

Evaluation of WBC, RDW and MPV Rates in the First Blood of Patients Admitted to the Emergency Department with Gastrointestinal System Bleeding

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Abstract

Gastrointestinal system (GI) bleeding is emergency intervention required situation and important problem due to mortality, morbidity and hospitalization costs¹. Despite the progress in diagnosis and treatment, upper GI bleeding has 2-10% mortality rate, thus since 1960, desired improvement could not be achieved^{1, 2}. Therefore, evaluation, diagnosis and treatment approaches of patients with upper GI-bleeding have a special importance. The severity ranges covers between; subclinical hidden bleeding to occult bleeding, from chronic anemia to acute hypovolemic shock³. White blood cells, also known as leukocytes (WBC), are immune system fighters and migrate to the side of all kinds of infections and inflammation. They are the main cells that cause inflammation. Leukocyte count (WBC): 4,500 to 10000 cells / mL. Average Platelet volume (MPV) is the laboratory finding which shows platelet activation. It is one of the simple subclinical inflammation marker. A red cell distribution width (RDW) reflecting the variability in the size of circulating erythrocytes and is often used as indicator for the diagnosis of anemia⁴. However, systemic inflammations, chronic nutritional disorders, ineffective erythropoiesis diagnosis and in bone marrow dysfunction RDW values may also increase⁵. In our study, retrospectively, between January 2020-March 2020, patients with Gastrointestinal system (GI) bleeding as the primary diagnosis, the age range between 18-75 years old and whose blood hemograms were studied were included. WBC, RDW and MPV values are proportioned.

Keywords: Bleeding, Emergency, Gastrointestinal

Introduction

Gastrointestinal system (GIS) bleeding is a group of diseases that are characterized by blood loss at one point of the digestive system and can result in death if not intervened. GIS bleeding constitutes an important part of admissions to the emergency department. Acute upper gastrointestinal bleeding is one of the most common causes of mortality and morbidity. They can apply to the emergency department with clinical pictures ranging from massive bleeding that can cause shock and death to occult bleeding that causes iron deficiency anemia through chronic blood loss.

Since patients with severe upper gastrointestinal bleeding frequently present to the emergency services, timely detection, and emergency intervention of these patients are important. Especially in patients admitted to the hospital with upper GIS bleeding, determining the risks in the triage stage will affect the clinical course of the disease. Since these patients are often the patients that require an urgent decision to direct their diagnosis and treatment, determining the risks will also enable the clinician to reach the right decisions in a short time. Most of these patients require hospitalization. The prolongation of the patient's stay causes negative consequences both in terms of prognostic and economics.

Risk factors of upper gastrointestinal bleeding include advanced age, chronic renal failure, and chronic liver dis-

ease, coexisting diseases such as peptic ulcer, history of previous surgical intervention, a presentation with hematemesis, development of hypotension, history of esophageal varicose bleeding, nonsteroidal anti-inflammatory drugs, steroid drugs, anticoagulants. drug use, smoking and alcohol habits, and lifestyle. The mortality rate is closely related to age. Such that, while the mortality rate is 8% under the age of 60, this rate rises to 13% above the age of 60¹. Its annual incidence is 80 to 170 per 100,000, and it is an important problem due to high mortality, morbidity, and hospitalization costs. It is classified as upper or lower GIS bleeding depending on where it originates. Upper GIS bleeding originates from the proximal of the Treitz ligament, while the term Lower GIS bleeding is used for bleeding from the distal of this level^{2,3}.

The severity of bleeding; It covers a broad spectrum that can range from subclinical occult bleeding to abnormal bleeding, from chronic anemia to acute hypovolemic shock. Despite all the advances in diagnosis and treatment attempts, the desired improvement has not been achieved in the 2-10% mortality of upper GIS bleeding since 1960. Therefore, evaluation, diagnosis, and treatment approaches of patients with upper GIS bleeding in the emergency department have special importance^{1,4}. Often the bleeding stops spontaneously. In cases where bleeding continues, hemostasis can be achieved with endoscopic treatment. Risky

cases with hemodynamic stability and bleeding control or recurrent bleeding are candidates for surgery.

In this disease group, which is characterized by blood loss, the most important analysis in evaluating both the severity of the disease, the follow-up process and the response to the treatment is the hemogram examination, which evaluates the number, ratio and distribution of erythrocytes, leukocytes and platelets in the blood.

Method

Archive records of patients between the ages of 18 and 75 who applied to the Emergency Medicine Clinic of Istanbul Health Sciences University Kanuni Sultan Süleyman Training and Research Hospital between January 2020 and March 2020 were examined, and patients with a primary diagnosis of gastrointestinal bleeding and a demogram test were included in our study. WBC, RDW and MPV values in the hemograms of these patients were examined.

