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Assessment of the endoscopy and colonoscopy results in relation with the age groups in the patients suffering anemia

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Abstract

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Aim: The aim is to investigate the importance of gastrointestinal system lesions in the etiology of anemia according to the results of gastroscopy and colonoscopy in patients with anemia according to age groups. With this, it is to determine the predictive factors that will provide or stimulate early diagnosis, especially in malignant diseases.

Material and Methods: In this study, the patients undergoing gastroscopy and colonoscopy with the diagnosis of anemia between 01 January 2013 and 01 January 2019 were evaluated retrospectively. 189 patients over 18 (93 female, 96 male) were covered. The patients were divided into two groups, namely below 65 and over 65. The final diagnosis was made according to outcomes of endoscopic biopsy.

Results: The gastroscopy (n=189) showed a benign appearance in 173 patients (91.5%), a malign appearance in 9 (4.8%) and bleeding lesions in 7 (3.7%). In the colonoscopic evaluation (n=189), 132 patients (69.8%) were normal, 26 (13.8%) benign, 21 (11.1%) malign, in 10 (5.3%) of the patients no focus was detected due to bleeding. Malignant patients were evaluated according to age and gender, 4 (2.1%) women and 11 (5.8%) men were detected in the group under 65 years of age, and 5 women (2.6%) and 10 men (5.3%) in the patient group over 65 years of age. Colorectal cancer was detected in 20 (10.6%) of total 21 (11.1%) malignant patients, making it the most frequent malignant disease.

Conclusion: Gastroscopy and colonoscopy in the patients with anemia is very important with regard to establishment of etiology. The advanced age patients with anemia must be scanned for malign disorders.



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Introduction

Anemia is the most common blood disorder and one of the most important public health problems for the world. Anemia affects approximately one-third of the world's population, and half of these are iron-deficiency anemia (IDA) [1, 2]. Chronic disease anemia (CDA) is the second most frequently observed cause for anemia [3].

Iron deficiency anemia is considered an alarm sign for the presence of possible GI malignancies, and underestimation may delay the diagnosis of GI tumors, particularly colorectal cancer [4]. Symptoms of Gastrointestinal System (GIS)-related anemia may manifest as nonspecific symptoms, such as bloating, vomiting, nausea, retrosternal burning, and epigastric pain, that are not differentiated to be associated with organic or functional diseases. Therefore, evaluation of the GI tract with a routine upper and lower GI endoscopy is required [5, 6]. One of the most

frequent reasons for IDA in post-menopausal women and adult men is the gastrointestinal system (GIS) losses, some of which are caused by malignancies [7].

For this reason, the main purpose of this study was to investigate GIS-related pathologies that cause anemia and to compare their relationship with complete blood count parameters according to age groups. With this, it is to determine the predictive factors that will provide or stimulate early diagnosis, especially in malignant diseases.

Materials and Method

The patients 18 years of age and over who were administered gastroscopy and colonoscopy who applied to the Inonu University, Turgut Ozal Medical Center Adult Gastroenterology Clinics for various reasons between 01 January 2013 and 01 January 2019 and subsequently diagnosed with anemia through complete blood count were included in the study and scanned retrospectively through the computer registry database. Then, the patients were divided into two groups on an age-based manner namely;

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Group A (n=99) patients < 65 years of age and Group B (n = 90) patients \geq 65 years of age.

Inclusion Criteria

1. Being over 18 years old,
2. Anemia was defined as hemoglobin concentration \leq 12 g/dl in women and \leq 13 g/dl in men by World Health Organization (WHO) [1].
3. Hemoglobin check with the same admission number, followed by gastroscopy and colonoscopy.

Exclusion Criteria

1. Being below 18 years old,
2. Active bleeding (active GI loss, epistaxis, menorrhagia, heavy menstrual blood loss),
3. Coagulation disorder,
4. Chronic kidney disease,
5. Hematologic malignity.

