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PREVALENCE OF SOME GASTRO-INTESTINAL PARASITES IN DIABETIC PATIENTS IN TANTA CITY, GHARBIA GOVERNORATE, EGYPT

By
AHMED ALY SABAH[1] AND ASHRAF GABR TEMSAH[2]
Departments of Parasitology, Faculties of Medicine, Al-Azhar University, Cairo[1] and Damietta Branch of Al-Azhar University, Damietta[2], Egypt

Abstract

It is well known that diabetes mellitus affects the immune system negatively through various ways. Diabetic patients are also considered as the immunocompromised group of patients. Infections with intestinal parasites are uncommon to cause high morbidity or mortality to man, but they are risky to diabetic patients. The study investigated the prevalence of common intestinal parasites in diabetic patients in Tanta City. Among the patients who were attending gastrointestinal department (360 patients), complaining of variouse abdominal symptoms and discomfort, thirty three (33) patients were known to be diabetic and on current treatment. Fecal samples were collected from diabetic patients and the same number from non-diabetic patients. Samples were examined macroscopically and microscopically by direct smear and different concentration methods then stained with iodine. The study was carried out through six months from March to August 2015 for common intestinal parasites. In diabetic group *E histolytica* were detected in 13 patients (39.4%), compared to (43%) among controls, *G. lamblia* was detected in a patient (3%) compared to (3%) in controls, *A. lumbricoides* was detected in one patient (3%) compared to (5%) in controls, and *E. vermicularis* was detected in one patient (3%) compared to (3.8%) in controls. The highest level of parasitosis among diabetic patients was *E. histolytica* (39%), but without significant difference between controls and patients. There for one can assume that *E. histolytica* could be considered as a monitor for environmental pollution, low stander hygiene and low standard of living.

Key words: Diabetic patients, *Entamoeba histolytica, Giardia lamblia, Ascaris lumbricoides, Enterobius vermicularis, Schistosoma mansoni, Ancytostoma duodenale*.

Introduction

Diabetes mellitus (DM) is becoming a major chronic disease burden all-over the world, including Egypt (Looker *et al*, 2010). The diabetic patients are considered as the immunocompromised group of patients *(*Kumar *et al,* 2014). Several aspects of immunity are altered in patients with diabetes (Joshi *et al,* 1999; Hansas *et al,* 2011). All these factors increase the risk of invasive microbial s as *Staphylococcus aureus in* diabetic patients (Hakeem *et al,* 2013). The intestinal parasites infection among diabetic patients were studied by several authors in many countries as Egypt (Abaza *et al,* 1995; El Nadi *et al,* 2015), Turkey (Nazligul *et al,* 2001), Iran (Akohlagi *et al,* 2005) and Nigeria (Aknbo *et al,* 2013). Others investigated intestinal parasites infection in immunocompramised patients (Bayoumy *et al,* 2010; Antonios *et al.,* 2010; Al Qobati *et al,* 2012).

The present study intended to investigate the prevalence of the common gastro-intestinal parasites in diabetic patients in Tanta City as it representing the Nile Delta Region.

Subjects, Materials and Methods

Among 360 cases were attending out-patient clinic complained from various abdominal disorders, 29 diabetes mellitus patients with either type I or II and on anti-diabetic treatment were selected. They were 12 males and 21 females with age range from 21-70 years ($\bar{x}$ 50.6$\pm$14.4). This study was approved by the Research and Ethics Committee of Al-Azhar University, according to local research governance requirements. All participants approved to share in accordance with the ethical standards. The clinical examination stressed on fever, pallor, jaundice, urticarial skin rash, liver, spleen and gall bladder. Stool samples were collected from diabetic patients as well as from controlled (non-diabetic). The samples examination: Fresh samples were examined by naked eye (macroscopic) for the presence of *Enterobius vermicularis*, and gravid segments of cestodes (Garcia, 2007). The microscopic examination was done using Kato thick smear method (Katz *et al,* 1970), by simple flotation and by simple sedimentation

(Garcia, 2001), then stained by hematoxylin and eosin as well as modified Ziel-Nelseen (MZN) for *Cryptosporidium parvum* (Garcia and Bruckner, 1997).

