*Turk J Gastroenterol 2007; 18 (3): 172-176*

# Effects of seasonal variations on acute upper gastrointestinal bleeding and its etiology

## Akut üst gastrointestinal sistem kanamalarının etiyolojisi ve mevsimsel değişikliklerin etkisi

Orhan SEZGİN[1], Engin ALTINTAŞ[1], Anıl TOMBAK[2]

*Departments of [1]Gastroenterology, and [2]Internal Medicine, Mersin University, School of Medicine, Mersin*

***Background/aims:*** *The aim of this study was to determine the causes and risk factors of acute upper gastrointestinal bleeding, a frequently encountered medical emergency, and to determine any relation in its frequency according to month or season.* ***Methods:*** *We evaluated the records of 336 patients who presented to our hospital with acute upper gastrointestinal bleeding between October 2001 and June 2005. Three hundred and sixteen patients had endoscopy within 12 – 24 hours of admission. Causes of bleeding, risk factors, drug usage and admission dates were documented, any relations with season or month of occurrence were determined and statistical analyses were made.* ***Results:*** *Two hundred and thirty-seven patients were male (70.5%) and 99 patients female (29.5%), with an average age of 57.7 years. The most frequent endoscopic findings were peptic ulcer (48.2%) and esophageal (or gastric) variceal bleeding (22%) in all seasons and months except September. Non-steroidal anti-inflammatory drugs (NSAIDs) were the most common risk factor (44.3%) and the risk of acute gastrointestinal bleedings was high in all seasons and months except October. March (14%) and spring (33.6%) were the month/season when bleeding was the most frequent. There was a gradual increase in the number of patients admitted with bleeding from autumn to spring. Furthermore, NSAID usage, which was the most frequent risk factor, showed a monthly fluctuation similar to the fluctuation in the total number of bleeding patients.* ***Conclusion:*** *In the province of Mersin, Turkey, the most common cause of acute upper gastrointestinal bleeding is peptic ulcer, and NSAID usage is the most frequent etiological risk factor. Although statistically insignificant, there were seasonal and monthly fluctuations in upper gastrointestinal bleedings in Mersin, where the Mediterranean climate is predominant. Bleeding was the most frequent in March and spring and the least frequent in September and autumn. Bleedings showed a seasonal fluctuation similar to that of NSAID usage, which was the most frequent risk factor. Therefore, if unnecessary NSAID usage can be prevented, it may be possible to protect most people against this emergency condition, which can be lethal, in all months and seasons.*

**Key words:** Acute upper gastrointestinal bleeding, seasonal variations, etiologies, risk factors

***Amaç:*** *Bu çalışmanın amacı, oldukça sık rastlanan, tıbbi acil bir durum olan akut üst gastrointestinal sistem kanamalarının nedenlerinin, risk faktörlerinin, aylarla ve mevsimlerle olan ilişkilerinin saptanmasıdır.* ***Yöntem:*** *Ekim - 2001 ile Haziran - 2005 tarihleri arasında, akut üst gastrointestinal sistem kanaması ile hastanemize başvuran toplam 336 hastayı değerlendirdik. 20 hastanın dışında tüm hastaların 12 – 24 saat içinde endoskopileri yapıldı. Kanama nedenleri, risk faktörleri, ilaç kullanımları, başvuru tarihleri kaydedildi, mevsim ve aylarla olan ilişkiler araştırıldı ve istatistiksel analizler yapıldı.* ***Bulgular:*** *Hastaların 237'si erkek (%70,5) ve 99'u kadın (%29,5) olup, yaş ortalaması 57,7 idi. Endoskopisi yapılan 316 hastanın eylül ayı hariç, tüm aylarda ve tüm mevsimlerde en sık endoskopik bulgusu, sırayla, peptik ülser hastalığı (%48,2) ve özofagogastrik varis kanaması (%22) idi. Non-steroid anti-inflamatuvar ilaçlar, en sık risk faktörü olarak bulundu (%44,3) ve aylara ve mevsimlere göre risk faktörleri kıyaslandığında da, ekim ayı haricindeki tüm aylarda ve tüm mevsimlerde en sık rastlanan risk faktörü oldu. Aylara ve mevsimlere göre olan kıyaslamada, mart (%14) ve ilkbahar (%33,6), kanamanın en sık görüldüğü tarihler oldu. Çalışmada, kanayan hasta sayısında sonbahardan ilkbahara doğru derece derece olan bir artış saptandı. Ayrıca, en sık risk faktörü olan non-steroid anti-inflamatuar kullanımı da aylık bir dalgalanma gösterdi ve bu dalgalanma, toplam kanayan hasta sayısı dağılımıyla benzer olarak bulundu.* ***Sonuç:*** *Bölgemizde, akut üst gastrointestinal sistem kanamasının en sık sebebi peptik ülser hastalığı olup, non-steroid anti-inflamatuar ilaç kullanımı en sık rastlanan etiyolojik risk faktörüdür. Bu çalışmaya göre, istatistiksel bir anlam saptanmasa da, Akdeniz ikliminin hüküm sürdüğü yöremizde, üst gastrointestinal sistem kanamaları, mevsimlere ve aylara göre bir dalgalanma gösteriyor. Buna göre, kanamalar, mart ve ilkbaharda en fazla, sonbahar ve eylülde en az görülmektedir. Kanamalar, en sık risk faktörü olan non-steroid anti-inflamatuar ilaç kullanımı ile benzer bir mevsimsel dalgalanma göstermiştir, böylece, gereksiz non-steroid anti-inflamatuar ilaç kullanımı engellenebilirse, her ayda ve her mevsimde, çoğu insanı, ölümcül olabilecek bu acil durumdan koruyabiliriz.*

