Gastrointestinal parasites presentations and histological diagnosis from endoscopic biopsies and surgical specimens

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ABSTRACT

Objective: To diagnose parasitic ova or worms during endoscopy, surgery or by histology from endoscopic or surgical specimen in our patients.

Methods: The diagnosis of parasitic disease in our patients was made by histological examinations from biopsies obtained either during an upper gastrointestinal or lower gastrointestinal endoscopy or from surgical specimens.

Results: Parasites were seen in endoscopic biopsies from upper gastrointestinal tract in 21 patients. Schistosoma ova was seen in biopsies from stomach or duodenum (12 patients). Small intestine biopsies showed Giardiasis (8 patients) and strongyloides (1 patient). Colonic biopsies showed schistosoma ova by paraffin section or by squash technique in 216 patients. Surgical specimens from 12 patients, who presented with acute abdomen and had surgery, due to appendicitis in 8 patients, in whom specimens showed (Schistosoma in 5 patients, amoebiasis in 2 patients and Trichuria in 1 patient). Four other patients presented with acute abdomen, where ischemic bowel necrosis or mesenteric vein thrombosis was found during surgery, specimens showed schistosoma ova.

Conclusion: The diagnosis of gastrointestinal parasites is not only made by stool but the diagnosis can be made by histology from endoscopic biopsies or surgical specimens.

Keywords: Gastrointestinal tract parasite, parasites, histological, endoscopy.

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Helminthic and protozoal infestation of the alimentary tract are endemic in tropical and subtropical areas but also occur in temperate zones. Recent estimates of world wide prevalence of intestinal nematode infections, suggest that one billion people are infected of which several millions have clinical disease due to A. lumbricoides, T. trichiura and hookworms.^{1,2}

The diagnosis of intestinal parasites is usually made by stool examination. Larva or adult worms can be incidentally found during endoscopy examination or diagnosed by endoscopic biopsies. Parasites may also present as acute abdomen and these parasites can be diagnosed during laparotomy or from surgical specimens.

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. Parasites cause different types of mucosal lesions in the gastrointestinal tract. Ova, larvae or adult worms as a result from injury and invasion, cause mechanical damage. Patients suffering from AIDS or other immunodeficiency syndromes, may develop severe and fatal parasitic diseases such as amoebiasis, strongyloidiasis, cryptosporidiasis and isoporiasis.^{3,4}

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Table 1	- Portal hypertensive	gastropathy in s	chistosomiasis	histological and	gastroscopic findings.
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Histology	No of patients with gastroscopy findings in stomach						
Stomach biopsies	Mild-moderate gastritis	Severe gastritis	Erosions	Congestion	Ulcers	Normal	
Mild-moderate inflammatory cells	2	-	4	1	-	-	
Severe inflammatory cells	2	2	3	6	-	-	
Capillary dilatation	-	-	2	3	1	-	
Schist. Ova (paraffin (sec)	-	-	-	2	-	-	
Schist. Ova (Crush prep)	-	-	2	-	-	-	
Helicobacter pylori	-	1	1	3	-	-	
No. significant abnormality	2	-	-	-	-	2	

Mucosal biopsies using endoscopic biopsy forceps will identify the presence of parasites, the extent of mucosal involvement and evidence of malabsorption, as well as other lesions.⁵ This communication is a review on parasites affecting gastrointestinal tract and also presents our experience at the Gastroenterology Department, Armed Forces Hospital, Riyadh, Saudi Arabia.

Methods. Between 1983 and 1997, at the Gastroenterology Department, Riyadh Armed Forces Hospital, 33,355 patients had upper gastrointestinal patients had endoscopies and 5,062 lower gastrointestinal endoscopies (either sigmoidoscopy or During upper gastrointestinal colonoscopy). endoscopy and when indicated in patients suspected with parasitic disease, biopsies were taken from duodenum and in some patients with schistosomiasis, biopsies were taken from the stomach for histological examination or for crush technique (squash technique) for ova. Usually during sigmoidoscopy or colonoscopy in patients suspected with sichistosomiasis, at least 3 colonic mucosal biopsies are taken even if colonic mucosa looked normal during the endoscopic examination.

Results. Upper gastrointestinal endoscopy. We have reported previously that several of our patients with bleeding oesophagul and gastric varices or portal hypertensive gastropathy were due to schistosomal liver disease.^{6,7} We have also studied the endoscopic findings in 34 patients with portal hypertensive gastropathy due to schistosomiasis and in all the biopsies that were taken from the stomach and duodenum for schistosomiasis, 4 with schistosoma ova was seen in stomach biopsies (Table 1). In 8 patients, duodenal biopsy showed schistosoma ova, in which one showed villous

atrophy (Figure 1A and B). One patient presented with abdominal pain and vomiting. Gastroscopy showed multiple Ascaris lumbricoides worms and this was also shown in barium meal. Giardia lamblia was isolated from duodenum biopsy in 8 of our patients, one of these who had malabsorption biopsy showed villous atrophy. The endoscopic findings were non specific and showed only inflammation, erosions or whitish nodules. In 4 of these patients, 3 stool examinations did not show Giardia lamblia (Figure 2A). One other patient had malabsorption biopsy and duodenal revealed strongyloides stercoralis ova (Figure 2B).

