Detection of Parasites During Upper Gastrointestinal Endoscopic Procedures

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Background and study aim: Helminthic and protozoal infestation of the alimentary tract is endemic in tropical and subtropical areas and also occur in temperate zones. The aim of this study was to evaluate the frequency and characterization of parasites detected during upper digestive endoscopic procedures.

Patients and methods: Retrospective analysis of the records of patients exposed to upper endoscopic procedures in the endoscopy units, Tropical Medicine Department, Zagazig University Hospitals, Egypt in a 5 year period extending from January 2007 to January 2012. A total of 4925 cases were included; 4708 cases for gastrodudenoscopy (EGDS) and 217 cases for endoscopic-retrograde-cholangio-pancreatography (ERCP). All cases were reviewed as regard age, sex, residence, indications for endoscopy and endoscopic features. Cases with parasitic infestations were characterized regarding the mentioned variables.

Results: A total of 8 cases with parasitic infestations were described. Six cases detected by EGDS and 2 cases by ERCP. Five cases were *Ancylostoma duodenale* , one case *Ascaris lumbricoides*, one case *Strongyloides stercoralis* and one case *Fasciola hepatica*. Most cases were presented with anemia and persistent epigastric pain. Seven cases were associated with duodenitis on endoscopic examination.

Conclusion: Parasites are not common findings during upper digestive endoscopic procedures, and should be suspected in patients with anemia and persistent epigastric pain.

INTRODUCTION

Helminthic and protozoal infestation of the alimentary tract are endemic in tropical and subtropical areas and also occur in temperate zones [1]. It is estimated that the world wide prevalence of intestinal nematode infections to be more than one billion people of which several millions have clinical disease due to *Ascaris lumbricoides*, *Trichuris trichiura* and hookworms [2,3]. Parasites of gastrointestinal tract have various and wide spectrum of presentations as parasites infest and inhabit upper or lower gastrointestinal tract, pancreas, liver, gall bladder and biliary tree [1]. The diagnosis of intestinal parasites is usually made by stool examination. Adult worms can be incidentally found during endoscopic examination [4].

PATIENTS AND METHODS

This retrospective study was conducted in Tropical Medicine Department, Zagazig university Hospitals, Sharkia Governorate, Egypt. We retrospectively reviewed the records of all patients presented to both esophag-gastro-duodenscopy (EGDS) and endoscopic-retrograde-cholangio-pancreatography (ERCP) units in the period from January 2007 to January 2012 .

Inclusion criteria:

1- Age ≥18 years.

2- Non-emergency endoscopy

3- Records containing all the relevant data

Exclusion criteria: Exclusion of cases with

1- Emergency endoscpoy

2- Incomplete files

3- Patients in whom the procedure was not completed (reaching the second part duodenum in EGDS and biliary cannulation in ERCP).

Patients:

A total of 4925 cases (4708 cases with EGDS, 217 cases for ERCP) attended to the endoscopy units of our department in the period of examination. They were reviewed as regard the demographic data, presentations, indications of endoscopy and endoscopic features. All cases of EGDS after fixation of a cannula enter the endoscopy theater were they lie on left lateral position and the endoscope pass after iv 7.5 mg midazolam or 10 mg diazepam as a sedative. The endoscope pass through the mouth, pharynex, esophageus, stomach, pylorus through the second part of the duodenum. In patients with ERCP the anathesiology reviewed all cases and only cases fit for general anesthesia were operated .

All the studied patients were subjected to the following:

I. Detailed history taking, with special attention to age, sex, presentation, residence and indication for endoscopy .

II. Complete procedural examination. In cases of EGDS examination was considered complete when the endoscope reaches second part of the duodenum. In ERCP examination was considered complete when opacification of intra and extra hepatic bile ducts was successful .

STATISTICAL ANALYSIS

Data were expressed as mean ± SD for quantitative variable, number and percentage for qualitative one.

RESULTS

The demographic data of all cases are presented in table 1. The majority of our cases are males and of rural residence. Follow up sclerotherapy is the most frequent indication for upper GIT endoscopy in our theater and obstructive jaundice is the main indication for ERCP.

Table (1): Shows the data of all patients.