**Anahtar kelimeler:** Akut üst gastrointestinal kanama, mevsimsel değişim, etiyoloji, risk faktörleri

**Address for correspondence:** Orhan SEZGİN
Department of Gastroenterology, Mersin University, School of Medicine, Mersin, Turkey
Phone: +90 324 337 43 00-1140
E-mail: sezginorhan@ttnet.net.tr

**Manuscript received:** 21.12.2006 **Accepted:** 17.05.2007

## INTRODUCTION

Acute upper gastrointestinal bleeding (UGB) is a common medical emergency (1, 2). The incidence of UGB ranges from 50 – 100 per 100,000 people per year and males are two times more likely to be affected (1). It is mainly caused by peptic ulcer (1, 2). Some studies have shown a seasonal fluctuation in the incidence of UGB (2-13), but this seasonal pattern remains controversial. In fact, while some studies have revealed an increased incidence in winter and a decreased incidence in summer, others have shown no seasonal influence (2, 3). It is thought that the fluctuating incidence of UGB results from environmental factors such as temperature, nutrition, or increased intake of salicylates or nonsteroidal anti-inflammatory drugs (NSAIDs) in winter (3). The mortality from UGB is correlated with age, presence and severity of co-morbid diseases and causes of bleeding (1). The most important issue is changes in treatment according to the etiological factor.

Because UGB is a medical emergency, health personnel who treat UGB patients must know the period(s) when this condition frequently appears and what to do. They should be offered training about the patient characteristics, and hospitals should be ready to provide care for these patients. Hence, we attempted to determine the characteristics of the patients who presented to our hospital with UGB and the seasonal fluctuations in the incidence of the disease.

## MATERIALS and METHODS

We reviewed the records of 336 patients living in the province of Mersin and in the neighboring area who were admitted to our hospital because of UGB from October 2001 to June 2005. The patients underwent urgent endoscopies within the first 12 - 24 hours of admission. Twenty patients were not subjected to endoscopy for various reasons (some due to shock, others refused). Characteristics of the patients, use of drugs such as NSAIDs, cause(s), other risk factors, other illnesses and admission dates were all documented. The 12 months of the year were divided into four seasons as winter (December, January, February), spring (March, April, May), summer (June, July, August) and autumn (September, October, November). Seasonal and monthly differences were evaluated.

### Statistical Analyses

The relations between gender, seasons, months, etiological factors, NSAID usage, endoscopic findings and UGBs were analyzed with chi-square test. Monthly and seasonal variations in the number of patients were evaluated with one-way ANOVA. SPSS (Statistical Package for Social Sciences) v.11.5.1 was used for statistical analyses. A value of $p<0.05$ was considered significant.

## RESULTS

Three hundred and thirty-six patients were included in the study. Two hundred and thirty seven patients were male (70.5%) and 99 patients female (29.5%). Ages ranged between 19 and 98 years with a mean of 57.7 years. Only cases admitted in the last three months of 2001 were included in the study, which accounts for the seemingly low percentage of admissions in that year (2.1%). The percentages of the patients admitted in 2002, 2003, 2004 and 2005 were 21.7%, 25%, 30.7% and 20.5%, respectively.

