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Detection of Gastrointestinal Lesions Causing Iron Deficiency Anemia by Upper With or Without Lower GI Endoscopy in the Egyptian Society

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ABSTRACT

Most gastrointestinal lesions cause iron-deficiency anemia. Endoscopy of the upper and lower digestive tracts is indicated for IDA patients because most sources of gastrointestinal hemorrhage can be found. Clinical history can predict positive GI endoscopic findings, but its sensitivity in detecting specific lesions, including GI neoplasia, is limited. This study included 1064 IDA patients who had upper and lower GI endoscopies to determine the efficacy of upper and lower endoscopy in diagnosing gastrointestinal causes of iron deficiency anemia in Egyptian individuals. According to our findings, the most common cause of Fe deficiency anemia in upper gastrointestinal lesions (39.8 %) was peptic ulcer, whether gastric or duodenal, followed by angiodysplasia (11.85 %). Colorectal cancer (31.4 percent) was the most common cause of Fe deficiency anemia in lower gastrointestinal lesions discovered by colonoscopy, followed by lower gastrointestinal angiodysplasia (2.7 %). There was a high prevalence of neoplasm in IDA patients. 303 of 700 patients with iron deficiency anemia developed gastrointestinal neoplasm, with 82 instances pathologically proving to be upper gastrointestinal adenocarcinoma and 221 cases being colorectal cancer. In 18 IDA patients, combined lesions were seen. Upper and lower GI endoscopies are beneficial in diagnosing Iron deficiency anemia, says this study. In elderly patients with iron deficiency anemia, gastrointestinal cancers are prevalent. Peptic ulcers are the most prevalent upper GI lesion in Egyptians.

1. Introduction

Anemia is a global issue and half of this load is iron deficiency anemia, most common in preschoolers and women. Iron deficiency diagnosis, prevention, and treatment are public health priorities in developing countries [16]. Beeturia [20], restless leg syndrome [28], reduced serum iron concentration, reduced transferrin levels [40], weakness, headache, irritability, weariness, and exercise intolerance are common

signs of iron insufficiency in adults. Many asymptomatic individuals report fatigue, weakness, exercise intolerance, and pica only after iron treatment. Extremely low serum ferritin levels might potentially cause anemia-like symptoms. Plummer-Vinson or Patterson-Kelly syndrome, spoon nails, and blue sclera, typical of iron insufficiency in the early 20th century, have nearly disappeared. Iron deficiency can cause glossal pain, diminished salivary flow, dry mouth, tongue papilla atrophy, and alopecia [17].

Iron deficiency (ID) is defined as the decrease of the total content of iron in the body. In most clinical settings, reduced availability of iron is the most important cause of anemia due to impaired erythropoiesis [23]. This type of anemia is the most frequent chronic anemia. ID may be the result of either excessive loss or, less frequently, decreased absorption. Missing bone marrow iron stores and/or low serum ferritin levels in people with absolute iron insufficiency make iron unavailable for normal or enhanced erythropoiesis. Poor iron intake, low iron absorption, or increased blood loss may cause this. In the West, blood loss is the most likely reason and should be investigated first [19]. Functional iron deficiency is characterized as inadequate iron for integration into erythroid precursors despite normal or increasing body iron reserves and bone marrow iron [18].

Overt or occult blood loss causes iron deficiency in developed countries. Overt blood loss is visible and easy to recognize by history alone. Hematemesis, melena, hemoptysis, severe menorrhagia, and extreme hematuria are examples [9]. Gastrointestinal malabsorption of iron [37], celiac disease [10], intravascular hemolysis [15], pulmonary hemosiderosis [21], gastric bypass surgery [8], peptic ulcers [7], portal hypertensive gastropathy [38], chronic gastritis [33], [34] esophageal cancer [25], gastric cancer, dieulafoy Lesion [35], gastric Antral Vascular Ectasia [22], hemosuccus pancreaticus [36], malignant neoplasms of the small intestine [24], and inflammatory bowel disease [25] are some of the important GIT related factors that should be considered in evaluating the etiology of iron deficiency anemia. In many cases, these alterations will be secondary to gastrointestinal disease. IDA occurs in 2%-5% of adult males and postmenopausal women in the developed world. ID, with or without anemia, is even more frequent [4].

Endoscopy is a diagnostic approach to confirm any physical or physiological abnormality in the gastrointestinal tract (GIT). Esophagogastroduodenoscopy (EGD) involves passing a small flexible endoscope through the mouth, pharynx, oesophagus, stomach, and duodenum. Beyond the ligament of Treitz, a longer endoscope can be inserted into the jejunum. EGD is diagnostic and therapeutic. Most current endoscopes use a video chip (charged coupled device) for enhanced imaging, instead of fibre optics [2].

The aim of our study was to assess the gastrointestinal tract (GIT) by upper & lower GI endoscopy in patients with iron deficiency anemia to detect GIT causes of anemia in those patients.

2. Methodology

2.1 Participants

The study was conducted on 1064 patients from internal medicine outpatient clinic of Kasr El Aini hospital from a period of 2014 to 2017 who were anemic and proved to have iron deficiency anemia with no obvious cause.