Data collection

Laboratory results, upper, lower endoscopic and pathology reports of patients, were scanned in the database system retrospectively.

Statistical Analysis

The effect size was predicted as 0.48 to compare the etiology of anemia by age group 95% confidence level (α : 0.05) and 80% power (β : 0.20). The minimum number of patients to be included in the study was calculated as 48. IBM SPSS Statistics 25.0 program was used in the analysis. Statistics were evaluated by giving numbers and percentages (%).

Results

Of the 189 patients included in the study 93 (49%) were female and 96 (50.8%) were male. 99 of those patients (52.4%) were group A and 90 (47.6%) were group B. The youngest patient was 20 and the oldest was 91, with an average of 61.02 ± 15.54 . The lowest HGB in the total blood count checked for the patients was 3.3 g/dl, the highest HGB was measured as 12.8 g/dl, yielding an average HGB of 9.72 ± 1.66 g/dl. In the upper endoscopy performed in the 189 patients, 173 (91.5%) revealed benign condition, 9 (4.8%) malign condition, but etiological focus was not observed in 7 (3.7%) patients of due to bleeding (Figure 1).

In the colonoscopy, 132 (69.8%) was normal, 26 (13.8%) were benign, 21 (11.1%) were malign, 10 (5.3%) were bleeding (Figure 2)

Among the etiologic causes of anemia, CDA was in the top with 76 (40.2%) patients which we included in the study. Second ranking was IDA with 37 (19.6%) patients. The malign conditions were observed in 30 (15.9%) patients, through gastroscopy and colonoscopy (Table 1).

The etiologies of anemia were collected under 15 sub-diagnoses. The most frequent diagnosis was CDA with 76 (40.2%) patients. The other patients were benign causes such as 37 (19.6%) IDA, 12 (6.3%) upper GI bleeding,

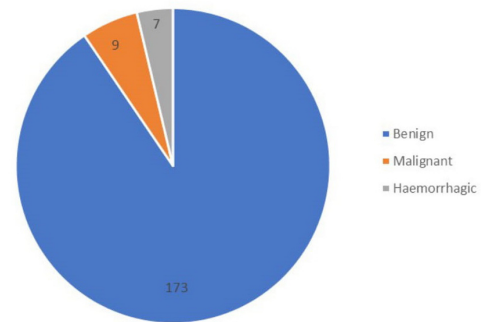


Figure 1. The Classification of Patients Undergoing Upper Endoscopic According to their Images

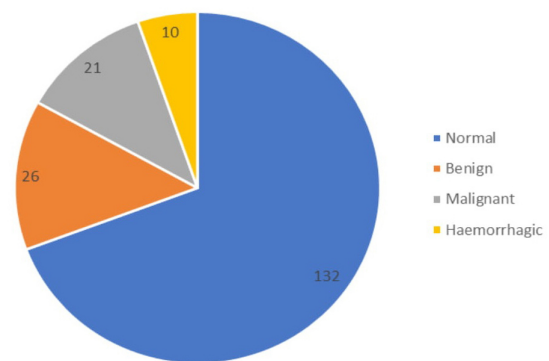


Figure 2. The Classification of Patients Undergoing Colonoscopy According to their Images

14 (7.5%) lower GI bleeding, 5 (2.6%) pernicious anemia, 3 (1.6%) ulcerative colitis, 3 (1.6%) Crohn's disease, 3 (1.6%) celiac disease, 5 (2.6%) non-GI bleeding, and 1 (0.5%) colon diverticulum. Of the remaining 30 (15.9%) were malignant causes including 1 (0.5%) esophageal cancer, 8 (4.2%) gastric cancer, 13 (6.9%) colon cancer, 7 (3.8%) rectum cancer and 1 (0.5%) appendix cancer.

