AUCTORES
Globalize your Research

Archives of Medical Case Reports and Case Study

Daniela Falcão and João Cruz *

Open Access

Research Article

Weekend Hospitalization in Nonvariceal Upper Gastrointestinal Bleeding – an Additional Risk?

Daniela Falcão [1*], João Cruz [2*], Joana Silva [1], Professora Doutora Isabel Pedroto [1,2]

[1] Gastroenterology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal.

[2] Instituto de Ciências Biomédicas Abel Salazar, Centro Hospitalar Universitário do Porto, Porto, Portugal.

***Corresponding Author: Daniela Falcão**, Gastroenterology Department, Centro Hospitalar Universitário do Porto, Porto, Portugal, and **João Cruz**, Instituto de Ciências Biomédicas Abel Salazar, Centro Hospitalar Universitário do Porto, Porto, Portugal.

Received date: May 02, 2022; Accepted date: June 06, 2022; Published date: June 10, 2022

Citation: Daniela Falcão, João Cruz, Joana Silva, Professora Doutora Isabel Pedroto, (2022) Weekend Hospitalization in Nonvariceal Upper Gastrointestinal Bleeding – an Additional Risk?. J. *Archives of Medical Case Reports and Case Study*, 6(2); **DOI:**10.31579/2692-9392/125

Abstract

Introduction: Weekend admission has been related to worse outcomes. The aim of this study is to assess the impact of the "weekend effect" in patients with nonvariceal upper gastrointestinal bleeding (NVUGIB).

Methods: Retrospective analysis of clinical and endoscopic data of patients admitted to Centro Hospitalar Universitário do Porto, from January/2016 to December/2018 for upper gastrointestinal bleeding (UGIB). The association between weekend admission and the timing of endoscopy; level of hospitalisation; surgery need; rebleeding and mortality was evaluated.

Results: A total of 545 patients were included. No significant association between weekday and weekend admissions was observed in any of the outcomes. The majority of patients underwent upper endoscopy up to 12 hours after admission (62.0% vs. 57.2%, weekday vs. weekend admission, respectively), with similar timings of endoscopy between both groups (p=0.607). Hospitalization in intensive and/or intermediate care units (41.6% vs. 42.8%, p=0.869) was not related to the day of admission. Also, no differences were assessed in the following outcomes: surgery need (5.8% vs. 6.3%, p=0.843), rebleeding (9.3% vs. 6.2%, p=0.289) and mortality rates (6.2% vs. 2.4%, p=0.103).

Discussion and Conclusion: In this sample of patients with NVUGIB, clinical management and results were independent of the day of admission. The absence of "weekend effect" seems to be related to the gastroenterology emergency model evaluated and its continuous access to endoscopic resources.

Key words: weekend effect; upper gi bleeding; nonvariceal; rebleeding, mortality

INTRODUCTION

Upper gastrointestinal bleeding (UGIB) is a major indication for emergency admission, with an incidence that varies from 48 to 160 cases per 100,000 individuals annually [1], representing at least 50% of the admissions regarding gastrointestinal bleeding [2]. The management of UGIB is a complex process, from resuscitation and stabilization to diagnosis and therapy. Endoscopy plays a key role, allowing clinical improvement of the outcomes in patients with UGIB [3].

The "weekend effect" has been described as an increased mortality in patients admitted during weekend [3-6]. Apparently, this is due to a reduced access to specialised medical care. On weekends, comparing to weekdays, hospitals usually operate on a reduced work schedule. This might be due to several reasons including economic constraints, decreased staffing, including senior staff. In addition, some of these admissions might be related to adverse lifestyle-related behaviours during the weekend [3,7-10].

The European Society of Gastrointestinal Endoscopy (ESGE) Guidelines recommends having endoscopy services available for evaluation and management of UGIB 24-hours/7-days. However, endoscopy units may be closed or operate only on a limited weekend schedule, thereby delaying endoscopy [11,12]. Potentially, this might be one of the major reasons for poorer outcomes among patients who are hospitalized during the weekend [13-15].

In this context, "weekend effect" closely reflects the organisational structure and performance of healthcare services, mainly "out-of-hours", by identifying the efficiency gaps, so it can help to point improvement needs [6].

In Northern Portugal, located at Centro Hospitalar Universitário do Porto (CHUP) there is an organized gastroenterology emergency model of care. A team of gastroenterologists from six public institutions and a nursing team from CHUP are responsible for the night shifts, the "out-of-hours" period,

from Monday to Sunday. This way, endoscopy is available seven days a week, 24 hours a day.