2.2 Inclusion and Exclusion Criteria

These patients were subjected to upper and lower GI endoscopy at EL-Ibrashy unit in Kasr El Aini hospital. The patient's inclusion criteria were hemoglobin concentration of ≤13 g/dl for adult men and ≤12 g/dl for

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adult women, and patients with microcytic hypochromic anemia (MCV <80 fl/ml^3) with specific laboratory values (serum iron concentration <45 µg/ml, serum ferritin concentration ≤ 30 ng/ml, or transferrin saturation ≤ 20 percent). The exclusion criteria included anemia of other types, patients with chronic kidney disease and renal failure, premenopausal female with gynecological problems, patients with liver cirrhosis, other known causes of iron deficiency anemia rather than (GIT) causes, and patients receiving medications in the form of non-steroidal anti-inflammatory drugs and anticoagulants.

2.3 Data Collection

The patients were evaluated for full medical history, clinical exam, laboratory tests (CBC, serum iron concentration, total iron binding capacity, transferrin saturation percent, serum ferritin, and occult blood in stool), upper GI endoscopy, lower GI endoscopy, and biopsy of lesions.

2.4 Data analysis

The variables were statistically analyzed to identify the main relation of iron deficiency anemia with any underlying GIT condition among the patients.

3. Results

The study was conducted on 1064 patients (of both sexes) from internal medicine outpatient clinic of Kasr El Aini hospital who were anemic and proved to have iron deficiency anemia with no obvious cause. These patients were subjected to full history taking, clinical examination, laboratory tests and upper and lower GI endoscopy at EL-Ibrashy unit in Kasr El Aini hospital. The patients' ages ranged from 19 to 94 years with a mean ± SD of 48.9 ± 14. There were 600 males and 464 females among the total 1064 patients.

3.1 Laboratory tests analysis

Laboratory tests were performed revealing microcytic hypochromic anemia which were confirmed by iron studies that revealed Fe deficiency anemia. Comparison between males and females as regards laboratory findings revealed no statistically significant differences (p value > 0.5). laboratory data of our patients and comparison between males and females are illusterated in table 1.

Table 1. Analysis of laboratory data of 1064 patients

	Mean	**SD**	**Median**	**Minimum**	**Maximum**	**P value**
Hb (g/dl)						
Males	7.9	1.6	8.2	3.2	11.0	
females	7.7	1.6	8	3.15	11.8	
MCV (fl)						
Males	56.8	8.1	57.0	24.0	76.0	
females	56.5	8.4	56.0	16.0	76.0	
Serum Iron (µg/dL)						**> 0.5 Non sign**
Males	26.1	9.2	27.0	8.0	42.0	
females	25.2	8.8	26.0	8.0	42.0	
Ferritin (µg/L)						
Males	22.1	5.4	24.0	8.0	32.0	
females	21.8	5.5	24.0	8.0	35.0	
TIBC (µg/dL)						
Males	506.1	145.4	512.0	214.0	965.0	

females	515.6	142.8	524.0	213.0	965.0	
T sat						
Males	5.56	2.83	5.8	1.16	17.7	
females	5.57	2.92	5.9	1.28	17.8	

* Hb: 12.5-16 g/dl, Serum iron: Male 50–160 µg/dL, Female 40–150 µg/dL, MCV: 78-99 fl, Serum ferritin: Male 30-300 µg/L, Female 15-150 µg/L, TIBC: Total iron-binding capacity: 240–450 µg/dL, T sat: Transferrin saturation: 15–50% (males), 12–45% (females)

In males, the Hb concentrations ranges from 3.20 to 11 gm/dL with a mean ± SD of 7.9 gm/dl ±1.6. The MCV ranges from 24 to 76 with a mean ± SD of 56.8 ±8.1. The serum Fe ranges from 8 to 42 with mean 26.1 and SD 9.2. The Ferritin ranges from 8 to 32 with mean 22.1 and SD 5.4. Their TIBC ranges from 213 to 965 with mean 506.1 and SD 145.8. Their transferrin ratio ranges from 1.16 to 17.7 with mean 5.56 and SD 2.83. In females their Hb concentrations ranges from 3.20 to 11.8 gm/dL with a mean of 7.7 gm/dl and a SD ±1.6. Their MCV ranges from 16 to 76 with a mean 56.5 and a SD ±8.4. Their serum Fe ranges from 8 to 42 with mean 25.2 and SD 8.8. Their ferritin ranges from 8 to 35 with mean 21.8 and SD 5.5. Their TIBC ranges from 213 to 965 with mean 515.6 and SD 142.8. Their transferrin ratio ranges from 1.28 to 17.8 with mean 5.57 and SD 2.92.

Upper and lower GI endoscopy of patients results revealed that 700 patients (65.8%) of the 1064 studied anemic patients had gastrointestinal lesions detected by either upper or lower or both GI endoscopy. Whereas 364 (34.2%) patients did not have lesions detected by upper and lower GI endoscopy and they were referred to further investigations. Thus, it was inferred that upper and lower GI endoscopy can find a cause of iron deficiency anemia in 65.8% of cases.

