DIAGNOSTIC YIELD OF BI-DIRECTIONAL ENDOSCOPY IN THE EVALUATION OF PATIENTS WITH IRON DEFICIENCY ANEMIA REFERRED TO THE KURDISTAN CENTER FOR GASTROENTEROLOGY AND HEPATOLOGY (KCGH)

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ABSTRACT

Background

Iron Deficiency Anemia (IDA) is the most common cause of anemia worldwide. IDA occurs in 2-5% of adult men and postmenopausal women in the developed world and is a common reason for gastroenterology referral. Bi-directional endoscopy is required to identify the cause of iron deficiency anemia.

Objectives

To assess different upper and lower gastrointestinal causes of IDA in patients who attend Kurdistan Centre for Gastroenterology and Hepatology diagnosed with iron deficiency anemia and referred for endoscopy.

Patients and Methods

It is a cross-sectional study implemented in the Kurdistan centre of Gastroenterology and Hepatology (KCGH) in Sulaimani City, Kurdistan region-Iraq for one year from 1st October 2020 to 30th September 2021 on a sample of one hundred and seventy patients with iron deficiency anemia. The diagnosis and severity classification of iron deficiency anemia was done according to the World Health Organization definition and classification. The gastrointestinal Specialist in the centre implemented the bi-directional endoscopy.

Results

The diagnostic yield of esophagogastroduodenoscopy findings of iron deficiency anemia patients 51.8% were gastropathy (41%), gastroesophageal reflux disease (32%), gastric ulcer (6%), duodenal ulcer (4%), hiatus hernia (4%), celiac sprue (4%), gastric antral vascular ectasia (3%), tumour (3%) and others (3%). While the diagnostic yield of colonoscopy findings of iron deficiency anemia patients, 43.5% were haemorrhoids (42%), polyps (37%), ulcers (12%), colorectal tumour (5%), and diverticulosis (5%).

Conclusion

Bi-directional endoscopy is safe in diagnosing and evaluating patients with iron deficiency anemia with high diagnostic yields.

Keywords: *Iron deficiency anemia, Bi-directional endoscopy, Gastrointestinal causes.*

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INTRODUCTION

Iron deficiency anemia (IDA) is defined as a low red blood cell count or haemoglobin level caused by a lack of iron and represents the prevalent cause of anemia. The point prevalence of IDA is between 2-5% in developed countries and 25-50% in developing countries [1-3]. Iron deficiency anemia is prevalent in Iraq and Kurdistan, with a point prevalence of 30-40% and a high prevalence in women [4, 5]. IDA is a common cause of morbidity globally [6]. IDA is classified into either absolute iron deficiency, associated with low body iron stores or functional iron deficiency, associated with inadequate iron supply despite apparently normal iron stores and the effect of hepcidin [7]. The aetiology of IDA is different regarding age, gender, and socioeconomic variation. Generally, it could result from low iron intake, low absorption, blood loss, and a high need for iron. It could also result from gastrointestinal disorders like gastroduodenal ulcers, polyps, and tumours. For that, assessing gastrointestinal pathology is required for patients with newly diagnosed IDA without obvious explanation [6].

The diagnosis of IDA includes history, physical examination, laboratory evaluation, and other tests for IDA causes. Most IDA cases are asymptomatic, but sometimes it is accompanied by clinical features and signs like pallor, fatigue, shortness of breath, and other symptoms related to the leading cause. The laboratory investigations included assessing serum ferritin level, serum iron level, total iron-binding capacity (TIBC), transferrin saturation, mean cell Hb (MCH), and red cell distribution width (RDW) [8].

Further investigations are required to detect the real causes of IDA or bleeding, like faecal immunochemical testing (FIT) and bidirectional endoscopy; esophagogastroduodenoscopy [EGD] and colonoscopy [9, 10].