Results

Of the 100 patients whose results were evaluated, 39% were women and 61% were men. The mean age was 55.9 (SD \pm 20.30), and the mean age of women was 60.23 (SD \pm 20.50), and the mean age of men was 53.27 (SD \pm 19.87) (Table 1). The mean WBC of these 100 patients was 9.99 (SD \pm 3.92), the mean MPV was 10.67 (SD \pm 1.09), and the mean RDW was 15.59 (SD \pm 3.86) (Table 2). It was not possible to evaluate endoscopic parameters because endoscopy could not be performed on all patients in our study.

Discussion

White blood cells (WBC), also known as leukocytes, which are the main cells that cause inflammation, are soldiers of the immune system and go to the area needed to fight any kind of infection and inflammation. Their number is 4,500 to 10000 cells/mcL. Again, the mean volume of platelets (MPV), whose primary task is clot formation but reacts sensitive to inflammation, is also a laboratory finding that shows platelet activation by stimulation of the bone marrow and is one of the simple markers that indicate subclinical inflammation. Red cell distribution width (RDW) is a marker that reflects the variability of the size of circulating erythrocytes and is generally used in the diagnosis of anemia. However, an increase in systemic inflammations, chronic nutritional disorders, diagnosis of infectif eritropoiesis and bone marrow dysfunction may be observed⁵.

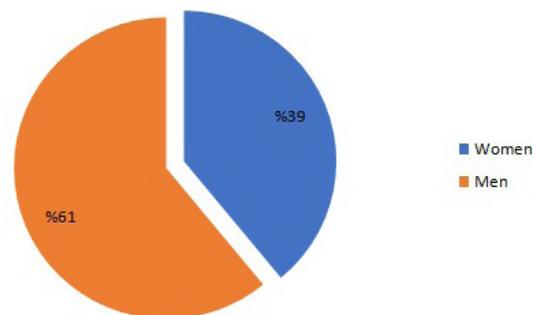


Table 1: Distribution of patients by gender

In the study conducted by Berrios et al.⁶, the frequency of GIS bleeding was found to be 98% in men, and it was found that most of these men (38%) were between the ages of 30-40. The male / female ratio is 2.19/1 in the study of Fleischer et al.⁷; 2,4/1 in the study of Paspatis et al.⁸; It was found to be 1.7/1 in the study of Zaltman et al.⁹. Cander et al. In his GIS bleeding study¹⁰, the male / female ratio was found to be 2, the average age of male patients was 61.60, and the average age of female patients was 63.90, and it was found to be consistent with the literature (p <0.05). The male / female ratio in our study was 1.56/1; The average age of male patients was 53.27, and the average age of female patients was 60.23. As seen in the literature and other studies, the risk of GIS bleeding in the male gender was found to be significantly (p <0.05) high.

Cander et al.¹⁰, mean leukocyte values were 11.06 \pm 4.06 k/uL and mean CRP values were 35.77 \pm 26.56 mg/L. The mean hospitalization period of these patients was found to be 6.40 \pm 6.17 days. The most common endoscopic findings in women presenting with upper GIS bleeding were detected as 70% stage 3, 20% stage 1b, and 10% stage 1a according to the Forrest endoscopic classification. There was no significant correlation (p <0.05) between the hospitalization time of the patients and endoscopy results, leukocyte and CRP values.

Acute upper gastrointestinal system bleeding is a medical emergency with mortality ranging between 5-15%¹¹.

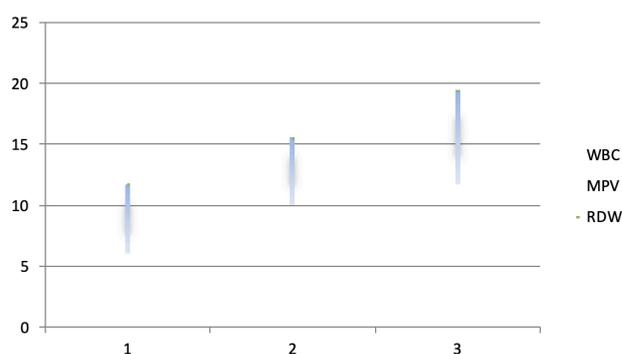


Table 2: WBC, MPV, RDW means of patients

Endoscopy is the most important process of diagnosis and treatment. Endoscopy complications are almost zero and it is a method that mostly saves patients from surgery. It is stated that 47% of patients with upper GIS bleeding need urgent endoscopy. In addition to medical treatment in upper GIS bleeding, therapeutic endoscopy is of great importance, especially in the treatment of bleeding peptic ulcers¹².

Patients with GIS bleeding require an urgent decision for their treatment after the examination. For this purpose, low and high-risk patients should be determined for mortality and re-bleeding. Many risk scoring systems have been developed that can easily be applied by the emergency clinician and can direct the treatment of patients. Patients with low risk of re-bleeding will be identified, after stabilization, they can be safely discharged in the early period and their follow-up and treatment can be continued on an outpatient basis. In this way; Both emergency clinics, beds and staff, which are already busy, will not be occupied unnecessarily, and treatment costs will be reduced. Also, better care will be provided to high-risk patients who need serious care¹³.