3.2 Relationship of laboratory tests with age and lesions

Comparison between patients with and without detected lesions as regards age and laboratory data is illustrated in table (2) and revealed that there is statistically significant difference between patients with and without detected lesions as regards age (52.06 + 14.24 y) in lesion pts versus (42.7 + 11.35 y) in pts without lesion p value 0.000. Results showed that there is statistically significant difference between patients with and without detected lesions as regards Hb %. A statistically significant difference between patients with and without detected lesions as regards TIBC was found. Lastly, no statistically significant difference between patients with and without detected lesions as regards MCV, serum iron, ferritin, and T sat.

Table 2. Comparison between patients with and without detected lesions as regards age and laboratory data

	pts without lesions	**pts with lesions**	**P value**
Age	**42.7 ± 11.35**	**52.06 ± 14.24**	**0.000***
Hb %	**9.2 ± 4.2**	**7.2 ±1.55**	**0.000***
MCV	56.95 ± 7.8	56.5 ± 8.4	0.4
Serum Fe	25.74 ± 9.7	25.71 ± 8.7	0.98
Ferritin	21.6 ± 5.76	22.2 ± 5.3	0.09
TIBC	**497.03 + 153.4**	**517.1+ 138.9**	**0.03***
T sat	5.79 ± 3.1	5.58 ± 2.93	0.096

It could be inferred that GI lesions are more common in older patients with lower Hb% than those with higher Hb%.

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3.3 Percentage of lesions in both upper endoscopy and colonoscopy

Lesions were detected by upper endoscopy in 464 pts; of them 18 pts had also lower endoscopy detected lesions. So patients with only UE lesions were 446 pts. Furthermore, lesions were detected by lower endoscopy in 254 pts; of them 18 pts had also upper endoscopy detected lesions. So patients with only LE lesions were 236 pts. Combined lesions in both upper and lower GIT were present in 18 patients (table 3).

Table 3. Percentage of lesions in both upper endoscopy and colonoscopy

	No	**%**
U/E	446	63.71
L/E	236	33.72
Combined UE & LE	18	2.57
Total	700	100.0%

3.4 Outcomes of Upper GI endoscopy

The data collected from Upper GI endoscopy is summarized in Table 4. Gastric ulcer was found in 32 pts (4.6%); duodenal ulcer in 53 pts (7.6%); Duodenal ulcer combined with angiodysplasia in 3 pts (0.4%); combined gastric & duodenal ulcers or ulcers combined with gastritis and or esophagitis were detected in 191 pts (27.29%), angiodysplasia in 83 pts (11.86%), gastritis was present in 3 pts (0.4%), cancer esophagus was detected in 25 pts (3.57%), cancer stomach was detected in 57 pts (8.14%), Barrett's esophagus was detected in 14 pts (2%), and Dieulofoys lesion was detected in 3 pts (0.4%).

Table 4. Percentage of different lesions in UGI endoscopy

Upper endoscopy	**No. of patients**	**%**
No lesions	236	33.7
Peptic ulcer	279	39.85
Angiodysplasia	83	11.85
Malignancy • stomach • esophagus	 57 25	11.71
Barrett's esophagus	14	2
Dieulofoys	3	0.4
Gastritis	3	0.4

So, peptic ulcer disease was detected in 279 pts (39.8%), so it represents the most prevalent upper GI lesion in cases of iron deficiency anemia followed by angiodysplasia (11.85%), then cancer stomach (8.14%), then cancer esophagus (3.57%) followed by Barrett's esophagus in 14 patients (2%) and finally dieulofoys (0.4%) & gastritis in 3 patients (0.4%).

3.5 Outcomes of Lower GI endoscopy

The data collected from Lower GI endoscopy is summarized in Table 5. Colorectal cancer was found in 221

pts (31.6%); angiodysplasia in 19 pts (2.7%); internal piles in 6 pts (0.8%) (managed by band ligation); and ulcerative colitis in 8 pts (1.1%).

Table 5. Percentage of different lesions in colonoscopy

Colonoscopy	No	%
No lesions	446	63.7
Colorectal cancer	221	31.6
Angiodysplasia	19	2.7
Internal piles	6	1
Ulcerative Colitis	8	1.1

Results revealed that (254) patient from the 700 patients showed lesions on colonoscopy with high prevalence of colorectal cancer in 221 patient (31.6%) followed by Angiodysplasia in 19 patient (2.7%).

3.6 Comparison between pts with and without colorectal malignancy

Our study revealed that 221 / 700 had cancer colon (116 males & 105 females). There was a statistically significant difference between patients with and without colorectal malignancy as regards age (63.1 + 9 y) in lesion pts versus (47 + 13.3 y) in pts without lesion p value 0.000. Furthermore, a statistically significant difference between patients with and without colorectal malignancy as regards Hb % was found. Also, there was a statistically significant difference between patients with and without colorectal malignancy as regard Serum Fe.