The endoscopic assessment of IDA patients revealed that about two-thirds showed pathologies in the gastrointestinal tract that could cause occult bleeding [11]. The most common endoscopy findings in IDA patients are the tumours (especially colon cancer) and inflammatory ulcerative pathology of the upper gastrointestinal tract [11]. It was found that lesions related to bleeding and IDA, which simultaneously affect the upper and lower gastrointestinal tract, had a low incidence [12]. However, due to the tendency of these pathologies to be related to bleeding, high efforts are directed toward searching for bleeding lesions, especially in postmenopausal women and men diagnosed with iron deficiency anemia [13]. Menstrual bleeding is the predominant cause of iron deficiency anemia in premenopausal women in developed countries. In contrast, in those countries, gastrointestinal bleeding is the predominant cause of iron deficiency anemia in postmenopausal women and adult men [14].

Many authors and guidelines advise referring IDA patients at risk of gastrointestinal bleeding or unexplained aetiology for bi-directional endoscopy after completing medical history and laboratory checking to look for bleeding lesions, Helicobacter pylori infection, disease and pathologies [6, 15-17]. It was found that the prevalence of Crohn's disease in asymptomatic IDA patients ranged between 2.3-5.0% and 10.3-15% in symptomatic IDA patients [18]. The IDA patients with unexplained aetiology had a high likelihood of Helicobacter pylori infection diagnosis after implementing EGD, specifically among adult and pediatric IDA patients [19]. The gastrointestinal endoscopy examination is not recommended for young women, except for those with gastrointestinal symptoms and after physician consideration [20]. The gastrointestinal endoscopy, commonly the colonoscopy, is an essential diagnostic tool in identifying IDA causes, even in asymptomatic young IDA patients [21]. The colonoscopy is helpful in the detection of tumours responsible for occult bleeding and iron-deficiency anemia[22]. Many guidelines recommended bi-directional endoscopy for recurrent IDA, refractory IDA and IDA patients dependent on blood transfusion [14, 16].

In Iraq, a high prevalence of iron deficiency anemia leads to a high referral rate of patients with bleeding symptoms or unexplained aetiology to bi-directional endoscopy examination [23]. These patients required further assessment and interventions, which also might need hospital admission and cause a heavy burden on health institutes. Categorizing endoscopy findings helps in differential diagnosis, early identification of risky causes of IDA, and exclusion of non-risky etiologies [24]. This study aimed to assess different upper and lower GIT causes of iron deficiency anemia in patients who attended the Kurdistan Centre for Gastroenterology and Hepatology (KCGH) diagnosed with IDA and referred for endoscopy.

PATIENTS AND METHOD

A cross-sectional study was implemented in the center of Gastroenterology and Hepatology (KCGH) in Sulaimani city, Kurdistan region-Iraq, for one year from 1st October 2020 to 30th September 2021. The studied population was all patients with iron deficiency anemia referred to KCGH for endoscopy. Inclusion criteria were 12 years and more and iron deficiency anemia.

The exclusion criteria were; children with age less than 12 years, pregnancy, menstrual disorders, renal diseases, hemoglobinopathies (thalassemia and sickle cell anemia), history of significant overt non-gastrointestinal blood loss, history of active bleeding (heavy menstruation, acute upper gastrointestinal bleeding, and epistaxis) also patients who refuse to be enrolled in the study. The study ethics were implemented regarding the Helsinki Declaration by documented agreement of patients, approved by the ethical committee in Kurdistan Board and hospital authority, and managed patients. A sample of one hundred and seventy patients with iron deficiency anemia was enrolled in the present study after eligibility to inclusion and exclusion criteria.

Patients' information was collected directly from patients, and results of specific investigations were implemented and filled in a prepared questionnaire designed by researchers. The researcher followed up with the patients after their referral to the KCGH centre until completing their investigations. The questionnaire included demographic characteristics of patients with iron deficiency anemia (age and gender), clinical risk factors of patients with iron deficiency anemia (melena, bleeding per rectum, past surgical history, non-steroidal anti-inflammatory drugs [NSAIDs], family history of inflammatory bowel disease and family history of colorectal carcinoma), and investigations findings of patients with iron deficiency anemia (haemoglobin, celiac serology, FOB, Fecal immunochemical test, OGD and colonoscopy). The diagnosis of iron deficiency anemia was done according to World Health Organization (WHO) definition and referred to the KCGH centre, which classified the anemia according to WHO classification (25). GIT Specialists in the KCGH centre implemented the bi-directional endoscopy.