The aim of this study is to evaluate the overall weekend effect in patients' outcomes, namely timing of endoscopy, intensive and intermediate care admission, bleeding recurrence, need for surgery and mortality rates in patients with nonvariceal upper gastrointestinal bleeding.

MATERIALS AND METHODS

We conducted a retrospective analysis of hospital records from patients admitted for UGIB, during the period of 1st of January 2016 and 31st of December 2018. The symptoms of UGIB were defined as melaena, hematemesis, hematochezia and/or symptomatic anaemia. Weekend admission was considered as hospitalization from Friday afternoon 3pm to Monday morning 7am. Despite the weekend definition, at CHUP, a gastroenterology team is present 24-hours/7-days, to fulfil the "out-of-hours" period, consisting of an experienced gastroenterologist and an endoscopy nurse. Patients with NVUGIB were included. The nonvariceal UGIB causes are presented on Table I.

	Weekday (n=366)		Weekend (n=179)		All (n=545)		*P* value
	n	%	n	%	n	%	
Mean age (SD), years	68.1	(17.1)	68.3	(15.5)			0.961
Sex							
Male	273	74.6	127	70.9	400	73.4	0.366
Female	93	25.4	52	29.1	145	26.6	
Drugs used							
Anticoagulant	52	16.4	24	16.2	76	16.3	0.959
Antiplatelet	104	33.0	56	38.1	160	34.6	0.285
NSAID	39	12.3	26	17.9	65	14.1	0.106
PPIs	65	20.6	25	17.2	90	19.6	0.394
Comorbidities							
Myocardial infarction	18	12.2	49	15.4	67	14.4	0.352
Congestive heart failure	39	26.4	82	25.7	121	25.9	0.882
Chronic liver disease	24	16.2	42	13.3	66	14.2	0.400
Chronic renal disease	20	13.5	36	11.3	56	12.0	0.498
Diabetes mellitus	41	27.7	77	24.2	118	25.3	0.420
Cerebrovascular diseases	21	14.6	42	13.6	63	13.9	0.787
Malignant tumors	16	11.0	46	14.9	62	13.7	0.265
CCI							
<6	188	62.5	99	68.8	287	64.5	0.194
≥6	113	37.5	45	31.3	158	35.5	
Pre-endoscopy Rockall Score, mean (SD)	3.4	(1.7)	3.3	(1.7)			0.715
Symptoms							
Melaena	87	26.7	33	22.3	120	25.3	
Hematemesis	127	39.0	51	34.5	178	37.6	
Hematochezia	10	3.1	3	2.0	13	2.7	0.073
Melaena and hematemesis	34	10.4	28	18.9	62	13.1	
Anemia	60	18.4	25	16.9	85	17.9	
Other	8	2.5	8	5.4	16	3.4	
Diagnosis							
Mallory-Weiss syndrome	40	10.9	21	11.7	61	11.2	
Gastric ulcer	110	30.1	61	34.1	171	31.4	
Duodenal ulcer	98	26.8	36	20.1	134	24.6	0.778
Gastric angioectasia	29	7.9	13	7.3	42	7.7	
Malignacies	40	10.9	22	12.3	62	11.4	
Inconclusive	4	1.1	2	1.1	6	1.1	
Others*	45	12.3	24	13.4	69	12.7	
Endoscopic treatment							
Yes	135	36.9	70	39.1	205	37.6	0.615
No	231	63.1	109	60.9	340	62.4	

*SD: standard deviation; NSAID: nonsteroidal anti-inflammatory drugs; PPIs: protón-pump inhibitors; CCI: Charlson comorbidity index. *Esophagitis, esophageal ulcer, hemorrhagic gastritis, gastroduodenitis, Dieulafoy's lesion, duodenal angioectasia, antral vascular ectasia*

Table 1: Demographic and clinical characteristics of 545 patients admitted for nonvariceal upper gastrointestinal bleeding according to weekday vs. weekend admission