Lower gastrointestinal endoscopy. Of 3 patients presented with bleeding per rectum, colonoscopy revealed multiple ulceration. Biopsy from which showed multiple Entaemoebaa histolytica. One patient presented with pruritis ani. Sigmoidoscopy clarified the presence of multiple Enterobious vermicularis worms. Previously, we reported the

 Table 2
 Endoscopic findings in 216 patients with colonic schistosomiasis.

Endoscopic appearance	Rectum	Colon	Rectum + Colon	Total
Patchy mucosal congestion + petechiae	24	11	26	61
Patchy erosions + ulcerations	09	03	10	22
Telengiectasis	01	02	04	07
Polyps	03	05	-	08
Normal	-	-	118	118
Total	37	21	158	216



Figure 1A - Endoscopic view of duodenum showing inflammatory changes, whitish spots and nodularity due to schistosoma mansoni.



Figure 2A - Duodenal biopsy showing many Giardia Lamblia.



 $Figure\,1B$ - Biopsy from duodenum showing schistosoma ova and inflammatory cell infiltrates involving mucos and submucosa.



 $Figure\,2B$ - Adult strongyloides stercoralis embedded in duodenal mucosa.



Figure 3A - Sigmoidoscopic view of rectum mucosa showing petechiae and hemorragic areas due to schistosoma mansoni infestation.



 $Figure \, 3B$ - Mucosal biopsies showing schistosoma mansoni ova by squash technique.

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Figure 4A - Appendicectomy specimens showing T. Trichiurus ova.

colonoscopic findings in 216 patients with schistosomal colonic disease.⁸ The endoscopic findings of which can bee seen in Table 2. The colonic biopsies showed schistosoma ova either by paraffin section or histology. (Figure 3A and B).

Acute abdomen. Acute abdomen develops if parasites involve the appendix, mesentery or cause peritonitis or obstruction in small or large bowels. Eight of our patients presented with acute appendicitis, had surgery. Appendectomy specimen showed parasitic appendicitis due to amoebiasis in 2 patients, schistosomiasis in 5 patients and trichiurus in one patient. (Figure 4A and B). One patient had intestinal obstruction that was found to be due to multiple Ascaris Lumbricoides worms involving the small bowel. Four of our patients with schistosomal liver disease presented with acute abdomen or subacute intestinal obstruction. Three patients were found with mesenteric vein thrombosis, due to



Figure 4B - Appendicectomy specimens showing Entamoeba histolytica trophozoite.

multiple schistosoma ova or worms causing bowel necrosis (Figure 5A). The fourth patient presented with subacute intestinal obstruction laparotomy, showed multiple calcified ova in the mesentery and around the colon with multiple adhesions. Histology showed granuloma with multiple schistosoma ova (Figure 5B).

Discussion. Upper GIT parasites present with abdominal pain, vomiting and peptic ulcer-like symptoms. Mucosal lesions in the stomach are caused by wandering parasites leading to mechanical injury and bleeding as in anisakias larva or ascaris.⁹⁻¹¹ Parasites can be found in the stomach or duodenum during endoscopy.^{12,13}

There is substantial variations among individuals in susceptibility to a wide variety of parasitic diseases. Part of these variations included



Figure 5A - Surgical specimen showing adult schistosoma worm in mesenteric vessel.



Figure 5B - Surgical specimen showing multiple schistosoma granuloma or ova in mesentery.

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environmental factors, genetic factors, nutritional and immunity state, health, hygiene, socio-economic factors, immigration and travelling.^{14,15}

Parasites can establish a relatively prolonged residence or colonization of the host alimentary tract interfering with the host acquisitions of nutrients by maldigestion, malabsorption, intestinal losses and competition with the parasitic burden can impair growth and nutrition with helminthic infections.^{16,17} Diarrhea anemia and malabsorption results from parasite injury, invasion or inflammation of the mucosal absorption surface of the small intestine, as giardia, hookworm or fish tape worm. in Strongyloides stercoralis larva, usually embedded in small intestinal mucosa, leads to mucosal atrophy and malabsorption. Anclystoma duodenal and Diphlobothrium Latum causes iron deficiency and vitamin B12 deficiency.