	Number	Percent (%)
Age (years)		
Range	19-59	
$\bar{X}$ ± SD	41.8 ± 9.2	
Sex		
Male	3199	65
Female	1724	35
Residence		
Rural	2904	59
Urban	2019	41
Presentation of EGDS (n=4708)		
Follow up	2946	62.6
Haematesis	511	10.9
Melena	341	7.2
Epigasrtic pain	841	17.9
Anemia	32	0.7
Others	37	0.7
Presentation of ERCP (n=217)		
Obstructive Jaundice	198	91
Billiary pain	19	9

EGDS esophag-gastro-duodenscopy, ERCP endoscopic-retrograde-cholangio-pancreatography .

During the 5 years period a total of 8 cases of parasitic infestation were determined. The adult worm was the detected stage in each case, confirmation of the morphologic features was done in the parasitology laboratory. Demographic and clinical characteristics of cases are described in table 2. All cases are of rural residence. *Ancylostoma* parasites was most frequent one where 5 cases were determined. *Ascaris*, *Strongyloides* and *Fasciola* each was

detected in one separate case. Most cases had upper abdominal pain and anemia as presenting manifestation. Most cases were referred to the endoscopy unit from the outpatient clinic (50%) and this means that manifestation were not handicapping, this was not the role in one case that was referred from the cardiology department were the patient with severe anemia was admitted due to exertional chest pain. Two cases was referred from the general surgery department for ERCP and was proved to be *Ancylostoma and Fasciola hepatica*. One case was admitted in our inpatient ward due severe anemia.

Table (2): Demographic and clinical characteristics of cases with parasitic infestation.

Case	Age (years)	Sex	Residence	Presentation	Referral	Worm
1	25	F	Rural	Epigastric pain, anemia	Outpatient	*Ancylostoma*
2	65	M	Rural	Epigastric pain, anemia, exersional chest pain	Cardiology	*Ancylostoma*
3	55	F	Rural	Epigastric pain, anemia	Outpatient	*Ancylostoma*
4	33	F	Rural	Right hypochondrial pain, CBD dilatation	Surgery	*Ancylostoma*
5	35	M	Rural	Epigastric pain, anemia	Outpatient	*Strongyloides*
6	58	M	Rural	Epigastric pain	Outpatient	*Ascaris*
7	34	M	Rural	Anemia	Inpatient	*Ancylostoma*
8	49	M	Rural	Obstructive jaundice	Surgery	*Fasciola*

F female, M male,EGDS esophago-gastro-duoenoscopy, CBD common bile duct, ERCP endoscopic retrograde cholangiopancreatography

The laboratory and endoscopic characteristics of patients having parasites during endoscopic examination are shown in table 3. Six cases were detected by diagnostic upper endoscopy while 2 cases were detected by ERCP. All cases of *Ancylostoma* had anemia, four cases had hemoglobin level <10 gm%, both *Strongyloides* and *Ascaris* cases had mild anemia and epigastric pain while *Fasciola* presented with obstructive jaundice. Although was not severe, most cases had signs of duodenitis in the form of mucosal erythema and congestion. One case had in addition mild antral gastritis, one case had papillitis and one case had no morphologic features of duodenitis.

Table (3): Laboratory and endoscopic characteristics of cases with parasitic infestation.

Case	Hemoglobin (gm%)	Endoscopic procedure	Site of detection	Endoscopic features
1	9	EGDS	Duodenum Second part	Gastritis, Duodenitis
2	6.5	EGDS	Duodenum Second part	Duodenitis
3	9.7	EGDS	Duodenum Second part	Duodenitis
4	11	ERCP	Duodenal papilla	Papillitis, Duodenitis
5	10.5	EGDS	Duodenum Second part	Duodenitis
6	10.1	EGDS	Duodenum Second part	Gastritis, Duodenitis
7	4.5	EGDS	Duodenum Second part	Duodenitis
8	12.5	ERCP	CBD, Duodenal papilla	Unremarkable

EGDS esophago-gastro-duoenoscopy, CBD common bile duct, ERCP endoscopic retrograde cholangiopancreatography.