For each patient, data collected were age, sex, comorbidities and Charlson Comorbidity Index (CCI), symptoms, pre-endoscopy Rockall score, antiplatelet, anticoagulant and nonsteroidal anti-inflammatory drug use, bleeding cause and need of endoscopic treatment. Different endoscopic treatments were used: submucosal adrenaline injections, sclerosant injections of polidocanol, thermocoagulation (heat probe, argon plasma),

endoscopic clips, and topic hemospray. The CCI was stratified into two groups according to the score (<6 and ≥6 points). Outcomes were defined as timing of endoscopy, intensive and intermediate care admission, need for surgery, and both in-hospital bleeding recurrence and mortality rates. According to ESGE Guidelines, the timing of endoscopy regarding admission was categorized into three groups: very early, <12 hours; early, ≤24 hours; and delayed, >24 hours. Rebleeding was considered in cases of further hematemesis, passage of fresh melaena or hematochezia and/or hypovolemic shock after the first endoscopy. In case of rebleeding, patients were rescoped. If bleeding could not be controlled by endoscopy, patients were referred for surgery.

Descriptive statistics was calculated for both continuous and discrete variables, stratifying the patients according to weekday vs. weekend admission. Differences between groups were assessed using the Chi-square and t-test tests. The primary independent predictor was the day of admission (weekday vs. weekend). Then, the model was adjusted for several risk factors selected based on their potential effect on the outcome.

RESULTS

Patient characteristics

A total of 545 patients with NVUGIB were included in the analysis. Demographic and clinical characteristics according to admission are detailed in Table I. There were 366 patients (273 men and 93 women, mean (SD) age of 68.1 (17.1) years) admitted on weekdays, and 179 patients (127 men and 52 women, mean (SD) age of 68.3 (15.5) years) during the weekend. There was no significant difference between groups for the mean age of patients (p=0.961). Also, no difference was found in the use of anticoagulants, antiplatelets, nonsteroidal anti-inflammatory drugs (NSAIDs) or proton-pump inhibitors (PPIs) according to the day of admission (p=0.959, 0.285, 0.106, 0.394, respectively). In both weekday and weekend admissions, the most common comorbidities were Diabetes mellitus (27.7% vs. 24.2%) and congestive heart failure (26.4% vs. 25.7%). When comparing both groups, most patients had a CCI score <6 (62.5% vs. 68.8%), with no significant differences in terms of comorbidities (p=0.194). Regarding the pre-endoscopy Rockall score in both groups, no significant difference was found (mean (SD) score of 3.4 (1.7) vs. 3.3 (1.7), p=0.715). In terms of symptoms, patients presented more frequently with hematemesis in both groups (39.0% vs. 34.5%). The most frequent causes of NVUGIB were gastric ulcer (30.1% vs. 34.1%) and duodenal ulcer (26.8% vs. 20.1%) along weekday and weekend admissions. No significant differences in the need for endoscopic treatment were found according to the day of admission (p=0.615).

Outcomes

Outcomes according to admission´s day are reported in Table II. When comparing the timing of endoscopy, no significant differences were observed between weekdays and weekends (p=0.607). Furthermore, most patients performed a very early endoscopy, <12 hours, in both weekday and weekend admissions (62.0% vs. 57.2%), followed by an early endoscopy, ≤24 hours (24.2% vs. 26.1%). Only 13.8% and 16.7% of the patients had a delayed endoscopy, >24h, on weekday or weekend, respectively. The intrahospital rebleeding rate was similar between weekdays and weekends (9.3% vs. 6.2%, p=0.289). Additionally, no difference was found in the need for surgery on weekends versus weekdays, (5.8% vs. 6.3%, p=0.843). Regarding the need and level of care in hospitalization, there was no difference, according to the day of admission, either in intensive or intermediate care units (intensive, 4.8% vs. 6.0%; intermediate, 36.8% vs. 36.8%, p=0.869). Again, no difference was found in in-hospital mortality rates, considering the day of admission (6.2% vs. 2.4%, p=0.103).

	Weekday (n=366)		Weekend (n=179)		All (n=545)		*P* value
	n	%	n	%	n	%	
Surgery	16	5.8	8	6.3	24	6.0	0.843
Endoscopy timing							
Very early <12h	184	62.0	79	57.2	263	60.5	0.607
Early ≤24h	72	24.2	36	26.1	108	24.8	
Delayed >24h	41	13.8	23	16.7	64	14.7	
Rebleeding, in-hospital							
Yes	26	9.3	8	6.2	34	8.3	0.289
No	255	90.7	122	93.8	377	91.7	
Hospitalisation							
Intermediate care unit	107	36.8	49	36.8	156	36.8	0.869
Intensive care unit	14	4.8	8	6.0	22	5.2	
No	170	58.4	76	57.1	246	58.0	
Death, in-hospital							
Yes	17	6.2	3	2.4	20	5.0	0.103
No	259	93.8	124	97.6	383	95.0	

Table 2: Outcomes of 545 patients admitted for nonvariceal upper gastrointestinal bleeding according to weekday vs. weekend admission

DISCUSSION

We conducted a study of a large series of patients admitted for NVUGIB during a 3-year period. We did not find any significant relation between weekend admission and increased mortality, nor with other outcomes.

