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Detection of Parasites During Upper Gastrointestinal Endoscopic Procedures

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Key words:

Parasites,
Ancylostoma, *Ascaris*,
Strongyloides,
Fasciola, Endoscopy.

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 gastroduodenoscopy (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-duodenoscopy (EGDS) and endoscopic-retrograde-cholangio-pancreatography (ERCP) units in the period from January 2007 to January 2012.

Inclusion criteria:

- 1- Age \geq 18 years.
- 2- Non-emergency endoscopy
- 3- Records containing all the relevant data

Exclusion criteria: Exclusion of cases with

- 1- Emergency endoscopy
- 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, pharynx, esophagus, stomach, pylorus through the second part of the duodenum. In patients with ERCP the anesthesiology reviewed all cases and only cases fit for general anesthesia were operated .

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

	Number	Percent (%)
Age (years)		
Range	19-59	
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
Haematemesis	511	10.9
Melena	341	7.2
Epigastric pain	841	17.9
Anemia	32	0.7
Others	37	0.7
Presentation of ERCP (n=217)		
Obstructive Jaundice	198	91
Biliary 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.

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.

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	<i>Ancylostoma</i>
2	65	M	Rural	Epigastric pain, anemia, exertional chest pain	Cardiology	<i>Ancylostoma</i>
3	55	F	Rural	Epigastric pain, anemia	Outpatient	<i>Ancylostoma</i>
4	33	F	Rural	Right hypochondrial pain, CBD dilatation	Surgery	<i>Ancylostoma</i>
5	35	M	Rural	Epigastric pain, anemia	Outpatient	<i>Strongyloides</i>
6	58	M	Rural	Epigastric pain	Outpatient	<i>Ascaris</i>
7	34	M	Rural	Anemia	Inpatient	<i>Ancylostoma</i>
8	49	M	Rural	Obstructive jaundice	Surgery	<i>Fasciola</i>

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

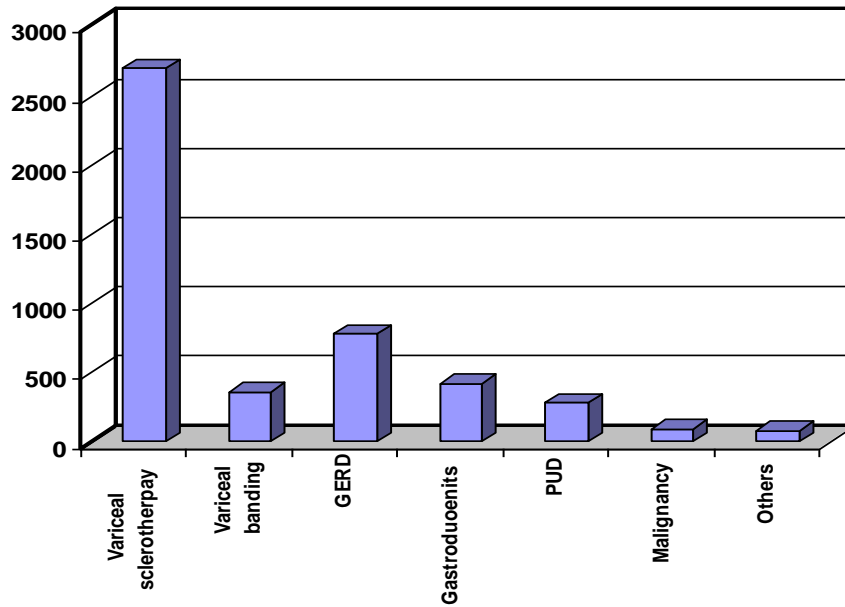


Figure (1): Endoscopic findings during EGDS.

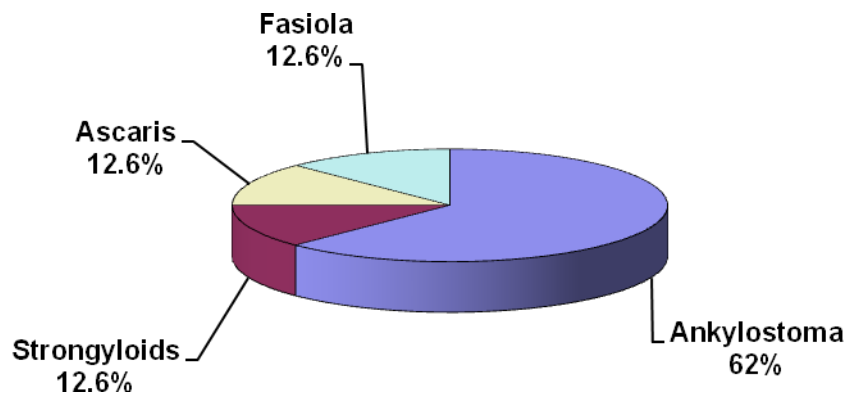


Figure (2): Types of parasite found during endoscopic procedures.

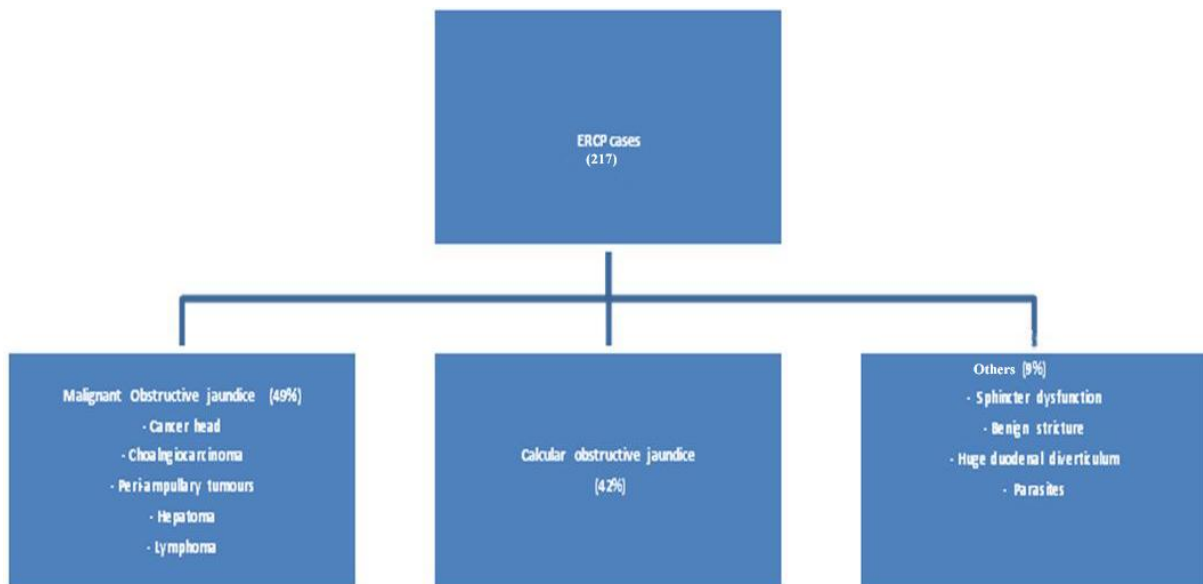
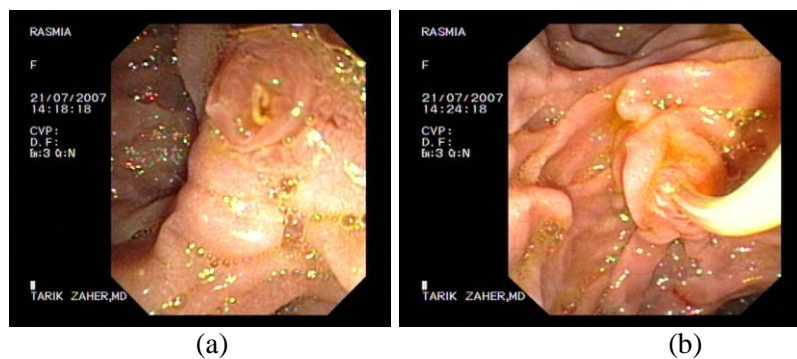


Figure (3): Results of ERCP



(a)

(b)

Figure (4): Parasite *Ancylostoma* 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).

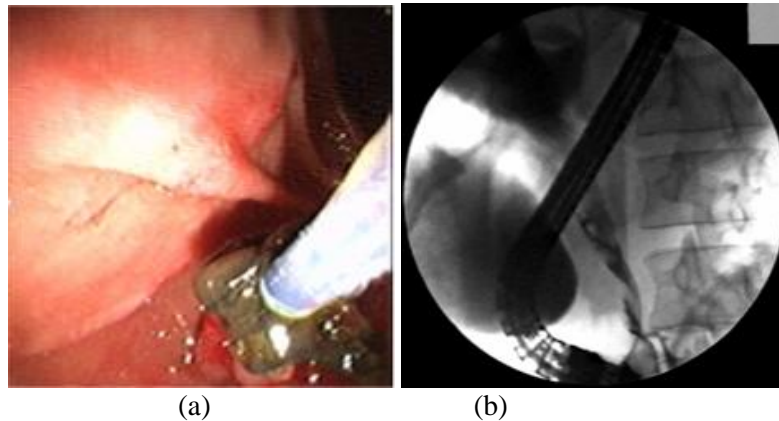


Figure (6): *Fasciola hepatica* worm grasped by biopsy forceps (a) on clearance of CBD during ERCP (b) (case 8).