In the group A, the lowest HGB was found to be 3.3 g/dl, the highest as 12.7 g/dl, with the average HGB concentration for the group was calculated as 9.95 ± 1.50 g/dl. Again for the same group, highest Mean Corpuscular Volume (MCV) was found to be 97 fL, the lowest as 57 fL, with the average MCV as 80.61 ± 8.15 fL.

In the group B, the lowest HGB is 3.8 g/dl, the highest HGB is 12.8 g/dl, with an average HGB of 9.47 ± 1.79 g/dl. In this group, the highest MCV was 105 fL, the lowest MCV was 62 fL, yielding an average fL calculation of 82.17 ± 9.01 fL.

Endoscopic images were evaluated according to age groups. The image was 91 (91.9%) benign, 4 (4.05%) upper GIS bleeding and 4 (4.05%) malignant of 99 patients group A I. In 90 patients who belong in group B, lesions seen were 82 (91.1%) benign, 3 (3.3%) upper GI bleeding and 5 (5.61%) malignant (Table 2). Colonoscopic appearance was normal in 71 (71.7%) of 99 patients in group A. The remaining images were evaluated

Table 1. The investigation of anemia etiology as main topics in patients

Etiology	Number of patients (%)
IDA	37 (19.6)
CDA	76 (40.2)
Benign Gastrointestinal Diseases	36 (19.1)
Malignant Gastrointestinal Diseases	30 (15.9)
Non-GIS Bleeding	5 (2.6)
Pernicious Anemia	5 (2.6)

Table 2. The comparison of gastroscopy and colonoscopy images by age groups

Subgroups	Gastroscopy n(%)		Colonoscopy n(%)	
	Group I	Group II	Group I	Group II
Normal	91 (91.9)	82 (91.1)	71 (71.7)	61 (67.8)
Benign	4 (4.05)	5 (5.6)	12 (12.1)	14 (15.6)
Malignant	4 (4.05)	3 (3.3)	11 (11.1)	10 (11.1)
Haemorrhagic	91 (91.9)	82 (91.1)	5 (5.1)	5 (5.5)
P value*	0.863	0.912		

*:Pearson chi square test

as 12 (12.1%) benign, 5 (5.1%) lower GIS bleeding and 11 (11.1%) malign conditions. In 90 patients in group B, it was 61 (67.8%) normal, 14 (15.6%) benign, 5 (5.5%) lower GIS bleeding and 10 (11.1%) malign reasons (Table 2).

There is 41 (41.4%) CDA, 22 (22.2%) IDA, 19 (19.2%) benign, 15 (15.2%) malign GIS conditions, 1 (1%) non-GIS bleeding and 1 (1%) pernicious anemia in the group A. In the group B has 15 (16.7%) IDA, 35 (38.9%) CDA, 17 (18.9) benign, 15 (16.7%) malign GIS condition, 4 (4.4%) non-GIS bleeding, 4 (4.4%) pernicious anemia (Table 3).

Fifteen different diagnoses of anemia were found and evaluated according to the age groups. The IDA diagnosis in the group A was more prominent in comparison to group B. Frequencies of CDA were found to be at similar rates, the lower GIS bleeding rates were found to be higher in the patients group B. Likewise, the pernicious anemia rate doubled in group B. The inflammatory in-

Table 3. The comparison of etiological causes of anemia by age groups

Etiology	GroupI n(%)	GroupII n(%)	P value*
IDA	22 (22.2)	15 (16.7)	0.405
CDA	41 (41.4)	35 (38.9)	
Benign	19 (19.2)	17 (18.9)	
Gastrointestinal Diseases			
Malignant	15 (15.2)	15 (16.7)	
Gastrointestinal Diseases			
Non-GIS Bleeding	1 (1)	4 (4.4)	
Pernicious Anemia	1 (1)	4 (4.4)	

*:Pearson chi square test

Table 4. The comparison of malignancy seen in gastroscopy and colonoscopy according to age groups