The literature on the "weekend effect" is rapidly growing and large studies have been commissioned to investigate the magnitude and mechanisms of this effect [16]. Although the causes of the "weekend effect" remain unclear, it is thought to be mediated through differences in the process of care and staffing between weekdays and weekends [17].

Several studies have addressed the issue of the so-called "weekend effect" in patients admitted for NVUGIB with inconsistent results [4,8,10,18-21]. Some reported a significant weekend effect in relation to the NVUGIB [4,10,19,21], whereas others did not find increased mortality among patients admitted on the weekend [8,18]. However, it is important to distinguish between variceal and nonvariceal bleeding. As the management and prognosis of variceal and nonvariceal bleeding differ significantly, this could influence the interpretation of the results. Data published suggests that there is no weekend effect in variceal UGIB [8,20]. In contrast, what is known about the "weekend effect" in patients with NVUGIB is contradictory. Three studies reported a significant weekend effect in relation to NVUGIB

[10,19,20], whereas two did not [8,18]. In our study, we did not find any "weekend effect" in relation to mortality. On the contrary, mortality was lower.

The "weekend effect" can strongly reflect organisational differences among different healthcare systems. Most UGIB studies have been conducted in the United States of America (USA) so far [10,20]. Ananthakrishnan et al. [20], documented a significant "weekend effect" in patients with nonvariceal bleeding. In addition, Shaheen et al. [10] performed one of the largest studies in the USA, with over 200,000 patients admitted for peptic ulcer related UGIB, reporting a significantly higher mortality rate for patients admitted during the weekends. Regarding Europe, most studies came from the United Kingdom (UK) [8,19]. A study conducted in Wales strengthened the "weekend effect" [19], but another one from the UK, Jairath et al. [8], concluded otherwise. More inconsistent results came from Europe. An Italian study [18] did not report differences in mortality rates based on the day of admission, whereas a Dutch study found a significant association [21]. Thus, information on this subject significantly differs not just between countries, but also between continents. This makes clear that asymmetries in patient's management, in the set of UGIB, explain differences on patient's outcomes. The day of admission is one variable in the process of care.

Previous studies have shown that endoscopy timing is significantly related to weekday or weekend admission. On one hand, according to some studies, endoscopy timing during weekday admissions was significantly inferior than for weekend admissions [4,5,8,10,19,20]. On the other hand, a few studies showed that the timing of endoscopy for weekend admissions is shorter when compared to weekday admissions [22,23]. We found no difference in the timing of endoscopy, regardless the day of the week. These results can be explained by the model of CHUP's gastroenterology emergency care organization. In fact, as mentioned above, a gastroenterology specialized team is present continuously. Therefore, no differences in endoscopy timing are observed between weekdays and weekends.

We also observed that in NVUGIB patients, the "weekend effect" is not associated with rebleeding. This finding is consistent with studies which also analysed rebleeding in UGIB patients [8,18,19].

Additionally, we did not find a difference in patients who underwent surgery based on the day of admission. Despite our finding, Shaheen et al. [10] reported that patients with NVUGIB underwent more frequently a surgical intervention when admitted during the weekend. It seems that, at CHUP, endoscopy therapy is equally effective during the week comparing to the weekend.

Moreover, the need and level of hospitalization, according to our findings, was also not related to the day of admission. Additionally, the same number of patients with NVUGIB were hospitalized during the week and weekend, regardless the level of care. In the end, most patients were not hospitalized, nor during the week, nor during the weekend. This could be explained by another of our findings: our mean pre-endoscopy Rockall score. In fact, in both groups, the mean pre-endoscopy Rockall score was low, describing our patients' sample with a very low chance of mortality, thus diminishing the need for hospitalization.

