The aging of the population is associated with the increased risk of chronic diseases, and greater consumption of drugs used in their treatment, which may lead towards gastrointestinal bleeding. The aim of the study was to analyze the reasons, treatment results, complications and mortality connected with gastrointestinal bleeding in patients aged 85 years and older.

Material and methods. The study comprised the retrospective analysis of 84 patients, aged between 85 and 97 years admitted to the Department of General Surgery with diagnosis of gastrointestinal bleeding, during the period between 2005 and 2010. The results were compared to a younger control group of 151 patients (mean age-53 years) with gastrointestinal bleeding, admitted to the department during the same period. Diagnosis was based on the history, physical examination, endoscopy, morphology and biochemical lab results. Analysis considered the therapeutic method used, treatment results, complications and hospital mortality. The endoscopic picture and risk of recurrent bleeding in patients with upper gastrointestinal hemorrhage was evaluated by means of the clinical Forrest scale. Results were subject to statistical analysis.

Results. Most of the gastrointestinal bleeding cases considering patients aged 85 years and older concerned the upper gastrointestinal tract (41.67%). Thirty (35.71%) patients were on drugs affecting the coagulation system. On admission, the average hemoglobin concentration level in the elderly was comparable to results observed in case of the control group. Considering patients aged 85+, drugs affecting the coagulation system were used statistically more frequently, as compared to younger patients. Recurrence of bleeding was observed in 10 (11.9%) study group patients. Overall mortality due to gastrointestinal bleeding in elderly patients amounted to 20.24% and was statistically higher, as compared to the control group- 7.2%.

Conclusions. Treatment results in case of gastrointestinal bleeding in the elderly patients (above 85 years) are burdened with a higher mortality rate. Different diagnostic and therapeutic methods should be applied in case of elderly patients (above 85 years), in order to increase their chance of survival. The problem of aging is an epidemiological phenomenon and gastrointestinal bleeding will become an increasing problem, needing to be solved in everyday clinical practice.

Key words: gastrointestinal bleeding, elderly patients, gastrointestinal endoscopy

The population of patients aged 65 years and older, according to demographic projections will be more and more numerous, both in Poland and throughout Europe, which is a significant medical challenge. According to GUS demographic forecasts for the Polish population, by 2035 the percentage of patients aged 65 years and older will increase from 13.5% in 2010 to 22.3% in 2030, and 23.2% in 2035. It is estimated that the current number of patients exceeding 85 years accounts for 1.3% of the Polish population (1). In this epidemiological context the number of hospitalized elderly patients, due to gastrointestinal (GI) bleeding is constantly increasing. GI bleeding might develop as a complication of coexisting diseases or occur independently. The presence of many diseases (the so-called geriatric syndrome) is characteristic of this group, which worsens prognosis during the
Gastrointestinal bleeding in patients aged 85 years and older is connected with increased risk of disease incidence and mortality. Considering the epidemiological point of view this difficult clinical problem will continue to grow, hence, the presented study.

The aim of the study was to compare the reasons, treatment results, complications and mortality of gastrointestinal bleeding in patients aged 85 years and older, as compared to younger patients.

MATERIAL AND METHODS

During the period between 2005 and 2010, 235 patients with gastrointestinal bleeding were subject to treatment at the Department of General, Oncological, and Endocrinological Surgery, Provincial Hospital in Kielce. Eighty-four patients were subject to retrospective analysis, aged between 85 and 97 years. The results were compared to the control group comprising 151 younger patients (mean age- 53 years) admitted to the hospital, due to gastrointestinal bleeding during the same period. Final diagnosis was established on the basis of the history, physical examination, endoscopy, and laboratory results. Inclusion criteria comprised patient age (over 85 years) of both gender, upper or lower gastrointestinal tract bleeding symptoms: any unexplained decrease in blood pressure and increased heart rate associated with coffee-ground vomiting, tarry or bloody stools, or unexplained hemodynamic deterioration, as well as decreased morphology (RBC, hematocrit and hemoglobin values).

Comprehensive analysis considered the following: the course of bleeding until hospital admission, medication used by the patient, coexisting diseases, physical examination, laboratory results (hemoglobin concentration, hematocrit and RBC values, biochemical and coagulation system results), as well as upper and lower gastrointestinal endoscopy results.

