

ENDOSCOPIC DIAGNOSIS AND TREATMENT OF UPPER GASTROINTESTINAL BLEEDING

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Upper gastrointestinal bleeding (UGB) is a common medical emergency problem with significant morbidity and mortality.

The aim of this paper is to establish the incidence of upper gastrointestinal bleeding in relation to sex and age, determine the prevalence of bleeding lesions and perform analysis of bleeding peptic ulcer in relation to the location, age, gender, Forrest classification and the need for endoscopic hemostasis.

The prospective study included 70 patients with UGB, 42 men and 28 women, mean age 68.64±13.66 years. The diagnosis of bleeding lesions was made exclusively by means of esophagogastroduodenoscopy. Forrest classification was used in the evaluation of the activity of bleeding ulcers of the stomach and duodenum.

The largest number of bleeding patients was of male sex (60%). Bleeding most commonly occurred in patients older than 60 years (84.29%). Statistically, female patients were significantly older than patients of male gender ($p=0.001$). The most common cause of bleeding was peptic ulcer (65.71%). The average age of patients with gastric ulcer was 70.57±15.68 years, with a duodenal ulcer 63.78±16.70 years. In the duodenum, Forrest Ib, IIa and IIb ulcers were usually confirmed, whereas Forrest IIC ulcers were identified in the stomach. Endoscopic hemostasis was required in 55.56% of patients with duodenal and in 23.81% of patients with gastric ulcer.

The incidence of UGB is higher in men and it increases with age. The most common cause of bleeding is ulcer disease. Patients with gastric ulcer are older than patients with duodenal ulcer, while both gastric and duodenal ulcers are found in the oldest patients. Duodenal ulcers cause serious bleeding and more often require endoscopic hemostasis. *Acta Medica Medianae 2015;54(2):24-30.*

Key words: bleeding, upper gastrointestinal bleeding, diagnosis, endoscopic treatment

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Introduction

Bleeding from the gastrointestinal (GI) tract represents a serious clinical problem, which in most cases requires hospitalization. Acute gastrointestinal bleeding often presents with dramatic clinical picture and requires urgent diagnostic and therapeutic procedures. For this reason, it ranks among the high-priority prehospital and hospital treatments (1). Due to the extremely large heterogeneity, for didactic reasons, bleeding from the gastrointestinal tract is divided into upper

gastrointestinal bleeding (UGB) and lower gastrointestinal bleeding (LGB). Upper gastrointestinal bleeding refers to hemorrhage with the source of bleeding located at a point from the mouth to the ligament of Treitz, that is, from the esophagus, stomach and duodenum. Bleeding below this anatomical demarcation point is lower gastrointestinal bleeding and includes bleeding from the small intestine and colon (1,2). Bleeding lesions are usually located in the upper gastrointestinal tract (80%), followed by the colon (20%), whereas bleeding from the small intestine is significantly lower (up to 2%) (3).

The incidence of UGB is 150 per 100.000 adults per year and accounts for 1.5% of all cases requiring urgent hospitalization, approximately one per thousand people on an yearly basis, in developed countries (1,4). Hospital mortality ranges from 5% to 15% (5), but can reach up to 35% in patients hospitalized for other medical problems (6-8). The occurrence of UGB is closely linked with increased consumption of non-steroidal anti-inflammatory drugs and the high incidence of *Helicobacter pylori* infection in patients with ulcer disease (9).

Table 1. The modified Forrest classification of bleeding ulcers

Active hemorrhage	
Forrest I-a	spurting arterial bleeding
Forrest I-b	oozing bleeding
Signs of recent hemorrhage	
Forrest II-a	visible blood vessels (g=blood vessel <2mm, G=blood vessel >2mm)
Forrest II-b	adherent clot
Forrest II-c	hematin-covered lesion
No signs of recent hemorrhage	
Forrest III	Clean bed of ulcer

Acute UGB is clinically manifested by hematemesis and/or melena. Hematemesis is the vomiting of fresh, bright red blood, dark red blood clots or stale (old) blood that looks like "coffee grounds". It is an exclusive characteristic of UGB, with a loss of about 1000ml of blood.