With the exception of 20 patients (6%), all underwent urgent endoscopy. Peptic ulcer was the most common endoscopic finding in all months except September and in all seasons, with a ratio of 48.2% (162 patients) in both males and females (Figure 1a, 1b), and the second most common cause was variceal bleeding, with a ratio of 22% (74 patients), which showed a pattern similar to peptic ulcer. Other frequent conditions were pangastritis (5.7%), malignancies (carcinoma or lymphoma infiltration) (3.9%) and erosive gastritis / bulbitis (3.6%). NSAIDs were the most frequent risk factor (44.3%). The risk factors for UGB are listed in Table 1. Distribution of the etiological factors by month and season revealed that NSAID use was the most frequent etiological factor in all months except October and in all seasons (Figure 2a, 2b). However, there was no significant difference in

**Table 1.** Distribution of bleeding patients according to risk factors

| Risk Factor | Frequency (n) | Percent (%) |
|---|---|---|
| Unknown | 67 | 19.9 |
| NSAID | 149 | 44.3 |
| OAD | 15 | 4.5 |
| PHT | 75 | 22.3 |
| Stress | 19 | 5.7 |
| Others | 11 | 3.3 |
| Total | 336 | 100.0 |

(Risk factors: NSAID: Nonsteroidal anti-inflammatory drug, OAD: Oral anticoagulant drugs, PHT: Portal hypertension, Others include: Mallory-Weiss syndrome, corrosives, Dieulafoy's lesion, hemophilia, *Helicobacter pylori*, carcinoma - lymphoma, bezoar, polyp, visible vessel, other drugs)

