis of celiac disease were excluded from the analysis.

Stool examination

Stool parasitological analysis of samples collected from spontaneous bowel movement was performed. Samples were collected in a sterile container and transported soon after to the laboratory for examination. Microscopically each stool specimen was examined in a fresh normal saline smear and Lugol's iodine preparation.

Esophagogastroduodenoscopy

All endoscopic examinations were performed by staff-members of our hospital's gastroenterology section, using an Olympus video scope GIF xQ 140. Duodenitis was diagnosed when scattered. Reddened raised non-eroded mucosal patches were endoscopically identified in the duodenal bulb and descending duodenum.

Histopathology

Hematoxylin and eosin (HE) staining of duodenal biopsy was used for pathological confirmation of giardia trophozoites. Most organisms were tangentially cut and many were seen as small sickle-shaped objects near the epithelial surface.

Statistical analysis

The SPSS (Release 11.5.0, standard version, copyright © SPSS; 1989-02) was used for data analysis. Descriptive analysis was done for demographic and clinical features. Results were presented as mean±SD for continuous variables, and number (percentage) for categorical variables. Univariate analysis was performed by using the independent sample *t*-test for continuous variables and Pearson's chi-square test for categorical variables to assess the demographic and clinical parameters associated with giardiasis. Odds ratio (OR) estimates with their 95% confidence interval (CIs) and *P* values were calculated (Table 1). $P \leqslant 0.05$ was considered statistically significant. All *P* values were two sided.

RESULTS

Patients

Two hundred and twenty patients fulfilled the criteria. There were 44% (96/220) patients who were giardiasis positive and 56% (124/220) were giardiasis negative. In patients with giardiasis, 72% (69/96) were males and 28% (27/96) were females. The mean age of patients with giardiasis was 28±17 years, while that of patients without giardiasis was 40±18 years ($P<0.001$). Abdominal pain was present in 71% (68/96) patients with giardiasis and in 56% (69/124) patients without giardiasis ($P = 0.02$), diarrhea was present in 29% (28/96) patients with giardiasis and in 14% (17/124) patients without giardiasis ($P = 0.005$, Table 1).

Table 1 Clinical details of patients with and without endoscopic giardiasis

Variables	Giardiasis positive (n = 96) (%)	Giardiasis negative (n = 124) (%)	*P*	OR (95%CI)
Age groups (yr)				
<22	34 (35)	21 (17)		1
22–31	29 (30)	27 (22)		0.7 (0.3–1.5)
32–48	20 (21)	35 (28)		0.4 (0.2–0.9)
>48	13 (14)	41 (33)	<0.001	0.2 (0.1–0.5)
Gender				
Female	27 (28)	43 (35)		
Male	69 (72)	81 (65)	0.301	1.4 (0.8–2.4)
Abdominal pain	68 (71)	69 (56)	0.021	1.9 (1.1–3.4)
Diarrhea	28 (29)	17 (14)	0.005	2.6 (1.3–5.1)
Weight loss	9 (9.4)	6 (5)	0.186	2.0 (0.7–5.9)
Endo-duodenitis	24 (25)	53 (43)	0.007	0.4 (0.2–0.8)
Histological duodenitis	65 (68)	58 (46)	0.002	2.5 (1.4–4.4)
Lamina propria inflammation	73 (76)	53 (42)	<0.001	4.4 (2.4–8.1)
Villus shortening	5 (5)	–	–	–

Results are presented as number (percentage), Odds ratio (95%CI).

Stool examination

Stool examination was carried out in 88.5% (85/96) cases, 6% (5/85) were positive for giardia cysts and trophozoites.

Endoscopy

On EGD, antral gastritis was present in 46% (44/96) patients with giardiasis and in 75% (93/124) patients without giardiasis ($P<0.001$); duodenitis was present in 25% (24/96) patients with giardiasis and in 50% (53/124) patients without giardiasis ($P = 0.006$); duodenal ulcer was present in 4% (4/96) patients with giardiasis and in 72% (89/124) patients without giardiasis ($P<0.001$, Table 1).

Histopathology

On histopathology of gastric antral biopsy, *H. pylori* was seen in 42% (40/96) patients with giardiasis and in 54% (67/124) patients without giardiasis ($P = 0.06$); antral gastritis was found in 53% (51/96) patients with giardiasis and in 81% (100/124) patients without giardiasis ($P<0.001$). Duodenitis was seen in 68% (65/96) patients with giardiasis and in 46% (58/124) patients without giardiasis ($P = 0.002$); villus shortening was seen in 5% (5/96) patients with giardiasis and absent in patients giardiasis negative; lamina propria inflammatory infiltration with increased intraepithelial lymphocytes and plasma cells was seen in 76% (73/96) patients with giardiasis and in 42% (53/124) patients without giardiasis ($P<0.001$, Table 1).