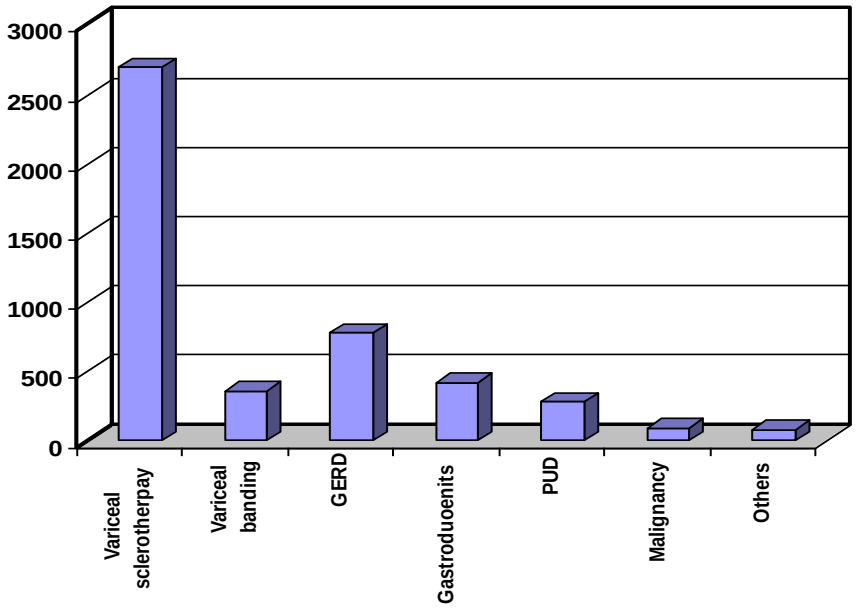


Figure (1): Endoscopic findings during EGDS.

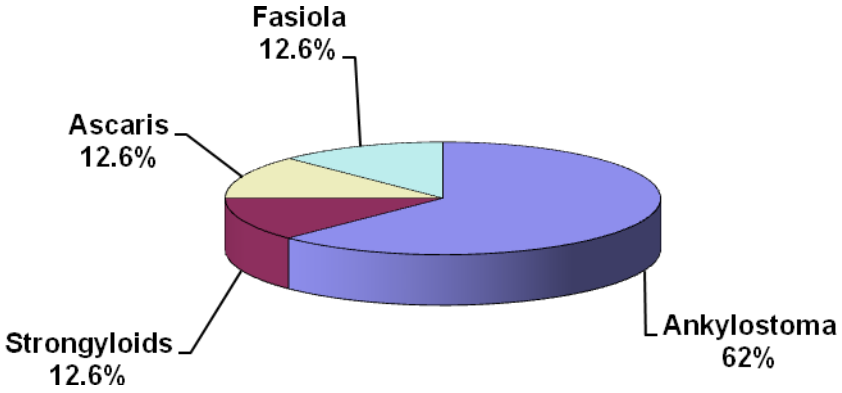


Figure (2): Types of parasite found during endoscopic procedures.

