

Correlation of Serum Ammonia with Grades of Hepatic Encephalopathy

¹Dr. Rajpreet Brar, Assistant Professor, Rama Medical College Hospital and Research Centre, Noida, India.

²Dr. Aparjot Singh, Associate Professor, Gian Sagar Medical College and Hospital, Rajpura, India.

Corresponding Author: Dr. Aparjot Singh, Associate Professor, Gian Sagar Medical College and Hospital, Rajpura, India.

How to citation this article: Dr. Rajpreet Brar, Dr. Aparjot Singh, “Correlation of Serum Ammonia with Grades of Hepatic Encephalopathy”, IJMACR– September– 2026, Volume – 9, Issue – 5, P. No. 956 – 965.

Open Access Article: © 2026 Dr. Aparjot Singh, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Hepatic encephalopathy (HE) is a serious neuropsychiatric complication of both acute and chronic liver disease. The Affected patients exhibit alterations in psychomotor, intellectual, cognitive, emotional, behavioral and fine motor functions. 58 patients of hepatic encephalopathy were enrolled in our study for the duration of 11 months. We aimed to look for the correlation of grades of hepatic encephalopathy with serum ammonia levels. The data was compiled by SAS-6.50 version. Regression analysis was employed to find the significance of the relationship between encephalopathy grades and various clinical parameters of encephalopathy patients. In our study, the correlation of serum ammonia was significant with the grade of encephalopathy. Hence, the serum ammonia correlated well with the grade of encephalopathy for the patients during their hospital stay, suggesting that the serum ammonia level was an indicator of the clinical outcome of the patients during their hospital stay. In our study, we

found that there is a strong correlation between Serum Ammonia level and Severity of liver disease. We found that High grade i.e. grade III & IV patients had significantly raised ammonia level.

Keywords: Encephalopathy, Liver, Ammonia, Neuropsychiatric.

Introduction

Upper gastrointestinal bleeding (UGIB) is haemorrhage in the upper gastrointestinal tract. Anatomic cut-off being ligament of Treitz, which connects the fourth portion of the duodenum to the diaphragm near the splenic flexure of the colon. Upper gastrointestinal bleeding is a significant and potentially life-threatening worldwide problem.¹ Despite advances in diagnosis and treatment, mortality and morbidity have remained constant. Bleeding from the upper gastrointestinal tract (GIT) is 4 times more common than bleeding from the lower GIT. Typically, patients present with bleeding from a peptic ulcer and about 80% of such ulcers stop

bleeding. Increasing age and co-morbidity increase mortality.

Correct diagnosis is the first step in the management of such cases and for accurate diagnosis there can be no substitute for actual visualization of the source of bleeding. With the advent of highly flexible pan endoscopes attempts to arrive at an early diagnosis have been made by several groups of workers. ² Gastrointestinal endoscopy is the preferred for diagnosis in patients with upper GI bleeding. Barium studies may interfere with subsequent endoscopy and have limited sensitivity. Advantages of endoscopy over barium studies include superior sensitivity, to determine the risk of rebleeding (thus influencing decisions such as level of hospital care, the ability to obtain biopsies for an accurate histologic diagnosis, duration of hospitalization and when to resume feeding), and to provide endoscopic therapy. Endoscopic treatment of bleeding esophageal reduces the incidence of re-bleeding and the need for surgery, and also improves survival. Radiologically we cannot detect acute ulcers and erosions. Moreover, a lesion when shown may not be source of bleeding. ³

Severe GI bleeding is documented as hematemesis, melena, haematochezia or positive nasogastric lavage accompanied by either shock or orthostatic hypotension, decrease Hb level of at least 2g/dl or need to transfuse at least 2 units of PRBC.

When there is visible blood loss from the GI tract it is known as overt bleeding. Hematemesis is defined as vomiting of blood, which indicates bleeding from the esophagus, stomach, or duodenum and includes vomiting of bright red blood, which suggests recent or ongoing bleeding, and dark material, which suggests recent bleeding. Melena is black tarry stool that is due to

degradation of blood by digestive tract enzymes and intestinal bacteria.

