

Impact of COVID-19 Pandemic and Lockdown on the Management of Upper Gastrointestinal Bleeding in the Emergency Department: A Cohort Study

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Abstract

Original Research Article

Background and study aims: During the COVID-19 pandemic, endoscopic procedures were associated with a high risk of SARS-CoV-2 infection. However, in cases of upper gastrointestinal bleeding (UGIB), priority should be given to early endoscopy. The aim of this study was to assess the impact of the pandemic and the lockdown on the performance of digestive endoscopy for UGIB. **Patients and methods:** This is a retrospective observational cohort of 350 patients, conducted between January 2019 and December 2020, in the emergency endoscopy department of our institution. We have divided our patients into two groups, according to the period in which they were admitted (respectively pre-pandemic and pandemic periods corresponding to the year 2019 and 2020), and we have split the pandemic period into 3 subgroups according to the lockdown, each of these 3 phases was compared to its counterpart of the pre-pandemic period by adapting the same dates. **Results:** There was no difference in the number of admissions for UGIB before and after the COVID-19 pandemic. However, patients admitted during the pandemic period were significantly older. Peptic ulcer remained the main cause of UGIB in both study periods, with a significant decrease in the pandemic period. The subgroups analysis of the pandemic and pre-pandemic period showed that patients admitted during the lockdown phase were significantly older, with a significant decrease in the ulcerative origin of UGIB and an increase in the need for endoscopic haemostasis procedures, whereas during the post-lockdown period, there was furthermore an increase in the number of patients with UGIB of neoplastic origin. **Conclusion:** Despite the current epidemiological context, digestive endoscopy must be performed within the usual timeframe while adopting adequate precaution measures. Our study suggest that the reorganisation of our endoscopy department during the pandemic was effective in coping with routine endoscopic emergencies during this constraining context.

Keywords: COVID-19, upper gastrointestinal bleeding, endoscopy.

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INTRODUCTION

Initially reported in China in December 2019, coronavirus disease (COVID-19) was quickly declared a public health emergency on January 30, 2020, and then a pandemic on March 11, 2020, by the World Health Organization. In Morocco, the first case was declared on the 2nd of March 2020, and to date, there are more than 500,000 infected individuals with a death toll of more than 9,000, and these numbers continue to rise.

Due to the virus pandemic evolution, a national lockdown was declared on the 20th of March 2020 to limit the disease spreading in the absence of effective treatment and vaccination at that time. This pandemic has challenged the usual healthcare services

around the world. Our national health system was put under strain, threatening its ability to provide adequate care, and became saturated with the lack of human and material resources to increase the healthcare capacity. Therefore, rescheduling any non-urgent intervention became our only option.

In our hospital, these changes have led to rearranging the patient's care priorities and strengthening the protective measures to reduce the risk of infection spreading.

One of the most affected activities by the new healthcare strategy was digestive endoscopy, which is a potentially aerosol-generating procedure, and considered to be at high risk of SARS-CoV-2 infection [1, 2]. For this aim, several recommendations have been

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published by various scientific societies at national and international levels, giving guidelines for the practice of endoscopy based on the evaluation of the procedure as an emergency, the stratification of the patient regarding the risk of infection with SARS-CoV-2, and the adequate use of personal protective equipment (PPE) [3, 4]. In our gastroenterology department, in accordance with the recommendations of the Moroccan Society of Digestive Endoscopy (S.M.E.D) [5], all non-emergency endoscopic procedures were temporarily suspended, giving priority to the performance of urgent procedures, especially in case of UGIB.

We report the experience of our emergency endoscopy department in the management of patients admitted for UGIB during the COVID-19 pandemic period. The aim of this study is to examine the impact of COVID-19 pandemic and lockdown on the number and characteristics of patients admitted and the endoscopies outcome performed for UGIB in our unit.

PATIENTS AND METHODS

Study design and participants

This retrospective observational cohort of 350 patients was conducted over a two-year period from January 2019 to December 2020 in the endoscopic emergency department of Mohammed V Military Hospital, Rabat, Morocco.

Methods and variables

The study included all patients admitted in the emergency department for UGIB.

We extracted demographic data (such as age and sex), clinical characteristics, endoscopic findings, and therapeutic data (endoscopic haemostasis procedure), from the endoscopy register of the emergency department.

The patients were divided into two groups, according to the period during which they were admitted (pre-pandemic and pandemic periods respectively corresponding to the year 2019 and 2020).

In order to evaluate our performance more precisely in this constrained context, we divided the pandemic period (2020) into 3 stages according to lockdown:

- Phase 1: pre- lockdown (from 01/01/2020 to 19/02/2020).
- Phase 2: national lockdown period (20/03/2020 to 30/06/2020).
- Phase 3: post- lockdown period (from 01/07/2020 to 30/12/2020).