Table 1. Characteristics of the study and control groups

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>mean age</td>
</tr>
<tr>
<td>Study group: age between 85-97 years</td>
<td>23</td>
<td>27.38</td>
<td>88</td>
</tr>
<tr>
<td>Control group: age &lt; 85 years</td>
<td>91</td>
<td>60</td>
<td>52</td>
</tr>
</tbody>
</table>
Analysis considered the therapeutic method used, treatment results, complications and hospital mortality. The patients’ clinical condition and risk of gastrointestinal bleeding recurrence were individually evaluated using the Forrest scale. The end-points were as follows: 1) recurrence of bleeding, 2) gastrointestinal bleeding complications, 3) hospital mortality during thirty days since the beginning of bleeding. The obtained results were subject to statistical analysis, based on the following: the Z, t-Student, chi$^2$, and Fisher-Snedecor tests. The tested null hypothesis was considered concerning equal variables, proportion and distribution values. The decision to reject the null hypothesis was based on the comparison of calculated values with the critical area estimated, according to the significance test.

RESULTS

Considering the 235 patients treated for gastrointestinal bleeding, 84 were subject to retrospective analysis, age ranging between 85 and 97 years. The study group comprised 23 (27.38%) male and 61 (72.62%) female patients. The average age of both male and female patients amounted to 88 years, while the median- 87 years. Based on the analysis most gastrointestinal bleeding cases in the elderly concerned the upper gastrointestinal tract (35 (41.67%) patients). Lower gastrointestinal bleeding was observed in 22 (26.19%) patients, while bleeding of unknown location in 26 (30.95%) patients. One case of upper gastrointestinal bleeding occurred after cholecystectomy. It is worth mentioning that nearly 50% of lower gastrointestinal bleeding cases concerned patients receiving antithrombotic drugs. Mild or severe hemorrhagic shock was observed in case of 13 (15.5%) patients.

During the initial 24-48 hours the patient was subject to upper gastrointestinal endoscopy. Gastroscopy was performed in 50 patients, colonoscopy and rectoscopy in five, while gastroscopy and colonoscopy in nine. In case of 20 patients endoscopy was not performed, due to lack of patient consent or severe patient general condition. In the remaining cases when bleeding was not responsible for hemodynamic disturbances, endoscopy was delayed.

The bleeding rate determined on the basis of upper gastrointestinal endoscopy, according to the Forrest scale, was similar considering both age groups. Stage IIIA (36.21% patients) or IIIB (31%) were most often observed. In 13.8% of cases endoscopy revealed the presence of a red or black spot at the bottom of the ulcer without a visible blood vessel (Forrest II C), and a clot covering the ulcer in 6.9% of patients (Forrest II B). Stage II A, according to the Forrest scale with a visible non-bleeding blood vessel was diagnosed in 3.45% of cases. The total number of patients with active bleeding (I A + I B) amounted to 8.62%.

Recurrence of bleeding during hospitalization was observed in 10 patients, including 8 with upper and 2 with lower gastrointestinal bleeding. Recurrent bleeding was responsible for mortality cases complicated by acute heart failure. Considering the 17 mortality cases, 11 were connected with upper gastrointestinal bleeding, 4 with lower gastrointestinal bleeding, while in two cases the location of bleeding was not determined.

Average hospitalization in case of elderly patients with gastrointestinal bleeding was 6.9 days, while the median- 5 days (maximum-36 days, minimum-one day).

Considering the study group the following cardiovascular diseases were observed: isch-

<table>
<thead>
<tr>
<th>No</th>
<th>Coexisting diseases</th>
<th>n</th>
<th>% of the study population (n=84)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ischemic heart disease</td>
<td>33</td>
<td>39.29</td>
</tr>
<tr>
<td>2</td>
<td>arterial hypertension</td>
<td>29</td>
<td>34.52</td>
</tr>
<tr>
<td>3</td>
<td>heart failure</td>
<td>19</td>
<td>22.62</td>
</tr>
<tr>
<td>4</td>
<td>atherosclerosis</td>
<td>14</td>
<td>16.67</td>
</tr>
<tr>
<td>5</td>
<td>diabetes mellitus</td>
<td>13</td>
<td>15.48</td>
</tr>
<tr>
<td>6</td>
<td>COPD</td>
<td>5</td>
<td>5.95</td>
</tr>
<tr>
<td>7</td>
<td>atrial fibrillation</td>
<td>4</td>
<td>4.76</td>
</tr>
<tr>
<td>8</td>
<td>chronic renal failure</td>
<td>5</td>
<td>5.95</td>
</tr>
</tbody>
</table>

Table 2. Coexisting diseases in the study group 85+

Table 3. Patient characteristics considering anticoagulation drugs

<table>
<thead>
<tr>
<th></th>
<th>Number of patients on anticoagulation drugs</th>
<th>Number of patients without anticoagulation drugs</th>
<th>Total</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>30</td>
<td>54</td>
<td>84</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Control group</td>
<td>34</td>
<td>117</td>
<td>151</td>
<td></td>
</tr>
</tbody>
</table>
emic heart disease, arterial hypertension, heart failure, and atherosclerosis. Thirteen patients were diagnosed with diabetes mellitus.