Melena signifies bleeding that originates from an UGI, small bowel, or proximal colonic source. Haematochezia is bright red blood per rectum, suggestive of either active UGI or small bowel bleeding or distal colonic or anorectal bleeding. Occult GI bleeding refers to subacute bleeding that is not clinically visible.⁴

Timing of Endoscopy

Patients should be examined as soon as possible following resuscitation. The exact timing will however depend on local circumstances and may involve some clinical compromise.

Patients examined within a few hours of hospital admission are more likely to have blood retained in their stomach and they are often more difficult to sedate as a result of anxiety. Delay beyond 48 hours makes the examination easier both for the doctor and the patient but has the disadvantage that the patient may rebleed during this interval. The bleeding lesion may heal rapidly and may not be visible if the examination is such delayed.⁵

The lesions that give rise to bleeding had been well established but the use of routine early esophago gastro duo denoscopy for establishing the diagnosis within first 24 – 48 hours of the upper gastrointestinal bleeding, has led to the reappraisal of their relative importance. Peptic ulcer disease and variceal bleed have assumed the greatest importance as a source of upper GIB and so is the case with superficial mucosal lesions and Mallory Weiss syndrome in forming an important source of UGIB.⁶

In the National ASGE survey, silverstein described certain attributes which they called the clinical

prognostic factors. According to this survey the following factors are reported:

Age: The mortality increases with increasing age with maximum above 70 years.

Sex: Mortality is greater in males as compared to females.

Onset of Bleeding: Higher mortality in patients who bleed in the hospital. Patients with cardiovascular, pulmonary, renal and neoplastic diseases are at greater risk.

Symptoms: There is no relation with the symptoms.

Medication: Patients who are on steroids carry poorer prognosis than patients on aspirin.

Color of Stool: Patients with red color aspirate is more ominous than coffee brown or clear aspirate.

Blood Transfusion: Patients who require more than 5 units of blood are at a greater risk.

Endoscopy: An oozing or pumping lesion carries greater mortality than a lesion which shows clot of blood.

Laboratory: Relation to a number of lab. parameters have also been described like serum albumins, bilirubin, BUN and pro thrombin time etc.⁷

The present study is therefore, being undertaken to find out the chief causes in cases of UGIT bleeding by early endoscopy. Also an attempt has been made to correlate the endoscopic findings and the short-term prognosis of these cases evaluated by an early esophago gastroduodenoscopy.

Methods

Study Design

This prospective study was conducted in Medicine Department of Rama Medical College Hospital and Research Centre, Noida from September 2025 to August 2026 with 86 patients; who came to the outpatient

department or emergency department with complaints of gastrointestinal bleeding in the form of: hematemesis, melena and hematochezia and were then evaluated clinically followed by endoscopy. Based on history and clinical examination, a tentative diagnosis was assigned to the patient. This diagnosis was later on compared with the endoscopic diagnosis.

Statistical Analysis

Information collected during the study was entered into Microsoft excel worksheet. All the data were processed using Statistical Package for Social Sciences (SPSS) version 20 (IBM, Chicago, USA). Categorical data was expressed as percentage (%) and Pearson's Chi Square test with degree of freedom 1 and confidence interval 95% was used. A P-value less than 0.05 (0.01) was considered as significant (Highly significant).

Results

Observations

The present study entitled correlation of clinical and endoscopic profile of patients with upper gastrointestinal bleeding in a tertiary care hospital, conducted amongst 86 patients who fulfilled the inclusion criteria. Endoscopy was done in all the patients within forty-eight hours of admission.

This study was carried out in the Medicine Department of Rama Medical College Hospital and Research Centre, Noida.

In present study out of 86 patients with upper GI bleed, 60.4% cases were males and 39.6% cases were females. Thus, male preponderance was observed with male: female ratio of 1.5: 1.

The maximum number of lesions was found in the age group of 41 – 60 years that included 41 patients (47.6%). Seventy-two patients out of 86 were below 60 years of age.

