

# Evaluation of nasogastric tubes to enable differentiation between upper and lower gastrointestinal bleeding in unselected patients with melena

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Gastrointestinal (GI) bleeding is a common surgical problem. The aim of this study was to evaluate how insertion of the nasogastric tube may enable differentiation between upper and lower GI bleeding in patients with melena. A retrospective study involving patients admitted to our surgery division with a melena was carried out between the years 2010 and 2012. A total of 386 patients were included in the study. Of these, 279 (72.2%) patients had negative nasogastric aspirate. The sensitivity of examination of nasogastric aspirate to establish the upper GI as the source of bleeding was only 28% and the negative predictive value of a negative nasogastric aspirate was less than 1%. Most patients who initially presented with melena and were found to have upper GI bleeding had a negative nasogastric aspirate. Insertion of a nasogastric tube does

not affect the clinical decision to perform upper endoscopy and should not be routinely carried out. *European Journal of Emergency Medicine* 00:000–000 Copyright © 2015 Wolters Kluwer Health, Inc. All rights reserved.

*European Journal of Emergency Medicine* 2015, 00:000–000

**Keywords:** melena, nasogastric aspirate, nasogastric tube, peptic disease, upper gastrointestinal bleeding

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Received 11 November 2014 Accepted 12 February 2015

## Introduction

Upper gastrointestinal (GI) bleeding is a common reason for admission to surgical departments. In the year 2000, the rate of hospital admission for upper GI bleeding in the USA was 47.7 per 100 000 [1]. The most frequent causes of upper GI bleeding are peptic disease, followed by esophageal varices [2]. Initial evaluation of these patients includes rectal examination, blood tests, and insertion of a nasogastric tube to enable differentiation between upper and lower GI bleeding. The diagnostic value of this examination is controversial. A positive gastric aspirate (PGA), defined as the presence of blood or 'coffee grounds', almost always indicates that the source of the bleeding is in the upper GI tract. A negative gastric aspirate (NGA) does not exclude the presence of the upper GI bleeding, and the overall sensitivity of gastric aspirate for detecting upper GI bleeding is reported to be 32–74% [3]. In addition, insertion of a nasogastric tube is one of the often painful and uncomfortable procedures carried out in the emergency department. Byers *et al.* [4], found an incidence of traumatic nasogastric intubations of 15% in 114 patients with hematochezia. Despite its low complication rate, the procedure is associated with multiple morbidities, some of them life threatening [5]. The aim of this study was to evaluate the sensitivity and negative predictive value of gastric aspirate in the evaluation of patients with upper GI bleeding.

## Methods

We carried out a retrospective cohort study involving patients initially admitted to our surgery division with a melena between the years 2010 and 2012. All patients underwent routine insertion of a nasogastric tube and examination of the aspirate as a part of their initial evaluation. Data were obtained from the medical charts and endoscopy reports. Age, sex, blood pressure, and hemoglobin on admission, initial clinical presentation of the bleeding, findings of the nasogastric aspirate and the source, and anatomical location of the bleeding as confirmed by upper endoscopy were noted. Patients with vomiting of blood or coffee ground were excluded from this study as well as patients with rectal bleeding and incomplete medical reports. Hemodynamic instability was defined as admission blood pressure of 90 mmHg and less. Statistical analysis included determination of specificity, sensitivity, and positive and negative predictive value. A *P*-value of less than 0.05 was considered statistically significant. This study was approved by the local ethics committee.

## Results

A total of 386 patients were included in the study. There were 232 men and 154 women. There were 279 (72.2%) patients with a NGA and 107 (27.8%) patients with blood or coffee ground in the nasogastric tube who comprised the PGA group. Table 1 shows the distribution of the final diagnoses in the two groups.

**Table 1** Distribution of the final diagnoses in the two groups

Diagnosis	Total	NGA	PGA	Sensitivity of NGA (%)
Gastritis and/or duodenitis	143	129	14	9.8
Duodenal ulcer	105	62	43	41.0
Gastric ulcer	73	42	31	42.5
Esophagitis	23	18	5	21.7
Gastric carcinoma	16	13	3	18.8
Angiodysplasias	7	4	3	42.9
Esophageal tumor	6	3	3	50
<sup>a</sup> Other	6	5	1	16.7
Esophageal varices	4	1	3	75
Mallory–Weiss tear	2	1	1	50
Normal study	1	1	0	
Total	386	279	107	28

NGA, negative gastric aspirate; PGA, positive gastric aspirate.

