8-22-2008

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Abstract

Purpose: To determine the risk factors contributing to and etiologies of gastrointestinal bleeding in an elderly patient population seen by Southwest Gastroenterology (SWGA) providers.

Methods: This study reviews charts of patients with GI bleeding from documented sources between 1/1999 and 3/2006. The cases are gathered retrospectively from the clinical records of SWGA, a 12-person private, single specialty gastroenterology group serving community hospitals. Etiology and risk factors for GI hemorrhages are recorded in an elderly population, defined as patients age 55 and older.

Results: GI hemorrhages are identified in 105 patients. The majority (83, 79%) of hemorrhages are upper GI bleeds (UGIB) comparing to 22 (21%) lower GI bleeds (LGIB). In the UGIB group, the most common etiology of bleed is gastric ulcer (29%). We also found 72% of UGIB patients on prescribed anticoagulation medications, including anti-platelet agents or non-steroidal anti-inflammatory drugs (NSAIDs). 20% of these patients are also positive for *H. Pylori*. Thirty patients in the UGIB group smoke or consume alcohol heavily (consuming more than 3 drinks per day for men and two drinks per day for women) while 2 patients smoke or consume alcohol in the LGIB group. Previous bleeds are common in both groups with 39 (41%) in UGIB and 9 (47%) in LGIB. Co-morbidity is the most common risk factor with 20 (91%) in LGIB and 73 (88%) in UGIB. In the peptic ulcer disease (PUD) bleeds, the majority (77%) are taking NSAIDs, while in the non-PUD bleeds, only 38% are currently on NSAIDs. Overall, there are 2 mortalities resulting from cardiovascular complications of GI bleeding.

Conclusion:

The etiologies of GI bleeds in this population are comparable to other studies in the literature. The ratio of UGIB to LGIB in this elderly population is also similar to that reported in the literature. The risk factors shown to be most correlated to bleeding are co-morbidities, previous episodes of bleeding, anticoagulation, NSAID use, smoking and alcohol use. NSAID use is significant in PUD bleed patients. This study reinforces that increased knowledge of etiology, incidence and contributing factors of GI bleeding are necessary for physicians to efficiently treat GI bleeds in the elderly population.

Introduction:

Gastrointestinal bleeding (GI) encompasses a broad array of clinical scenarios. GI bleeding can vary from occult to massive hemorrhage and lead to increased morbidity and mortality. In the elderly, GI bleeding is associated with higher rates of morbidity and mortality than in the young.[1] The increased morbidity and mortality in the elderly can be linked to a higher incidence of pre-existing co-morbid conditions which may complicate the natural course of a GI hemorrhage.

GI bleeding results in over 300,000 hospitalizations annually in the United States.[2] The expanding elderly population and the current incidence of GI diseases in this population are significant issues for the future of healthcare.[3] The aging process, co-morbid conditions, multiple drug therapies, smoking, alcohol consumption, and *H. Pylori* are all established risk factors in GI bleeding in the elderly.[1]

Although there have been major technical advances in the management of acute gastrointestinal hemorrhage, in the elderly it remains a serious and at times fatal clinical problem. Ninety percent of deaths from acute gastrointestinal bleeding occur in patients over the age of 65.[4] Despite the salient progress in management of acute GI bleeding, the mortality rate from upper GI bleed has not changed in past several decades, probably due to the incidence of acute GI bleeding in the elderly in the last 30 years.[4] It has been proposed that the selective increase in GI bleeding in the elderly could be related to widespread NSAID use in the older age groups.[4,5] There also tends to be a delay in diagnosis of GI bleeding in the elderly because of atypical symptoms and signs and the unwillingness of physicians to more urgently investigate older patients.[4]

Research in the area of GI bleeding is hampered by a significant lack of prospective and randomized, controlled studies or any data based on scrupulous meta-analysis.[6] Identifying the different GI bleeding risk factors that are more common in the elderly will aid in diagnosis as well as prevention of possibly fatal GI bleeds. The elderly (60 and older) are surprisingly susceptible to bleeds as they compose 44.5% of the upper GI bleeding population and 75% of the deaths.[7] About 1 in 8 Americans was elderly in 1994, but about 1 in 5 will be elderly by the year 2030.[3] The rise in the elderly population combined with the increased incidence in elderly GI bleeds demonstrates the importance of new research in this field. This retrospective study will aim to find significant etiologies and risk factors specific to elderly UGIB and LGIB. We will also look at concomitant use of NSAID use in elderly PUD vs. non-PUD populations. Lastly, we will compare our series with respect to etiologies and outcomes to other similar series in elderly populations.