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 may 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 philippinensis*, 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 endoscopic 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 availability 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 health 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 eosinophilia and also

when duodenitis is associated with negative *Helicobacter pylori* tests.

Obstructive jaundice due to parasitic agents may be predicted by systemic eosinophilia 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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Helicobacter Pylori Infection / Hepatic Encephalopathy Inter-Relationship before and after its Eradication

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Background and study aim:

Helicobacter pylori (H. pylori) bacteria convert urea to ammonia, which has been implicated in causation of hepatic encephalopathy (HE) in patients with liver cirrhosis. The aim of this work was to assess the effect of helicobacter pylori infection and its eradication on hepatic encephalopathy.

Patients and methods: From March 2010 to November 2011, in Tropical Medicine Department, Zagazig university Hospitals, 90 patients with grade 0-II hepatic encephalopathy were enrolled in the study. The patients diagnosed for hepatic encephalopathy using psychometric tests [number connection test (NCT), and circle connection test (CCT)] and Grading of the symptoms of hepatic encephalopathy was performed, they were evaluated for H. pylori infection (through detection of H. pylori stool Ag), liver impairment, and blood ammonia concentration. A group of the H. pylori +ve patients were given eradication therapy (triple therapy: 1 wk therapy with omeprazole plus clarithromycin and tinidazole), then patients were reevaluated after 2 months using psychometric tests and blood ammonia concentration and compared with untreated group.

Results: In our study, the mean level of blood ammonia concentration was significantly higher in H. pylori-positive patients (group II and III: 78.1±9.36 and 82.73±12.22 mmol/L) in comparison to H. pylori-negative patients (group I: 65±17.47 mmol/L) where P<0.001. Also the time needed to perform NCT and CCT

show the lowest mean in H. pylori -negative patients (64.73±13.08 and 35.67±6.66 sec. respectively) in comparison to H. pylori- positive patients with statistically significant difference (P<0.001 for both tests). CCT was significantly reduced in treated and eradicated patients after therapy (30.46±4.9 sec) and shows statistically significant difference (P<0.001) in comparison to untreated or failed to eradicate groups. The blood ammonia concentration in patients with H pylori was significantly reduced after bacterium eradication compared with the concentration after conventional treatment to HE in H. pylori infected controls (49.04± 13.67 vs 61.17±9.81). However, blood ammonia level was reduced in those who received treatment and failed to eradicate in a significant difference from those who didn't receive eradication therapy (infected controls) (61.17±9.81 vs 75±14.9). Also there was statistically significant difference as regard to hepatic encephalopathy grade pre- and post treatment in infected treated and eradicated group (P=0.04) while there was no statistically significant difference in infected controls or failed to eradicate groups.

Conclusion: H pylori infection is an important factor for inducing high blood ammonia concentration in HE patients. Anti-H. pylori therapy results in reduction in blood ammonia levels and may be helpful for treatment and prevention of HE.

INTRODUCTION

Hepatic encephalopathy is a spectrum of neuro-psychiatric abnormalities in patients with liver dysfunction [1]. Although the exact pathogenesis is unknown, accumulation of ammonia from poor hepatic function porto-

systemic shunting has been implicated as a primary factor [2]. Helicobacter pylori is a Gram -ve micro-aerophilic bacterium that inhabits stomach and duodenum [3]. Helicobacter pylori produces large amounts of the enzyme urease, molecules of which are

localized inside and outside the bacterium. Urease breakdown urea to carbon dioxide and ammonia[4]. Elevated levels of ammonia could deteriorate hepatic encephalopathy. As a result, it can be posulated that helicobacter pylori infection may potentially contribute to the development of hepatic encephalopathy [5]. Helicobacter pylori eradication may be helpful for treatment and prevention of hepatic encephalopathy [6]. Other studies had shown ammonia levels do not significantly differ between cirrhotic patients with and without H pylori infection. Ammonia production in the stomach by H pylori urease appears to be inadequate to clinically affect ammonia disposal in the majority of cirrhotic patients [7-10].

PATIENTS AND METHODS

From March 2010 to November 2011, in Tropical Medicine Department, Zagazig University Hospitals; out of 145 examined hepatic encephalopathy patients at the start of the study, 90 educated patients with grade 0-II hepatic encephalopathy were enrolled in the study. The patients diagnosed for hepatic encephalopathy using psychometric tests and grading of the symptoms of hepatic encephalopathy is performed according to the West Haven classification system [11]. All the studied patients were on similar therapy for hepatic encephalopathy with neomycin sulphate 500 mg tab QID, oral lactulose at a dose level sufficient to assure two to three loose motions per day and protein restriction (about 40 gm per day) to reduce the effect of ammonia producing gut flora on hyperammonaemia. Exclusion criteria included patients who were illiterate, those with severe cardiac, pulmonary, cerebral, or renal disorders, patients with severe hepatic encephalopathy of grades III and IV, patients currently receiving helicobacter pylori eradication therapy, and patients with Active gastrointestinal bleeding.

The studied patients were grouped according to helicobacter pylori antigen in stool into 3 groups: Group I: (Non infected control group) H. pylori -ve hepatic encephalopathy patient, Group II: (Infected group) H. pylori +ve hepatic encephalopathy patient who received eradication therapy (triple therapy omeprazole 20mg b.i.d plus clarithromycin 500 mg b.i.d. plus tinidazole 500 mg b.i.d for 1 week duration) and Group III: (Infected control group) H. pylori +ve hepatic

encephalopathy patients who didn't receive eradication therapy.

Patients were evaluated by full history taking, thorough clinical examination for signs of chronic liver disease, and Psychometric tests [number connection test (NCT), circle connection test (CCT)].

Laboratory investigations

Routine hematological and biochemical investigations which include liver function tests, kidney fuction tests, prothrombin time (PT), complete blood picture., H pylori infection by detection of H. pylori Ag in stool, liver impairment (according to Child-Pugh classification, including the total score of HE, ascites, prothrombin time, albumin concentration and bilirubin level, which ranked as Child-Pugh class A, B and C), blood ammonia concentration, and HE grade were evaluated for all the patients.

Detection of H pylori infection

Enzyme-linked immunosorbent assay (ELISA) for H. pylori Ag in stool have been done using anti-H. pylori antibodies coated on microwells to capture H. pylori antigen and peroxidase-conjugated polyclonal antibodies to detect the immune complex. Fresh stool samples were collected from all the patients. This test was repeated for group II (infected group) to confirm eradication after 2 months of treatment.

Ammonia measurement

Fasting venous blood samples were obtained from each patient to measure ammonia concentration (mmol/L) and blood samples was collected in EDTA, according to the manufacturer's instructions.

Psychometric tests

All patients underwent NCT and CCT. Before the actual tests, the procedure was explained and demonstrated, and a dummy run was done, which was not taken into account. Time taken for completion of each test and the number of errors were recorded. The tests were repeated for groups II (infected treated group) and III (infected controls) after two months.

H pylori eradication therapy

Group II patients with H pylori infection received 7 days triple eradication therapy (omeparazole 20 mg b.i.d plus clarythromicin 500 mg b.i.d plus tinidazole 500 mg b.i.d.).

STATISTICAL ANALYSIS

Statistics were calculated using SPSS ver. 10. Qualitative variables were expressed by means of frequency and percentiles, and were analyzed using the χ^2 test. Quantitative results are expressed as means \pm SD. Groups were compared by using paired t test, ANOVA or the Wilcoxon signed-rank test.

RESULTS

In the present work, 90 educated patients with grade 0-II hepatic encephalopathy diagnosed using psychometric tests (NCT and CCT) and gading of the symptoms of hepatic encephalopathy is performed. They were grouped depending on diagnosis of helicobacter pylori antigen in stool into 3 groups: non infected group (H. pylori negative), infected group who received treatment for H. pylori eradication and infected group who didn't receive eradication therapy. Eradication rate in the group received eradication therapy was 80% (24/30).

There were no significant differences in Clinical and demographic characteristics between patients in the three groups of the study. Similarly the laboratory findings of patients in the three groups was not significantly different. Regarding Child-Pugh class among studied groups (H. pylori positive and negative groups) in current study before treatment, there was no statistically significant difference where P were 0.160, 0.950, 0.563 for class A, B, C respectively. Also there was no statistically significant difference in regard to hepatic encephalopathy grade among different groups before treatment where P were 0.487, 0.732, 0.51 in grades 0, I, II respectively.

In this study, the frequency of precipitating factors of HE among different groups showed that infections (other than SBP) were the most frequent factor among all studied patients (34.49%), followed by diuretics (20%) and constipation was the least (1.1%) with no statistically significant difference in all risk factors among studied groups.

In this study regarding the results of psychometric tests scores among studied groups before treatment, the time needed to perform NCT and CCT showed the lowest mean in group I (H. pylori negative group) in comparison to both groups II and III (both groups are H. pylori positive) with statistically significant difference

($P < 0.001$) (table 1). While for comparing psychometric tests scores among the groups after treatment and after two months of 1st evaluation, in our study, we found that CCT was significantly reduced in treated and eradicated group after therapy and showed statistically significant difference ($P < 0.001$) in comparison with treated and failed to eradicate group as well as untreated group (table 2). Although NCT showed the lowest reduction following treatment in treated and eradicated group and in comparing results of psychometric tests before and after treatment in the same group showed a significant reduction but there was no statistically significant difference in comparison to the reduction in other studied groups.