Subgroups	Gastroscopy n(%)		Colonoscopy n(%)	
	Group I	Group II	Group I	Group II
Female	0(0)	0(0)	4 (36.4)	4 (40)
Male	4(100)	3(100)	7 (63.6)	6(60)
P value*	-	0.999		

*: Fisher's exact test

Table 5. The comparison of HGB and MCV values of the patients with malignant diagnosis according to age groups

Variables	Group I median (min-max)	Group II median (min-max)	p value*
HGB (g/dl)	10.1(3.3-12.7)	9.8(3.8-12.8)	0.067
MCV (fL)	81(57-97)	83(62-105)	0.244

HGB:Hemoglobin, MCV: Mean corpuscular volume. *:Mann Whitney U Test

testinal conditions such as Crohn and ulcerative colitis as well as celiac disease were found to be higher in the group A. The non-GIS bleeding rates in the group B were higher. Colonic diverticula was encountered only in a patient, who was also group B. Among the malign conditions diagnosed through endoscopy and colonoscopy, esophagus cancer was observed in 1 (%1) patient in the group A while there was no incidence in the group B Gastric cancer was observed in 3 (3%) group A and 5 (5.6%) in the group B. Colon cancer was observed in the group A in 6 patients(6.1%), in the group B, 7 patients (7.6%). Rectum cancer was observed in 4 (4%) of the patients in the group A and in 3 (3.3%) in the the group B. Appendix cancer, similar to the esophagus cancer, was observed in 1 (1%) in the group A while there was no finding in the group B.

According to age and sex, out of the group A women, 4 (2.1%), and men 11 (5.8%) had malign condition. Similar to group A, malign condition was found in 5 (2.6%) of the female patients in the group B, and in 10 (5.3%) of the male patients. Out of the malign condition carrying patients, 21 (11.1%) were male, 9 (4.7%) were female (Table 4).

Furthermore, the average age of the 30 patients who were assessed in the study with a malignity was calculated as 61.26(female:60, male:61.8 years). Likewise, the general hemoglobin average in the patients with malignity was 9.86 g/dl, that in Group A was 10.11, and in the Group B it was 9.60 g/dl. The average MCV of the all patients malignity was 80.33 fL, 82.33 in the Group A and 78.33 fL in the group B (Table 5).

Discussion

The most frequently encountered anemia is IDA while approximately 2 billion people are affected [8]. The most frequent reason for the blood loss in females prior to menopause was menstruation. GIS losses are more prominent as the cause of anemia in men and postmenopausal

women [9]. It is possible to clarify the etiology of iron deficiency anemia by endoscopic methods only in 76.1% of the patients [10]. In our study, CDA was found to be the most common reason. The malignancy rates in the endoscopic procedures carried out in developed countries due to IDA is between 6 and 11.2% [11,12]. In a study performed in Turkey, the malign condition detection rate after gastroscopy in the patients with IDA was 0.9%, while in the patients undergoing colonoscopy was 4.7% [11, 13]. In our study, the malignancy rate in the patients who underwent gastroscopy was found to be 4.7%. This rate was 11.1% in the colonoscopy. Considering gastroscopy and colonoscopy results simultaneously, the malign patient ratio in our study was detected as 15.8%. Our malignancy rate was slightly higher than in previous studies.

Out of the patients with gastric cancer, 8 (1.44%) were over 50 years old, 2 (0.36%) were below 50. All of the patients with colon cancer were over 50 years old [7]. Furthermore, of the malign patients, 15 were male, 8 female. In our study, 8(4.2%) patients were diagnosed with gastric cancer, 13(6.9%) with colon cancer, 7 (3.7%) with rectum cancer. Of the patients detected to have gastric cancer, 3 (1.58%) were < 65 years of age and 5 (2.64%) were ≥ 65 years of age. With regard to colon cancer, 6 (3.17%) were < 65 years of age, 7 (3.7%) were ≥ 65 years of age. The average age of the patients diagnosed to have malignancy was 61.02 years. Furthermore, 21 of the malign patients were male, 9 were female. In this study, the malignancy rate increases with the age, while malign conditions are encountered at a higher rate in male. In our study, the higher incidence of malignancy in the male and the increased malignancy possibility with the increasing age is supported by this study.