Methods:

This retrospective study was performed using the clinical records of SWGA from 1/1999 to 3/2006 with documented sources of bleeding. The charts were gathered using diagnostic codes that would focus on GI bleeding diagnoses with endogastroduodenoscopy (EGD), small bowel capsule study or colonoscopy in patients who are age 55 and older. Excel spreadsheets were used to record the data from the charts using a numbered coding system. Etiologies of GI bleeds and risk were recorded. Risk factors recorded include age, gender, *H. Pylori* status, medications, previous GI bleeds, co-morbid conditions, tobacco use, and alcohol use. Alcohol use and tobacco use were only considered if they were concomitant with the GI bleed episode. More than 3 drinks

per day for male and 2 for female were considered risk factors for alcohol use. Only chart numbers were used to protect confidentiality of the patients. Medications were divided into aspirin, anti-coagulants (warfarin, heparin, enoxaparin), NSAIDs, COX2 inhibitors, and other anti-platelet drugs. Co-morbid conditions were categorized into cardiovascular, pulmonary, endocrine, neoplasia, renal, neurologic and autoimmune diseases. Patients without identified source of bleed were excluded from the study. Once the data were collected, the etiologies of bleeding were compared with similar studies from the literature. We also identified the most common risk factors for UGIB and LGIB. HIPAA regulations were followed with the only identifier being the medical record number to exclude repeat entries and allow further viewing of the charts.

Statistical methods:

We subjected our primary research questions to power analysis and determined that we required 100 patients. We attempted to find statistical significance in the risk factors of UGIB vs. LGIB, PUD vs. non-PUD and also similarities between this study and others in terms of different etiologies of bleeds. The relationship between peptic ulcer disease and NSAID use was analyzed using the chi-square distribution. The Bonferroni inequality was used to correct for multiple comparisons.

Results:

Patient Profile and Risk Factors

Table 1
Etiologies of UGIB

Etiologies	Number	Percent
Esophageal ulcer	3	4%
Mallory-Weiss tear	1	1%
Cameron's ulcer	2	2%
Gastric ulcer	24	29%
Duodenal ulcer	14	17%
Erosive gastritis	22	27%
Erosive esophagitis	7	8%
Radiation induced	1	1%
AVM	4	5%
Varices	4	5%
Pyloric channel	1	1%

After 105 patients' data were collected, 83 (79%) were found to be UGIB and 22 (21%) were LGIB. The mean age overall was 73. Mean ages were 72 and 77 for UGIB and LGIB, respectively. The range was 55 to 92. Forty-nine (47%) were male and 56 (53%) were female. Sixty (72%) of the UGIB were on an NSAID (including aspirin), anticoagulation or antiplatelet medication. Twenty percent of UGIB were positive for *H. Pylori*. Thirty patients were found to smoke or drink alcohol in UGIB while 2 patients were found to smoke or drink in the LGIB. A history of previous bleeds was common in

both groups with 39 (41%) in UGIB and 9 (47%) in LGIB. Table 3 demonstrates the distribution of comorbid conditions among patients. Co-morbidity was the most prevalent risk factor with 20 (91%) in LGIB and 73 (88%) in UGIB. The most common comorbid disease was cardiovascular followed by endocrine. Eight patients had liver disease in the UGIB group. Only 11% of patients did not demonstrate any comorbid disease.

In table 1, 24 (29%) of the UGIB were caused by gastric ulcer which was the most common etiology. Erosive gastritis was the next most common with 22 patients (27%). Only 4 patients in this elderly population were diagnosed with esophageal varices all of whom had liver disease. Duodenal ulcer was also frequent with 14 (17%) of the total UGIB. Other less common etiologies were AVMs, esophageal ulcers, esophagitis, Cameron's ulcers, radiation induced esophagitis and Mallory-Weiss tears.

Table 2
NSAID use in PUD vs. Non-PUD

	Peptic Ulcer Diagnosis	
NSAID Use	Yes	No
Yes	47	17
No	14	27
Total	61	44

In table 2, 73% (47/64) of NSAID users had PUD as the etiology of their bleed while 34% (14/41) of non-NSAID users had this etiology (chi-square = 15.85, $p < 0.0001$). Twelve of 14 patients with non-NSAID users tested positive for HP. Twelve of fourteen patients who tested positive for H. Pylori were found to have a PUD bleed. Fifty-seven of 64 (89%) PUD patients had a comorbid condition. Of those patients, 47 (82%) were taking NSAIDs. Twenty (24%) of the UGIB patients were transfused while 8 (36%) of LGIB were transfused. Nineteen patients in UGIB required endoscopic intervention (sclerotherapy, cauterization, or banding). Overall, there were 2 mortalities in longstanding ICU patients from cardiovascular complications of GI bleeds. GI bleed was not the cause of the initial presentation of the admitted patient.