Giardia lamblia parasite lives in the duodenum. Patients present with abdominal pain, dyspepsia and diarrhea. Involvement of duodenal mucosa in chronic giardiasis might lead to malabsorbtion.¹⁸ In some patients, chronic giardiasis treatment might be difficult and endoscopic installation of mepacrine into duodenum might be effective.¹⁹ Duodenal aspirate or duodenal biopsies from 8 of our patients showed giardia lamblia which was diagnosed by endoscopic biopsies from duodenum with or without villous atrophy. Previously, we have also studied the value of duodenal aspirate in diagnosis of Giardia lamblia infection and we have found that the diagnostic yield of aspirate was better than stool examination.20

Lower GIT parasites present with diarrhea, non specific abdominal pain, discomfort or distension. Pruritis ani is a common presentation of Enterobius vermicularis infection. Acute or chronic bleeding per rectum results from colonic erosions or ulcerations in amoebiasis or schistosomiasia.^{21,22}

Parasites such as Taenia, Trichuris trichunia or Ascaris lumbericoids might cause heavy infestation and may lead to intussusception or intestinal obstruction and in certain cases may lead to perforation of the bowel.²³ Ascaris migrates into the pancreatic duct and leads to recurrent pancreatitis or into biliary tree causing obstructive Jaundice and cholangitis.²⁴ Acute abdomen also occurs due to peritonitis paralytic perforation, or ileus. Hemoperitoneum may result from liver flukes infestation or anisakiasis. Parasites can involve appendix and present with acute appendicitis.

Schistosomiasis involves the small bowel mucosa and the mesentery may be involved.²⁵ Patients may present with acute abdomen. Intussusception can result due to bilharzial polyps. Inflammatory masses in the intestinal wall (bilharziomas) may be formed and the muscular layer and serosa of the intestine may be involved with granulomatous formation which results in exudative peritonitis or mesenteric vein thrombosis and bowel ischemia.^{26,27} Four of our patients presented with acute abdomen and had laparotomy. At surgery they were found to have small bowel necrosis. Histology showed mesenteric vein thrombosis due to schistosoma ova.

Appendicitis occurs secondary to obstruction by several parasites.^{28,29} Heavy infestation with parasites such as Ascaris, Trichuris and Tenia cause volvulus, intusussuception and intestinal obstruction.^{9,23} In schistosomiasis, appendicitis might develop due to obstruction or due to other factors. Parasites such as Enterobius, Trichuria, Hymenolopus and Amoebia can also be seen in the appendix. A study from India, revealed that in 2.5% of patients who had a appendectomy were due to parasites such as E Vermicularis, E histolytica, A. Lumbricoides, Trichiura and Taenia spp, may have a causal role in appendicular pain and chronic inflammation.³⁰⁻³²

In our hospital 8 patients presented with appendicitis. Appendix specimens showed parasitic appendicitis due to amoebiasis (2 patients) schistosoma (5 patients), and T Trichuria trichuria (1 patient).

Several parasites involve the colon and present as acute presentation or chronic presentation. Adult worms usually inhibiting small intestine like Ascaris lumbricoides may pass down into the colon. Enterobius vermicularis and Trichius trichuria adult worms usually live in caecum and are sometimes found in rectum.^{30,31} These parasites can be seen during colonoscopy and can be extracted.

Entomoeba histolytic causes abdominal pain and diarrhea with blood. The amoeba causes ulceration of the bowel mucosa and this might lead to some bleeding. In this situation, vegetative forms of amoeba might be recovered from stool. In chronic amoebiasis, the symptoms are recurrent and stool shows entamoeba cyst.33,34 In amoebic colitis, the colonic mucosa during colonoscopy looks granular, hyperemic, friable, ulcerated and may simulate inflammatory bowel disease.³⁵ Amoeboma in the caecum may present as right iliac fossa mass and during colonoscopy is seen as erythematous, oedematous and irregular polypoid mass with superficial ulceration which can be misinterpreted as carcinoma.

In a study from Egypt, it was found that the prevalence of amoebiasis in patients with schistosomal colonic polyposis was 37% compared to 15% in schistosomal patients without polyposis and 11% in non-schistosomal patients.³⁶ In our unit between 1979 and 1985, 1,660 lower gastrointestinal tract endoscopies were performed due to different gastrointestinal problems. In 31% of these patients, the colonic biopsies taken during endoscopy showed an abnormality. One hundred and sixty seven patients had colonic schistosomiasis and 5 had schistosomal polyps. In 5 patients, the colonic biopsies showed amoebic colitis, one of these

patients had a severe amoebic colitis with ulcerations and later developed a rectal stricture which needed dilation.3

Colonic mucosal lesions in schistosomiasis (Table 2) include diffuse or patchy areas of redness, telangiectasis like lesions, petechiae and mucosal vessels congestion and hyperemia, erosions, ulceration and polyps.⁸ Bilharzial strictures are rare and occur in the rectum. They are usually annular and due to bilharzial ulceration healing by fibrous Rarely colonic strictures develop due to tissue. extensive fibrosis.8

Carcinoma of the colon has been reported as a complication of long standing colonic Schistosoma japonicum infection. Development of colonic malignancy with Schistoma mansoni has not been established.27,38-40

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