Melena is black, sticky, tarry stool, which is also foul-smelling. It is the result of the enzymatic and bacterial transformation of hemoglobin into the hematin in the intestines. Blood loss of up to 500ml causes melena, although the loss of only 60ml of blood is quite sufficient for its creation. Melena may, besides the upper GI tract, also originate from the lower GI tract up to the middle of the transversal colon (5). Melena must not be substituted for the greenish stool, resulting from iron intake, or the black stool caused by ingesting bismuth. Severe UGB with massive and rapid passage of blood through the intestines can manifest as coagulated blood passing through the rectum (haematochesia) in about 2% of patients (2).

Urgent proximal endoscopy (within 6-12 hours after the onset of bleeding) confirms the diagnosis in most patients and allows for targeted endoscopic treatment, including injection hemostasis, thermocoagulation, mechanical hemostasis etc. (4,9). Endoscopic hemostasis results in decreased morbidity, reduces the risk of recidive bleeding and the need for surgical intervention (9).

The most common causes of UGB are peptic ulcers (35-50%), gastroduodenal erosions (8-15%), esophageal and gastric varices (10%), Mallory-Weiss syndrome (5-10%), vascular ectasia (5-7%), tumors of the stomach or the esophagus (1%). Approximately 20-30% of patients with ulcer disease will bleed at least once during the evolution of the disease (10). Bleeding may be the first and only symptom of the disease (11). Bleeding from peptic ulcer presents in 20% of patients with melena, in 30% with hematemesis, 50% of patients have both melena and hematemesis, whereas about 5% of patients have haematochesia (12).

The modified Forrest classification of bleeding ulcers has been widely accepted for the diagnosis of bleeding and prognosis of the disease (Table 1). Active bleeding (Forrest Ia and Ib) carries a high risk of continuing the ongoing bleeding. Stigmata of bleeding (Forrest IIa, IIb and IIc) carry a certain

risk of rebleeding and have greater significance for gastric than duodenal ulcer (10). In 80% of cases, the bleeding stops spontaneously (11), while in others there is a need for endoscopic or surgical intervention.

Aim

The aim of the paper is to establish the incidence of upper gastrointestinal bleeding in relation to sex and age, determine the prevalence of bleeding lesions, analyze bleeding peptic ulcer in relation to the location, age, gender, Forrest classification and the need for endoscopic hemostasis.

Patients and methods

This prospective study included 70 patients who were hospitalized at the Department of Gastroenterology and Hepatology of the Clinical Center Niš, during 2014. The reason for hospitalization was upper gastrointestinal bleeding presenting with hematemesis and/or melena.

The diagnosis of bleeding lesions of the proximal segment of the GI tract was confirmed exclusively by esophagogastroduodenoscopy, using endoscope brand "Olympus" and "Pentax". Forrest classification was used for the evaluation of the activity of bleeding ulcers in the stomach and duodenum.

Patients with active bleeding and bleeding stigmata (Forrest IIa and IIb) underwent endoscopic hemostasis with injection of epinephrine solution 1:10000 around ulcers, 2ml in each of the four quadrants, and then another 2ml directly into a blood vessel, and/or by application of mechanical hemoclips.

Quantitative statistical analysis was performed on the computer. Excel program from the Microsoft Office 2007 software package was used for data entering, ranking, clustering, and also for tabular and graphical display. Comparison of numerical values of characteristics between the two groups of patients was performed using the Student's t-test. As a threshold of the statistical significance in making conclusions, the level of error estimate less than 5% ($P < 0.05$) was used. Results of statistical analysis are shown in tables and graphs.

Results

The study included 70 patients, out of which 42 (60%) men and 28 (40%) women.

The average age in the study population was 68.64±13.66 years. The youngest patient was 24 years old and the oldest was 90 years old (Table 2). The female patients were statistically significantly older than the male ones (74.57±9.82 vs 64.69±14.52, p=0.001).

Most of the patients were aged between 60-79 years (43 patients, 61.43%), followed by patients older than 80 years (16 patients, 22.86%), while the smallest number of the patients was younger than 60 years (11 patients, 15.71%) (Figure 1).

Bleeding was manifested in the form of hematemesis in 18 (25.71%) patients, in the form of melena in 37 (52.86%) patients, while 15 (21.43%) patients presented with both hemate-mesis and melena (Figure 2).