Okutur et al. In their study¹⁴, 164 (71.3%) of 230 patients were male and 66 (28.7%) were female. The male/ female ratio is 2.48/1. The mean age of the patients was 52.4 ± 19.4 years and ranged between 15-90 years. Looking at the age distribution, 5.3% of the patients were under 20 years old, 23.9% were between 21-40 years old, 34.3% were between 41-60 years old, and 36.3% were over 60 years old. For the admission to the emergency department, 17% of the patients came with hematemesis, 37.8% with hematemesis + melena, and 45.2% with melena. 74 patients (31.8%) had a history of previous upper GIS bleeding, 23 patients (10%) had a history of previous GIS operation. The duration of stay in the ward was 6.6 ± 4.1 days. Duration of hospital stay was significantly longer in patients with esophageal varices on endoscopy ($p < 0.05$).

40% of the patients ($n = 91$) had at least one comorbid disease and hypertension (46.2%) and diabetes mellitus (22%) were the leading ones. When the presence of additional disease was evaluated, 40% of the patients had at least 1 additional disease and the most common additional diseases were diabetes mellitus and hypertension. Being over 60 years of age in GIS bleeding, presenting with hematemesis and the presence of additional disease increase the mortality significantly ($p < 0.05$). While 92.6% of the patients were discharged with medical treatment, 5.7% of them were lost. As a matter of fact, 9 of the 13 patients who died were over 60 years old and had additional diseases, and 10 of them applied to the emergency service with hematemesis.

126 patients (54.8%) had at least one drug use. NSAIDs ranked first with 96.8% ($n = 122$), followed by warfarin 7.1% ($n = 9$), heparin 1.6% ($n = 2$) and steroid 1.6% ($n = 2$). The most common drug that causes gastrointestinal bleeding was NSAIDs. When the arrival hemogram values of the patients were examined, hemoglobin: 9.5 ± 2.7 g/dl, hematocrit: $28.5 \pm 8.1\%$, MCV: 87.1 ± 8.0 fl, platelet: $265991 \pm 139082/\text{mm}^3$.

Especially if NSAIDs are to be administered in patients over 60 years of age, gastroprotective drugs must be added together. In the treatment of patients with GIS bleeding, the aim is primarily to provide hemodynamic stability. For this, pharmacological treatment should be initiated in addition to appropriate fluid replacement therapy. Then, endoscopy should be planned and diagnosed as soon as possible. Endoscopic diagnosis-treatment success in patients with GIS bleeding is related to the bleeding episode and the time between clinical presentation and endoscopy. Therefore, endoscopy should be performed as soon as possible, especially for patients with high-risk indicators for mortality and recurrent bleeding.

In a study that lasted more than three years, WBC, CRP, Endoscopy findings and demographic findings were compared to determine the hospitalization criteria of patients with GIS bleeding. In total, the average WBC of 30 patients was found to be 11.06. After the calculations, it was observed that CRP and WBC values had no significant effect ($p > 0.224$) on hospitalization or mortality¹⁵.

In a study conducted by Bahar Işık, in which upper GIS hemorrhage mortality and MPV values were examined, the mean MPV value was found to be 8.03 ± 1.19 , and mortality rates were found to be higher ($p < 0.002$) in patients with high MPV values¹⁶. On the other hand, it is seen in the literature that even unrelated conditions such as nosebleeds and colorectal cancer that cause inflammatory events increase the RDW value ($p < 0.029$)^{17,18}.

In addition to providing bleeding control, accompanying diseases should be treated carefully in reducing mortality. Patients with upper gastrointestinal bleeding, especially those with advanced age and comorbid diseases, should be followed up in intensive care conditions due to the high mortality rate. Upper gastrointestinal system bleeding is one of the common urgent problems in gastroenterology and constitutes 80% of all gastrointestinal system bleeding. Etiologically, peptic ulcer, erosive gastritis, esophageal varices are the most common lesions. It will be more appropriate to follow-up patients with the critical condition in intensive care units. Clinical parameters of increased risk for re-bleeding and mortality before endoscopy; Patients over the age of 65 have a shock, concomitant disease, rectal examination, sputtered content, and fresh red blood in the nasogastric aspiration fluid¹⁹.

As a result, the most important parameter that adversely affects GIS bleeding is advanced age. Patients with advanced age and GIS bleeding with comorbid diseases should be directed to endoscopy without delay. These patients can have a high mortality rate and should be followed in intensive-care conditions. Although there are significant results of using WBC, RDW, and MPV values in the follow-up of GIS bleeding in the studies conducted so far, it is obvious that new studies will increase these data by expanding and differentiating the studies with appropriate parameters.

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