Our study revealed that blood ammonia level among different groups before treatment showed statistically significant difference in group I (H. pylori negative) ($65 \pm 17.47 \mu\text{mol/L}$) in comparison to group II and III (H.pylori positive) ($78.1 \pm 9.36 \mu\text{mol/L}$ and $82.73 \pm 12.22 \mu\text{mol/L}$ respectively) with $P < 0.001$ (table 3).while the blood ammonia level after treatment and 2 months from onset of the study was most reduced in group IIa (infected treated and successfully eradicated group) in comparison to group IIb (infected treated and failed to eradicate group) and III (infected control group) and this reduction was statistically significant ($P < 0.001$) (table 4).

In our study, we found that comparing blood ammonia level pre- and post treatment showed highly significant reduction in treated and eradicated group ($P < 0.001$) and it was also significant for those who were treated and failed to eradicate ($P = 0.023$).While there was non-significant reduction regarding level of ammonia before and after 2 months of evaluation in infected control group who received no eradication treatment ($P = 0.14$) (table 5).

Our study found a statistically significant difference in regard improvement of hepatic encephalopathy grade pre- and post treatment in H pylori-positive patients after treatment and successful eradication ($P = 0.04$). While in other groups of H.pylori-positive who didn't receive eradication therapy or those who failed to eradicate, there was no statistically significant difference as regard to hepatic encephalopathy grade pre- and post treatment (table 6).

Table (1): Psychometric tests scores among studied groups before treatment

Psycho-metric test	Group I (uninfected controls) no=30	Group II (infected group) no=30	Group III (infected controls) no=30	F	P
NCT mean±SD (range)	64.73±13.08* (44-94)	77.2±9 (56-95)	78.03±12.42 (56-102)	12.28	<0.001
CCT mean±SD (range)	35.67±6.66* (27-57)	46±8.48 (30-57)	50.07±6.8 (37-60)	30.53	<0.001

*significant difference from group II and III.

Table (2): Psychometric tests scores for group II (IIa: eradicated, IIb: failed to eradicate) and group III (infected controls) before and after treatment

Psycho-metric test	Group IIa (infected & eradicated) no=24	Group IIb (failed to eradicate) no=6	Group III (infected controls) no=30	F	P
1 st NCT mean±SD (range)	76.75±9.51 (56-95)	79±6.99 (68-87)	78.03±12.42 (56-102)	0.14	0.865
2 nd NCT mean±SD (range)	45.75±9.87 (40-77)	60.76±4.93 (54-67)	60.03±9.87 (42-78)	2.3	0.109
P	<0.001	0.001	<0.001		
1 st CCT mean±SD (range)	45.25±8.85 (30-57)	49±6.54 (41-57)	50.07±6.8 (37-60)	2.68	0.77
2 nd CCT mean±SD (range)	30.46±4.9* (24-40)	38.67±2.8 (35-42)	37.07±5.48 (27-46)	13.5	<0.001
P	<0.001	0.006	<0.001		

*significant difference from group IIb and III.

Table (3) blood ammonia level (mmol/L) among different groups before treatment.

	Group I (uninfected controls) no=30	Group II (infected group) no=30	Group III (infected controls) no=30	Test of significance F	P
Mean (range)	65* (40-104)	78.1 (58-97)	82.73 (65-104)	14.041	<0.001
±SD	17.47	9.36	12.22		

*significant difference from group II and III.

Table (4): Blood ammonia level (mmol/L) after treatment and 2 months of 1st evaluation.

	Group IIa (infected & eradicated) no=24	Group IIb (failed to eradicate) no=6	Group III (infected controls) no=30	Test of significance F	P
Mean (range)	49.04* (13-73)	61.17# (43-71)	75 (44-104)	23.8	<0.001
±SD	13.67	9.81	14.9		

*significant difference from group IIb and III.

significant difference from group III.

Table (5): Blood ammonia level (mmol/L) pre- and post treatment between group II (IIa: eradicated, IIb: failed to eradicate), and group III (infected controls).

Group	Pre-treatment Mean \pm SD	post-treatment Mean \pm SD	t	P
Group IIa (infected & eradicated) no=24	79.21 \pm 9.1	49.04 \pm 13.67	9.97	<0.001
Group IIb (failed to eradicate) no=6	73.67 \pm 9.89	61.17 \pm 9.81	3.25	0.023
Group III (infected controls) no=30	82.73 \pm 12.22	\pm 14.9 ν \circ	1.48	0.14

Table (6): Changes of hepatic encephalopathy grade pre- and post treatment within each group (G.).

Grade of HE	Pre-treatment no (%)	post-treatment no (%)	Z value	P
Grade 0(G. IIa)	3 (12.5)	9 (37.5)	2.05	0.04
Grade 1(G. IIa)	13(54.16)	11(45.83)		
Grade 2(G. IIa)	8 (33.33)	4 (16.66)		
Grade0(G. IIb)	0(0.0)	1 (16.66)	1.34	0.18
Grade1(G. IIb)	3(50.00)	4(66.66)		
Grade2(G. IIb)	3 (50.00)	1 (16.66)		
Grade 0(G. III)	10(33.33)	8 (26.66)	0.33	0.96
Grade 1(G. III)	6(20.00)	9(30.00)		
Grade 2(G. III)	14 (46.66)	13 (43.33)		

DISCUSSION

Although baseline predictors are useful tools in HE, ammonia has been one of the most widely studied etiological factors in the pathogenesis of hepatic encephalopathy. About half of the ammonia produced in the intestine is synthesized by luminal bacteria, with the remainder coming from dietary protein and glutamine [12]. Most currently available therapies for prevention of HE focus on reducing blood ammonia concentration [13,14]. *H. pylori* is known to produce copious amounts of ammonia due to its strong urease activity [15]. The Hypothesis that *H. pylori* are a significant risk factor for HE is still being debated, and the effectiveness of eradication therapy as treatment in *Hp*+ patients remains controversial. Although studies continue to be published on the subject, the results are still inconclusive [7,16]. Previous studies have shown that ammonia levels in gastric juice were higher in patients with liver cirrhosis who had *H. pylori* infection than in those who did not have such infection [17]. Infection with these bacteria has also been shown to be associated with elevation of blood ammonia levels and recurrent attacks of overt encephalopathy [18]. However, some other studies have failed to find a significant difference between fasting venous blood ammonia

concentrations in patients with *H. pylori* infection and those without [19].

The present study aimed to answer the most clinically relevant question of whether eradication therapy would improve the outcome of HE in cirrhotic patients who most commonly present to our clinical practice. Namely ambulatory patients, who present with mild to moderate grades of encephalopathy (Grade 0–2). In the present work, 90 educated patients with grade 0-II hepatic encephalopathy diagnosed using psychometric tests (NCT and CCT) and grading of the symptoms of hepatic encephalopathy is performed according to the West Haven classification system [11]. They were grouped depending on diagnosis of helicobacter pylori antigen in stool into 3 groups: non infected group (*H. pylori* negative), infected group who received treatment for *H. pylori* eradication and infected group who didn't receive eradication therapy. Eradication rate in the group received eradication therapy was 80% (24/30). After treatment the comparison included the treated and successfully eradicated group, those who received eradication therapy but failed to eradicate and the infected group whom didn't receive eradication therapy.

We did not find a significant difference in age, sex, liver impairment, Child-Pugh class, hepatic encephalopathy grade and precipitating factors of HE between H pylori-positive and -negative groups

We found that the time needed to perform NCT and CCT show the lowest mean in group I (H. pylori negative group) in comparison to both groups II and III (both groups are H. pylori positive) with statistically significant difference ($P < 0.001$). While for comparing psychometric tests scores among the groups after treatment (after two months of 1st evaluation), in our study, we found that CCT was significantly reduced in treated and eradicated group after therapy and showed statistically significant difference ($P < 0.001$) in comparison with treated and failed to eradicate group as well as untreated group. Although NCT showed the lowest reduction following treatment in treated and eradicated group and in comparing results of psychometric tests before and after treatment in the same group showed a significant reduction but there was no statistically significant difference in comparison to the reduction agreement with results of a study conducted by Agrawal et al. in 2011, the changes in psychometric tests in patients with HE after treatment showed a significant reduction in the time taken to complete the psychometric tests after anti-H. pylori treatment [20]. While in another study by Demirturk et al. in 2001 who studied effect of H. pylori eradication on visual evoked potentials (VEP) in cirrhotic patients, VEP recordings were abnormal in 14 out of 24 patients before the treatment. Only four of these 14 patients with abnormal recordings showed improvement which was statistically non significant ($P > 0.05$) [21]. Also Rekha et al in 2007, did not show any statistically significant difference between the patients with and those without H. pylori infection regarding NCT[22].

Our study revealed that blood ammonia level among different groups before treatment showed statistically significant difference in group I (H. pylori negative) in comparison to group II and III (H.pylori positive) with $P < 0.001$. These results agreed with studies which reached the same conclusion in regard to blood ammonia level where H pylori-positive patients' results were significantly higher than that in H pylori-negative patients [6,23]. While other studies' results came in contradiction with our results as there was no statistically significant difference

between H pylori-positive and H pylori-negative patients[9, 24].

In the current study we found that, the blood ammonia level after treatment (2 months from onset of the study) was most reduced in group IIa (infected treated and successfully eradicated group) in comparison to group IIb (infected treated and failed to eradicate group) and III (infected control group) and this reduction was statistically significant ($P < 0.001$). This came in agreement with other studies that found reduced ammonia concentration and recovery from HE after eradication H. pylori[6,21,25]. All of these studies are contrary to the results of Hassan et al. in 2007, where comparison of the eradication therapy among the H pylori-positive patients and antimicrobial therapy among H pylori-negative patients did not show any significant difference in the outcomes[24]. Also Miquel et al. in 2004 found that fasting blood levels of ammonia were comparable in H. pylori infected and non-infected patients with advanced cirrhosis of the liver and sub clinical HE, and no reduction was observed after H. pylori eradication among infected patients [9].

