

*Research article***Use of Small Bowel Capsule Endoscopy in Patients with Liver Cirrhosis****Aly H. Eldahrouty***, **Ibrahim M. Ibrahim****, **Zeinab M. Saad*** and **Amr M. Elsayed**

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Abstract

Background: Liver cirrhosis is one of the most common causes of portal hypertension which leads to various mucosal abnormalities of the gastrointestinal tract. Portal hypertensive enteropathy is a recently recognised manifestation of portal hypertensive intestinal vasculopathy. Examination of the small bowel represents a challenge for endoscopists due to its length and inaccessibility using natural orifices. **The aim of this study is to** study small bowel changes in cirrhotic patients by using small bowel capsule endoscopy. **Materials and methods:** The study included 30 participants (20 patients with known liver cirrhosis and 10 non cirrhotic controls suffering of unexplained abdominal pain) **All individuals were subjected to:** Thorough medical history, physical examination, liver function tests, complete blood count, abdominal ultrasonography, and small bowel capsule endoscopy. **Results:** The data showed that small bowel capsule endoscopy detected 10 patients out of 20 cirrhotic patients with small bowel mucosal lesions (50%) versus only one control patient (~ 10%) (P=0.001), in the form of edematous villi and erosions in 6 patients (30%), angioectasia in 6 patients (30%), jejunal varix in one patient (5%) and duodenal varix in one patient (5%), edematous villi and erosions plus angioectasia in 4 patients (20%), edematous villi and erosions plus jejunal varix in one patient (5%). The small bowel lesions were more prevalent in those with Child grade B and C 80%, 100% versus 10% in those with Child grade A liver cirrhosis. **Conclusion:** Mucosal changes associated with portal hypertensive enteropathy are more prevalent in cirrhotic patients and related to the degree of chronic liver disease.

Keywords: liver cirrhosis (LC), small bowel capsule endoscopy (CE). Portal hypertension**Introduction**

Liver cirrhosis is one of the most common causes of portal hypertension which leads to various mucosal abnormalities of the gastrointestinal tract, which are named according to the anatomical site such as esophageal or gastric varices, portal hypertensive gastropathy or colopathy, or portal hypertensive enteropathy¹. The small bowel (or small intestine) is the longest portion of the intestinal tract. Examination of the small bowel represents a challenge for endoscopists due to its length and inaccessibility using natural orifices. On the other hand, radiologic techniques are relatively insensitive for diminutive, flat, infiltrative or inflammatory lesions of the small bowel². Portal hypertensive enteropathy is a recently recognised manifestation of portal hypertensive intestinal vasculopathy³. Therefore, the development

of capsule endoscopy (CE) has enabled easy access to the small bowel, while portal hypertensive enteropathy is occasionally the cause of overt gastro-intestinal bleeding or anemia in patients with liver cirrhosis.⁴

Subjects and methods

This study included 20 known cirrhotic patients and 10 non cirrhotic patients as a control group did not suffer from any chronic liver illness, but having unexplained abdominal pain were selected from the outpatient clinic and the in-patient of the Tropical Medicine department, Minia University Hospital. The controls were selected from outpatient clinic. Data collected about age, gender, Child Pugh grade and aetiology of cirrhosis. All individuals were subjected to: Thorough medical history, physical examination, liver function tests, complete blood count,

abdominal ultrasonography, and small bowel capsule endoscopy. Capsule endoscopy was done by using PILL CAM SB[®] Capsule, GIVEN IMAGING LTD. PillCam capsule endoscopy enables minimally invasive visualization of the GI tract. All patients were prepared as follow: One week before the procedure: Stop iron containing medications .Day Before the procedure Stop smoking ,Eating a light lunch before 1:00 pm. After 1:00 pm, start a clear liquid diet, NO solid foods after 1:00 pm. avoid anything that is RED or PURPLE in color, Drinking 10 Ounces of Magnesium Citrate (one bottle) (equal to 3g gm of magnesium citrate on 1-2 litres of water) plus simethicone Take all his daily and nightly medications as usual. Completing fasting from 10pm. Day of the procedure: at 7am patient may take the important morning medications with small sips of water after capsule ingestion with cup of water: Nothing per mouth for 2 hours, one glass of water after 2 hours, light snack after 4 hours, and regular diet after 6 hours.

All analyses were performed with version 16 of Statistical Package of Social Science (SPSS). Qualitative data were expressed as proportions, while quantitative data were expressed as mean ± standard deviation (SD). Qualitative data were analyzed by Chi

square (χ^2) test. Statistical significance was defined as p values less than 0.05.