Table 6. Comparison between pts with and without colorectal malignancy:

	pts with cancer colon (221)	pt without cancer colon (479)	P value
Age	**63.1 ± 9**	**47 ± 13.3**	**0.000***
Hb %	**.65 ± 1.4**	**7.6 ±1.5**	**0.000***
MCV	56.2 ± .77	56.65 ± 8.8	0.5
Serum Fe	**.248 ± .91**	**26.17 ± 8.6**	**0.04***
Ferritin	21.9 ± 5.6	22.4 ± 5.1	0.2
TIBC	528.5 ± 153.7	511.9+ 131.3	0.1

Comparison between patients with different locations of colorectal cancer as regards age and hematological study revealed no significant differences ($p > 0.05$) (table 7)

Table 7. Comparison between patients with different locations of colorectal cancer

	Age (year)	**Hb** (gm/dl)	**MCV**	**Serum Fe**	**Ferritin**	**TIBC**
Ascending (115) 57 F, 58 M	62.15 ± 9.67	6.58 ± 1.5	56.37 ±7.79	25.67 ±8.55	21.76 ±5.56	541.3 ± 159.4
Transverse (14) 7 F, 7 M	62.4± 8.4	6.8±1.19	54.43±8.12	24.29± 9.9	20.5± 5.39	530.57± 126.5

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Descending (65) 27 F, 38 M	64.34 ± 8.69	6.37 ± 1.32	56.19 ± 7.73	23.64 ± 9.94	22.39 ± 5.87	507.98 ± 115.9
Sigmoid (9) 4 F, 5 M	66.2 ± 7.1	5.9 ± 1.8	58 ± 6.6	21.4 ± 9.38	24.4 ± 4.7	457 ± 133.9
Rectum (18) 10 F, 8 M	63.8 ± 6.48	6.06 ± 1.49	55.78 ± 7.06	24.9 ± 8.5	20.5 ± 5.6	554 ± 239.9
p- value	**> 0.05 (non-significant)**					

*F = females M= male

3.7 Patients with combined lesions (18 pts)

Out of total 18 patients with lesions, it was reported that 7 pts were with colon cancer, 2 pts with gastritis, 2 pts with cancer esophagus, and 3 pts with gastric ulcer. Similarly, 8 pts with angiodysplasia in LE with peptic ulcer in 4 pts and UE angiodysplasia in 4 pts were diagnosed. Moreover, one patient with cancer esophagus with internal piles and two pts with peptic ulcers with internal piles were found. So if we find lesion in UE that can explain anemia it is better to do LE for the detection of combined lesions.

In our study occult blood in stool was done in 235 patients while the results in the remaining patients were not obtained due to a lag in the patients to perform the test because of its difficult precautions, results revealed being positive in 55 (11.8%) patients with upper GI lesions and positive in 180 (29.7%) patients with lower GI lesions. So all patients with positive occult blood in stool had lesions but difficult precautions limited the number of patients.

There was no statistically significant difference found between male and female patients regarding the presence of gastric ulcer (P value = 0.331), duodenal ulcer (P value = 0.070), angiodysplasia (P value = 0.427), Barrett's esophagus (P value <0.001), cancer esophagus (P value = 0.392), cancer stomach (P value = 0.255), ulcerative colitis (P value = 0.072), colorectal cancer (P value =0.142), and colon angiodysplasia (P value = 0.739).

3.8 Prevalence of GI lesions according to Age of patients

We have classified the age of patients into different age groups including group (1) less than 30 years, Group (2) 30 to 50 years, Group (3) 50 to <70 years, Group (4) more than 70 years. According to the age we detected the prevalence of each lesion in each age group. Percentage of peptic ulcer disease regarding different age groups was found to be high in the age group of (30 to <50) years (56.4%) with lowest prevalence in the age group more than 70 (4.3%).

Table 8. Percentage of peptic ulcer according to the different age group

			Peptic Ulcer Disease		**Total**
			No	**Yes**	
Age Code	**<30**	Count	19	35	54
		% within peptic ulcer	4.5%	12.4%	7.7%
	30≤50	Count	**113**	**159**	**272**

		% within peptic ulcer	**27%**	**56.4%**	**38.9%**
	50≤70	Count	227	76	303
		% within peptic ulcer	54.3%	27%	43.3%
	≥70	Count	59	12	71
		% within peptic ulcer	14.1%	4.3%	10.1%

Similarly, percentage of angiodysplasia regarding different age groups with high prevalence was observed in the age group of (30 to<50) years (57%) with lowest prevalence in the age group more than 70 (0%).

Table 9. Percentage of Angiodysplasia according to the different age group

			Angiodysplasia		**Total**
			No	**Yes**	
Age Code	**<30**	Count	40	14	54
		% within peptic ulcer	6.5%	16.3%	7.7%
	30≤50	Count	**223**	**49**	**272**
		% within peptic ulcer	**36.3%**	**57%**	**38.9%**
	50≤70	Count	280	23	303
		% within peptic ulcer	45.6%	26.7%	43.3%
	≥70	Count	71	0	71
		% within peptic ulcer	11.6%	0%	10.1%

Prevalence of Barrett's esophagus regarding different age groups was high in the age group of (30 to <50) years (71.4%) with lowest prevalence in the age group more than 70 years and less than 30 years.