Table 2. Distribution of bleeding patients by age and sex

Statistical parameter	Women (n=28)	Men (n=42)	Total (n=70)	p value
Arithmetic mean	74.57	64.69	68.64	p=0.001
Standard deviation	9.82	14.52	13.66	
Median	75.00	66.00	70.00	
Minimum	55.00	24.00	24.00	
Maximum	90.00	85.00	90.00	

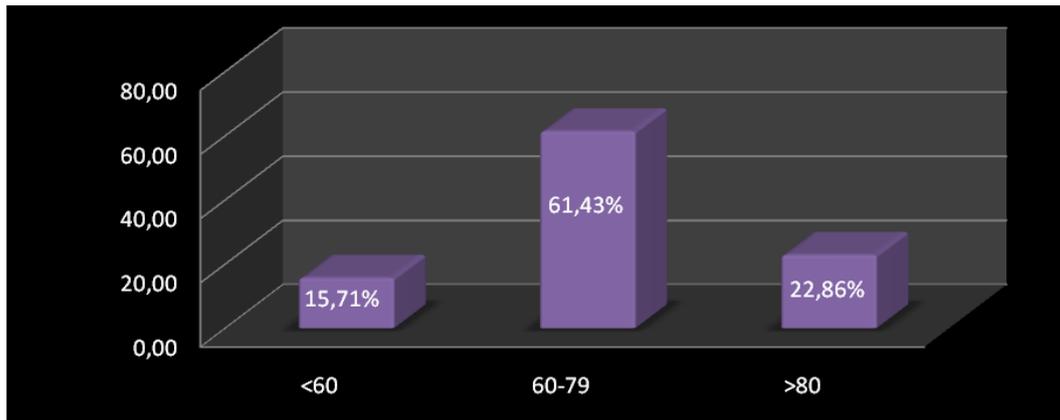


Figure 1. The bleeding patients in relation to age

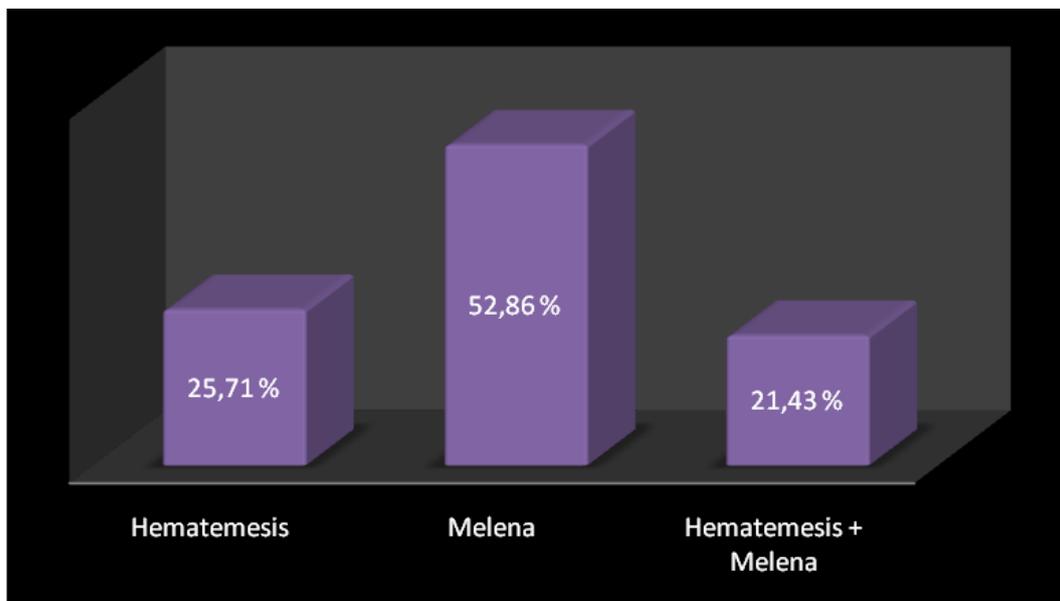


Figure 2. Clinical manifestations of bleeding

The most common bleeding lesion is peptic ulcer, which was verified in 46 (65.71%) patients: 21 patients (30%) with gastric ulcer, 18 patients (25.71%) with duodenal ulcer, 4 patients (5.71%) with ulcer of the neck of hiatal hernia, and 3 (4.29%) with both gastric and duodenal ulcers. Gastroduodenal erosions were found in 7 patients (10%), and esophagitis in 5 (7.14%) patients. Other lesions were present in smaller percentages: 4.29% varices, 4.29% gastric carcinoma, 2.86% polyp, 1.43% achalasia, 1.43% Dieulafoy lesion (Figure 3).