In a study carried out by Ezat Rahimi et.al. with regard to endoscopy and colonoscopy on the patients with IDA, out of the 227 patients, 11 (4.8%) gastric cancer, 15 (6.6%) colon cancer and 3 (1.3%) had celiac disease [14]. In our study, 8 (4.2%) patients gastric cancer, 13 patients (6.9%) colon cancer and 3 patients (1.6%) had celiac disease. Our malignancy and celiac disease rates are in compliance with the literature.

In the study performed by Motohiko Kato et.al. in 2017, out of the over 85 years old 333 patients underwent colonoscopy 37 (15%) were found advanced colorectal cancer and the association between the colorectal cancer cases with the MCV level was examined. The patients were analyzed under 4 groups with regard to MCV value; for the 1st group, < 89.8 fL, for the 2nd group, < 93.3 fL, for the 3rd group < 96.9 fL, for the 4th group, < 97 fL was accepted. Within such groups, the advanced colorectal cancer rates were found to be about 30%. Furthermore, the MCV was found to be significantly lower in the right colon lesions. The patients in the lowest MCV group were found to be 6 times risky with regard to colon cancer risk [15]. In our study, the average MCV in the ≥ 65 years of age and male patient population with gastrointestinal malignancy was found to be 78.2 fL, while in general malign patients was detected as 80.3 fL. Age factor and MCV together into account, this study is supportive to ours. Furthermore, 29 of the 30 malign patients in our study, has the MCV value below 89.8 fL.

In a prospective study to research the causes of IDA by Xavier Bosch et.al., 583 (15%) malign gastrointestinal lesion was found. The average age was 70.6 in patients with an average HGB of 6.4 g/dl [16]. In different studies, MCV and HGB values were found lower [17,18,19]. In the multi-centered study carried out by Droogendijk et.al., the median HGB value of the patients included in our study was 9.9 g/dl with a median MCV value of 82 fL. The most common CRC(10.6%) and gastric cancer (4.2%) were detected [20]. In our study, the rate of GIS malignancy, was found to be 15.8%. In our study, the average age was 61.2 in patients with an average HGB of 9.86 g/dl. The reason for such difference could be defined as for the HGB value in the groups covered by the study, different lower limits were defined for diagnosis of anemia. All studies demonstrate that low HGB and MCV values are predictive factors for having a malignant lesion.

Parallel to international guides, the current studies strongly recommend endoscopic and colonoscopic scanning in anemia is diagnosed in over 50 years of age postmenopausal women and adult men. In addition, in the our study, low MCV levels were observed along with anemia, and the GIS related malignities were encountered more frequently in the males.

Conclusion

Existence of GIS malignities among the most frequent reasons of anemia in adult men and postmenopausal women renders GIS caused losses important. Because of that, everybody who has a suspected symptom along with anemia must be evaluated for malignity. In both groups, average MCVs are 82 fL or below. So, in all patients ≥ 65 years of age, whom HGB < 10 g/dl and MCV < 82 fL, lower and upper GIS evaluation should be performed for early malignity diagnosis, if there is no contraindication. If such features are accompanied to male, the patient must be investigated absolutely for GIS scanning to find out malign conditions.

Conflict of Interest

All authors declare that there is no conflict of interest.