Statistical analysis: Data was done using SPSS software (version 15.0, SPSS Inc., Chicago, IL, USA).

Results

The clinical examination of diabetic patients stressed on all manifestations suggesting the gastro-intestinal parasitosis. The liver, spleen, heart and chest were within normal as all were well controlled and follow-up. But, some looked fatigue and weakness, with hypertensive. Symptoms of peripheral neuropathy or autonomic neuropathy present in three male-patients

Table 1; Intestinal parasites as indicated by all methods of examination

Item	*E. histolytica*	*G. lamblia*	*A. lombricoides*	*E. vermicularis*	*S. mansoni*	*A. duodenale*
Diabetics No. 29	13/33 39.4%	1/33 3%	1/33 3%	1/33 3%	1/33 3%	0.0
Controls No. 260	13/30 43%	1/30 3.3%	2/30 6.6%	1/30 3.3%	1/30 3.3%	0.0

Discussion

In the present study, stool examination showed that in diabetic group *E histolytica* were detected in 13 patients (39.4%), compared to (43%) among controls, *G. lamblia* was detected in a patient (3%) compared to (3%) in controls, *A. lumbricoides* was detected in one patient (3%) compared to (5%) in controls, and *E. vermicularis* was detected in one patient (3%) compared to (3.8%) in controls.

Generally, the recent precipitous rise in autoimmune diseases is placing an increasing clinical and economic burden on health systems worldwide (Bilbao *et al*, 2014). Besides, Rydén and Faresjö, 2013) stated that while the mechanisms leading to β-cell destruction and clinical onset of T1D are still unclear, the composition of the immune profile is probably important for the outcome of immune activity. They studied the composition and possible changes of the immunological profile, spontaneously and following stimulation with the auto-antigens GAD65, and HSP60, at the high-risk and T1D onset and further to 8 months post diagnosis. They concluded that changes in immunity in the individuals with high risk of developing T1D points to alterations/actions in the immune system already early in the pre-diabetic phase.

As to the diabetes and parasites, long ago, Pricoli *et al.* (1981) in Portugal examined oral glucose tolerance test performed in 30 patients with intestinal schistosomiasis and 30 controls and found that the mean value of glycemia in the patients was superior, but none of the patients show a diabetic G.T.T. curve. Bessman and Sapico, (1992) stated that a common belief that certain infections occur more frequently in diabetes mellitus patients than in non-diabetics. As in some infections, poor diabetic control is strongly linked. The diabetics comprised 50%-70% of patients who undergo non-traumatic foot or leg amputations, the majority of which were necessitated by infection and necrosis of soft tissue and/or bone. Imputed host defense abnormalities include defective immune responses, peripheral neuropathies, impaired distal arterial supply, and problems in "control" of the diabetic state eventuating in catabolic metabolism. The increased bacterial translocation as a source of the causative bacteria is another potential entry site. Possible virulence factors of the invading organisms include polymicrobial synergism, glycocalyx formation, and inoculum size. Treviño-Pérez *et al*. (1995) in Mexico reported two diabetic patients with normal TCD4+ cell count with the chronic diarrhea caused by *Cryptosporidium parvum* and they added that this parasite must be considered in diabetic patients with diarrhea. Seyrafian *et al*. (2006) in Iran reported that indicate that the prevalence rate of *Cryptosporidium* infection was higher in dialysis patients than in the general population. Moreover, dialyzed diabetic patients had the highest rate of infection. As hemodialysis they were candidates for renal transplantation, general preventive measures against acquiring *Cryptosporidium* infection must be considered. Saunders *et al.* (2007) in the United Kingdom examined whether infection with *Trichinella spiralis* or

Heligmosomoides polygyrus could inhibit the development of autoimmune diabetes in NOD mice and mechanisms involved in protection and the role of Th2 responses. They found that protection from diabetes was afforded by helminth infection, appeared to inhibit autoimmune diabetes by disrupting pathways leading to the destruction of beta cells, and was mediated by seemingly independent mechanisms depending on the parasite but which might be related to the capacity of the host to mount a Th2 response.