Table 1: Etiology of upper GI bleed

Lesion	n (%)
Portal hypertension related Esophageal varices and/or gastric fundal varices	48(55.8)
Gastric ulcer	11(12.7)
Duodenal ulcer	08(9.3)
Superficial mucosal lesions*	11(12.7)
Carcinoma stomach	02(2.3)
Carcinoma Esophagus	01(1.1)
Mallory Weiss tear	05(5.8)
Total	86(100)

* Esophagitis, Gastritis, Duodenitis

The most common etiology of UGIB was portal hypertension related esophageal varices and/or gastric fundal varices, seen in 48 (55.8%) patients. Gastric ulcers and superficial mucosal lesions were present in (12.7%)

patients each, whereas Duodenal ulcers were present in 8 (9.3%) patients. Other lesions identified were Mallory weis tear (5.8%), CA stomach 2 (2.3%), CA esophagus 1 (1.1%)

Table 2: The age-wise break-up of various lesions

Etiology	Age Group					
	<20	21-40	41-60	61-80	81-100	Total
Varices	1	12	33	1	1	48
G.U& D.U	4	4	4	6	1	19
SML	5	4	1	1	0	11
Malignancy	0	0	1	2	0	3
MWT	1	0	2	2	0	5
Total	11	20	41	12	2	86

Majority of the patients (n=33) in the age group 41-60 years had esophageal and gastric varices as the underlying etiology, while Gastric and duodenal ulcer (n=6) was most commonly seen in 61-80 years of age group. 5 of 11 patients of superficial mucosal lesions were <20 years old.

Majority of the patients (n=33) in the age group 41-60 years had esophageal and gastric varices as the underlying etiology, while Gastric and duodenal ulcer (n=6) was most commonly seen in 61-80 years of age group. 5 of 11 patients of superficial mucosal lesions were <20 years old.

Table 3: Clinical Presentation of patients with upper GI bleed

Clinical Presentation	n (%)
Melena	27(31.4)
Hematemesis	22(25.5)

Hematemesis and Melena	20(23.2)
Hematochezia	3(3.4)
Hypotension	8(9.3)
Altered sensorium	6(6.9)

In our study, 27 (31.4%) patients presented with Melena, 22 (25.5%) patients presented with hematemesis, 20 (23.2 %) patients presented with both hematemesis and

Melena. Other clinical presentations were hematochezia in 3.4%, hypotension in 9.3% and altered sensorium in 6.9% patients.

Table 4: Clinical and endoscopic diagnosis

Lesion	No. of Cases (n)	clinically diagnosed n (%)	Endoscopically diagnosed n (%)	P Value
Esophageal varices	48	41(85.4)	48 (100)	0.018*
D.U. & G.U.	19	12(63.1)	19 (100)	0.012*
Superficial lesion	11	6 (54.5)	11(100)	0.042*
Malignancy stomach and esophagus	03	01(33.4)	03(100)	0.386
MWS	5	3(81.6)	5 (100)	0.427
TOTAL	86	61(70.9)	(96.5)	

*Significant at 0.05 level of significance.

In cases of esophageal varices, 41 patients (85.4%) could be correctly diagnosed clinically before endoscopy, based on the history and clinical examination the diagnosis was confirmed on endoscopy for all 48 patients, the difference between clinical and endoscopic diagnosis was statically significant ($p=0.012$)

Similarly, in cases of Duodenal and Gastric ulcer, 12(63%) could be correctly diagnosed clinically before endoscopy and 06 (54.5%) cases of superficial mucosal

lesions could be diagnosed clinically before endoscopy respectively the difference between clinical and endoscopic diagnosis was statically significant ($p=0.018$)

In cases of MWT and in malignancy of esophagus/stomach a correct diagnosis could be made in (81%) and (33.4%) cases. These differences were found to be statistically insignificant ($P = \text{More Than } 0.05$).

Table 5: Relation between various lesions and mortality

Lesion	No. of cases	Mortality (%)	No dying of bleeding (%)	No dying of other causes (%)
Esophageal varices	48	10(20.8)	4(8.3)	06 (12.5)
D.U. & G.U.	19	02 (10.4)	01 (5.2)	01 (5.2)
Superficial mucosal lesion	11	01(9.0)	00	1(9.0)
CA stomach and esophagus	03	-	-	-
MWS	05	-	-	-
Total	86	13(15.1)	05 (5.8)	08 (9.3)

The highest number of deaths, i.e. 10(20.8%) occurred in patients with esophageal varices however, (8.3%) of patients died of variceal bleed and (12.5%) died due to other cause (ARDS, UROSEPSIS, CARDIAC). In patients of duodenal and gastric ulcer, 2 deaths occurred and one of them was directly due to bleeding and the other due to cardiac problem(CAD).