Table 10. Percentage of Barrett's oesophagus according to the different age group

			Barrett's oesophagus		**Total**
			No	**Yes**	
Age Code	**<30**	Count	54	0	54
		% within peptic ulcer	7.9%	0%	7.7%
	30≤50	Count	**262**	**49**	**272**
		% within peptic ulcer	**38.2%**	**71.4%**	**38.9%**

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	50≤70	Count	299	4	303
		% within peptic ulcer	43.6%	28.6%	43.3%
	≥70	Count	71	0	71
		% within peptic ulcer	10.3%	0%	10.1%

Upper GIT cancer regarding different age groups showed high prevalence in the age group of (50 to<70) years (67.9%) with lowest prevalence in the age group less than 30

Table 11. Percentage of upper GIT cancer according to the different age group

			upper GIT cancer		**Total**
			No	**Yes**	
Age Code	**<30**	Count	52	2	54
		% within peptic ulcer	8.4%	2.5%	7.7%
	30≤50	Count	256	16	272
		% within peptic ulcer	41.4%	19.8%	38.9%
	50≤70	Count	**248**	**55**	**303**
		% within peptic ulcer	**40.1%**	**57.9%**	**43.3%**
	≥70	Count	63	8	71
		% within peptic ulcer	10.2%	9.9%	10.1%

On the other hand, colorectal cancer regarding different age groups showed high prevalence in the age group (50 to<70) years (65.2%) and > 70 (24%) with lowest prevalence in the age group (<30) (0%).

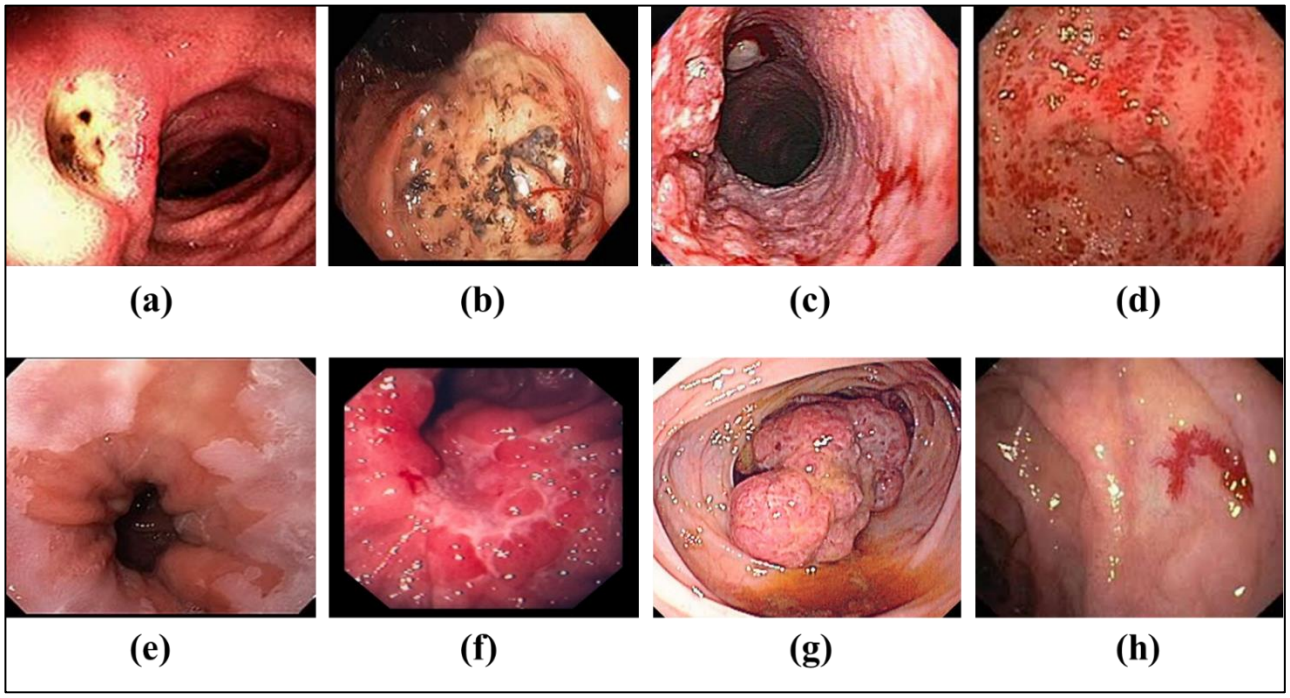

Figure 1. (a) 32 years old patient with duodenal ulcer (b) 45 year old patient with gastric ulcer (c) 65 years old patient with oesophageal cancer (d) 55 years old patient with gastric angiodysplasia (e) 35 years old patient with Barrett's esophagus (f) 57 years old patient with gastric cancer (g) 65 years old patient with colorectal cancer (descending colon), and (h) 50 years old patient with Intestinal angiodysplasia

Table 12. Percentage of Colorectal cancer according to the different age group

			Colorectal cancer		**Total**
			No	**Yes**	
Age Code	**<30**	Count	54	0	54
		% within peptic ulcer	11.3%	0%	7.7%
	30≤50	Count	248	24	272
		% within peptic ulcer	51.8%	10.9%	38.9%
	50≤70	Count	**159**	**144**	**303**
		% within peptic ulcer	**33.2%**	**65.2%**	**43.3%**
	≥70	Count	**18**	**53**	**71**
		% within peptic ulcer	**3.8%**	**24%**	**10.1%**

The prevalence of intestinal angiodysplasia was high in the age group (30 to<50) years (42.1%) with lowest prevalence in the age group (<70).