Each one of these 3 phases was compared to its counterpart in the pre-pandemic period (2019) by considering the same dates.

Ethical considerations

Ethics committee approval was not required given the observational nature of the study and the use of anonymous clinical data for analysis.

Statistical analysis:

Descriptive data are presented as means (\pm standard deviation [SD]) for normally distributed continuous variables. Categorical variables were presented as counts and percentages.

The Chi-square test and Fisher's exact test were used to compare categorical variables. Student's t-test was used to compare the age of patients between each phase of the study.

A two-tailed P-value of <0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 22.0 program.

RESULTS

During the period under analysis 350 endoscopic procedures for UGIB were performed. Among these procedures, 169 were performed during the pandemic period.

Epidemiologically, the average age of our patients was 54 ± 13 years old, with extremes ranging from 17 to 90 years old, and the predominant age range was from 50 to 59 years old.

Our series was characterized by a clear male predominance estimated at 75.10%, that being a sex ratio of 3. This male predominance was linked with our medical facility's patient population, most of which are male military patients.

The clinical characteristics of the patients admitted during the two periods of the study are shown in Table 1. In fact, there was no difference in the number of endoscopies performed for UGIB between the two groups: 181 endoscopies (0.49 endoscopies/day) and 169 endoscopies (0.46 endoscopies/day) were performed during the pre-pandemic and pandemic phases, respectively ($p=0.66$). However, patients admitted during the pandemic period were significantly older (mean age 56.89 vs. 52.9 years, $p=0.004$). Peptic ulcer remained the most common cause of UGIB in both study periods; however, there was a significant decrease in the proportion of patients with ulcerative UGIB in the pandemic period (62.4% vs 47.3%, $p=0.005$). There was no significant difference in the other parameters studied, i.e. the sex of the patients, the other etiologies of UGIB (variceal haemorrhage, neoplastic haemorrhage, oesophagitis, angiodysplasia, Mallory-Weiss syndrome), as well as the percentage of patients who required endoscopic haemostasis.

The results of the subgroup analysis (the 3 phases) of the pandemic and pre-pandemic period are summarized in Tables 2, 3 and 4. During the pre-lockdown period, there was no significant difference between the two groups regarding the different parameters studied.

However, patients admitted during the lockdown phase were significantly older (mean age 58 vs. 52.79 years old, $p=0.038$), with a significant decline in the ulcerative origin of UGIB (46.2% vs. 71.8%, $p=0.037$) and they required more endoscopic

haemostasis procedures (65.4% vs. 35.9%, $p=0.02$). During this phase, two endoscopies were performed on two patients confirmed to have COVID-19 on nasopharyngeal swab by polymerase chain reaction (PCR). Both patients had no respiratory symptoms and presented with UGIB in the form of haematemesis. In the post-lockdown period, patients were significantly older (mean age 58.82 vs. 51.23 years old, $p<0.001$), with a significant decline in the ulcerative origin of UGIB (40.2% vs. 59.1%, $p=0.011$), and an increase in the percentage of UGIB of neoplastic origin (12% vs. 3.4%, $p=0.032$)

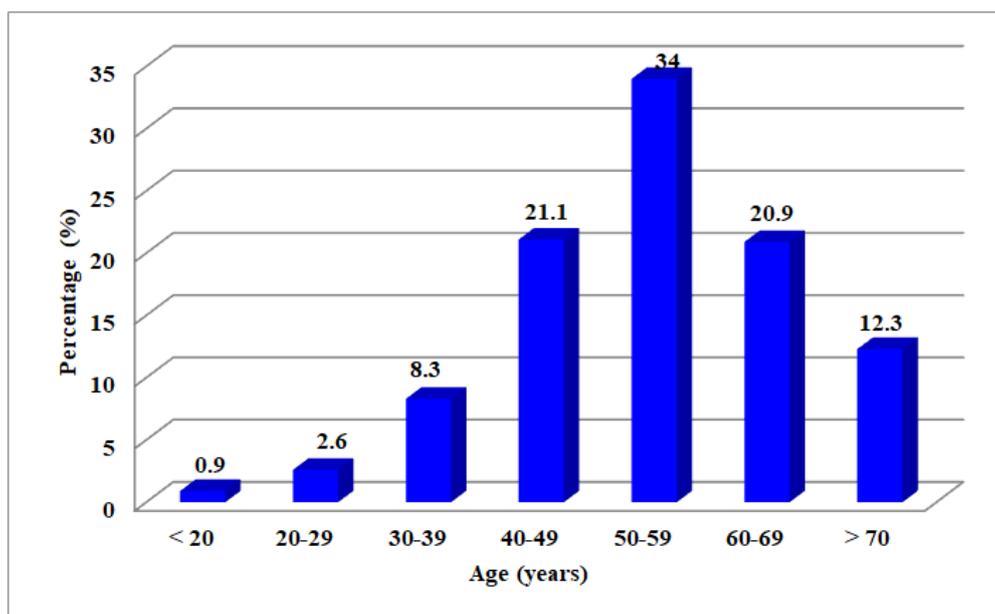


Fig 1: Distribution of patients by age group

Table 1: Epidemiological and clinical characteristics of patients hospitalized for UGIB according to the phase in which they were admitted