Yamada *et al*. (2008) in Japan reported that diabetes mellitus patient with left hemiparesis and disorientation was hospitalized because of atypical non-hypertensive multiple intracerebral hemorrhages and conservatively treated. The patient was readmitted suffering from fever for nearly 2 weeks. Stool examination showed *Metagonimus yokogawai* eggs and after treatment he became normal and his diabetes mellitus (DM) markedly improved. They concluded that DM is a chronic sign of metagonimiasis in carriers and that the intracerebral hemorrhage might be an acute sign in the aggravated phase of the disease.

Baiomy *et al*. (2010) in Greater Cairo studied the prevalence of the opportunistic parasites among 100 immunocompromised patients selected from Al Azhar University Hospitals. They were 40 malignancy patients, 30 with DM and 30 with chronic renal failure. Also, 20 cross-matched healthy controls were included. The results showed that the opportunistic parasites were in 30% of patients and in 10% of healthy controls. The highest parasitosis was in the malignancy patients (18%). The patients suffering from chronic renal failure or from diabetes mellitus were equally affected (6% each group). There was significant relation between malignancy patients and the diabetic or chronic renal failure ones, but without significant relation between diabetic and chronic renal failure patients. *G. lamblia* was the most common parasite found in patients (10%) of which 5% were among those with the malignancy, others were the *C. parvum* (7%), *Cyclospora cayetanensis* (3%) and *Microsporidia* species (2%). The mixed infection with both *C. parvum* and *Cyclospora* was detected in two patients. But, in the study neither *Isospora belli* nor *Strongyloides stercoralis* were detected. They added that ELISA showed antibodies against *Toxoplasma gondii* in six patients but none against *Leishmania d. infantum.*

El Nadi *et al.* (2015) in Upper Egypt, stated that intestinal parasites usually create benign diseases, though they may induce complications with high morbidity and mortality to the immunocompromised, including the diabetic patients. They studied the prevalence of intestinal parasitic infections in diabetic patients, comparing to non-diabetic controls and other parameters. They found that in the diabetic patients, *G. lamblia* was in 22 cases (22%) and 5 (5%) among controls, *E. histolytica* in 7 cases (7%) and 3 (3%) among controls, *Hymenolypis nana* in 5 cases (5%) and 3 (3%) among controls, *E. coli* in 8 patients (8%), *E. hartmanni* in 3 cases (3%), *Dientamoeba fragilis* in a case (1%), *C. parvum* in 5 cases (5%) and microsporidia in 3 cases (3%). On the other hand, they neither found, *E. coli, E. hartmanni, D. fragilis* and *C. parvum* nor microsporidia in controls. The rate of *G. lamblia* in DM patients compared to controls was high significant ($P<0.001$). *Hymenolepis nana* was 5% (5 cases) in diabetic patients compared to 3% (3 cases) in controls.

Conclusion

The present outcome data highlights the risk of parasitic infection to the diabetic patients. No doubt, the parasitosis treatment might improve the diabetes levels

Recommendations

1. Diabetes mellitus should be controlled as much as it should be to avoid risk of infection.
2. Gastro-intestinal parasitic infections should be treated promptly in uncontrolled diabetic patients.
3. The improvement of the socio-economic condition.
4. The parasitic infections could differ from one place to another even in the same country affected by environmental and biological factors as well as and human attitude and behaviors.
5. Health education is a must to improve their knowledge about parasites infection and prevention.

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