Ulcer disease was diagnosed in 30 (65.22%) men and 16 (34.78%) women (Table 3). Among patients with ulcer disease, the most frequent localization was in the stomach (45.66%), followed by the duodenum (39.13%), neck of the hiatal hernia (8.69%), and the smallest number of patients was found to have both gastric and duodenal ulcers (6.52%). There was no statistically significant difference in the incidence of stomach ulcer ($p=0.903$), duodenal ulcer ($p=0.879$), ulcers of both the stomach and duodenum ($p=0.274$) and

ulcer of the neck of the hiatal hernia ($p=0.566$), in relation to gender (Table 3).

Patients presenting with both gastric and duodenal ulcers are the oldest (77.00 ± 7.94 years), followed by patients with gastric ulcer (70.57 ± 15.68), patients with ulcer of the back of hiatal hernia (67.50 ± 14.25), while the youngest patients are diagnosed with duodenal ulcer (63.78 ± 16.70 years). There was no statistically significant difference in patients' age in relation to different localization of ulcer disease ($p=0.413$) (Table 4).

During endoscopic diagnosis, ulcers of the stomach and duodenum are classified according to Forrest classification. In the stomach, the most commonly diagnosed ulcers are Forrest II-c ulcers (52.38%), and in the duodenum Forrest Ib (27.77%) and IIb (27.77%) ulcers (Figure 4).

Forrest Ia was not detected in any of the patients with gastric and duodenal ulcers. Statistically, Forrest IIc is significantly more frequent in patients with gastric ulcer compared to patients with duodenal ulcer ($p=0.047$) (Table 5).

Table 3. Incidence of peptic ulcer disease in terms of localization and gender

Localization of ulcers	Men	Women	Total	p value
Stomach	14 (30.44%)	7 (15.22%)	21 (45.66%)	0.903
Hernia neck	3 (6.52%)	1 (2.17%)	4 (8.69%)	0.566
Duodenum	12 (26.09%)	6 (13.04%)	18 (39.13%)	0.879
Stomach + duodenum	1 (2.17%)	2 (4.35%)	3 (6.52%)	0.274
Total	30 (65.22%)	16 (34.78%)	46 (100.00%)	

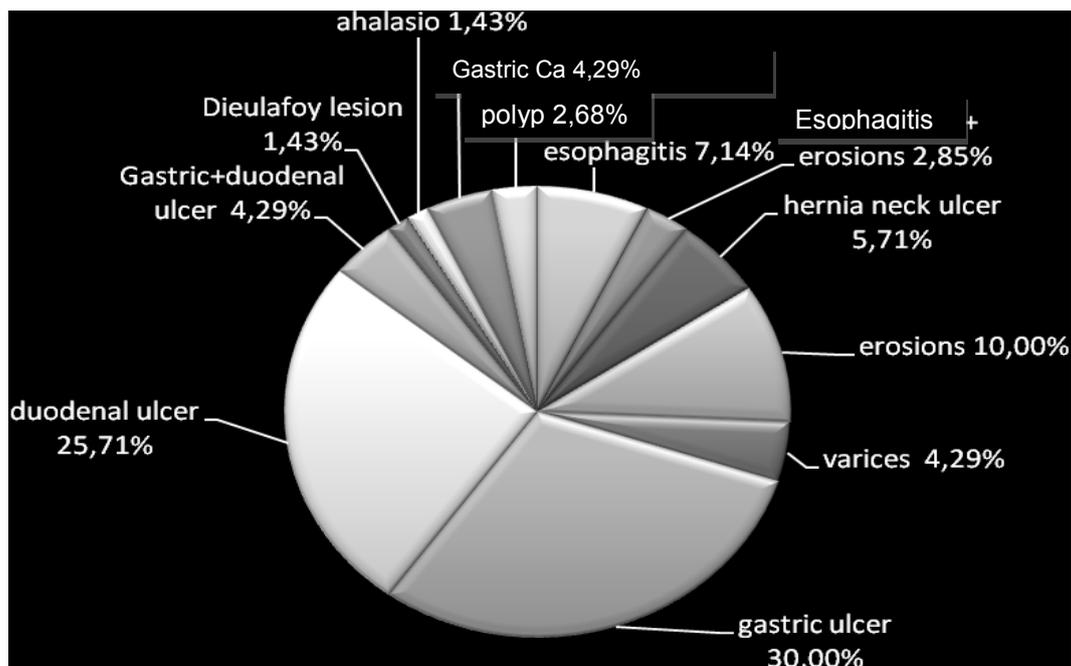


Figure 3. Representation of bleeding lesions in the proximal segment of the digestive tract