In our study, we found that comparing blood ammonia level pre- and post treatment within each group showed highly significant reduction in treated and eradicated group ($P < 0.001$) and it was also significant for those who were treated and failed to eradicate ($P = 0.023$). While there was non-significant reduction regarding level of ammonia before and after 2 months of 1st evaluation in infected control group who received no eradication treatment ($P = 0.14$). The reduction in blood ammonia in the treated and failed to eradicate group may be explained by inhibition of the intestinal flora with anti-H. pylori drugs or due to partial reduction of H.pylori bacterial load. However, our finding of a greater and significant improvement in blood ammonia levels in patients with H. pylori infection who have successfully eradicated in comparison to those who were treated and failed to eradicate appears to indicate that H. pylori infection contributed to high blood ammonia production in these patients and its eradication causes significant reduction of blood ammonia level. These results came in agreement with Agrawal et al. in 2011 who found a significant reduction in blood ammonia levels in both H. pylori-positive and H. pylori negative patients with HE after triple-drug anti-H. pylori treatment

for one week. This reduction was more marked in patients with *H. pylori* infection [20].

Our study found a statistically significant difference in regard improvement of hepatic encephalopathy grade pre- and post treatment in *H. pylori*-positive patients after treatment and successful eradication ($P= 0.04$). While in other groups of *H. pylori*-positive who didn't receive eradication therapy or those who failed to eradicate, there was no statistically significant difference as regard to hepatic encephalopathy grade pre- and post treatment. These results suggested significant clinical improvement in the infected and successfully eradicated group. These results agreed with results of Chen et al. in 2008 and Agrawal et al. in 2011 where HE rate significantly dropped after *H. pylori* eradication [6,20]. While results of Hassan et al. study conducted in 2007 showed that the score, grades and success rate of HE didn't significantly differ between those who received eradication therapy and those who received antimicrobial therapy alone [24].

In conclusion, data from our study suggested that *H. pylori* infection might augment the blood ammonia levels which may be additive risk for HE in patients with liver cirrhosis, and that eradication of this infection may help ameliorate the manifestations of this complication. Also it concluded that triple therapy in addition to its anti-*H. pylori* effect might has local GIT and systemic anti-bacterial effect on other bacteria, hence reduce the deterioration of liver status..

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Ethical approval: The protocol of the study was approved by the ethical committee of Faculty of Medicine, Zagazig University. Informed consents were obtained from all patients.

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Improving Community Knowledge and Attitude towards Pulmonary Tuberculosis in Zagazig District- Sharkia Governorate through Application of Interventional Health Education Program

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Background and study aim: Egypt has achieved treatment success rates higher than the WHO-recommended target of 85 percent. However the case detection rate of about 50 percent remains below the 70 percent target. This is due to low awareness of population about tuberculosis, delay of patients medical advice about chest symptoms, and lack of coordination between different health sectors. The aim of this study is to clarify knowledge and attitudes regarding pulmonary TB among population of Zagazig district in Sharkia governorate, and to assess the effect of a community intervention health education in improving their knowledge and attitudes about pulmonary TB.

Patients and methods: Survey was conducted on 254 individuals from both sexes ≥ 18 years old in Zagazig district, Sharkia governorate. A questionnaire for Knowledge and attitude about pulmonary tuberculosis was adapted from (Advocacy, Communication and Social Mobilization for TB control /A guide to developing knowledge, attitude and practice surveys). Then an intervention health education program was implemented and evaluated after three months.

Results: The study revealed that 61.4% of adults of both sexes had unsatisfactory knowledge about tuberculosis. Only

(16.5%) were aware that diagnosis and treatment of tuberculosis were free of charge. The correct duration of standard treatment was reported by (21.7%) of studied group. Only 54.3% of study group seeking treatment at a health facility, when feel symptom. About 62.3% were more likely to feel fear and embarrassed if being a TB patient. However, about 60.2% of study population seem to be supportive to tuberculosis patients. The main source of acquired information about tuberculosis were television (54.7%). Regarding the effect of the health education intervention on knowledge of the studied group; there were statistical significant improvement in knowing the mode of transmission of pulmonary TB, place of treatment, and its duration after health education program ($p < 0.05$). The studied group who had satisfactory knowledge about pulmonary tuberculosis was doubled after health education program.

Conclusion: The survey results showed that the overall knowledge regarding TB was unsatisfactory in the studied population. After health education program there is improvement of knowledge regarding TB among studied group.

INTRODUCTION

Tuberculosis is re-emerging global health problem in need to have better understanding by communities. Africa currently carries a huge burden of tuberculosis (TB) which estimated at 30% of the total global number of TB cases and coming second after Asia (50%), where approximately 41% of the highest burdened countries with TB worldwide were found in Africa [1]. Other compounding factors, apart

from HIV, that have resulted in the increasing trend of TB in Africa are poverty, which is closely related to malnutrition, crowded living conditions, lack of access to free or affordable healthcare services, and dependence on traditional healers that can facilitate the transmission of tuberculosis [2]. WHO is working to reduce the burden of TB, and halve TB deaths and prevalence by 2015.

Through its stop TB strategy and supporting the global plan to Stop TB. Despite the quality-assured TB services in line with the stop TB strategy [3]. TB case detection is incomplete, the global TB burden remains high and TB incidence is declining slowly worldwide [4]

Egypt is considered one of the high-burden countries in eastern mediterranean region[5]. In the past the Egyptian government organized TB control through its network of chest care facilities. Then government established the National TB Program (NTP) in an attempt to provide more efficient and effective TB control services. Through primary health care units, health insurance organizations, university hospitals, and prison facilities have been involved in the effort to expand awareness, which now reaches 100 percent of the population. The NTP has become a model of TB control for middle income countries in the region and now provides training courses targeted to international audiences. While Egypt has achieved treatment success rates higher than the WHO-recommended target of 85 percent. But the case detection rate about 50 percent which remains below the 70 percent target. This due to low awareness of population about tuberculosis, delay of patients medical advice about chest symptoms, lack of coordination within different health sectors[6].

In Egypt the principal risk factors for treatment failure of pulmonary tuberculosis were non-compliance to treatment, due to deficient health education and poor knowledge about the pulmonary TB disease [7].

Ensuring high awareness in communities about health in general and pulmonary TB and TB services in particular is the cornerstone in proper management of tuberculosis patients. People must be aware about TB symptoms and take appropriate action early, by seeking care from the available health facilities. More importantly, people need to know that, the available health services offer something valuable at an affordable cost[8]

Aim of the Study

To improve awareness of population about TB and consequently helping in early case detection and improving their compliance to treatment.

Objectives: To clarify knowledge and attitudes regarding pulmonary TB in population of Zagazig district in Sharkia governorate, and to

assess the effect of a community health education program intervention in improving knowledge and attitudes about pulmonary TB.

PATIENTS AND METHODS

Study design: It was carried out in two phases

Phase one: survey part

Phase two: intervention part

Setting: it was carried out at Zagazig district, Sharkyia Governorate- Egypt .

Sampling technique: A multistage systematic random sampling design was adopted for the current study. Zagazig district was divided into rural and urban regions; El Zohor region was chosen randomly (urban part). Two villages were chosen as rural part; (Tahlet Bordin, and Tarout) (1st sampling stage). Then each selected place was divided by main landmarks into four geographical sectors, then one sector was selected randomly from each place (second sampling stage). Each sector was divided into main streets, three streets were chosen randomly (third sampling stage). Each house in the selected streets was given a code and recorded in a prescribed forms for the study to facilitate the follow up assessment of the sample. Then every third house was taken randomly after selecting the 1st one randomly from the 1st three houses .

Sample size was calculated by using Epi-info version (6.04);

- At the 1st stage (survey part):

Population at Zagazig district at or above the age of 18 years were 848000. Urban to rural population ratio=1:4. Percent of satisfactory knowledge about TB =42.6% [9], at test power=80 and 95% CI. Accordingly, the estimated sample size =254 persons .

The target population: adults aged ≥ 18 years, both sexes and permanently residing in the selected places.

Data collection tools: structured questionnaire was used which included; Socio-demographic data such as age, gender, education, occupation, income.

Questions for knowledge and attitude about pulmonary tuberculosis which were adapted from. Advocacy, Communication and Social Mobilization for TB control /A guide to developing knowledge, attitude and practice

surveys[10]. It was translated into Arabic language.

Knowledge about pulmonary tuberculosis: This part included questions about TB symptoms, mode of transmission, and duration and cost of treatment, seriousness of TB and methods of prevention. The sources of information about TB. knowledge score for each question ranges from 0 for incorrect knowledge to 1 for correct one. Total minimum score =0 and total maximum knowledge score =10. The median knowledge score for the study population was calculated. The participants who were knowledge score above the median were classified as having satisfactory knowledge about pulmonary tuberculosis. However those who had knowledge score equal or below median were classified as having unsatisfactory knowledge about pulmonary tuberculosis.

Attitude towards pulmonary tuberculosis: This part included four questions about attitude of studied subjects if they assume themselves to have pulmonary tuberculosis. The questions included; What they would do if they thought they had TB symptoms? When participants go to health services? How TB patients are regarded in their community? And what would their reaction be if they found out that they have TB?.