1 patient out of 11 died in superficial mucosal lesions patients not directly due to bleed but due to other cause No death was seen in patients with malignancy. This discrepancy was seen as the period of follow-up was only 10 days and these patients were given adequate supportive treatment.

Discussion

Eighty-six patients of Hematemesis were included in this study.

Sex Ratio

In present study out of 86 patients with upper GI bleed, 60.4% cases were males and 39.6% cases were females. Thus, male preponderance was observed with male: female ratio of 1.5: 1. P mahajan et al in a study of 1790 cases reported a sex ratio of 1.6:1 in favor of males.⁸ Thus, upper gastrointestinal bleeding is more common in males than in females probably because in our study alcohol consumption was frequent amongst male patients

Timing of Endoscopy. Resort to the early endoscopy resulted in a yield of positive diagnosis of a bleeding or potentially bleeding lesion in 100% of these patients. Allan et al reported a positive diagnosis of the lesion in 90% of patients examined within first 48 hours after the bleeding episode⁹.

Thus early, endoscopy led to correct diagnosis as well as adequate treatment In our study.

Age Distribution.

CM, Shyam sundar et al also found the maximum incidence of bleeding between 41-60 years of ages¹⁰. In our study the maximum number of lesions was found in the age group of 41 – 60 years that included 41 patients (47.6%). Seventy-two patients out of 86 were below 60 years of age, probably because of increased consumption of alcohol and NSAID in this age group.

Causes of Upper Gastrointestinal Bleeding

The most common etiology of UGIB in our study was portal hypertension related esophageal varices and/or gastric fundal varices, seen in 48 (55.8%) patients. Gastric ulcers and superficial mucosal lesions were present in (12.7%) patients each, whereas Duodenal ulcers were present in 8 (9.3%) patients. Other lesions identified were Mallory weiss tear (5.8%), CA stomach 2 (2.3%), CA esophagus 1 (1.1%)

Western studies based on early endoscopy have also reported a high incidence of superficial mucosal lesions as a cause of upper gastrointestinal bleeding. Schiller et al reported a figure of 25.3% whereas figures of 35% and 47% were reported by Sugawa et al, Stenvenson et al.^{11, 12, 13} In another study done by Anand et al. from North India, causes of bleeding were esophageal varices in 45.5%, duodenal ulcer in 25%, gastric ulcer in 5% and gastritis in 8.5%¹⁴ In contrast, Singh SP et al performed a study from eastern India in 2013, the endoscopic diagnosis was duodenal ulcer in 57.6% patients, variceal bleed in 12.8% patients, gastric ulcer in 1.8% patients, Mallory–Weiss tear in 1.8% patients, erosive gastritis in 1.8% patients and malignancy comprised of 7.7% of cases¹⁵ Sugawa et al reported that 40% of patients with duodenal ulcer, 20% of patients with erosive gastritis and 10% with Mallory Weiss Syndrome bled from associated lesions and as much as

62% of patients with esophageal varices bled from associated lesions¹². Portal hypertension related esophageal varices was the commonest cause in our study. This can be due to increased number of patients presenting in our institute from UP, Chronic hepatitis C is more prevalent in these region and also most of patients in our study was cirrhotic.