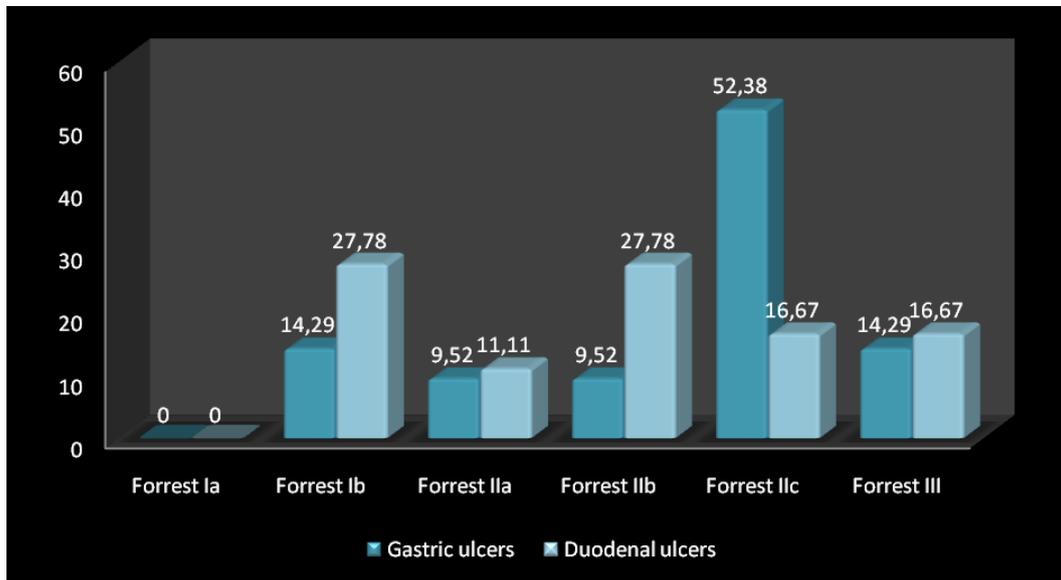


Figure 4. Forrest classification of bleeding ulcers of the stomach and duodenum

Table 4. Distribution of patients with ulcer disease by age

Localization of ulcers	Age Arithmetic mean	Age Minimum	Age Maximum
Stomach	70,57	29,00	89,00
Duodenum	63,78	24,00	90,00
Stomach + duodenum	77,00	68,00	83,00
Hernia neck	67,50	50,00	81,00

Table 5. The presence of the gastric and duodenal ulcers in relation to the Forrest classification

Forrest classification	Gastric ulcers		Duodenal ulcers		p value
	n	%	n	%	
Forrest Ia	0	0	0	0	-
Forrest Ib	3	14.29	5	27.78	0.432
Forrest IIa	2	9.52	2	11.11	0.636
Forrest IIb	2	9.52	5	27.78	0.215
Forrest IIc	11	52.38	3	16.67	0.047
Forrest III	3	14.29	3	16.67	0.590
Total	21	100.00	18	100.00	

Endoscopic hemostasis of stomach ulcers were done with a solution of epinephrine in two patients (9.52%), while in three patients (14.29%) both epinephrine and the application of hemoclips was necessary. In 10 (55.56%) patients with duodenal ulcer, endoscopic hemostasis with a solution of epinephrine was performed.

Discussion

The study included 70 patients who were hospitalized because of the bleeding from the proximal segment of the GI tract. In most of the patients, bleeding manifested in the form of melena (52.86%). The incidence of upper gastrointestinal bleeding is significantly higher in males and in older people (1,2,9), which was confirmed in this study. Bleeding occurred in 68.57% of the male patients. In this study, the average age was 68.64 ± 13.66 years. The oldest patient was 90 years old. Even 84.29% of the patients were older than 60 years,

confirming that the incidence of bleeding increases with age. Female patients were statistically significantly older than male patients (74.57 ± 9.82 vs. 64.69 ± 14.52 , $p=0.001$).