The OGD and colonoscopy equipment used were Olympus CV-170 type. The patients were prepared appropriately before OGD and colonoscopy. The Bowel preparation used is polyethene glycol powder and castor oil capsules. The reports of endoscopy were recorded, and the patients have managed accordingly. Celiac disease is diagnosed by celiac screening serology, endoscopic features, and histopathology.

The patients' information was entered and interpreted statistically by the SPSS program-26. Suitable tables and figures were implemented accordingly.

RESULTS

In this study, one hundred and seventy patients with iron deficiency anemia (IDA) were enrolled with a mean age of (43.9 ±16.8 years) and a range of (17-94 years). 23.5% of them were in the age of fewer than 30 years, 21.2% of them were in the age group 30-39 years, 24.7% of them were in the age group of 40-49 years, 11.8% of them were in the age group of 50-59 years, 10.6% of them were in the age group of 60-69 years, and 8.2% of them were in the age of 70 years and more. Female patients with IDA were more than males (67.1% vs 32.9%), Table 1. Melena was shown in 5.9% of IDA patients, and bleeding per rectum was present in 14.1%. Past surgical history was positive in 21.2% of IDA patients. A non-steroidal anti-inflammatory drug intake history was shown among 5.9% of IDA patients. In contrast, only two IDA patients had a positive family history of inflammatory bowel disease, and four had a positive family history of colorectal carcinoma., Table 2. The mean haemoglobin level of IDA patients was (9.4 gm/dl); 27.1% had mild anemia, 54.1% had moderate anemia, and 18.8% had severe anemia. Faecal occult blood test-Fecal immunochemical test was positive in 16.5% of IDA patients. The esophagogastroduodenoscopy (OGD) finding was abnormal in 48.2% of IDA patients, while the colonoscopy was abnormal in 56.5% of IDA patients, Table 3. The common OGD findings of IDA patients were gastropathy (41%), GERD (32%), gastric ulcer (6%), duodenal ulcer (4%), hiatus hernia (4%), celiac sprue (4%), GAVE (3%), tumours (3%) and others (polyps, erosions) (3%), Figure 1. The common colonoscopy findings of IDA patients were non-bleeding haemorrhoids (42%), polyps (37%), ulcers (12%), colorectal tumours (5%), and diverticulosis (5%), Figure 2.

Table 1. Demographic characteristics of IDA patients.

Variable	No.	%
Age	**mean ± SD (43.9±16.8 years)**	
<30	40	23.5
30-39	36	21.2
40-49	42	24.7
50-59	20	11.8
60-69	18	10.6
≥70	14	8.2
	Gender	
Male	56	32.9
Female	114	67.1
Total	**170**	**100.0**

Table 2. Clinical risk factors of IDA patients.

Variable	No.	%
	Melena	
Yes	10	5.9
No	160	94.1
	Bleeding per rectum	
Yes	24	14.1
No	146	85.9
	Past surgical history	
Yes	36	21.2
No	134	78.8
	NSAIDs use	
Yes	10	5.9
No	160	94.1
	Family history of IBD	
Yes	2	1.2
No	168	98.8
	Family history of CRC	
Yes	4	2.4
No	166	97.6
Total	**170**	**100.0**

Table 3.Investigations findings of IDA patients.