Table 13. Percentage of Intestinal angiodysplasia according to the different age group

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			Intestinal angiodysplasia		Total
			No	Yes	
Age Code	**<30**	Count	49	5	54
		% within peptic ulcer	7.2%	26.3%	7.7%
	30≤50	Count	**264**	**8**	**272**
		% within peptic ulcer	**38.8%**	**42.1%**	**38.9%**
	50≤70	Count	297	6	303
		% within peptic ulcer	43.6%	31.6%	43.3%
	≥70	Count	71	0	71
		% within peptic ulcer	10.4%	0%	10.1%

4. Discussion

Anemia is a major world-wide health problem. Approximately one-half of this burden is a result of iron deficiency anemia. The diagnosis, prevention, and treatment of iron deficiency are obviously a major public health goal, especially in low- and middle-income countries [16]. Iron deficiency (ID), with or without anemia, is often caused by digestive diseases and should always be investigated, as its causes could be serious diseases, such as cancer. Diagnosis of ID is not always easy. Low serum levels of ferritin or transferrin saturation, imply a situation of absolute or functional ID [27]. After an initial evaluation by clinical history, full laboratory tests for iron deficiency, gastroscopy and colonoscopy are the key diagnostic tools for investigating the origin of ID, and will detect the most important and prevalent diseases [3].

The aim of this study was to detect the upper and the lower Gastrointestinal lesions causing Fe deficiency anemia and the Incidence of these lesions in the Egyptian society considering that IDA is one of common health problems in Egypt. One thousand sixty four patients with IDA (with no obvious cause) participated in this study. Basic criteria for diagnosis of IDA included Hb concentration of 12 gm/dL or less for men, and 11 gm/dL or less for women, with hypochromic, microcytic indices and a serum ferritin less than 30 ng/mL. Females with gynacological problems and patients with chronic diseases were excluded from our study. All participants were subjected to thorough history taking, clinical examination and upper and lower GI endoscopy.

Our study revealed that from 1064 patients 700 patients (65.8%) had GIT lesions by upper or lower endoscopy while 364 patients (34.2%) had no GIT lesions. They were 366 males (52%) and 334 females (48%). Upper gastrointestinal lesions were detected in 446 patients (63.7%) while lower gastrointestinal lesions were present in 236 patients (33.7%). Combined lesions in both upper and lower GIT were present

in 18 patients.

In a study conducted by Raje and colleagues (2007) on 142 patients referred with iron deficiency anemia; 135 patients (95%) had lesions by upper or lower GI endoscopy while in seven patients (5%) no cause was found. The difference in percentage of lesions between Raje's study and our study could be attributed to the difference in inclusion criteria as in his study he included patients with Hb < 11gm /dl in males and < 10 gm/dl in females and serum ferritin < 12 ng/ml while in our study we included patients with Hb < 12gm/dl in males and < 11gm/dl in females as well as he conducted his study on 142 patients while our study was conducted on 1064 patients. In another previous study by [31] all the patients were anemic with Hb level and serum ferritin levels consistent with Fe deficiency anemia similar to the inclusion criteria in our study. In his study gastrointestinal lesions were detected in 62 patients (62%) and no lesions in 37 patients (37%) although Rockey conducted his study on 100 patients the percentage of lesions detected was 62% similar to our study, but our study excluded patients with Chronic kidney disease and chronic liver disease while Rockey didn't exclude these patients as 33 patients had concomitant organ diseases. Moreover, a study was conducted by [30] on 227 patients in which the causes of Fe deficiency anemia were detected by upper and lower endoscopy in 101 patients (44.5%) and undetected in 126 patients (55.5%) compared with our study it was conducted on 1064 patients, causes of IDA were detected in 700 patients (65.8%) and undetected in 364 patients (34.2%). This difference was because that Rahimi didn't subject his entire patients to both upper and lower GI endoscopy as he stated that in his study 217 from 227 patients underwent upper endoscopy while 179 from 227 patients underwent colonoscopy and this differ from our study in which all patients were subjected to both Upper and lower GI endoscopy.