Clinical Presentation of patients with upper GI bleed

In our study, (31.4%) patients presented with Melena, (25.5%) patients presented with Hematemesis, (23.2 %) patients presented with both Hematemesis and Melena. Other clinical presentations were hematochezia, hypotension and altered sensorium. Parvez, et al a study from eastern India included 337 patients. The clinical presentation of the patients was mainly in the form of Hematemesis (n = 205, 60.8%), melena was seen in 171 (50%) of patients. Hypotension was noted in 50 (14.8%) patients at presentation and altered sensorium in 24 (7.12%)¹⁶. In a study by Bhattarai et al from Nepal included 660 cases. Two hundred and sixty-four (40%) patients presented with only Melena, 201 (30.5 %) with both Hematemesis and Melena, and 135 (20.5%) presented with only Hematemesis. The rest 60 (9 %) had a history of dizziness, generalized weakness. A total of 126 (19%) patients presented with shock.¹⁷

Causes of Superficial Mucosal Lesions and Varices

Superficial mucosal lesions include esophagi is, erosive gastritis, mucosal hyperemia and erosions. SML were present in (12.7%) patients in our study, for which NSAID and Aspirin were found to be the commonest cause. Similarly, S narum et al, reported that among the drugs, NSAIDS and aspirin were found to be the most frequent culprit followed by prednisolone. Other important causes of superficial mucosal lesions were alcohol and uremia. In a few cases, the exact cause of

superficial erosive lesion could not be identified.¹⁸ Jick H et al presented a report from Boston University, showed ethacrynic acid to be most frequently associated with upper gastrointestinal bleeding. Other drugs incriminated are heparin, warfarin, steroids and aspirin.¹⁹ Thus, NSAIDS are the most frequent cause of SML, as it is the most frequently consumed analgesic and easily available over the counter drug. In this study, the cause of esophageal varices was found to be predominantly cirrhosis of liver. In our study 42 were cirrhotic in origin. In 6 (6.9%) cases, non-cirrhotic portal fibrosis And EHPVO was found to be the cause of esophageal Varices This distribution is in conformity with the earlier reported by Hedberg^{20,21} Variceal bleeding, as expected in commonly seen with grade II and III Varices. No patient had grade I varices. In our study out of 42 patients with liver cirrhosis, maximum number of patients (34) had grade III esophageal varices (p=0.791), out of 2 patients of noncirrhotic portal fibrosis only patient had grade III esophageal varices (p=0.887) and out of 4 patients of EHPVO, 3 patients had grade III esophageal varices. Thus our study observed no significant association between etiology and grades of esophageal varices (p>0.05)

Mortality in Various Types of Lesions

The overall mortality in this study was found to be 15.1%. The highest number of deaths, i.e. 10(20.8%) occurred in patients with esophageal varices however, (8.3%) of patients died of variceal bleed and (12.5%) died due to other cause (ARDS, urosepsis, cardiac). In patients of duodenal and gastric ulcer, 2 deaths occurred and one of them was directly due to bleeding and the other due to cardiac problem (CAD). 1 patient out of 11 died in superficial mucosal lesions patients not directly due to bleed but due to other cause. The reason for no

deaths in the malignancy group is the short duration of follow up that was done in this study. Schiller et al reported a figure of 10% mortality in their study.¹¹ McGinn with Novis reported a mortality of 16.6% in their study^{22, 23, 24}

Clinical Diagnosis Vs. Endoscopic Diagnosis and the Relevance of Early Endoscopy

A clinical diagnosis was assigned to all the patients who presented with hematemesis, taking a detailed history and doing a thorough physical examination. This clinical diagnosis was later compared with endoscopic diagnosis. In the present study, endoscopy could pick up correct diagnosis in 100% of all cases in contrast to a correct diagnosis of 70.9% on the basis of the history and physical examination. The clinical diagnosis could be made with high degree of accuracy in patients of esophageal varices 41 (85.4%), peptic ulcers 12(63%) and superficial mucosal lesions 06 (54.5%), simply by taking a good history and a thorough physical examination. The difference between clinical and endoscopic diagnosis was statically significant ($P < 0.05$) In cases of MWT and in malignancy of esophagus/stomach a correct diagnosis could be made in 81% and 33.4% cases.