	Pandemic phase n = 169	Pre-pandemic phase n = 181	<i>p</i>
Age*	56.89 ± 13.83	52.9 ± 12.17	0.004
Gender (male) *	124	139	0.459
Number of endoscopy	169	181	0.66
Causes of UGIB:			
Ulcerative origin **	80 (47.3)	113 (62.4)	0.005
Varicose origin **	33 (19.5)	24 (13.3)	0.113
Neoplastic origin **	18 (10.7)	13 (7.2)	0.254
Esophagitis **	11 (6.5)	10 (5.5)	0.698
Angiodysplasia **	6 (3.6)	4 (2.2)	0.531
Mallory-Weiss syndrome **	5 (3)	4 (2.2)	0.744
Others**	6 (3.6)	5 (2.8)	0.673
No lesion **	10 (5.9)	8 (4.4)	0.526
Haemostasis procedure **	68 (40.2)	60 (33.1)	0.169

* Mean ± standard deviation

** counts (percentage)

Table 2: Epidemiological and clinical characteristics of patients hospitalized for UGIB during the lockdown phase

	Phase A n = 26	Phase B n = 39	p
Age*	58 ± 8.76	52.79 ± 10.51	0.038
Gender (male) *	21 (80.8)	31 (79.5)	0.899
Number of endoscopy	26	39	0.34
Causes of UGIB:			
Ulcerative origin **	12 (46.2)	28 (71.8)	0.037
Varicose origin **	6 (23.1)	5 (12.8)	0.325
Neoplastic origin **	1 (3.8)	4 (10.3)	0.544
Esophagitis **	2 (7.7)	0 (0)	0.156
Angiodysplasia **	3 (11.5)	2 (5.1)	0.382
Mallory-Weiss syndrome **	1 (3.8)	0 (0)	0.4
Haemostasis procedure **	17 (65.4)	14 (35.9)	0.02

* Mean ± standard deviation

** counts (percentage)

Table 3: Epidemiological and clinical characteristics of patients hospitalized for UGIB during the post-lockdown phase

	Phase A n = 92	Phase B n = 88	p
Age*	58.82 ± 15.86	51.23 ± 12.4	<0.001
Gender (male) *	66 (75)	63 (68.5)	0.332
Number of endoscopy	92	88	0.34
Causes of UGIB:			
Ulcerative origin **	37 (40.2)	52 (59.1)	0.011
Varicose origin **	19 (20.7)	11 (12.5)	0.142
Neoplastic origin **	11 (12)	3 (3.4)	0.032
Esophagitis **	5 (5.4)	5 (5.7)	0.598
Angiodysplasia **	1 (1.1)	0 (0)	0.511
Mallory-Weiss syndrome **	3 (3.3)	4 (4.5)	0.716
Haemostasis procedure **	28 (30.4)	23 (26.1)	0.522

* Mean ± standard deviation

** counts (percentage)

Table 4: Epidemiological and clinical characteristics of patients hospitalized for UGIB during the pre-lockdown phase

	Phase A n = 51	Phase B n = 54	p
Age*	52.86 ± 11.29	54.33 ± 11.14	0.503
Gender (male) *	40 (78.4)	42 (77.8)	0.935
Number of endoscopy	51	54	0.34
Causes of UGIB:			
Ulcerative origin **	31 (60.8)	33 (60.1)	0.973
Varicose origin **	8 (15.7)	8 (14.8)	0.901
Neoplastic origin **	5 (9.8)	6 (11.1)	0.827
Esophagitis **	4 (7.8)	5 (9.3)	0.537
Angiodysplasia **	2 (3.9)	2 (3.7)	0.669
Mallory-Weiss syndrome **	1 (2)	0 (0)	0.486
Haemostasis procedure **	23 (45.1)	23 (42.6)	0.796

* Mean ± standard deviation

** counts (percentage)

DISCUSSION

Based on the results of our study, we noted no change in the number of hospitalizations for UGIB before and after the COVID-19 pandemic. This result was indeed our objective because emergency procedures, by definition, cannot be delayed and can

occur independently of the pandemic context, and UGIB was certainly not the exception. This objective would not have been reached without the reorganization of our service during the pandemic. Indeed, the measures implemented have allowed us to support the usual workload of endoscopic emergencies, in notably the creation of a pathway dedicated to SARS-CoV-2-

positive patients, the development of adequate training with appropriate instructions to the staff, and an adequate policy for the use of personal protective equipment (PPE), which has allowed us to avoid the risk of virus spreading among patients and operators. And so far, we have not had any documented cases of SARS-CoV-2 infection in patients or staff related to our endoscopic procedures.