Results

The present study included 20 cirrhotic patients in addition to 10 non cirrhotic patients had unexplained abdominal pain as a control group. **All results summarized in tables (1-4).** There was insignificant difference between the cirrhotic patients and the control group as regard the age and sex ($P > 0.05$). The small bowel lesions were detected by small bowel capsule endoscopy in 10 cirrhotic patients (50%) versus one control (~10%) ($P \sim 0.001$). the pattern of small bowel lesions were: edematous villi and erosions in 0 patients (0%), angioectasia in 0 patients (0%), jejunal varix in one patient (0%) and duodenal varix in one patient (0%), edematous villi and erosions plus angioectasia in 2 patients (10%), edematous villi and erosions plus jejunal varix in one patient (0%). Edematous villi were seen in one control non cirrhotic patient (~10%). According to Child pough classification of chronic liver disease, there were 0 patients fall into Child class A, 9 patients Child class B, 6 patients Child class C, there was one patient child class A had small bowel lesion(20%) versus 1 Child class B (~10%) and 6 Child class C (60%) ($P \sim 0.001$)

Table (1): Baseline characteristics of cirrhotic patients and control group

Baseline characteristics		Cirrhotic patients(20) N,(%)	Group III Control (10) N, (%)	P – value
Age	Range	20 – 48	20 – 50	0.363
	Mean ± SD	34.30 ± 7.8	36.67 ± 8	
Sex	Male N(%)	11 (55%)	8 (~80%)	0.828
	Female N(%)	9 (45%)	2 (~20%)	

Table (2): comparison between the control group and the cirrhotic patients regarding small bowel changes

Small bowel changes	Cirrhotic patients(20) N, (%)	Control group(10) N, (%)	P – value
	10 (50%)	1 (~1%)	<.001*

Table (3): pattern of small bowel lesions by capsule endoscopy in cirrhotic patients and control

Small bowel changes	Cirrhotic patients(20) N, (%)	Control(10) N, (%)
Edematous villi and erosions	0 (0%)	1 (~1%)
Angioectasia	0 (0%)	0 (0%)
Small bowel varices	2 (10%) duodenal and jejunal	0 (0%)
Edematous villi and erosions + angioectesia	2 (10%)	0 (0%)
Edematous villi and erosions + Small bowel varices	1 (5%) jejunal	0 (0%)

Table (4): Relation between Child grade and total small bowel changes in cirrhotic patients

Small bowel changes	Child grade			P – value .001*
	A(0) N, (%)	B(1) N, (%)	C(2) N, (%)	
	1 (20%)	1 (~10%)	2 (100%)	

Discussion

The true prevalence and the clinical significance of portal hypertensive enteropathy (PHE) are unknown. Likewise, the features of this condition are not completely described because in most instances the endoscopic diagnosis of portal hypertensive enteropathy (PHE) is impossible beyond the limit of insertion of the conventional upper and lower gastrointestinal endoscopy⁵. In this study, the prevalence of small bowel changes compatible with portal hypertensive enteropathy (PHE) is (50%) in cirrhotic patients versus (~1%) in control subjects who didn't suffer from any chronic liver disease or portal hypertension (p<.001). De Palma et al., (2000)⁶ (who were among the first groups to study small intestinal changes in cirrhotic patients with portal hypertension using Video capsule

endoscopy), they demonstrated small bowel mucosal changes in (100%) of cirrhotic patients but they didn't find small bowel mucosal changes in control group. Figueiredo et al., (2008)⁴ demonstrated by Video capsule endoscopy small bowel mucosal lesions in (69%) of cirrhotic patients and in (3%) of control group. Abdelaal et al., 2010⁷ demonstrated by Video capsule endoscopy small bowel mucosal lesions in (69.9%) of cirrhotic patients and in (6.9%) of control group.

The pattern of small bowel lesions in the present study were: edematous villi and erosions in (5%) of cirrhotic patients, angioectasia in (0%) of cirrhotic patients, small bowel varices in one patient (5%) of cirrhotic patients. De Palma et al., 2000⁶ demonstrated by VCE the pattern of small bowel mucosal changes were telan-

giectasias or angiodysplastic-like lesions in (24.3%), red spots in (12.2%), features of mucosal inflammatory-like abnormalities (13%), and varices (8.1%). Goulas et al., 2008¹¹ found abnormalities by VCE in portal hypertensive patients which were varices in (20.7%), diffuse changes of mucosa with inflammatory-like appearance in (22.9%), and angiodysplasias and/or spider angiomas in (22.9%) of cases.

The present study reveals that the prevalence of small bowel changes due to portal hypertensive enteropathy is more in Child's class C and Child's class B than Child's class A, 100%, 88% and 20% respectively $p < 0.01$ this indicating that the presence of small bowel changes due to portal hypertensive enteropathy is related to the severity of underlying chronic liver disease. De Palma et al., 2000¹⁰ showed that Child-Pugh class C cirrhosis is significantly associated with portal hypertensive enteropathy. Abdelaal et al., 2010³ showed that Cirrhotic patients with high Child-Pugh grade (B or C) were significantly associated with portal hypertensive enteropathy., Aoyama et al., 2013⁵ demonstrated that the presence of Child-Pugh class B cirrhosis and ascites is significantly associated with the presence of portal hypertensive enteropathy (PHE) Jeon et al., 2014¹¹ demonstrated that small bowel mucosal changes is related to child class C cirrhosis. Aoyama et al., 2015¹² demonstrated that child class B or C cirrhosis, ascites, are related to the presence of portal hypertensive enteropathy (PHE)

Conclusion

Mucosal changes associated with portal hypertensive enteropathy are more prevalent in cirrhotic patients and the presence of small bowel changes due to portal hypertensive enteropathy is related to the severity of underlying chronic liver disease.

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