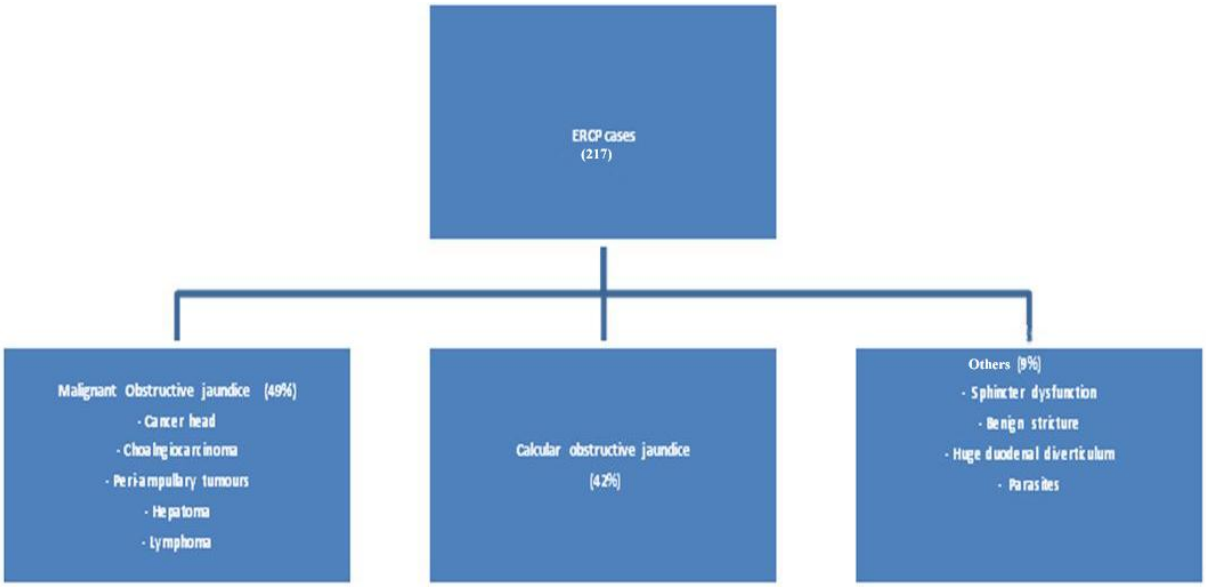


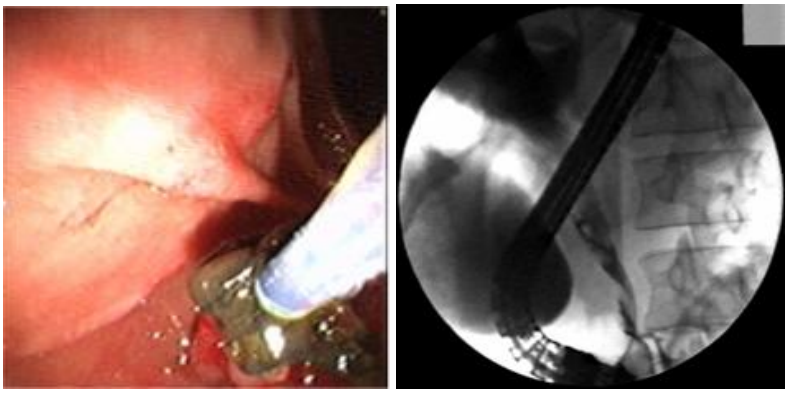
Figure (3): Results of ERCP

(a) (b)

Figure (4): Parasite *Ancylostom*a emerging from the duodenal papilla (a) while cannulation (b) (case 4).

(a) (b)

Figure (5): *Ascaris* worm detected in 58 years old male, before (a) and after (b) endoscopic extraction (case 6).



(a) (b)

Figure (6): *Fasciola hepatica* worm grasped by biopsy forceps (a) on clearance of CBD during ERCP (b) (case 8).

DISCUSSION

Usually, the diagnosis of alimentary tract parasites is made by the characteristic findings such as eosinophilia and egg shape appearance on fecal examination [1]. However, misdiagnosis may be due to the absence of eggs of the parasites in stools or eosinophilia. Upper endoscopy is a very important tool for the diagnosis of gastrointestinal problems, and there are some reports of parasitic diagnosis during routine upper endoscopy [4-6]

Parasites may be missed during routine upper endoscopy, and this may be due to the observation that the nematode is often hidden among gastric folds, and can be confused with gastric mucus. Consequently, the use of narrow band imaging has been recently suggested to improve parasite detection at endoscopy [7]. Although diagnostic upper endoscopy my detect adult worms the introduction of push enteroscopy and capsule endoscopy detected more lesions related to this form of infection e.g. erythematous rings with central fibrin points that may represent a source of occult blood loss [8].

Parasites especially hookworms are common causes of occult gastrointestinal bleeding and anemia especially in the tropical countries [9]. Six out of our eight cases had anemia, and this may be due to blood suction by the infesting parasite or blood loss from pathological lesions induced by these parasites. Gastrointestinal blood loss associated with hookworm infestation is always occult but massive bleeding is uncommon [10,11]. Each worm sucks between 0.1 and 0.4 ml of blood/day. It can be responsible for a daily blood loss up to 250 ml/day in heavy infection. The severity of blood loss in hookworm disease depends on the acuteness and magnitude of infestation [12]. These notions explain the severe anemia (hemoglobin <10 gm%) noticed in 4 cases in this study, all were infested by the hookworm Ancylostoma. Bleeding by Ascaris is probably due to produced toxins by the worm that lead to multiple intestinal erosions which may cause the bleeding [8]