During this pandemic phase, the patients admitted for UGIB were older with a significant decline in the ulcer origin of the bleeding. The reasons of this decrease are not clear. However, the lifestyle changes observed during this period, notably social distancing, as well as home confinement and the change in eating habits that it implies, could possibly explain part of this decrease. The stress factor must also be taken into account. In our study, as in other reports [6], ulcerative GI bleeding is the most common cause of UGIB. It is possible that in recent years the fact that lifestyle and stress-related factors contributing to digestive tract disorders, including peptic ulcer disease, has been rather ignored [7]. This is in accordance with our findings and might confirm the hypothesis that stress-related factors contributing to peptic ulcer disease might have influenced our results. In particular, variceal bleeding was not affected neither by the pandemic nor by the lockdown.

Subgroup analysis of the pandemic period showed that patients admitted during the lockdown phase were significantly older, with a significant decrease in the ulcerative origin of UGIB and an increase in the need for endoscopic haemostasis procedures, which reflects our policy of assessing urgency of the procedure in this challenging context. Furthermore, there has been an increase in the number of patients with UGIB of neoplastic origin during the post-lockdown period. The reasons for this increase are not clearly understood, but could be explained by the difficulties of travel and access to health services throughout the lockdown period, patients's fear of the risk of SARS-Cov 2 transmission in hospitals, and their reluctance to consult during the lockdown in the presence of certain symptoms considered to be trivial, particularly in the case of mild digestive haemorrhage, which led to their delayed consultation.

The impact of the COVID-19 pandemic on the management of UGIB in the emergency department has been reported in several other studies, including one conducted in Italy, one of the most affected countries by COVID-19. The study reports the experience of the emergency endoscopy department of St. Orsola University Hospital in Bologna, which showed no significant difference in the number of endoscopic procedures performed during the pandemic period compared with the same period of the previous year [8], which conforms to our findings in this study.

From the same perspective, a multicentre study conducted in Austria among 98 hospitals performing emergency digestive endoscopies showed, contrary to our study, a 40.7% reduction in cases of UGIB during the period of national lockdown. This reduction was notable for non-varicose haemorrhages, while varicose haemorrhages remained stable [9], the latter being a common point with our study.

Another multicentric study was conducted in Hong Kong involving 2,416 patients admitted with UGIB, including 824 hospitalizations during the COVID-19 period, to assess the impact of the first wave of COVID-19 on the number and characteristics of patients with UGIB. The study found a slight but significant reduction in hospitalizations for UGIB in Hong Kong during the initial phase of COVID-19, followed by a rebound of this number at week 14 of the first COVID-19 case, which also coincided with the end of the first wave of COVID-19 in Hong Kong. Patients admitted during the COVID-19 pandemic were found to be older with lower hemoglobin levels. There was also a higher proportion of variceal bleeding during this period. [10].

A study conducted at 2 hospitals in New York City, one of the epicentres of the COVID-19 pandemic, showed that patients admitted during the pandemic with UGIB had severe symptoms, even those not affected by SARS-CoV-2. As they had more concerning laboratory findings on admission, were less likely to undergo inpatient endoscopy, more likely to be transfused, and had increased hospital length of stay than those admitted before the pandemic [11].

The strength of our study was the use of a complete database that collected all patients's informations admitted to our hospital for UGIB during the study period. In addition, to have a more accurate analysis and to evaluate the impact of lockdown on the management of UGIB in the emergency department, we compared the 3 phases of the COVID 19 pandemic, with the same periods of the previous year. The limitations of our study lie firstly in its retrospective nature, secondly, in the eventual lack of information concerning patients with UGIB not hospitalized in our institution during this period and those admitted to other hospital structures that are more accessible.

In conclusion, UGIB is a diagnostic and therapeutic emergency that can be life-threatening. Despite the current epidemiological context and the fact that digestive endoscopy is a potentially aerosol-generating procedure with a high risk of SARS-CoV-2 contagion, it must be performed within the appropriate time frame and with adequate precautions to ensure the safety of the patient and medical staff. The results of our study suggest that the reorganisation of our endoscopy department during the COVID-19 pandemic was effective and enabled us to handle the usual

workload of endoscopic emergencies during this challenging context. However there was a change in the characteristics and outcome of endoscopy during this period. In fact, we noted that during the lockdown and post-lockdown phase patients admitted for UGIB were older with a significant decrease in the ulcerative origin of the bleeding, whereas during the post lockdown period there was an increase in the number of patients presenting UGIB with a neoplastic origin.

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Conflicts of Interest: We have no known conflict of interest to disclose.

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