Fieldwork

After obtaining official permissions to undertake the study. The pilot- study was done to test the feasibility of questionnaire and time needed to answer it.

Phase one: The researchers started the survey: met the selected subjects, explained to them the purpose of the study, and solicited their participation after obtaining their oral consent. Then interview was done using the prepared questionnaire as a pre-test. Each pretest interview took about 15 minutes to fill the questionnaire. An appointment was scheduled for each subject to meet at the related primary health care unit for implementing health education program.

Phase two: an intervention health education community based program, with pre and post assessment.

- Intervention part of the study (2nd stage) included the following:

the sample size: was calculated to detect an improvement in subjects knowledge and attitude

related to pulmonary tuberculosis from a pre-intervention level of 38% to an expected post-intervention level of 65%, with a 95% level of confidence, and power of test 80%. Accordingly, the estimated sample size was 60 subjects.

Analysis of the obtained pre-test data was done. Then, the researchers designed the health educational intervention program, which was adopted from the National tuberculosis program [6]. It included clear message, with simple brochures, power point presentation and posters to explain all the items of knowledge and attitude regarding Pulmonary TB. It was delivered to the individuals through face-to-face method as lectures in the related primary health care unit. Brochures were distributed to remind the recipients of the health messages about pulmonary tuberculosis. Then, a posttest was done after 3 months on the same individuals using the same pre-test interview form in order to assess the changes of their, knowledge and attitude after the intervention.

Statistical analysis: Data entry and analysis were done by using Epi-Info 6.04 and SPSS version 19 computer software packages. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Categorical variables were compared using Mc Nemar chi-square test (paired qualitative data). Statistical significance was considered at p-value <0.05.

RESULTS

As regards to socio-demographic characteristics of the 254 individuals, 50.4% were males and 49.6% were females. More than three quarters were married. The majority of the studied subjects were residing in rural areas (78.7%). About three quarters of the studied group were \leq 40 years old. The majority of studied group were from high social class (48.8%) followed by middle social class (31.5%). About 14% of studied group were smokers.

The mean knowledge score about pulmonary tuberculosis among the studied population was 5.8 ± 1.65 , (median (6), range (1–9)). Only 38.6% of participants had Satisfactory knowledge. It was found that males had higher and statistically significant satisfactory Knowledge about pulmonary TB compared to females (44.5% and 32.5% respectively) as demonstrated in table (1).

Symptoms, transmission and prevention of pulmonary tuberculosis: the Interviewed subjects identified that; cough >3 weeks as the presenting complaint for pulmonary TB (41.7%), air borne the main mode of transmission of pulmonary TB (73.2%), in addition to 31.1% of them reported that covering mouth and nose during coughing or sneezing as the main preventive measure, as shown in figure (1).

Regarding pulmonary tuberculosis treatment: the majority of interviewees (79.1%) mentioned that treatment of tuberculosis by specific drugs were provided by health centers. Only 21.7% of the interviewed persons mentioned that treatment duration of pulmonary TB was 6–9 months. About 70% of the studied individuals knew that tuberculosis was treated at government hospitals. Whereas 16.5% of them described that diagnosis and treatment of tuberculosis were free of charge as in figure (1).

Seriousness of pulmonary TB: 37% of the studied subjects reported that pulmonary TB is a dangerous disease and about 67% considered pulmonary TB as a moderate prevalent health problem in Egypt as in figure (1).

The main information sources about pulmonary tuberculosis were television (54.7%) , health care providers (17.7%), then newspapers and posters (15%) figure (2).

As regards to attitudes and intended health-seeking behavior; The majority of the studied group (81.5%) answered that they would go to a health facility if they thought that they had TB as in table (2). Early seeking behavior when they

feel symptoms of pulmonary TB among 54.3% of the studied group.

In the current study, 60.2% of the studied population believed that society was supportive to tuberculosis patients. However 27.2% of them thought that they react friendly with tuberculosis patients but with avoiding them. 62.3% said that if they were diagnosed with tuberculosis they would be afraid and embarrassed, and 32.3% of them would feel sad and hopelessness, only 5.5% of participants would feel shameful as in table (2).

Regarding the effect of health education intervention on knowledge of the studied group. There were statistical significant improvement in knowing the mode of transmission of pulmonary TB, place and duration of treatment, after the health education program ($p < 0.05$). Before the health education program total knowledge score about pulmonary TB had Mean \pm SD (4.9 \pm 1.8), median (5), and range (1-8). About 46.3% of the interviewed participants had satisfactory level of knowledge which increased to 94.4% after intervention. However there was improvement in the total knowledge score after the health education program with mean \pm SD (7.7 \pm 0.966), median (7), and range (4-9) Table (3).

A statistical significant difference was detected in the intended health-seeking behavior when the participants were asked what they would do if they thought they had pulmonary tuberculosis symptoms. Also, the person stigma showed statistical significant difference in the items of sadness and hopelessness ($p < 0.05$) table (4).

Table (1): Distribution of knowledge about pulmonary tuberculosis among studied group according to socio-demographic characteristic.

Variables	knowledge	Total N (254)		satisfactory knowledge		Unsatisfactory knowledge		p
		N	%	N	%	N	%	
				98	38.6	156	61.4	
Sex	males	128	50.3	57	44.5	71	55.4	0.049
	Females	126	49.7	41	32.5	85	67.5	
Age	≤ 40	190	74.8	71	37.4	119	62.6	0.4
	>40	64	25.2	27	42.2	37	57.8	
Social class	High	124	48.8	40	32.3	84	67.7	0.079
	Middle	80	31.5	33	41.3	47	58.7	
	Low	50	19.7	25	50	25	50	
Residence	rural	200	78.7	78	39	122	61	0.79
	Urban	54	21.3	20	37	34	66	
Marital status	married	196	77.1	78	39.8	118	60.2	0.46
	Others	58	22.8	20	34.5	38	64.5	
Smoking	smokers	36	14.2	17	47.2	19	52.8	0.48
	Ex- smoker	22	8.7	9	40.9	13	59.1	
	Non- smoker	196	77.1	72	36.7	124	63.3	

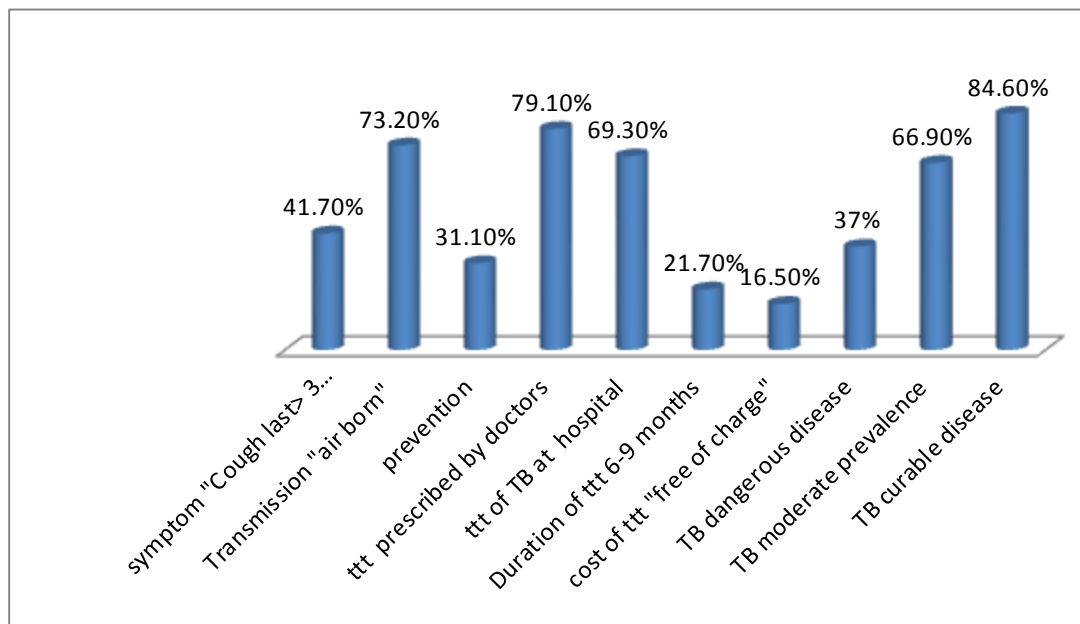
Figure(1): Percentage of knowledge about pulmonary tuberculosis among studied group during survey phase

Table (2): Distribution of attitudes regarding pulmonary tuberculosis among the studied group during survey phase

Variables	Number	%
What you do if you suspect you have symptoms of TB(intended health seeking behavior)		
• Health facility	207	81.5
• Pharmacy	26	10.2
• Traditional healer	21	8.3
When will you go to a health facility (intended health seeking behavior)		
• When I feel symptoms	138	54.3
• Continuous symptoms more than 3weeks	50	19.7
• If I realize that the symptoms are pulmonary tuberculosis	59	23.2
• I would not go to doctors	7	2.8
How is a TB patient regard in your community		
• Most people reject	32	12.6
• Most people friendly but avoid	69	27.2
• Most people support and help him	153	60.2
How would your reaction if you were discovered that you have pulmonary tuberculosis (personal stigma)		
• Fear and embarrassment	158	62.3
• Shame	14	5.5
• Sad and hopelessness	82	32.3

Table (3): Effect of health education program about pulmonary tuberculosis on knowledge of studied group