Considering elderly patients (>85 years) with gastrointestinal bleeding, 30 (35.71%) received drugs affecting the coagulation system, including dicoumarol and ticlopidin derivatives, and acetylsalicylic acid. Antithrombotic drugs were administered in case of 7 (8.33%) male and 23 (27.38%) female patients. Six (7.14%) female patients were on dicoumarol derivatives, while 19 (22.62%) on acetylsalicylic acid, including 6 (31.58%) men and 13 (68.42%) women, while 5 (5.95%) patients received ticlopidin. Three female patients received both, acetylsalicylic acid and ticlopidin.

In case of the control group, 22.5% of patients received antithrombotic drugs. The number of patients receiving drugs affecting the coagulation system increased systematically with age. One must mention the high number of patients (12/22) with lower-GI bleeding receiving drugs affecting the coagulation system.

The chi-square test demonstrated that the hypothesis concerning the equal distribution of patients receiving and not receiving anticoagulation may be rejected at the level of p=0.03. Thus, elderly patients received anticoagulation drugs significantly more often.

When assessing the most important causes of upper-GI bleeding, gastric erosions (26.23%), gastric ulcers (24.6%), and duodenal ulcers were most often diagnosed. Other pathologies occurred less frequently. In 27.86% of cases endoscopic examinations showed no abnormalities. Lower-GI bleeding was associated with the presence of colorectal diverticulae (7 patients), benign and malignant tumors, as well as hemorrhoids.

The average hemoglobin concentration on admission to the hospital was 9.7 g/dl, being comparable with control group values (9.9 g/dl). Table 4 presented laboratory results considering elderly patients with GI bleeding.

The mean hemoglobin level on admission to the hospital in case of patients receiving drugs affecting coagulation did not differ significantly, in comparison to the control group, and amounted to 9.61 g/dl (standard deviation - 2.48) vs 9.35 g/dl (standard deviation – 2.58). The statistical test value: $t = 0.409662$; dual critical area – $p = 0.6835$. The 95% confidence interval for the mean hemoglobin level in patients on anticoagulation, ranged between 8.68395 g/dl and 10.536 g/dl. The 95% confidence interval for the mean hemoglobin level in patients on anticoagulation, considering the control group, ranged between 8.4498 g/dl and 10.2502 g/dl.

Overall mortality due to gastrointestinal bleeding in case of elderly patients amounted to 20.24%, being statistically higher ($p<0.005$), as compared to the control group – 7.2%. In case of patients with upper-GI bleeding – 8/35 died; in case of lower-GI bleeding – 6/22 died; while in 3/26 the location of bleeding was not determined (autopsy was not performed). The direct cause of death was connected with GI bleeding complications: cardiorespiratory failure in 10 (58.8%) subjects and acute renal failure in 6 (35.3%) patients. In one case the initial cause of death was associated with general neoplastic dissemination leading towards GI bleeding. Mortality in elderly patients receiving coagulation was statistically similar ($p>0.05$), as compared to the younger patient group (6.7% (2/30) vs 14.7% (5/34), respectively).

| Table 4. Laboratory results in elderly patients with GI bleeding |
|-------------------|-------------------|-------------------|-------------------|
| **HGB 14-18 g/dl** | **Mean value on admission** | **Mean value at discharge** | **Median value on admission** | **Median value at discharge** |
| 9.7 | 10.58 | 9.9 | 10.2 |
| **PT 9.7-14.5 s** | 17.31 | 14.61 | 13 | 14.32 |
| **INR 0.8-1.2** | 1.47 | 1.18 | 1.1 | 1.12 |
| **INDEX 80-120%** | 81.90 | 82.64 | 88.3 | 85.55 |
| **APTT 25-40 s** | 31.83 | 34.52 | 29.9 | 33.6 |
| **TT 14-20 s** | 16.54 | 17.28 | 16.6 | 17.4 |
| **D-dimers 63.8-246.4 µg/l** | 88.66 | 271 | 56 | 271 |
| **Urea (20-45 mg/dl)** | 89.48 | 66.64 | 70.5 | 48 |
| **Creatinine 0.9-1.3 mg/dl** | 1.65 | 1.50 | 1.18 | 1.15 |
The mean hemoglobin level on admission, considering deceased patients on anticoagulation drugs amounted to 9.4 g/dl, while that of the control group – 6.2 g/dl.