<sup>a</sup>Other findings were one each of gastric polyp, duodenal polyp, duodenal diverticulum, penetration of pancreatic carcinoma into the duodenal wall, anastomotic ulcer, and one patient who initially presented with melena; both upper and lower endoscopies were interpreted as normal.

The sensitivity of examination of nasogastric aspirate to establish the upper GI as the source of bleeding was only 28% and the negative predictive value of a NGA was less than 1%.

Nineteen of 107 (17.8%) patients with PGA were hemodynamically unstable compared with only 3.2% of those with NGA ( $P < 0.001$ ) (Table 2).

In the PGA group, 14 (5.02%) patients were admitted to the ICU because of GI bleeding compared with eight (7.48%) from 107 patients with NGA ( $P = 0.33$ ).

## Discussion

Acute GI bleeding is a common medical problem. Initial management of these patients includes resuscitation, identification of the source of bleeding, and an appropriate therapeutic plan. When the presenting symptom is hematemesis or coffee grounds, the diagnosis of upper GI bleeding is almost always confirmed. When the initial manifestation is melena, the source of the hemorrhage may be above or below the ligament of Treitz. The actual proportion of patients presenting with melena alone and finally diagnosed with lower GI bleeding is unknown. Ibach *et al.* [6] identified the source of hemorrhage in the lower GI tract in 37% of patients with melena and a non-diagnostic upper endoscopy examination. In 2009, Gayer *et al.* [7] found melena in 11% of 1112 patients with endoscopically confirmed lower GI bleeding. In this study, upper endoscopy was normal in only one of 386 patients presenting with melena.

**Table 2** Distribution of stable versus unstable patients in both groups

	Hemodynamically stable	Hemodynamically unstable	Total	P-value
PGA	88	19	107	< 0.0001
NGA	268	9	227	

NGA, negative gastric aspirate; PGA, positive gastric aspirate.

Insertion of a nasogastric tube has been recommended to differentiate between upper and lower GI bleeding and select the appropriate endoscopy examination [8]. This recommendation is justified by the belief that the presence of a PGA could dictate therapeutic decisions, such as referral of patients for early esophagogastroduodenoscopy, admission to an ICU, or early blood product administration. In this study, we did not find any difference in admissions to ICU because of bleeding between NGA and PGA groups.

However, several studies have questioned the clinical benefit of early gastroscopy. Targownik *et al.* [9], in a study of 169 patients, did not find any advantage for performing gastroscopy within 6 h of admission to the emergency room. Lim *et al.* [10] showed that early endoscopy does not have an effect on mortality in patients with low-risk nonvariceal bleeding. We found a significant difference in hemodynamic instability in patients with PGAs compared with those without blood or coffee grounds in the aspirate. However, there was no significant difference in those requiring care in the intensive care ward. In any case, hemodynamic instability and the decision to perform therapeutic procedures are usually determined by other clinical criteria and usually not influenced by evaluation of the aspirate.

Moreover, a negative aspirate does not exclude the presence of upper GI bleeding. The sensitivity of this procedure is low. A completely closed pylorus prevents duodenogastric reflux and a patient with no blood or coffee grounds in the nasogastric aspirate may actually have massive duodenal bleeding. In these cases, the addition of nasogastric lavage would not provide additional information. Rockey [2] showed that almost 20% of patients had active bleeding despite a clear nasogastric aspirate. The overall sensitivity of performing nasogastric aspirate reported in the literature is between 32 and 74% [5]. Witting *et al.* [3] studied 213 unselected patients with a sensitivity of only 42% for nasogastric aspirate. This figure is comparable with but still higher than our results, with only 28% of patients having a positive aspirate. The negative predictive value of a negative aspirate in our study was less than 1% and 72% of patients with a negative aspirate had an upper GI source of bleeding. Therefore, a NGA provides little or no benefit in ruling out significant upper GI bleeding and most probably has no effect on the clinical decision to perform gastroscopy.

## Conclusion

Most patients who initially presented with melena and were found to have upper GI bleeding had a NGA. Insertion of a nasogastric tube does not affect the clinical decision to perform upper endoscopy in patients with melena and should not be routinely carried out.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

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