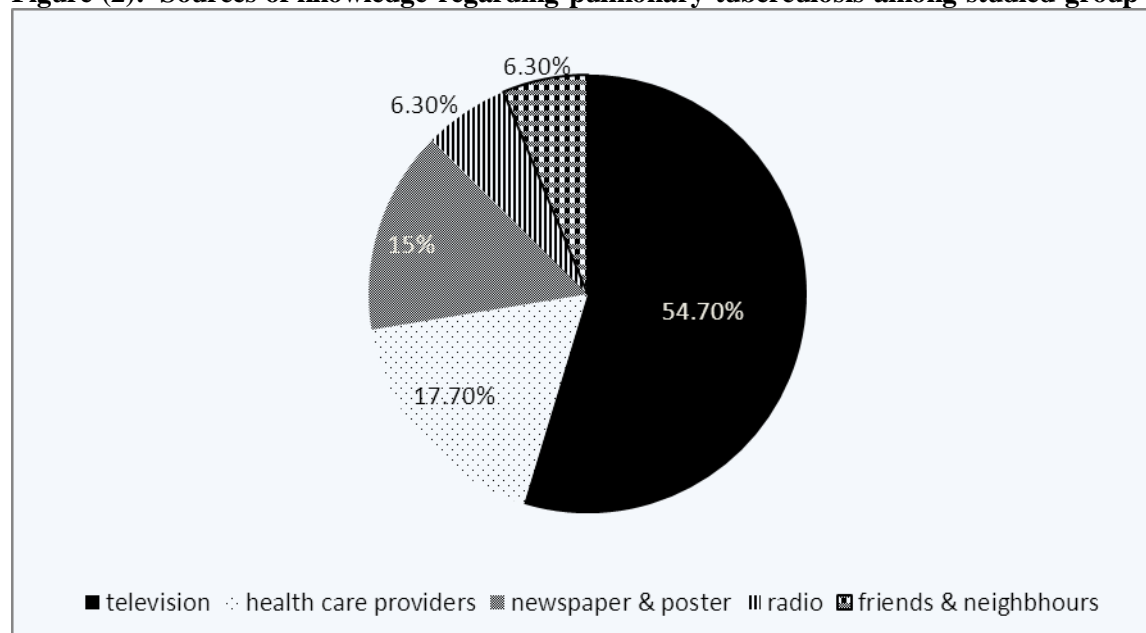
Knowledge	Before(54) N %	After (54)* N %	p
<u>Symptoms:</u>			
Cough last > 3 weeks	19 35.2	17 31.5	>0.05
<u>Transmission of pulmonary TB</u>			
Through the air if person cough or sneeze	32 29.3	51 94.4	*<0.05
<u>Prevention</u>			
Covering mouth and nose	24 44.4	34 62.9	>0.05
<u>TTT OF TB</u>			
Treatment prescribed by doctors	30 55.5	53 98.1	*<0.05
<u>place of ttt:</u>			
governmental hospital	26 48.1	53 98.1	*<0.05
<u>duration of treatment</u>			
6- 9 months	10 18.5	47 87	*<0.05
<u>Cost of ttt and diagnosis</u>			
Free of charge	10 18.5	9 16.7	>0.05
<u>TB seriousness</u>			
Dangerous	19 35.2	14 25.9	>0.05
<u>Prevalence of TB</u>			
*Moderate prevalence	34 62.9	41 75.9	>0.05
<u>curable disease</u>			
yes	42 77.7	50 92.6	>0.05

* 6 subjects were dropped out at posttest & excluded from analysis. Total knowledge score before health education program mean± SD (4.9±1.8) median (5) range (1-8) . percent of participants had satisfactory level of knowledge before health education program were (46.3%). Total knowledge score after health education program mean± SD(7.7±0.966) median (7) range (4-9) . percent of participants had satisfactory level of knowledge after health education program were (94.4%). P value computed by Mc Nemar chi square test . *p statistically significant.

Table (4): Effect of health education program on attitudes regarding tuberculosis among the studied group

Variables	Before(54)		After(54)		p
	N	%	N	%	
What do you if you suspect you had symptoms of TB(intended health seeking behavior)					
• Health facility	37	68.5	51	94.4	<0.05*
• Pharmacy	14	25.9	1	1.9	<0.05*
• Traditional healer	3	5.6	2	3.7	>0.05
When will you go to a health facility (intended health seeking behavior)					
• When I feel symptoms	26	48.2	28	51.9	>0.05
• Continuous symptoms more than 3weeks	14	25.9	20	37.0	>0.05
• If you realize that the symptoms are pulmonary tuberculosis	14	25.9	6	11.1	>0.05
How is a TB patient regard in your community					
• Most people reject	13	24.1	16	29.6	>0.05
• Most people friendly but avoid	23	42.6	23	42.6	>0.05
• Most people support and help him	18	33.3	15	27.8	>0.05
How would your reaction if you were found out that you have TB(personal stigma)					
• Fear and embarrassment	30	55.6	34	62.9	>0.05
• Shame	8	14.8	13	24.1	>0.05
• Sad and hopelessness	16	29.6	7	13.0	<0.05*

*P statistically significant

Figure (2): Sources of knowledge regarding pulmonary tuberculosis among studied group

DISCUSSION

TB is re-emerging as a global public health problem. Public health efforts should primary directed towards primary preventive measures mainly improving awareness of population. Health education as an integral part of the overall

control process of TB. Health education must target all members of the community.

As regard the symptoms of pulmonary tuberculosis less than half of the respondents in this study identified cough more than three weeks as the presenting complaint of pulmonary

tuberculosis. This finding is in accordance with Khan et al (2006) [11] who reported that Cough >3 weeks was mentioned by less than half of the respondents . This finding is an important point in national control program in Egypt, as it depends on passive case finding.

About three quarters of the studied subjects had correct knowledge about mode of transmission of pulmonary tuberculosis, and its place of treatment. This result is consistent with Mustaq et al (2011)[12] who found that, the majority of studied group in Pakistan had correct knowledge about mode of transmission, treatment and place of treatment of tuberculosis, where national programs of tuberculosis are applied in both countries.

Regarding awareness of the studied group about the methods of prevention of pulmonary tuberculosis, only one third of them mentioned that covering mouth and nose during sneezing and cough. About one quartile reported vaccination as a preventive measure for pulmonary tuberculosis and prohibition of promiscuous spill on ground was reported by 28% of studied group. In agreement with Yousif et al (2009)[13] who found that a considerable proportion of participants did not know the method of prevention of tuberculosis. Ignorance of the facts that the disease is an airborne and contagious one has the consequence of increasing transmission of the disease. As patients will not care of adopting control measures in their households and/or workplace.

The current study found that one fifth of the studied group knew the correct duration of treatment of pulmonary tuberculosis . The Egyptian study of Morsy et al(2003)[7] revealed that the significant risk factor for treatment failure was the non-compliance to treatment, due to lack of awareness about the duration of standard treatment of pulmonary tuberculosis. A similar study in Sudan reported that about one half of patients knew the actual duration of treatment[14]. This can be explained by the fact that patients must be oriented by the duration of treatment for better compliance to treatment.

This study found that only 16.6% of the studied group knew that diagnosis and treatment of pulmonary tuberculosis are free of charge . This agreed with the study of Wang et al (2008)[15] .Mustaque et al(2010)[9]who found that small proportion of studied group knew that diagnosis and treatment of pulmonary tuberculosis are free

of charge. lack of awareness that diagnosis and treatment of pulmonary tuberculosis free of charge lead to delay of seeking for diagnosis and treatment of pulmonary tuberculosis.

In agreement with the study of Yousif et al(2009)[13], the majority of the studied group (84.6%) declared that pulmonary tuberculosis is a curable diseases. Moreover two thirds of the studied group reported that pulmonary tuberculosis is a moderate prevalent disease in Egypt and about two fifths of the studied group announced that pulmonary tuberculosis is a serious disease.

In agreement with a study in Pakistan done by Mustaque et al (2011)[12] the main information sources about pulmonary tuberculosis were television and health care providers. Other sources, as radio newspapers , posters, family and friends. This can be explained as television plays a vital role in the community health education program about pulmonary tuberculosis and the wide spread of television in every house at any time.

The present study found that, the majority of the studied group (81.5%) answered the question What they do if they suspect that they have symptoms of TB (intended health seeking behavior), by they would go to a health facility. In agreement with ; the studies of Enwuru et al (2002)[16] , Hoa et al (2003)[17]and Mustaque et al (2011)[12]found that most respondents would go to health facility as soon as they realize that they had symptoms of pulmonary tuberculosis. About one half of the studied group would go if they felt symptoms ,the other half would go to health facility after persistent symptoms or if they became sure that symptoms of pulmonary tuberculosis. This behavior will lead to late case finding and more spread of the disease.

On studying personal stigma about pulmonary tuberculosis. The majority of the studied group would feel fear ,embarrassed , a shamed and hopelessness if they discovered that they having pulmonary tuberculosis. The same results reported by the studies of Singh et al (2002)[18] , Yousif et al(2009)[13] and Mustaque et al (2011)[12]. This can be explained by the fact that pulmonary tuberculosis is a disease associated with poverty and low socioeconomic level. The point of view of society that condemned tuberculosis patients.