Our study has some limitations. Firstly, this is a northern centre study which limits the possibility to generalize our conclusions to a national level. Secondly, endoscopic and admission reports lacked some information, leaving us with some missing cases. The strengths of our study are the high number of patients included and how it gives us a better understanding of the effectiveness of care in acute nonvariceal bleeders. Overall, our findings have significant implications for the understanding of gastroenterology emergency models of care.

CONCLUSION

We did not identify any differences in the clinical outcomes of patients admitted for NVUGIB during weekdays or weekends. Therefore, our data support that endoscopy units working 24 hours a day, seven days a week, may address this specific health care need in an efficient way.

REFERENCES

1. Tielleman T, Bujanda D, Cryer B. Epidemiology and Risk Factors for Upper Gastrointestinal Bleeding. Gastrointest Endosc Clin N Am. 2015;25(3):415-28. Epub 2015/07/05. doi: 10.1016/j.giec.2015.02.010. PubMed PMID: 26142028.
2. Laine L. CLINICAL PRACTICE. Upper Gastrointestinal Bleeding Due to a Peptic Ulcer. N Engl J Med. 2016;374(24):2367-76. Epub 2016/06/16. doi: 10.1056/NEJMcp1514257. PubMed PMID: 27305194.
3. Gupta A, Agarwal R, Ananthakrishnan AN. "Weekend Effect" in Patients With Upper Gastrointestinal Hemorrhage: A Systematic Review and Meta-analysis. Am J Gastroenterol. 2018;113(1):13-21. Epub 2017/11/15. doi: 10.1038/ajg.2017.430. PubMed PMID: 29134968.
4. Dorn SD, Shah ND, Berg BP, Naessens JM. Effect of weekend hospital admission on gastrointestinal hemorrhage outcomes. Dig Dis Sci. 2010;55(6):1658-66. Epub 2009/08/13. doi: 10.1007/s10620-009-0914-1. PubMed PMID: 19672711.
5. Shih PC, Liu SJ, Li ST, Chiu AC, Wang PC, Liu LY. Weekend effect in upper gastrointestinal bleeding: a systematic review and meta-analysis. PeerJ. 2018;6:e4248. Epub 2018/01/18. doi: 10.7717/peerj.4248. PubMed PMID: 29340247; PubMed Central PMCID: PMCPMC5768163.
6. Tufegdzic M, Panic N, Boccia S, Malerba S, Bulajic M, La Vecchia C, et al. The weekend effect in patients hospitalized for upper gastrointestinal bleeding: a single-center 10-year experience. Eur J Gastroenterol Hepatol. 2014;26(7):715-20. Epub 2014/05/23. doi: 10.1097/meg.0000000000000124. PubMed PMID: 24849766.
7. Bell CM, Redelmeier DA. Mortality among patients admitted to hospitals on weekends as compared with weekdays. N Engl J Med. 2001;345(9):663-8. Epub 2001/09/08. doi: 10.1056/NEJMsa003376. PubMed PMID: 11547721.
8. Jairath V, Kahan BC, Logan RF, Hearnshaw SA, Travis SP, Murphy MF, et al. Mortality from acute upper gastrointestinal bleeding in the United kingdom: does it display a "weekend effect"? Am J Gastroenterol. 2011;106(9):1621-8. Epub 2011/05/25. doi: 10.1038/ajg.2011.172. PubMed PMID: 21606977.
9. Liu L, Hao D, Liu W, Wang L, Wang X. Does Weekend Hospital Admission Affect Upper Gastrointestinal Hemorrhage Outcomes?: A Systematic Review and Network Meta-Analysis. J Clin Gastroenterol. 2020;54(1):55-62. Epub 2018/08/18. doi: 10.1097/mcg.0000000000001116. PubMed PMID: 30119093.
10. Shaheen AA, Kaplan GG, Myers RP. Weekend versus weekday admission and mortality from gastrointestinal hemorrhage caused by peptic ulcer disease. Clin Gastroenterol Hepatol. 2009;7(3):303-10. Epub 2008/10/14. doi: 10.1016/j.cgh.2008.08.033. PubMed PMID: 18849015.
11. Gralnek IM. Evaluating the "weekend effect" on patient outcomes in upper GI bleeding. Gastrointest Endosc.

2014;80(2):236-8. Epub 2014/07/19. doi: 10.1016/j.gie.2014.04.004. PubMed PMID: 25034837.