Peptic ulcer and erosion are responsible for the occurrence of bleeding in almost three-quarters of cases (1). Peptic ulcer is the cause of over 60% of bleeding patients (2,9), as shown in this study (65.71% of patients had peptic ulcer). Erosions were at the second place in terms of bleeding incidence (10%), followed by esophagitis (7.14%), esophageal varices (4.29%), gastric cancer (4.29%), polyps (2.86%), achalasia (1.43%), Dieulafoy lesions (1.43%).

In the United States, duodenal ulcers are more common than gastric ulcers, but patients with gastric ulcer are hospitalized more often than patients with duodenal ulcer (55.10% vs. 38.50%) (10). Our study showed that patients with gastric ulcer are more often hospitalized than those with duodenal ulcer (54.35% vs. 39.13%). The oldest

patients are those diagnosed with both gastric and duodenal ulcers (77.00 ± 7.94 years), followed by patients with gastric ulcer (70.57 ± 15.68 years), while patients with duodenal ulcer were the youngest (63.78 ± 16.70 years).

Duodenal ulcers are more likely to erode larger blood vessels, causing more severe bleeding (9). This is confirmed in our study by the fact that the need for endoscopic hemostasis was higher in patients with duodenal ulcer (55.56%) than with gastric ulcer (23.81%). The most common duodenal ulcers were Forrest Ib, IIa and IIb (66.67%), while Forrest IIc ulcer was statistically significantly more frequently diagnosed in the stomach com-

pared to the duodenum ($p=0.047$) (Table 2).

Conclusion

The incidence of bleeding from the proximal segment of the GI tract is higher in males. The incidence of bleeding increases with age. Gastro-duodenal ulcer and erosions are responsible for the occurrence of bleeding in almost three-quarters of cases. Patients with gastric ulcer were older than patients with duodenal ulcer. Patients with both gastric and duodenal ulcers are the oldest. Duodenal ulcers cause more serious bleeding than gastric ulcers, and therefore require a greater need for endoscopic hemostasis.

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ENDOSKOPSKA DIJAGNOZA I TRETMAN KRVARENJA IZ PROKSIMALNOG SEGMENTA DIGESTIVNOG TRAKTA

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Krvarenje iz proksimalnog segmenta digestivnog trakta (PSDT) je čest urgentni medicinski problem sa značajnim morbiditetom i mortalitetom.

Cilj rada bio je određivanje incidencije krvarenja iz proksimalnog segmenta digestivnog trakta u odnosu na pol i životno doba, određivanje prevalencije krvarećih lezija, analiza krvarenja iz peptičkog ulkusa u odnosu na lokalizaciju, godine starosti, pol, Forrestovu klasifikaciju i potrebu za endoskopskom hemostazom.

Prospektivna studija obuhvata 70 bolesnika sa krvarenjem iz PSDT, 42 muškarca i 28 žena, prosečne starosti 68,64±13,66 godina. Dijagnoza krvarećih lezija je postavljena isključivo ezofagogastroduodenoskopijom. U proceni aktivnosti krvarećih ulkusa želuca i duodenuma korišćena je Forrestova klasifikacija.

Najveći broj bolesnika sa krvarenjem je muškog pola (60,00%). Krvarenje se najčešće javljalo kod bolesnika starijih od 60 godina (84,29%). Bolesnice su bile statistički značajno starije u odnosu na obolele muškog pola ($p=0,001$). Najčešći uzrok krvarenja je peptički ulkus (65,71%). Prosečna starost bolesnika sa ulkusom želuca bila je 70.57±15,68 godina, a sa ulkusom duodenuma 63,78±16,70 godina. U duodenumu su najčešće verifikovani Forrest I-b, II-a i II-b ulkusi, a u želucu Forrest II-c ulkusi. Endoskopska hemostaza bila je potrebna kod 55,56% bolesnika sa duodenalnim i 23,81% bolesnika sa želudačnim ulkusom.

Incidencija krvarenja iz PSDT veća je kod muškaraca i raste sa godinama starosti. Najčešći uzrok krvarenja je ulkusna bolest. Bolesnici sa želudačnim ulkusom stariji su u odnosu na one sa duodenalnim ulkusom, dok su najstariji oni sa udruženim želudačnim i duodenalnim ulkusom. Duodenalni ulkusi izazivaju ozbiljnija krvarenja i češće zahtevaju endoskopsku hemostazu. *Acta Medica Medianae 2015;54(2):24-30.*

Ključne reči: krvarenje, proksimalni segment digestivnog trakta, dijagnoza, endoskopski tretman