When a worm is found in the duodenum during upper gastrointestinal endoscopy, differential diagnosis is important to determine the diagnosis for the appropriate treatment. This can be achieved according to the morphology of the worms under microscopy and the location where they are detected. All our cases were confirmed by appearance of the adult worm and microscopic examination in the laboratory. The common intestinal worms include hookworms, *Ascaris lumbricoides, Trichuris trichiura, Enterobius vermicularis, Strongyloides stercoralis, Capillaria phillippinensis,* and *Anisakis.* In Egypt the most common gastrointestinal parasites are *Ascaris lumbricoides, Enterobius vermicularis, Heterophyes heterophyes, Fasciola, Schistosoma mansoni, Hymenolepis nana, Ancylostoma duodenale* [13,14]

Whipworm is 30-50mm in length and inhabits the large intestine (especially around cecum). Pinworm also inhabits the same areas as the whipworm. Therefore, both parasites are very rarely observed during upper gastrointestinal endoscopy and that is why none of these worms were not detected in this study. *Ascaris* is a large roundworm (15-40cm in length) and inhabits the small intestine and hence could be detected during upper endoscopy. The rest of the parasites, including hookworm, usually reside in the upper portion of small intestine; but it is hard

to distinguish them only by endoscopy [12] and that is why parasitological confirmation is needed.

The frequency of parasitic infestation in our study is 0.16% among cases exposed to upper endoscopic procedures, this in part is due to inclusion of therapeutic endoscopies (mainly variceal injection and banding), and this is directly related to the high prevalence of cirrhosis and portal hypertension in Egypt [15,16].

Our findings denote that parasitic detection during upper endoscpic procedures is an incidental event. This in part is due to the decrease in the prevalence rates of parasitic infestations in Egypt due to good hygienic measures, sanitation and the improved health care systems regarding the availably and efficacy in diagnosis and treatment [13]. Rural communities of Egypt, although developed than before, still had a high prevalence of parasitic infestation [13,14,17,18] and this may be related to different causes which include poor sanitary conditions, lack of proper sewage disposal systems, lack of proper heath awareness and sometimes also lack of efficient health care systems. This is confirmed in this study where all cases of parasitic infestation are of rural origin.

Men appeared as the main victims in studies concerned with parasitic infestations during endoscopy [14,19,20], in our study 62.5% cases were males and 37.5% were females, and this may be related to more risk of exposure in men than women.

Few papers studied the duodenal changes induced by parasitic infections. Epidemiological data are poor and the relevance of works outlining the parasitic duodenitis profile is not clear. The most common endoscopic findings are mucosal edema, erythema, friability, white villi, erosions and pseudopolyps [20-22]. One large study from Brazil [20] showed villus atrophy and reactive epithelium were the dominant histological changes in *Strongyloides* and *Cryptosporidium* cases and were more prominent in patients with concomitant HIV infection. The study concluded that there are no endoscopic and histopathological findings said to be pathognomonic of parasitic duodenitis [20]. However, in our community, parasitic duodenitis might be suspected when it occurs in the context of systemic and/or mucosal esinophillia and also when duodentis is associated with negative *Helicobacter pylori* tests.

Obstructive jaundice due to parasitic agents may be predicted by systemic esinophillia and detection of parasites on ultrasound examination, CT or MRI. In general, neither the clinical presentation nor the general laboratory findings are sufficiently unique to raise the possibility of a parasitic biliary infestation in the mind [23]. In this study 2 cases of obstructive jaundice were found,; one case due to *Fasciola hepatica* worm and another case due to incidental infestation of the biliary tree by *Ancylostoma* worm. These findings coincide with the endemicity of both infections in the rural community of Egypt [13,23-25].

Improved sanitation, hygiene and chemotherapy have made hookworm infestation a rarity in developed countries, but it is still endemic. Although it is less common than other diseases such as neoplasm and ulcer, parasite infection should always be considered as a differential diagnosis in patients with iron-deficiency anemia and unexplained gastrointestinal blood loss, especially in poor sanitary areas. It is also crucial to observe the distal duodenum carefully in upper endoscopy although parasite infestation is not suspected clinically [12].

In conclusion, detection of parasites during upper gastrointestinal endoscopic procedures is an incidental event. Detection of parasites in the duodenum should be suspected in patients with anemia and persistent epigastric pain. Biliary parasites should be kept in mind while evaluating rural cases with obstructive jaundice.

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Conflicts of Interest: Non.

Ethical Approval: Not needed (retrospective study).Informed consents were routinely obtained from patients attending endoscopy.

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