12. Hwang JH, Fisher DA, Ben-Menachem T, Chandrasekhara V, Chathadi K, Decker GA, et al. The role of endoscopy in the management of acute non-variceal upper GI bleeding. Gastrointest Endosc. 2012;75(6):1132-8. Epub 2012/05/26. doi: 10.1016/j.gie.2012.02.033. PubMed PMID: 22624808.
13. Ferguson CB, Mitchell RM. Nonvariceal upper gastrointestinal bleeding: standard and new treatment. Gastroenterol Clin North Am. 2005;34(4):607-21. Epub 2005/11/24. doi: 10.1016/j.gtc.2005.08.003. PubMed PMID: 16303573.
14. Weeda ER, Nicoll BS, Coleman CI, Sharovetskaya A, Baker WL. Association between weekend admission and mortality for upper gastrointestinal hemorrhage: an observational study and meta-analysis. Intern Emerg Med. 2017;12(2):163-9. Epub 2016/08/19. doi: 10.1007/s11739-016-1522-7. PubMed PMID: 27534406.
15. Zhou Y, Li W, Herath C, Xia J, Hu B, Song F, et al. Off-Hour Admission and Mortality Risk for 28 Specific Diseases: A Systematic Review and Meta-Analysis of 251 Cohorts. J Am Heart Assoc. 2016;5(3):e003102. Epub 2016/03/20. doi: 10.1161/jaha.115.003102. PubMed PMID: 26994132; PubMed Central PMCID: PMCPMC4943279.
16. Chen YF, Boyal A, Sutton E, Armoiry X, Watson S, Bion J, et al. The magnitude and mechanisms of the weekend effect in hospital admissions: A protocol for a mixed methods review incorporating a systematic review and framework synthesis. Syst Rev. 2016;5:84. Epub 2016/05/23. doi: 10.1186/s13643-016-0260-2. PubMed PMID: 27209320; PubMed Central PMCID: PMCPMC4875695.
17. Lilford RJ, Chen YF. The ubiquitous weekend effect: moving past proving it exists to clarifying what causes it. BMJ Qual Saf. 2015;24(8):480-2. Epub 2015/07/01. doi: 10.1136/bmjqs-2015-004360. PubMed PMID: 26124193.
18. Soncini M, Chilovi F, Triossi O, Leo P. Weekend effect in non-variceal upper gastrointestinal bleeding: data from nine italian gastrointestinal units. Am J Gastroenterol. 2012;107(4):635-6. Epub 2012/04/06. doi: 10.1038/ajg.2011.431. PubMed PMID: 22475969.
19. Button LA, Roberts SE, Evans PA, Goldacre MJ, Akbari A, Dsilva R, et al. Hospitalized incidence and case fatality for upper gastrointestinal bleeding from 1999 to 2007: a record linkage study. Aliment Pharmacol Ther. 2011;33(1):64-76. Epub 2010/12/07. doi: 10.1111/j.1365-2036.2010.04495.x. PubMed PMID: 21128984.
20. Ananthakrishnan AN, McGinley EL, Saeian K. Outcomes of weekend admissions for upper gastrointestinal hemorrhage: a nationwide analysis. Clin Gastroenterol Hepatol. 2009;7(3):296-302e1. Epub 2008/12/17. doi: 10.1016/j.cgh.2008.08.013. PubMed PMID: 19084483.
21. de Groot NL, Bosman JH, Siersema PD, van Oijen MG, Bredenoord AJ. Admission time is associated with outcome of upper gastrointestinal bleeding: results of a multicentre prospective cohort study. Aliment Pharmacol Ther. 2012;36(5):477-84. Epub 2012/07/04. doi: 10.1111/j.1365-2036.2012.05205.x. PubMed PMID: 22747509.
22. Haas JM, Gundrum JD, Rathgaber SW. Comparison of time to endoscopy and outcome between weekend/weekday hospital admissions in patients with upper GI hemorrhage. Wmj. 2012;111(4):161-5. Epub 2012/09/14. PubMed PMID: 22970530.
23. Nahon S, Pariente A, Latrive JP. Weekend admission does not influence the mortality of upper gastrointestinal bleeding caused by peptic ulcers: results of a French prospective study of the association nationale des gastroentérologues des hôpitaux généraux group. Clin Gastroenterol Hepatol. 2009;7(8):911; author reply 2. Epub 2009/04/07. doi: 10.1016/j.cgh.2009.03.018. PubMed PMID: 19344789.

DOI:10.31579/2692-9392/125