Although community stigma from a perceived tuberculosis infection, 60.2% of respondents believed that people should support and help pulmonary tuberculosis patients. About one third of respondents, thought that people should be friendly to pulmonary tuberculosis patients with avoided them. Only 12.6% of respondents believed that people must reject the pulmonary tuberculosis patients. Disagreement with the study of Mustaque et al (2011)[12] who found that nearly one half of the studied group believed that the community reject of pulmonary tuberculosis patients. Our finding can explained by culture of humanity of Egyptian population.

This study revealed that 38.6% of studied group had satisfactory knowledge about pulmonary tuberculosis, in agreement with the study of Ali et al(2003)[19] and Mushtaq et al (2010)[9] who found that low awareness of Pakistan population about TB. Also others studies found that low awareness of African population about tuberculosis[20,21]. But the percent of awareness of population in the present study was three times more than Philipinian population [22]. This finding may be due to discrepancy of health education programs were offered to different population.

The present study found that the health education program increased mean knowledge score about pulmonary tuberculosis from 4.9 ± 1.8 to 7.7 ± 0.97 . The percentage of studied group had satisfactory knowledge about pulmonary tuberculosis was doubled after health education program. As regard seeking health behavior, health education program increase attitude to go a health facility and decrease other choices as go to pharmacy or traditional healers. Also significant decrease in feeling of sadness and hopelessness associated with expectation of pulmonary tuberculosis among a studied group. In agreement with Croft and Croft(1999) [23]and Khan et al[24] who found that well – conducted community education campaigns had shown to produce favorable outcome In Bangladesh. It is of great importance for the patients to know that TB is curable with regular treatment. This will psychologically encourage them to abide by their treatment instructions. Patients' knowledge about the duration of treatment needed to cure the disease is an important educational message. As the bacteria needs 6-8 months for full clearance from host tissues[25]. The health education intervention of current study, improved awareness of studied group about mode of

transmission, treatment, place of treatment and duration of treatment of pulmonary tuberculosis. In addition, intended health seeking behavior was improved as they would go to a health facility; other choices were nearly neglected.

CONCLUSION

The survey results showed that the overall knowledge regarding TB was low among the studied population. After the health education program there was betterment of correct knowledge regarding TB among the studied group. Most of respondents knew about mode of transmission, the correct duration of TB treatment. Health education program improved their attitude regarding the disease and its treatment.

Recommendations:

- The study indicated the need of implementing frequent health educational programs, to improve population awareness and attitude about pulmonary tuberculosis.
- Mass media Health education must be considered an integral part of the overall control process of tuberculosis.
- Further researchers are needed using other methods of health education.

Funding: Non.

Conflicts of interest: Non.

Ethical issues: Permission was obtained from Sharkia Health Directorate to conduct the study. Informed oral consent was obtained from each person to participate in the current work after explanation of its objectives. Total confidentiality of any information was secured. The intervention have no harmful effect on participants, and they were informed about their right to withdraw at any time.

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Evaluation of Carvedilol in Prevention of First Attack of Variceal Hemorrhage in Patients with Liver Cirrhosis

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Background and study aim: Carvedilol has beneficial effects on splanchnic haemodynamics following acute and chronic administration in cirrhosis. The aim of this study is to evaluate the role of carvedilol in prevention of first variceal bleeding in patients with liver cirrhosis and to compare its effect with that of variceal band ligation (VBL) and propranolol.

Patients and methods: Seventy five patients with liver cirrhosis and endoscopically proven esophageal varices (grade II or larger in size with or without variceal red color signs), that have not bled yet were randomized to either VBL performed every 2 weeks until varices were eradicated (25 patients), carvedilol 12.5mg once daily (25 patients) or propranolol titrated to reduce resting pulse by >25% (25 patients) and followed

up on the same schedule at 6 and 12 months.

Results: Carvedilol had lowest rate of the first variceal bleeding when compared with VBL and propranolol (10%, 12% and 20% respectively). Carvedilol had significantly decreased the percentage of patients with varices grade III or IV over the follow up period (from 40% to 24%). Both carvedilol and propranolol significantly decreased severity of portal hypertensive gastropathy over follow up period. On the other hand, VBL significantly increased severity of portal hypertensive gastropathy.

Conclusion: Carvedilol is effective in preventing the first variceal bleeding. Carvedilol is an option for primary prophylaxis in cirrhosis and esophageal varices grade \geq II in single daily dose of 12.5 mg.

INTRODUCTION

A major cause of cirrhosis related morbidity and mortality is the development of variceal hemorrhage. Variceal hemorrhage occurs in 25 to 40 percent of patients with cirrhosis[1]. In the view of relatively high rate of bleeding from esophageal varices, an important goal of management of patients with cirrhosis is the primary prevention of variceal hemorrhage, therefore, all patients with cirrhosis should undergo diagnostic screening upper gastrointestinal tract endoscopy when cirrhosis is first diagnosed to document the presence of varices and to determine their risk for variceal bleeding. In patients with medium/large varices that have not bled either, nonselective Beta blockers (Propranolol or Nadolol) or variceal band ligation (VBL) is recommended for the prevention of first variceal bleeding and VBL should be considered in patients with

contraindications, intolerance or non-compliance to beta blockers[2].

Carvedilol is a potent non cardioselective Beta-blocker with intrinsic anti-alpha1-adrenergic activity. Therefore, its effects mimic those of the combination therapy using propranolol and prazosin[3]. Furthermore, Carvedilol has beneficial effects on splanchnic haemodynamics following acute and chronic administration in cirrhosis, without compromising hepatic blood flow or renal function[4]. Low dose carvedilol 12.5 mg is an extremely potent portal hypotensive pharmacological agent with minimal effects on systemic haemodynamics[5].

The aim of the study was to evaluate the role of carvedilol in prevention of first variceal bleeding in patients with liver cirrhosis and to compare its effect with that of propranolol and esophageal band ligation.

PATIENTS AND METHODS

This study was conducted in the Tropical Medicine Department, Faculty of Medicine Zagazig University, between December 2008 and September 2011. Seventy five patients were selected with liver cirrhosis and endoscopically proven esophageal varices (grade II or larger in size with or without variceal red color signs), that have not bled yet.

Exclusion criteria were as follows; contraindications to Beta-blockers, serum creatinine greater than 2 mg/dL, history of haematemesis and/or melena, history of sclerotherapy or band ligation, history of beta blockers intake, hepatoma, portal or hepatic vein thrombosis, tense ascites, presence of gastric or duodenal varices, severe erosive esophagitis, active duodenal or gastric ulceration, or gastrointestinal tract (GIT) tumor. Written informed consent was taken from each patient.

The patients were randomly distributed to 3 equal treatment groups. Group I included 25 patients who underwent endoscopic VBL. It was repeated every 2 to 4 weeks until esophageal varices became either grade I or complete obliteration. Group II included 25 patients who received carvedilol. It was started at a daily dose of 6.25 mg at the morning. The dosage of carvedilol was increased after 1-2 weeks to a target dose of 12.5 mg per day while heart rate is more than 55 beat per minute and systolic pressure is greater than 85 mm Hg. Group III included 25 patients who received propranolol. It was started at a dosage of 20 mg twice daily and the dosage was stepwise increased every 1-2 weeks by 20-40 mg as tolerated until the resting heart rate was reduced by 25% from base line or was approximately 55 beat per minute while systolic blood pressure was greater than 85 mmHg.

All the patients were subjected to full history taking, clinical examination, complete blood picture, liver and kidney function test, modified Child Pugh classification, abdominal ultrasonography, colored doppler portal vein, endoscopy at randomization time, 6 and 12 months.

Assessment of 1st variceal bleeding in the three treatment groups was done during the follow up period (one year from a randomization time). Variceal bleeding is defined clinically by hematemesis and/or melena with endoscopic

evidence of variceal hemorrhage (stigmata of recent hemorrhage on a varix and no other lesions) and at least a 2 g/dL reduction in hemoglobin within 24 hours of admission.

Statistical analysis:

Data were entered, checked and analyzed using Epi-Info version 6.02 and SPSS for windows version 8[6]. Baseline parametric data were expressed as the mean and standard deviation, and any differences in the groups were analyzed using an unpaired Student t test. Differences in parametric data over time were analyzed using the paired sample t test. Non parametric data were analyzed using the chi squared test Multilogistic Regression analysis and ROC curve were used to assess variables predicting the end points used cut off value.

RESULTS

There were no statistically significant differences among the three treatment groups regarding demographic and base line clinical data, laboratory, ultrasonographic data, portal vein congestion index (CI) (area /mean velocity), endoscopic findings and Child Pugh classification (table1). Serum creatinine level in propranolol group showed statistically significant increase over the follow period (1.23 ± 0.29 at start of the study versus 1.41 ± 0.40 mg/dl at 12 months, $P = 0.02$). On the other hand, Serum creatinine was unaffected (1.14 ± 0.23 versus 1.16 ± 0.29 mg/dl, $P = 0.21$) in carvedilol group. The portal vein congestion index (CI) significantly decreased over the follow up period in both carvedilol group (0.183 ± 0.09 at randomization time to 0.152 ± 0.01 at 12 months with $P = 0.009$) and propranolol group (0.185 ± 0.09 at randomization time to 0.169 ± 0.09 at 12 months with $P = 0.01$). However, there was no significant change in the mean CI in VBL group (0.176 ± 0.08 at 0 time to 0.171 ± 0.02 at 12 months with $P = 0.86$).