These differences were not statistically significant probably because the number of cases were very less. In a study by Avery et al on 2011 patients of upper gastrointestinal bleed, indicated that they could pick up correct diagnosis by endoscopy in 100% of all cases in contrast to correct diagnosis of 56.7% on the basis of history and physical examination.²⁵

An analysis by Eastwood et al showed, that only about 60% of patients gave history suggestive of peptic ulcer disease and in rest, a history of drug ingestion was present prior to the episode of bleeding and therefore a

false positive diagnosis of acute erosive gastritis was made. On applying the statistical test for significance it was found that the difference between the number who could be diagnosed on clinical grounds and those who could be diagnosed correctly by endoscopy was not significant.²⁶

While in our study esophageal varices, peptic ulcer disease could be correctly diagnosed clinically before endoscopy in 85.4%, 63% respectively, which was statistically significant, this was in accordance with previous studies. thus endoscopy had significant advantage in diagnosing these lesions. since, UGIE is also warranted for therapeutic purpose, it should be done in each patient presenting with UGI bleed, preferably within 48 hours and one should not only rely on clinical diagnosis alone.

Conclusion

This study was conducted in the Medicine Department of Rama Medical College Hospital and Research Centre, Noida. The maximum number of lesions were found in the age group of 41 – 60 years. Upper GI bleed was more common in males than females, (60.4%) were males and (39.6%) cases were females.

The most common etiology of UGIB was portal hypertension related esophageal varices and/or gastric fundal varices. Gastric ulcers and superficial mucosal lesions were 2nd most common cause of UGI bleed.

- Duodenal ulcer was responsible for 9.3% of cases of UGI bleeding.
- Other lesions identified were Mallory weis tear (5.8%), CA stomach (2.3%), CA esophagus (1.1%)
- Drugs were found to be the commonest cause of Hematemesis due to superficial mucosal lesions. Among the drugs NSAIDS were most common

The most common comorbidity was chronic liver disease (hepatitis C) Followed by alcoholic liver disease. The most common presentation of UGI bleed in our study was melena (**31.4%**) followed by hematemesis (**25.5%**), (23.2 %) patients presented with both hematemesis and melena. Our study observed no significant association between etiology and grades of esophageal varices ($p>0.05$). Esophageal varices (85.4%) could be correctly diagnosed clinically before endoscopy, based on the history and clinical examination the diagnosis was confirmed on endoscopy and the difference between clinical and endoscopic diagnosis was statistically significant ($p=0.012$). Duodenal and Gastric ulcer (63%) could be correctly diagnosed clinically before endoscopy and (54.5%) cases of superficial mucosal lesions could be diagnosed clinically before endoscopy respectively the difference between clinical and endoscopic diagnosis was statistically significant ($p=0.018$). The overall mortality in this study was round to be 15.1%.

The highest number of deaths, i.e. 10(20.8%) occurred in patients with esophageal varices however, (8.3%) of patients died of variceal bleed and (12.5%) died due to other cause (pneumonia, urosepsis, cardiac).

In patients of duodenal and gastric ulcer, 2 deaths occurred and one of them was directly due to bleeding and the other due to cardiac problem (CAD).

Although statistically it would seem that early endoscopy has little advantage over clinical examination but for an individual case when the diagnostic dilemma for the cause of bleeding presents, no physician will hesitate to agree that early endoscopy is invaluable for correct diagnosis.

References

1. Antunes C, Copelin II EL. Upper Gastrointestinal Bleeding. In Stat Pearls [Internet] 2021 Jul 21. Stat Pearls Publishing.
2. Christensen S, Riis A, Nørgaard M, Sørensen HT, Thomsen RW. Short-term mortality after perforated or bleeding peptic ulcer among elderly patients: a population-based cohort study. BMC geriatrics. 2007 Dec;7(1):1-8.
3. Forrest, J. A. H. & Logan, R. F. A. (1977). Comparative diagnostic accuracy of barium meal and endoscopy. British Medical Journal, 1, 50.
4. Barkun A.N., Bardou M., Kuipers E.J., et al. International consensus recommendations on the management of patients with non variceal upper gastrointestinal bleeding. Ann Intern Med 2010; 152:101.
5. Saltzman JR, Feldman M, Travis A. Approach to acute upper gastrointestinal bleeding in adults. Up-To Date, Waltham, MA (Accessed on March 08, 2017). 2018.
6. Jung K, Moon W. Role of endoscopy in acute gastrointestinal bleeding in real clinical practice: An evidence-based review. World journal of gastrointestinal endoscopy. 2019 Feb 16;11(2):68.
7. Silverstein FE. : Gastrointest. Endosc. 27(2):73-9, 1981. The national ASGE Survey on upper gastrointestinal bleeding. I & II. Study, design and base line data.
8. Mahajan P, Chandail VS. Etiological and endoscopic profile of middle aged and elderly patients with upper gastrointestinal bleeding in a Tertiary Care Hospital in North India: A retrospective analysis. Journal of mid-life health. 2017 Jul;8(3):137..