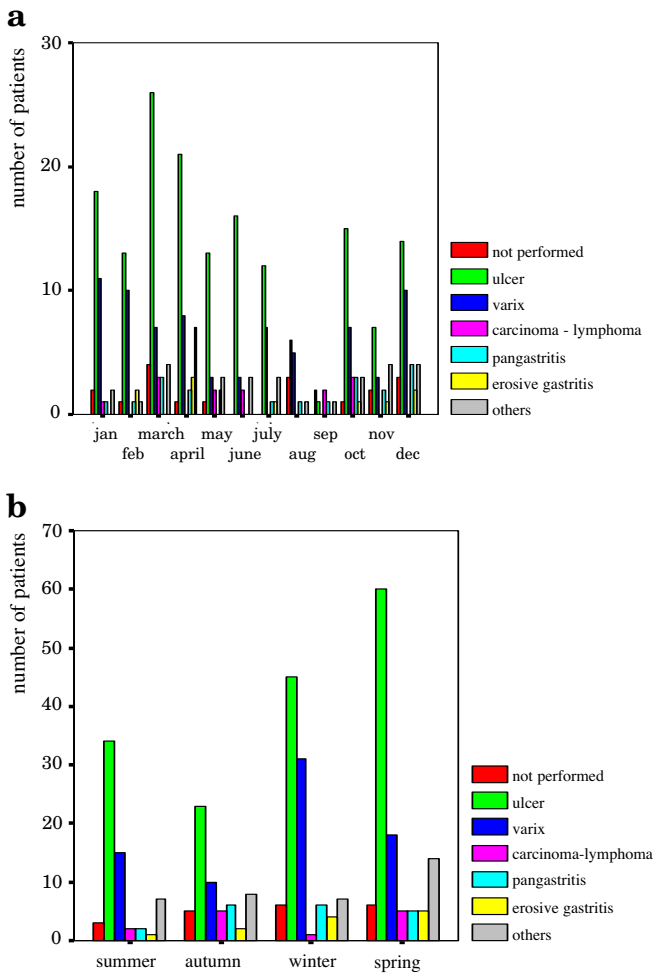


**Figure 1. a)** Distribution of endoscopic diagnoses by month and **b)** Distribution of endoscopic diagnoses by season

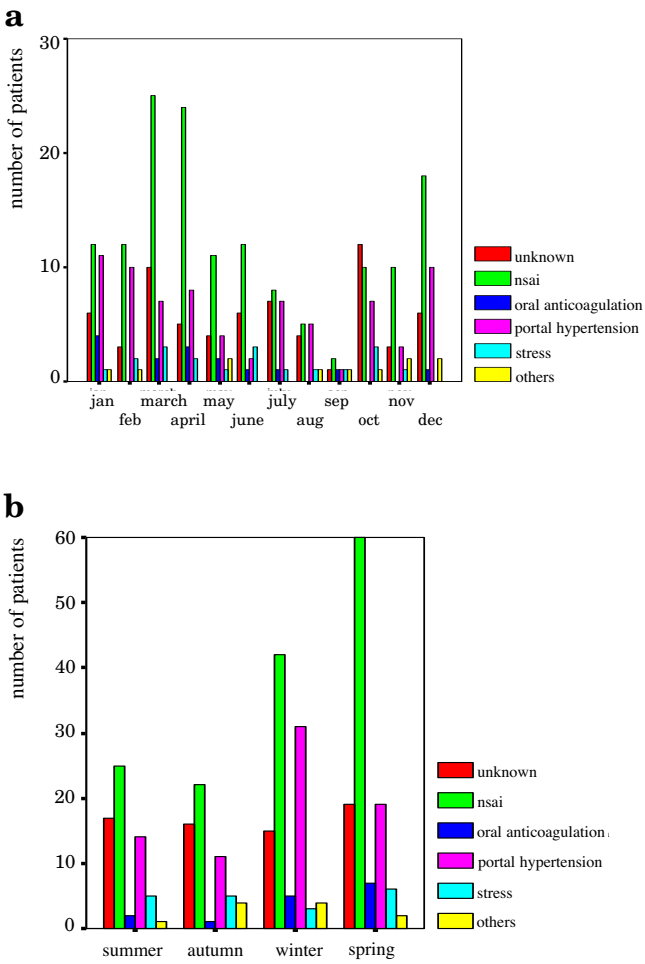


**Figure 2. a)** Distribution of etiological factors by month and **b)** Distribution of etiological factors by season

the frequency of NSAID use according to month and season.

Upper gastrointestinal bleedings were the most common in March (14%) and spring (33.6%). UGBs were the most common in spring and winter in both genders, while autumn was the third most common season in males, and fourth in females (Figure 3). We determined a gradual increase in the number of patients from autumn to spring, with a peak in spring (Figure 4a, 4b). Although not statistically significant, the use of NSAIDs, the most frequent risk factor, showed a monthly fluctuation and peaked in March (16.8%) (Figure 4c). The total number of bleeding patients showed a similar fluctuation to that of NSAIDs usage (Figure 4b).

## DISCUSSION

Acute UGB is a frequent medical emergency. Peptic ulcer was the first etiological cause and NSA-