Carvedilol had significantly decreased the number of patients with varices grade III or IV over the follow up period (from 40% to 24%). On the other hand, propranolol had no significant change in the number of patients with varices grade III or IV. Both carvedilol and propranolol significantly decreased the number of patients with moderate PHG over follow up period (32%, 12% and 8% at 0, 6 and 12 months respectively in carvedilol group) and (40%, 28% and 24% at 0, 6 and 12 months respectively

in propranolol group). On other hand, in VBL group, there was statistically significant increase of severity of PHG over follow up period (32%, 32% and 48% at 0, 6 and 12 months respectively). Varices were eradicated in 56% of patients after a mean of 4.24 ± 1.39 band sessions. Median time to eradication was 18 week (range, 8-36 weeks).

Incidence of bleeding ranged from 8% in carvedilol group to 12% in VBL group and 20%

in propranolol but this difference was not statistically significant (table 2). Serum albumin best predicting incidence at cut off value less than 2.75 mg/dl with C-statistic > 0.73 and 95 % Confidence Interval (CI) 0.609 - 0.853. The only variables that could significantly predict the probability of incidence of first variceal bleeding among all variables at randomization time were mild PHG and serum albumin ≤ 2.75 mg (table 3).

Table (1): Child Pugh classification of the patients at randomization time.

		VBL n = 25	Carvedilol n = 25	Propranolol n = 25	Total n = 75	X ²	P
Class n (%)	A	9 (36%)	9 (36%)	10 (40%)	28 (37.3%)	0.39	0.98
	B	6 (24%)	7 (28%)	7 (28%)	20 (26.7%)		
	C	10 (40%)	9 (36%)	8 (32%)	27 (36%)		

Table (2): Incidence of variceal heamorrhage among the treatment groups

	VBL n = 25	Carvedilol n = 25	Propranolol n = 25	Total n = 75	X ²	P
Non bleeder n (%)	22 (88%)	23 (92%)	20 (80%)	65 (86.7%)	1.61	0.45
Bleeder n (%)	3 (12%)	2 (8%)	5 (20%)	10 (13.3%)		

Table (3): Multilogistic Regression Analysis of variables at randomization time

	95 % CI		P value
	Lower	Upper	
PHG mild	0.144	22.918	0.64
PHG moderate	1.701	218.193	0.01*
PHG marked	0.318	317.670	0.19
Albumin ≤ 2.75 mg/dl.	1.863	188.462	0.01*

* P<0.05 significant

DISCUSSION

Carvedilol, a non-cardioselective beta-blocker, is more effective in reducing portal pressure than propranolol, however, there have been much need for clinical studies assessing the efficacy of carvedilol in primary prophylaxis [7].

Carvedilol was found to have lower bleeding rate than VBL and propranolol (8%, 12% and 20% respectively) over treatment period of 12 months. This finding is in concordance with that reported by Tripathi et al. [8] who compared between carvedilol and VBL over longer treatment duration (median of 20 months) and found that carvedilol had lower bleeding rate than VBL (10 % and 23% respectively). This confirms the efficacy of carvedilol.

In our study, no bleeding from band ulcer had occurred, mostly because of long interval between VBL endoscopy settings (2-4 weeks), which may explain the lower rate of variceal bleeding with VBL in our study than reported by Tripathi et al. [8] who implemented short intervals of 1 to 2 weeks between banding sessions.

The present study showed that Propranolol treatment had the highest bleeding rate (20%). Perez-Ayuso et al. [9] compared between 2 treatment groups (propranolol versus VBL) and reported that propranolol had a significant higher rate than VBL (25% versus. 12% respectively). On the other hand, Drastich et al. [10] reported lower bleeding rate with propranolol versus VBL (6 % versus 5%). This

variation in bleeding rates could be explained by the predominance of Child Pugh class A and B patients in the study of Drastich et al. [10]. These findings indicate that propranolol has a better efficacy in less advanced liver cirrhosis and compensated cirrhosis.

In this study, moderate PHG at the start of the study and baseline serum albumin less than 2.75 mg/dl, were the only variables that could significantly predict the probability of incidence of 1st variceal bleeding among the three treatment groups. Others had reported that grade III varices could predict variceal bleeding [8].

Serum creatinine level in propranolol group showed statistically significant increase over the follow-up period (1.23 ± 0.29 at start of the study versus 1.31 ± 0.40 mg/dl at 12 months, $P = 0.02$). On the other hand, Serum creatinine was unaffected (1.14 ± 0.23 versus 1.16 ± 0.29 mg/dl, $P = 0.21$) in carvedilol group. These results agreed with that reported by Banares et al. [4] who found that the mean serum creatinine level was unaffected during a longer follow-up period. So this confirms the safety profile of carvedilol treatment on kidney function. The portal vein congestion index significantly decreased over the follow-up period in both carvedilol group (0.183 ± 0.09 at 0 time to 0.152 ± 0.01 at 12 months with $P = 0.009$) and propranolol group (0.185 ± 0.09 at 0 time to 0.169 ± 0.09 at 12 months with $P = 0.01$). However, there was no significant change in the mean CI in VBL group (0.176 ± 0.08 at 0 time to 0.171 ± 0.02 at 12 months with $P = 0.86$). So both carvedilol and propranolol had a maintained decrease effect on CI which is correlated with presence and size of varices [11].

Carvedilol had significantly decreased the percentage of patients with varices grade III or IV over the follow-up period (from 40% to 24%). On the other hand, propranolol had no significant change in the percentage of patients with varices grade III or IV. This confirms the efficacy of carvedilol as portal hypotensive drug as recorded by Garcia-Tsao et al. [2]. Both carvedilol and propranolol significantly decreased the percentage of patients with moderate PHG over follow-up period (32%, 12% and 8% at 0, 6 and 12 months respectively in carvedilol group) and 40%, 28% and 24% at 0, 6 and 12 months respectively in propranolol group). On the other hand, in VBL group, there was statistically significant increase of severity of PHT over

follow-up period (from 32%, 32% and 48% at 0, 6 and 12 months respectively). These results insure the effects of carvedilol and propranolol on portal hypertension and on its complication unlike VBL which only treats varices with no effect on the underlying cause or the other complication of portal hypertension; furthermore, VBL had increased the severity of PHG. This may be due to the effect of eradication of OV collaterals on portal hypertension or PHG develops as a result of congestion caused by blockade of gastric blood drainage rather than by hyperemia [12]. The eradication rate in VBL group was 56% but other studies with larger numbers of patients and longer follow-up reported rates between 70% and 75% [8], [13].

CONCLUSION

Carvedilol is effective in preventing the 1st variceal bleeding and it can be considered as a treatment option for primary prophylaxis of variceal bleeding in patients with liver cirrhosis and esophageal varices \geq grade II in a single daily dose of 12.5mg.

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Conflicts of interest: Non .

Ethical approval: The protocol of the study was approved by the ethical committee of Faculty of Medicine, Zagazig University. Informed consents were obtained from all patients.

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Video Case: Lower Esophageal Crack and Gastric Leiomyoma: Uncommon Causes of Upper Gastrointestinal Bleeding in Egypt

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Comment

A 62 years old male patient presented by an acute attack of upper gastrointestinal bleeding. The patient gave no history of any chronic medical disease. He then was admitted to the emergency unit of Al-Reyah Hospital (a charity hospital, Biala, Kafr El-Sheikh, Egypt) and after

resuscitation measures an emergency upper GIT endoscopy was done, the source of bleeding was identified as a lower esophageal linear crack while a large gastric smooth mass not yielding on pressure was seen and it seems to be most probably a gastric leiomyoma.

Image case: Extraction of Large Stone from the Common Bile Duct

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A 60 years old women presented by abdominal pain and recurrent bouts of fever 4 years after cholecystectomy. Abdominal ultrasonography revealed dilated common bile duct and stone inside. Serum bilirubin was mildly elevated.

Endoscopic retrograde cholangio-pancreatography (ERCP) revealed dilated common bile duct with large stone inside. Sphincterotomy was done and large stone was extracted by basket forceps.

The definition of a large stone should include the lower CBD diameter so that any stone exceeding that should be called “large”, regardless of the stone size[1]. Biliary plastic stents plus endoscopic sphincterotomy without stone extraction as primary therapy at initial ERCP is a safe and effective method in the management of large or multiple CBD stones .Hong et al found that the total stone clearance at second ERCP after stenting was 94.2%, only 5.7% of which needed mechanical lithotripsy [2]. Endoscopic sphincterotomy plus large-balloon dilatation (ESLBD) after endoscopic sphincterotomy is a simple, reproducible and effective technique, associated with a low morbidity rate and

helps in avoiding mechanical lithotripsy in 95.3% of cases for the endoscopic extraction of large or multiple common bile duct stones [3].

So the great majority of patients with large stones can be treated endoscopically. In cases of unsuccessful stone extraction using balloons, baskets, mechanical lithotripsy, electrohydraulic or laser lithotripsy and large balloon dilation, the patient should be referred for extracorporeal shock wave lithotripsy or a percutaneous approach and finally surgery[1] .

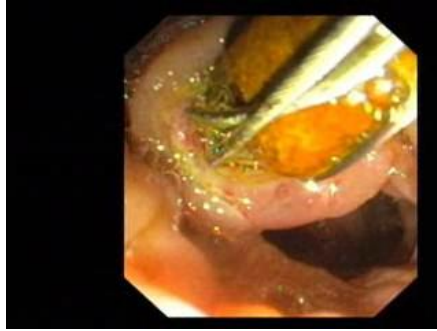


Image (1): Large stone during extraction by basket forceps outside the common bile duct.



Image (2): Another view of the stone.

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