9. Allan R, and Dykes PW. : Gastrointestinal Endosc. 20: 154-55, May 1974. A comparison of routine and selective endoscopy in the management of acute gastrointestinal hemorrhage.
10. CM S, Sharma GD, Rana BS. Profile of acute upper gastro intestinal bleed: a referral hospital-based study in sub Himalayan region.2018
11. Schiller KFR. : Practitioner. 216(1295):584-7, 1976. Fibre-endoscopy in gastrointestinal disease II. Upper gastrointestinal tract.
12. Sugawa C, Gobielle M, and Schier IL. : Third World Congress of Gastrointestinal Endoscopy. Mexico City, 1974. Quoted in the 'Topics in Gastroenterology' Part 3.
13. Stevenson GW, Cox RR, and Roberts CJC. : Br. Med. J. 2:723-24, 1976. Prospective comparison of double contrast barium meal examination and fiberoptic endoscopy in acute upper gastrointestinal hemorrhage.
14. Anand CS, Tandon BN, Nundy S. The causes, management and outcome of upper gastrointestinal haemorrhage in an Indian hospital. Journal of British Surgery. 1983 Apr;70(4):209-11.
15. Singh SP, Panigrahi MK. Spectrum of upper gastrointestinal hemorrhage in coastal Odisha. Tropical Gastroenterology. 2013 Jun 1;34(1):14-7
16. Parvez MN, Goenka MK, Tiwari IK, Goenka U. Spectrum of upper gastrointestinal bleed: An experience from Eastern India. Journal of Digestive Endoscopy. 2016 Apr;7(02):055-61.
17. Bhattarai S. Clinical Profile and Endoscopic Findings in Patients with Upper Gastrointestinal Bleed Attending a Tertiary Care Hospital: A Descriptive Cross-sectional Study. JNMA: Journal of the Nepal Medical Association. 2020 Jun;58(226):409
18. Narum S, Westergren T, Klemp M. Corticosteroids and risk of gastrointestinal bleeding: a systematic review and meta-analysis. BMJ open. 2014 May 1;4(5):e004587.
19. Jick H, Porter J. Drug-Induced Gastrointestinal Bleeding: Report from The Boston Collaborative Drug Surveillance Program, Boston University Medical Center. The Lancet. 1978 Jul 8;312(8080):87-9.
20. Hedberg SE. : Surg. Clin. North Am. 46:499-512, 1966. Early endoscopic diagnosis in upper gastrointestinal hemorrhage. An analysis of 323 cases.
21. Hedberg SE.: Arch. Surg. 108:123, 1974. Endoscopy in massive gastrointestinal tract bleeding.
22. McGinn FP, Guyer PB, and Wilken BJ. : Gut 16(9):707-13, 1975. A prospective comparative trial between early endoscopy and radiology in acute upper gastrointestinal hemorrhage.
23. Novis BH, Barbesal GD, and Bank S. : Third World Congress of Gastrointestinal Endoscopy, Mexico City, 1974. Quoted in the 'Topics in Gastroenterology' Part 3, p. 20-21 (1975). Blackwell Scientific publications, Oxford.
24. Novis BH, Duys P, and Barbezat GO. : Gut 17(4):258-63, 1976. Fiberoptic endoscopy and the use of the Sengstaken : Tube in acute gastrointestinal hemorrhage in patients with portal hypertension and varices
25. Avery Jones F.: Gastroenterology. 30:166-189, 1956. Hematemesis and Melena with special reference to causation and to the factors influencing the mortality from bleeding peptic ulcer.
26. Eastwood GL.: Gastroenterology. 72(4 Part I):737-39, 1977. Does early endoscopy benefit the patient with active upper gastrointestinal bleeding?