Our study revealed that the most common single gastrointestinal Lesion causing Fe deficiency anemia detected by upper endoscopy was Peptic ulcer disease followed by Angiodysplasia and that cancer colon was the most common lower gastrointestinal lesion causing Fe deficiency anemia so our study partially agree with some studies that were performed for diagnosis of Fe deficiency anemia using endoscopy as the corner stone of diagnosis. Our study agrees with [31] who conducted his study on 100 patients .Peptic ulceration was the most common lesion identified in the upper gastrointestinal tract accounting for 19 of 37 lesions (51%) while our study revealed that peptic ulcer is the most common lesion identified in the upper gastrointestinal tract accounting for 279 of 700 (39.8%) Rockey revealed that cancer colon was the most common lesion in the colon accounting for 11of the 26 colonic lesions while our study agreed with Rockey as colorectal cancer is the most common cause in the lower gastrointestinal tract accounting for 221 of 700 (31.6%). Furthermore, our are in accordance with the study conducted by [30] which revealed that peptic ulcer (38%) is the most common Upper GI lesions causing IDA especially duodenal ulcer (9.2%) followed by gastric cancer 11 patients (4.8%) while the most common lower GI lesion was colorectal cancer 15 patients (6.6%) and this agree with our study being peptic ulcer the most common upper gastrointestinal lesion (39.8%) and colorectal cancer (31.6%) the most common lower GI lesion causing IDA.

Our study disagrees with another study which was performed by [26] for evaluation of gastrointestinal tract in Egyptian patients with Iron deficiency anemia by using upper and lower GIT endoscopy in sixty patients with IDA. Upper GIT endoscopy and colonoscopy was done for all patients. Out of sixty patents, a total of 24 patients (40%) had positive upper endoscopic lesions, 18 patients (30%) had positive lower endoscopic lesions and 10 patients (16.7%) had positive findings on both upper and lower Endoscopy. The most common upper GI lesions were hiatus hernia with esophagitis in 11 patients (18.3%), erosive gastritis in 9 patients (15%), duodenitis in 7 patients (11.7%), gastric Ulcerations in 6 patients (10%) and gastric tumors in 5 patients (8.3%), while the most common lower GI lesions were proctocolitis in 10 patients (16.7%), piles in 7 patients (11.7%), cancer colon in 6 patients (10%) and colonic polyps in 5 patients (8.3%). Eleven

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patients (18.3%) had GI malignancy, 5 in stomach (8.3%) and 6 in the colon (10%).While our study revealed peptic ulcer being the most common upper gastrointestinal lesion causing Fe deficiency anemia in 279 patients (39.8%), Angiodysplasia in 83 patients (11.85%), cancer stomach in 57 patients (8.14%), cancer oesophagus in 25 patients (3.5%) followed by Barrett's esophagus in 14 patients (2%).And colorectal cancer is the most common in lower GI lesions (31.6%) followed by angiodysplasia in 19 patients (2.7%) .While our study revealed high prevalence of gastrointestinal malignancy (303) patients, cancer esophagus (25), cancer stomach (57) and colorectal cancer (221). Our study agrees with [26] in that they concluded that upper and lower GI endoscopy is an effective investigation for patients with IDA and its use should be encouraged and that Evaluation of the lower GIT by colonoscopy is recommended to be done to all patients with suspected IDA irrespective of the upper endoscopy finding.

Another study was carried out by [13] on 100 patients with Fe deficiency anemia. 30 patients were diagnosed with gastric telangiectasia and 45 patients were diagnosed to have peptic ulcer and this agrees with our study that reveled angiodysplasia (11.85%) is the second common cause of Fe deficiency anemia after peptic ulcer (39.8%) detected by upper endoscopy in the Egyptian society. But his study didn't include lower GI lesions causing Fe deficiency anemia as the patients were not subjected to lower GI endoscopy.

Our results agrees with [1] who performed his study on 71 patients with iron deficiency anemia. After excluding patients with obvious causes of blood loss, inadequate diet, chronic diseases, or malignancies, patients underwent colonoscopy, as well as gastroscopy. Results revealed a likely cause of iron deficiency anemia was detected in 60 patients (85%) and undetected in 11 patients (15%).The most common GI lesions were gastritis (13), peptic ulcer (7), hiatal hernia with linear erosions (5), gastric cancer (2), colon cancer (10 patients), colonic vascular ectasia (3), colonic polyps (2), and Crohn's disease (1), celiac disease (4). Six patients (8%) had coincident gastrointestinal findings, while our study revealed peptic ulcer being the most common upper gastrointestinal lesion causing Fe deficiency anemia in 279 patients (39.8%), Angiodysplasia in 83 patients (11.85%), cancer stomach in 57 patients (8.14%), cancer oesophagus in 25 patients (3.5%) followed by Barrett's esophagus in 14 patients (2%) and colorectal cancer is the most common lower GI lesion (31.6%) followed by angiodysplasia in 19 patients (2.7%).

In our study there was significant relation between age, Hb, TIBC and iron deficiency anemia patients being more significant in patients with detected lesions than those with no detected lesions as GI lesions is higher in older age with lower Hb%. Our study revealed that 221 / 700 had cancer colon (116 males & 105 females). In our study there was statistically significant difference between patients with and without colorectal malignancy as regards age, Hb and serum Fe, where colorectal malignancy is significantly higher in older patients with lower Hb and lower serum Fe. Another study was conducted by [6] were they conducted their study on 148 patients. They divided the patients into 2 groups (group A) malignant and (group B) nonmalignant lesions. Chao and colleagues found that there is a relation between those with lesions and different blood values including Fe studies and CBC. Their results revealed that there is a significant relation between malignant group and age, Hb and ferritin, where there was significantly older age, lower Hb and lower serum ferritin in malignant group.