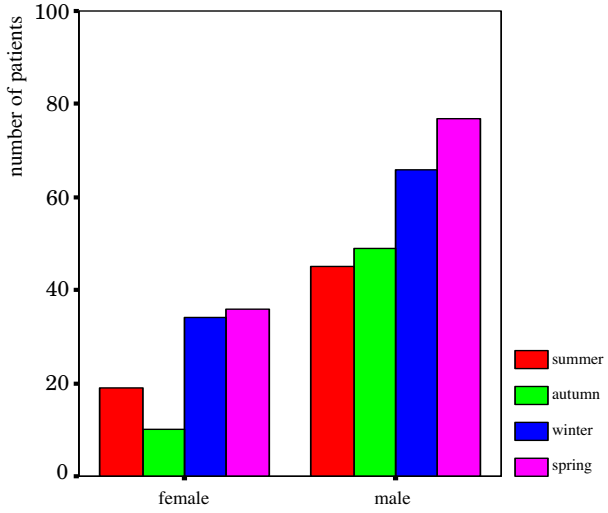


**Figure 3.** Distribution of bleeding patients by gender and season

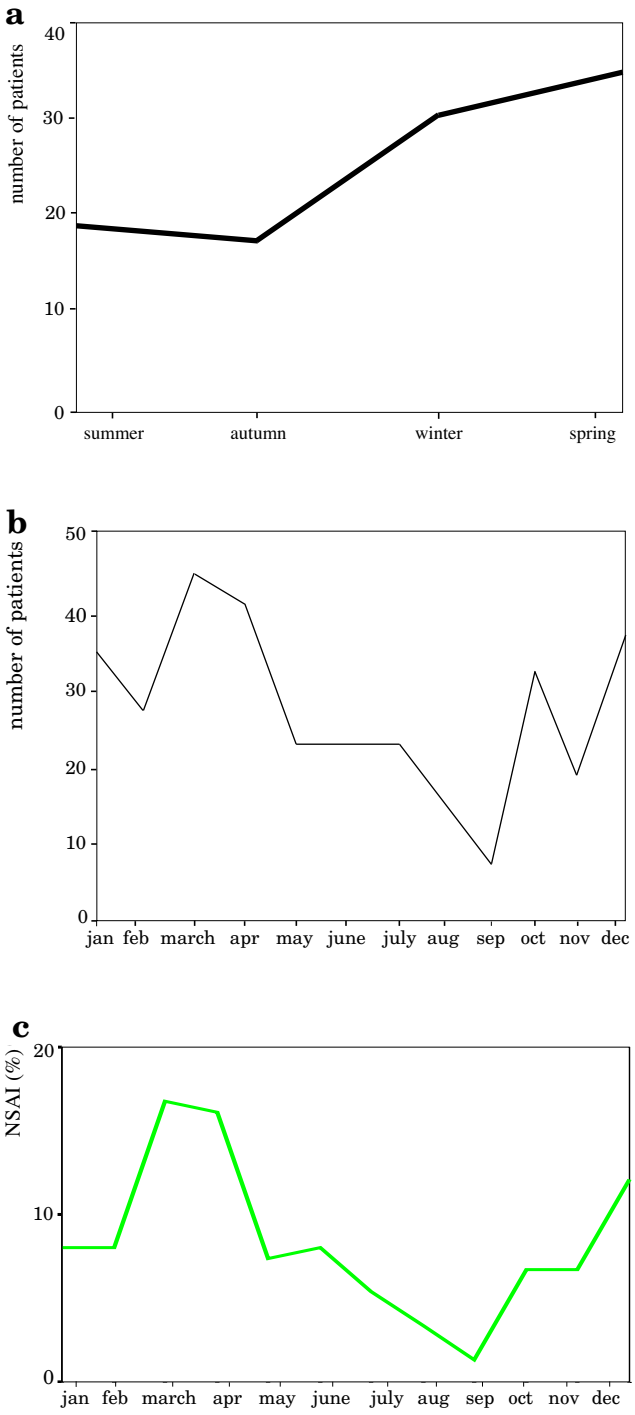


**Figure 4. a)** Variations in the number of bleeding patients according to season, **b)** Variations in the number of bleeding patients according to month, **c)** Relative variations (%) in the number of patients on NSAID according to month (note the similarity between Figures 4b and 4c)

IDs were the most common risk factor for UGB in this study, consistent with the literature. We found that UGB occurrence was the highest in spring (33.6%) and the lowest in autumn (17.6%). The ratio of bleeding was the lowest in September (2.1%) and there was a peak in March (14%). In the literature, seasonal pattern of UGB remains controversial; some studies revealed that peptic ulcer was more frequent in spring (2) as in the present study, and in autumn (8, 10, 11) and winter (3, 4, 7, 13), which is not consistent with the results of the present study. This seasonal and monthly fluctuation may be associated with environmental factors such as climate, nutrition and increased intake of salicylates or NSAIDs in winter. Since the present study included the patients living only in the province of Mersin, where the Mediterranean climate is predominant - rainy but not very cold in winter, hot and humid in summer and usually rainy in spring and autumn with mild seasonal variations - we could not explain the seasonal influences on UGB. No geographic influences on the seasonal fluctuation in UGBs could be determined in other studies as well (14). It is also unclear whether climatic factors influence UGBs.

In this study, there was a similar monthly and seasonal fluctuation in the number of bleeding patients and NSAID intake; that is, peptic ulcer was the most common endoscopic finding of UGB, which was the highest in March and the lowest in September, and NSAID intake was the major risk factor for UGB and was most frequent in March and the lowest in September. Although this relation was statistically insignificant in this study, we can clearly say that NSAIDs were the most frequent cause of peptic ulcer and UGB.

In conclusion, although statistically insignificant, a seasonal and monthly fluctuation in UGBs was determined. Many studies have failed to determine the causes for these fluctuations. Peptic ulcer is the most frequent cause and NSAID use is the most frequent risk factor in our country according to the results of the present study. Prevention of unnecessary NSAID usage could help to protect most people against UGB, likely to be lethal, in all months and seasons.

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