Analysis of treatment

Red blood cell concentrate transfusions were performed in 36 (42.86%) patients. The diagnostic and therapeutic management in case of GI bleeding was based on Polish guidelines published in 2008 (6). The patient was admitted to the Clinical Department of Surgery after the physical examination and initially confirmed GI bleeding. Depending on the severity and dynamics of bleeding, laboratory results were collected at the ER or Department of Surgery. In case of hemorrhagic shock, resuscitation was initiated: colloid and crystalloid fluid supplementation, gastric tube placement, blood sampling, and rapidly transported to the Department of Surgery. Once there, depending on the patient’s condition, colloid and crystalloid fluid therapy was continued with full monitoring of vital signs. If symptoms indicated upper-GI bleeding the patient received intravenous pantoprazol at a dose of 8 mg/hour for a period of 72 hours, and remestyp 1-2 mg for 4 hours during 48 hours, depending on the clinical situation. Depending on the severity of bleeding immediate or delayed gastroscopy was performed. If bleeding from esophageal varices was observed, sclerotherapy and ligation using elastic bands was performed. Bleeding from active gastric or duodenal ulcers was subject to physiological saline and adrenaline or ethosclerol injections, depending on the endoscopic evaluation. Conservative treatment was continued using blood substitutes (red blood cell concentrate), and antifibrinolytic drugs were administered, including exacyl, cyclonamine, vitamin K, and calcium preparations. In selected cases intravenous somatotropin was administered. In case of bleeding after an overdose of dicoumarol derivatives freshly frozen plasma and vitamin K were administered until normal INR values were obtained. In case of patients with gastrointestinal bleeding INR values equaling 9 were observed. In each case of lower-GI bleeding conservative treatment was initiated. Until final diagnosis was established the following management was implemented: proton pump inhibitors at a dose of 8 mg/hour for three days, remestyp 1-2 mg for 4 hours, transfusions of red blood cell concentrates, cyclonamine, exacyl, and vitamin K. When upper-GI bleeding was excluded proton pump inhibitor therapy and remestyp were discontinued. In case of all patients with lower-GI bleeding it was possible to control bleeding by means of conservative therapy. In case of unsuccessful upper GI-bleeding therapy, both endoscopic and pharmacological, the decision to perform surgery was undertaken (ulcer underpinning or excision).

In case of our study group only one patient with lower-GI bleeding was subject to surgical intervention (laparotomy and sigmoid stomy formation). In case of the control group none of the patients’ required emergency surgery, due to GI bleeding.

DISCUSSION

Gastrointestinal bleeding in patients aged 85 years and older is a common cause of hospitalization. The above-mentioned poses a significant clinical problem, due to the occurrence of complications and high mortality, in comparison to younger control group patients. The analysis of our own experience leads to essential observations. The comparison of younger patients with the elderly, following GI bleeding indicated the need to notice the differences in the hemodynamic compensation of these patients. Older patients were hospitalized with higher morphological values which was associated with chronic bleeding leading towards hemodynamic deterioration, impeding everyday functioning. Therefore, our study demonstrated that mean hemoglobin values on admission, considering patients receiving antithrombotic and antiplatelet drugs amounted to 9.4 g/dl, in comparison to the control group-6.2 g/dl.

It is estimated that the overall incidence of upper gastrointestinal bleeding has a decreasing tendency (112.5 during the period between 1983 and 1985 to 89.8 per 100.000 / year during the period between 2002 and 2004; which corresponds to a 35.5% reduction), but does not concern patients >70 years (7). According to English Authors, despite the decline in the incidence of peptic ulcer disease during a period of 10 years, one observed an increase in the number of hospital admissions considering elderly patients, due to bleeding, especially
Gastrointestinal bleeding in patients aged 85 years and older

Mortality declined in all age groups, except for elderly women with duodenal ulcers. At the same time one observed an increase (460%) in therapy using low doses of aspirin, oral antithrombotic drugs (200%), and non-steroid anti-inflammatory medication (13%) (8).

Considering the American society hospitalization of patients aged 65 years and more, due to GI bleeding during the period between 1989 and 1999 amounted to 6.8/1000 person-year. Each year more than 1% of hospitalizations concerned patients above the age of 80 years, due to GI bleeding (9).

Prospective multicenter French studies conducted amongst 359 patients above the age of 85 years diagnosed with upper-GI bleeding, in comparison to the 558 patients aged between 65 and 74 years, demonstrated that peptic ulcer disease is the most common cause of upper-GI bleeding in the elderly, as compared to younger control group patients (62.5% vs 49.5%, respectively (p<0.001)) (10). Similar results were observed in our study. Erosions and gastric and duodenal ulcers were diagnosed in 50.83% of the elderly patients. The Authors of the study suggested that this dependency does not apply to patients taking non-steroid anti-inflammatory drugs (NSAID). Our study showed upper-GI bleeding in case of patients on anticoagulation, being diagnosed in 18/30 subjects (60%).