References

- Williams, A. M., Addo, O. Y., Grosse, S. D., et al. "Data needed to respond appropriately to anemia when it is a public health problem." *Annals of the New York Academy of Sciences* 1 (2019): 268-280.
- Babaei M, Shafiei S, Bijani A, Heidari B, Hosseini SR, Vakili Sadeghi M. Ability of serum ferritin to diagnose iron deficiency anemia in an elderly cohort. *Rev. Bras. Hematol. Hemoter* 2017, 39: 223-8.
- Fraenkel PG. Understanding anemia of chronic disease. *Hematology*. 2015, 1: 14-8.
- Lindsay, J. O., Robinson, S. D., Jackson, J. E., & Walters, J. R. "The investigation of iron deficiency anemia—a hospital based audit." *Hepato-gastroenterology* 46.29 (1999): 2887-2890.
- Alquist, D., Fennerty, B., Fleischer, D., et al. "American Gastroenterological Association medical position statement: evaluation and management of occult and obscure gastrointestinal bleeding." *Gastroenterology* 118.1 (2000): 197-200.
- Tamer A, Korkut E, Korkmaz U, Akcan Y. Üst Gastrointestinal Endoskopi Sonuçları: Düzce Bölgesi. *Kocatepe Tıp Dergisi* 2005, 6: 31-4
- Bayram M, Köksal AR, Boğa S, Alkım H, Şen İ, Alkım C. Anemi nedeniyle yapılan gastroskopi ve kolonoskopi sonuçlarının değerlendirilmesi. *Endoskopi Gastrointestinal* 2015, 23: 31-4.

8. DeMaeyer E, Adiels-Tegman M. The prevalence of anaemia in the world. *World Health Stat Q.* 1985, 38: 302-16.
9. Provan D. Mechanism and management of iron deficiency anemia. *Br J Haematol* 1999, 105(1) :19-26.
10. Milano A, Balatsinou C, Filippone A, et al. A prospective evaluation of iron deficiency anemia in the GI endoscopy setting: Role of standard endoscopy, videocapsule endoscopy, and CT-enteroclysis. *Gastrointest Endosc.* 2011, 73: 1002-8.
11. Ioannou GN, Rockey DC, Bryson CL, Weiss NS. Iron deficiency and gastrointestinal malignancy: A population-based cohort study. *Am J Med.* 2002, 113: 276-80.
12. James MW, Chen CM, Goddard WP, Scott BB, Goddard AF. Risk factors for gastrointestinal malignancy in patients presenting with iron deficiency anaemia. *Eur J Gastroenterol Hepatol* 2005, 17(11):1197-203.
13. Ünal ÜH, Fidan C, Korkmaz M, Selçuk H. Demir eksikliği olan hastalarda gastrointestinal sistem endoskopi bulguları. *Akademik Gastroenteroloji Dergisi* 2012, 3: 113-6.
14. Rahimi E, Behroozian R, Eishi A. Prevalence of Gastrointestinal Tract Lesions in Patients With Iron-Deficiency Anemia. *Iran J Blood Cancer* 2008, 1: 5-10.
15. Kato M, Kubosawa Y, Hiarai Y, et al. Usefulness of mean corpuscular volume for detection of advanced colorectal cancer in patients older than 85 years. *Digestion* 2018, 97: 177-82.
16. Bosch X, Montori E, Guerra-García M, et al. A comprehensive evaluation of the gastrointestinal tract in iron-deficiency anemia with predefined hemoglobin below 9 mg/dL: A prospective cohort study. *Dig Liver Dis* 2017, 49: 417-26.
17. Schneider C, Bodmer M, Jick SS, Meier CR. Colorectal cancer and markers of anemia. *Eur J Cancer Prev.* 2018, 27: 530-8.
18. Kepczyk MT, Kadakia CSC. Prospective evaluation of gastrointestinal tract in patients with iron-deficiency anemia. *Dig Dis Sci.* 1995, 40: 1283-9.
19. Rockey DC, Cello, JP. Evaluation of the Gastrointestinal Tract in Patients with Iron-Deficiency Anemia. *New England Journal of Medicine* 1993, 329(23): 1691-1695.
20. Droogendijk J, Beukers R, Berendes PB, et al. Screening for gastrointestinal malignancy in patients with iron deficiency anemia by general practitioners: An observational study. *Scand J Gastroenterol* 2011, 46: 1105-10.