Table 3
Comorbid disease by category

Comorbid Disease	Number of patients	Percent of patients
Metastatic cancer	2	2%
Cardiovascular	48	46%
Pulmonary	18	17%
Autoimmune	9	9%
Neurologic	14	13%
Primary Cancer	5	5%
Hepatic	14**	0%
Endocrine	33	31%
Renal	10	10%
None	12	11%

*Many patients had multiple comorbid disease and these were counted individually. Therefore the total number with comorbid disease is higher than the total number of patients in the study and the percent of patients is greater.
**8 UGIB and 6 LGIB

Discussion:

Table 4
Frequency (%) of causes of UGIB in Published Series

	Antler age >55 n=50	Cooper age >80 N=103	Segal age >60 n= 100	Sugawa 15-88 n=462	Our series 55-92 n=83
Gastric ulcer	29	20	35	21	29
Duodenal ulcer	21	20	38	15	17
Gastritis	17	13	7	25	27
Esophagitis	14	14	11	3	8
Esophageal ulcer	0	4	NA	NA	4
Varices	12	2	11	18	5
Mallory-Weiss tear	2	2	3	11	1
Other/unknown	4	25	0	7	9

In this study, we took a closer look at the risk factors and etiologies specifically in an elderly population treated in community hospitals. Our study is similar to other community hospital studies in that peptic ulcer disease is the most frequent cause for GI bleeding. [8-10] Duodenal ulcer in our study were not as frequent as in other studies.[11] Table

4 compares the etiologies found in our series versus etiologies of similar studies. When revised to other similar series, as table 4 demonstrates, the etiologies categorized as PUD bleeds (gastritis, gastric and duodenal ulcer disease) are similar to our series. This study did not generate enough LGIB patients for significant comparison of etiology or risk factors, however, we did investigate the ratio of UGIB to LGIB. The ratio in this series was 4:1 which is not markedly different than previous studies approximating the ratio at 5:1.[12]

In our elderly population, esophageal varices were not a common cause of UGIB. Variceal hemorrhage has historically a higher mortality rate in the elderly.[13] The low incidence of variceal bleeding in this series correlates with the low mortality rate (2%). A low incidence of esophageal varices correlates to small number of patients with liver disease in our group.

We found that NSAID use continues to be a significant risk factor for peptic ulcer bleeds in the elderly. The etiology of UGIB has changed during the last 15 years probably due to significantly increased use of NSAIDs in the elderly.[14] Our series demonstrated that patients with PUD bleeds are significantly more likely to be consuming NSAIDs than non-PUD bleed patients. Historically, NSAID use in patients (with bleeding PUD) is higher than in control subjects, irrespective of HP status and type of controls.[15-17] The high frequency of some co-morbid conditions such as rheumatoid arthritis, musculoskeletal pain, mechanical heart valves, and atrial fibrillation in the elderly requires chronic NSAIDs, aspirin and/or anticoagulation.[18-19] Our study showed that 89% of PUD bleeds had a comorbid condition and 82% of those patients with PUD bleed and comorbid condition were taking NSAIDs. Ongoing use of NSAIDs in PUD bleeds has been shown to increase the mortality in the elderly.[13,20,21] Unlike younger patients, the presentation of peptic disease in the elderly population is subtle and atypical, and thus leads to a delay of diagnosis.[4] Due to comorbidities and advanced age, PUD may results in increased complications, morbidity and mortality.[22,23]

The history of previous GI bleed was also very high in both UGIB and LGIB (41% and 47%, respectively). The possibility of closer monitoring and risk factor reduction of elderly patients with a history of GI bleed may reduce these recurrent bleeds.[24] The increased mortality due to UGIB in the elderly argues for a lower threshold to proceed with EGD in this population.[13,25] Endoscopy is well-tolerated and low-risk in the elderly.[23]

We conclude that in the elderly population, NSAIDs continue to be a major cause of UGIB, specifically PUD bleeding. Also, comorbid conditions and history of previous bleed are very common risk factors in elderly GI bleed populations. Considering the expanding elderly population, increased knowledge of etiology, incidence and contributing factors will be necessary for physicians to efficiently treat this group of patients.[3]

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