Amongst factors that increase the risk of bleeding, anticoagulation and ASA therapy, as well as NSAID and ASA therapy seem important in elderly patients. The physician ordering drugs to the patient should take into account the risk of bleeding in case of anticoagulation therapy (11).

The American consensus and results of the Polish Working Group concerning the principles of prevention of gastrointestinal complications during antiplatelet therapy recommends the prophylactic use of proton pump inhibitors in case of suspicion of peptic ulcer disease, previous history of bleeding, dual antiplatelet therapy, and combined treatment using antiplatelets and anticoagulants (12, 13). Study results suggest that proton pump inhibitors are indicated in elderly patients, which require the administration of NSAIDs or aspirin for a short period (14, 15). The vast majority of study group patients did not receive the recommended proton pump inhibitors, as a result of incorrect and insufficient information or negligence to comply with the recommendations.

The use of non-steroid anti-inflammatory drugs is strongly correlated with the occurrence of bleeding in case of patients diagnosed with colorectal diverticulae (16). In our study, 6/7 cases (85.7%) of diverticular bleeding was observed in elderly patients on anticoagulation therapy. Patient mortality in the elderly, due to GI bleeding amounted to 10.3% vs 8.4% in case of younger patients, according to French studies (10). Our study results demonstrated elderly mortality amounting to 20.24% vs 7.2%, as compared to the control group. The difference was statistically significant, being evidence of the life-threatening condition in case of elderly patients with GI bleeding. In conclusion, every fifth patient died in the group 85+, and every fifteenth in the younger group. Red blood cell concentrate transfusions were required in 42.86% of patients, as compared to French study data –73% (17).

Amongst the elderly study patients with gastrointestinal bleeding, 15.48% were diagnosed with diabetes mellitus. Other Polish investigations concerning GI bleeding demonstrated diabetes mellitus in 20.80% of patients (18), while mortality amounted to 18.47%. In our study mortality amounted to 2.38% (2 patients).

According to current recommendations all patients with endoscopic features of recurrent bleeding should undergo endoscopic hemostasis (19). Attempts were made to evaluate the efficacy of endoscopic hemostasis in case of peptic ulcer bleeding considering elderly patients (>80 years). Results demonstrate that endoscopy is as simple to perform, safe and effective, as in younger patients. Old age is not a risk factor of recurrent bleeding and death after endoscopic hemostasis (15, 20, 21).

Treatment of elderly patients, due to peptic ulcer disease and GI bleeding does not differ from that in younger people. However, elderly patients require a specific approach, which takes into account changes associated with age, functioning, and short-term mortality. One should consider such issues as type of diet, medication used, antithrombotic therapy, and endoscopy results (15, 22).

Very few clinical studies focus on the oldest patient age group (>85 years). There are also
no specific recommendations considering management of GI bleeding in the above-mentioned group. The coexistence of many diseases is also a significant problem, especially in the elderly. The so-called “domino effect” implies a number of bleeding complications, which in younger patients are not so intense. The cardiovascular disturbances presented in the study required the administration of anticoagulants and at the same time gave rise to complications, which were a direct threat to the patients’ life. Thus, the assessment of coexisting diseases is very important because of the possibility of complications influencing the patients’ future life.

One should recommend the use of proton pump inhibitors during anticoagulation therapy, which might reduce the risk of upper-GI bleeding.

CONCLUSIONS

1. Gastrointestinal bleeding treatment results in elderly patients (>85 years) are burdened with higher mortality. Patient evaluation indicates the need for diverse diagnostic and therapeutic methods, considering the many coexisting diseases characteristic of patients aged 85 years and older, in order to increase the chances for further life.

2. The problem of aging is an epidemiological phenomenon and GI bleeding as a growing problem will be particularly difficult to solve in everyday clinical practice.

REFERENCES

5. Union of European Medical Specialists - Geriatric Section. Geriatric Medicine (accepted Malta, 03/05/08; enhanced in Copenhagen 06/09/08)
18. Buksa J, Grzeszczak W, Frączak T: Czy obecność cukrzycy wpływa na występowanie krwawień z prze-
wodu pokarmowego i rokowanie w ich przebiegu. 

Received: 12.11.2011 r.  
Adress correspondence: 25-736 Kielce, ul. Grunwaldzka 45