DISCUSSION

It is sometimes difficult to establish the diagnosis of giardiasis. Tests for parasitic antigen in stool are at least as sensitive and specific as good microscopic examination and are easier to perform. All these methods occasionally yield false-negative results.

The implications of this study are that no symptom complex is associated with the giardiasis. Giardiasis may present with abdominal pain alone and it should be considered even in the absence of diarrhea. Abdominal pain is the most common presentation and diagnosis, and investigations carried out are more often for gastritis or peptic ulcer disease with or without *H pylori* infection. Abdominal pain has also been previously found to be significantly associated with the presence of giardiasis[8]. In our study, the incidence of giardiasis was higher in males, which is in agreement with the other studies[9-11]. However, the mean age of our patients was lower and might be attributed to more frequent exposure to this water borne infection because of social activities that involve frequent restaurants beside others. Diarrhea was seen in only 29% of cases. *G lamblia* infestation or other infectious causes were not considered because of the absence of diarrhea in most of these cases and hence a single stool examination was carried out. It is generally held that giardiasis may present with atypical gastrointestinal symptoms but this would be expected in combination with diarrhea[12]. The sensitivity for examination of a single random stool specimen is only 30-50%[13-14]. Hence this might explain the 6% low yield of stool examination in the cases for giardia cysts and trophozoites. Microscopic examination of a single stool sample cannot exclude *G lamblia* infection; therefore, at least three stool specimens should be examined before other diagnostic procedures. As only saline or Lugol's iodine examination of fecal smear was employed, it may have been insufficient in the absence of numerous parasites[14]. Other useful methods such as zinc sulfate floatation, a concentration technique for cysts, were also not employed in our study.

Duodenal ulcer is not a feature of giardiasis, while duodenitis was seen in 25% on endoscopy and in 68% on histology ($P = 0.002$). EGD with duodenal biopsy helps ruling out peptic ulcer as the only cause of symptoms. Giardiasis was associated with the normal endoscopic findings in the duodenum in 75% cases (Table 1). Hence duodenal biopsy should be considered with EGD in patients with abdominal pain as antral biopsy alone may prove inadequate for determining the cause of abdominal pain in a developing country. This is in agreement with the opinion held by some investigators that routine duodenal biopsies should be done in patients undergoing upper intestinal endoscopy[15,16]. In this study, most of our cases on EGD showed normal duodenal mucosa but duodenal biopsy with H&E staining demonstrated *G lamblia* trophozoites (Table 1). Although special stains such as Giemsa or phosphotungstic acid hematoxylin can occasionally be helpful, routine hematoxylin and eosin staining is almost always satisfactory[17].

The data suggesting the role of giardiasis in dyspeptic patients are in contradiction to a previous prospective study[17]. Carr *et al*.[18] carried out a study in an area which is not endemic for Giardia, and demonstrated Giardia in 15.5% of patients presenting with dyspepsia and its prevalence is similar with or without obvious lesions at endoscopy. In their study, only 52% patients presented with abdominal pain, and patients with vomiting and diarrhea as presentation had a significantly increased prevalence of Giardia. However, our data originates from a developing country located in an area endemic for the acquisition of Giardia. In our study, patients more commonly presented with abdominal pain than diarrhea (Table 1). The discrepancy describing a lower frequency of endoscopic duodenitis and higher frequency of histologic duodenitis in infected patients than in non-infected group might be due to a higher prevalence of *H pylori* infection in the latter. However, this was a retrospective observational study with its selection bias and limitations in diagnostic methods. Serial stool examinations were not carried in all patients.

The presentation of giardiasis varies and for diagnosis it requires a high degree of suspicion in the appropriate clinical setting. Examination of duodenal biopsy from patients presenting with abdominal pain should be considered so as to prevent missing diagnosis of giardiasis. Giardiasis is diagnosed more often on EGD with duodenal biopsy rather than on stool examination. As cyst excretion is variable and may be undetectable at times, repeated

examination of properly preserved stool samples and biopsy of the small intestine may be required to detect the parasites. A prospective study is under way to confirm the results of this study.

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