Variable	No.	%
Hb mean ± SD (9.4±1.8 gm/dl)		
Mild anemia	46	27.1
Moderate anemia	92	54.1
Severe anemia	32	18.8
FOBT, FIT		
Positive	28	16.5
Negative	142	83.5
EGD		
Normal	82	48.2
Abnormal	88	51.8
Colonoscopy		
Normal	96	56.5
Abnormal	74	43.5
Total	**170**	**100.0**

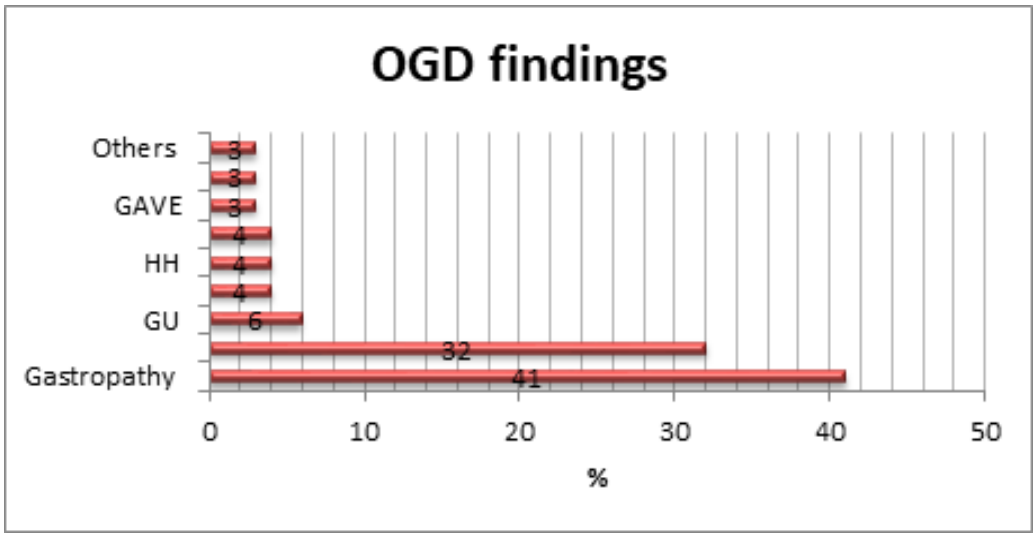

Figure 1. OGD findings of IDA patients.

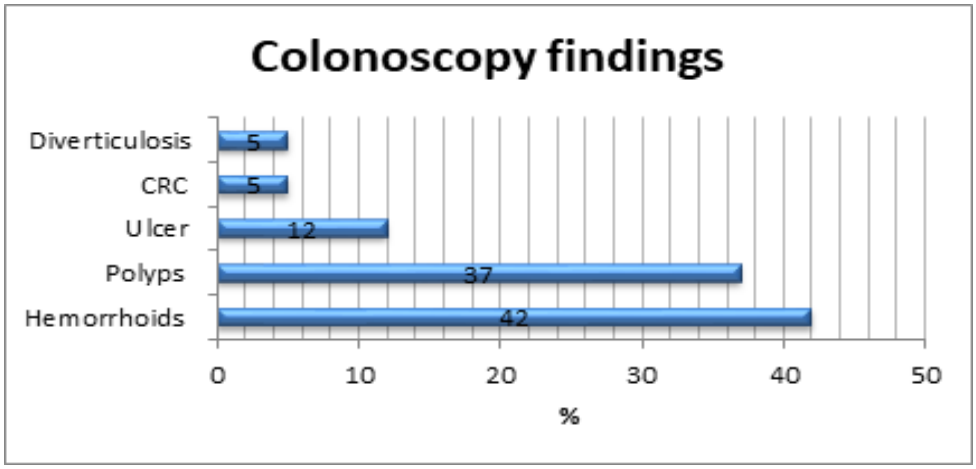

Figure 2. Colonoscopy findings of IDA patients.

DISCUSSION

Iron deficiency anemia is a leading cause of anemia globally. Bi-directional endoscopy is a formal investigation of IDA cases with bleeding or unexplained etiology history. OGD is indicated for IDA irrespective of upper gastrointestinal symptoms or positive colonoscopy findings [26].