In the study conducted by [29] on 142 patients referred with iron deficiency anemia, nine patients (6.3 %) of them had colon cancer; eight of nine cancers were in the right colon. Other patients with iron deficiency anemia were found to have benign upper or lower gastrointestinal disease (125) pts or upper gastrointestinal cancer (1) patient. Compared to our study cancer colon was detected in 221 patients being more common in the ascending colon (115) pts, descending (65) pts, rectum (18) pts, transverse (14) pts and sigmoid (9) pts. In our study there was no significant difference between the different locations of colorectal cancer as

regards the age, sex and different Hematological values.

Our study revealed that there is a significant difference in barrett's esophagus regarding sex being higher in females in 13/14 patients than in males in 1/14 patients. And this disagrees with a study performed by [14] who conducted their study on one thousand patients with chronic GERD symptoms. Barrett's esophagus was present in 7.3% of patients with chronic GERD symptoms; there was no significant difference between patients with Barrett's esophagus and GERD regarding sex. This difference can be attributed to the difference in the type of selected patients as in our study we selected patients with Fe deficiency anemia not GERD patients.

A study conducted by [11] who conducted their study on 170 patients with GERD. Barrett's esophagus was present in 60 patients with higher prevalence in females (66.6%) than males (33.3%). And this agrees with our study showing higher prevalence in females 13/14 patients while in males 1/14 patient. Our study revealed that there was no significant difference in esophageal cancer regarding sex as in males it is found in 12 patients while in females it is found in 13 patients, and this disagrees with a study conducted by [5] which was conducted on 8900 malignant patients their data were collected from different medical centers in a period from 2009 till 2016 presenting with Fe deficiency anemia and proved to be malignant. 5500 patient were diagnosed to have different malignancies while 3400 patient proved to have gastrointestinal malignancies with high prevalence of cancer esophagus in males in 2200 (64.7%) than females in 1200 patients (35.2%).

Overall, our study revealed that (464) patient from the 1064 patients showed lesions on upper endoscopy with high prevalence of peptic ulcer including gastric ulcer alone 32 patients (4.6%) and duodenal ulcer alone 53 patients (7.6%) while peptic ulcer whether (gastric or duodenal) associated with other lesions represents 191 patients (27.2%). the second common upper gastrointestinal cause of Fe deficiency anemia was angiodysplasia in 83 patients (11.7%) followed by cancer stomach in 57 patient (8.1%) and cancer esophagus in 25 patients (3.6%) with finally Barrett's esophagus in 13 patient (1.9%). While our study revealed that (254) patients from the 1064 patients showed lesions on colonoscopy with high prevalence of colorectal cancer in 221/254 patients (87%) followed by Angiodysplasia in 19/254 patients (7.5%). Our study concluded that there was no significant difference between patients with different locations of colorectal cancer as regards age and hematological study. However in a study conducted by [12] on 1189 patients with colorectal adenocarcinoma revealed that the prevalence of anemia diminished gradually and linearly as the location of the tumors was more distal towards the rectum. Anemia was found in 74.7% (215/288) of the patients with cancer in the caecum or ascending colon, 57.1% (48/84) in the transverse colon, 40.0% (180/300) in the sigmoid and 30.5% (114/374) in the rectum. This difference was because that in our study we selected patients with Fe deficiency anemia, we didn’t select malignant patients. About 364 of the patients with Fe deficiency anemia who were subjected to our study revealed no gastrointestinal abnormalities in their upper and lower endoscopy indicating that still there is a percentage of the patients with IDA could not be diagnosed by upper and lower endoscopy which necessitates further diagnostic procedures in the form of enteroscopy and C.T angiography.

In our study all patients with angiodysplasia were subjected to APC, 83 pts by U/E and 19 pts by L/E (1–3 sessions were performed at weekly intervals), and endoscopy was performed after 3 months to check for the recurrence of bleeding spots. Patients were regularly followed up for 3 months to check for any clinical and laboratory evidence of bleeding (hemoglobin (Hb) level). The procedure was successful, and the overall success rate was 100%. There were no serious complications (no hemorrhage, perforation, or stricture) during or after the procedure. However, there were some side effects, such as transient fever (>38°C),

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dysphasia, and retrosternal pain and there was remarkable improvement in Hb level in most of the patients that underwent APC treatment. A positive family history of GI bleeding (due to gastric telangiectasia) was reported in three cases. There was no history of blood disease or other associated diseases.

5. Conclusion

This study concludes that upper and lower GI endoscopies are very valuable investigations in the diagnosis of causes of Iron deficiency anemia. Furthermore, gastrointestinal malignancies are very common in Iron deficiency anemia patients especially old age. However, peptic ulcer diseases remain the first common upper gastrointestinal lesion in Egyptian patients.

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