The current study reported that standard bi-directional endoscopy (OGD and colonoscopy) diagnostic findings of patients with iron deficiency anemia were haemorrhoids (42%), gastropathy (41%), polyps (37%) and GERD (32%). These findings are close to the results of Odhaib et al. [27] observational, multicenter retrospective study in Basrah city (Southern Iraq) on 398 asymptomatic patients with iron deficiency anemia which showed that the main bi-directional endoscopy findings were atrophic gastritis (42%), nonspecific colonic inflammatory changes (40%), peptic ulcer (20%) and non-bleeding haemorrhoids (10%). Similarly, a hospital-based prospective observational study by Prasad et al. [28] in India on 50 patients with iron deficiency anemia revealed that bi-directional endoscopy results were gastritis (46.1%), peptic ulcer (30.7%) and celiac disease (23.1%) as upper gastrointestinal findings and inflammatory bowel diseases (40%), chronic polyps (20%), rectal ulcer (20%) and tuberculosis (20%) as lower gastrointestinal findings. Anemia, specifically iron deficiency anemia, is regarded as the most common manifestation of gastropathy [29]. Additionally, bleeding or non-bleeding haemorrhoids constitute the common aetiology of IDA among young men, which is detected by endoscopy [30].

The present study revealed that common OGD findings of IDA patients were gastropathy (41%), GERD (32%), gastric ulcer (6%), duodenal ulcer (4%), hiatus hernia (4%), celiac sprue (4%), GAVE (3%), tumour (3%) and others (3%). These findings are similar to the results of Majid et al. [31] cross-sectional studies in Pakistan on 95 patients with iron deficiency anemia who reported that common OGD results of patients were erosive gastritis (8.4%), erosive esophagitis (6.3%), gastric ulcer (5.3%), duodenal ulcer (5.3%), hiatus hernia (2.1%) and tumours (1.1%). Droogendijk et al. [32] retrospective study in the Netherlands on 287 patients with iron deficiency anemia found that the main OGD findings were erosive esophagitis (28%) and gastritis (17%), and duodenitis (14%).

In the current study, the common colonoscopic findings of patients with IDA were haemorrhoids (42%), polyps (37%), ulcers (12%), colorectal tumours (5%) and diverticulosis (5%). These findings are close to the results of Yun et al. [33] retrospective study on 206 adult patients with iron deficiency anemia which reported that the colonoscopy findings were mainly haemorrhoids (52.3%), polyps (33.3%), tumours (11.9%) and ulcerative colitis (2.3%). On the other hand, Abdullah and Nanakali observational study [34] in Erbil city (Kurdistan region) on patients referred to colonoscopy reported that the main findings were haemorrhoids (18.4%), polyps (16%), colitis (13.6%), tumours (6.4%), ulcers (4.8%) and diverticulitis (4%). Colonoscopy is significant in detecting cancers, especially colorectal carcinoma presented clinically by iron-deficiency anemia [35]. Amilaji et al. [36] retrospective study in the UK reported a great benefit of colonoscopy in diagnosing and prognosis of colorectal carcinoma.

In the present study, 27.1% of patients with IDA had mild anemia, 54.1% had moderate anemia, and 18.8% had severe anemia. These findings are close

to the results of Sethi et al. [37] retrospective cohort study in the USA, which reported that bi-directional endoscopy was safe for patients with severe anemia. Furthermore, in the current study, the faecal occult blood test-Fecal immunochemical test was positive in 16.5% of IDA patients. This finding is consistent with Clackett et al. [38] studies in the UK, which revealed that FOBT, FIT was a proper prioritization diagnostic tool in patients with iron deficiency. In addition, the United States Preventive Services Task Force adopted faecal occult blood testing and the American College of Gastroenterology as a screening tool for colorectal carcinoma [39, 40].

In conclusion, the study concluded that bi-directional endoscopy is important in diagnosing and evaluating patients with iron deficiency anemia with high diagnostic yields. The common findings of bi-directional endoscopy of patients with iron deficiency anemia were haemorrhoids, gastropathy, polyps and gastroesophageal reflux disease. Therefore, the current study recommended that physicians adopt bi-directional endoscopy as a diagnostic tool for iron deficiency anemia.

Conflicts of interest

None

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