




## Research



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## Contribution of esophagogastroduodenoscopy in the investigation of iron deficiency anaemia at the Sikasso Hospital

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## Abstract

**Introduction:** iron deficiency is the most widespread nutritional deficit worldwide and is estimated to affect 1 billion people. The objective of our work was to determine the value of esophagogastroduodenoscopy in the diagnosis and management of iron deficiency anaemia at the Sikasso hospital. **Methods:** this was a retrospective, descriptive study conducted between November 2016 and March 2018 in the hepato-gastroenterology unit of Sikasso hospital. Data from patients with iron deficiency anaemia who did esophagogastroduodenoscopy (EGD) with gastric biopsies were used. These data were entered in Excel then analysed with the version 7.0 of the Epi-info software. **Results:** a total of 57 patients were included in our study. The average age was 40.2 years (16-83). The sex ratio (male/female) was 0.5. The esophagogastroduodenoscopy performed revealed antropfundic gastritis (80.70%), bulbar ulcer (5.26%), chronic gastric ulcer (1.75%), budding gastric process (2 cases) and grade I oesophageal varicose veins (2.50%). The anatomo-pathological examinations carried out revealed helicobacter pylori in 31 patients, chronic antritis (57.89%), chronic funditis (49.12%), non-specific interstitial duodenitis (43.85%) and villous atrophy (31.57%). Celiac disease was reported in 5.26%, gastric kitten ring cell tumour was present in 1 patient. **Conclusion:** in this study, the esophagogastroduodenoscopy performed greatly contributed to the diagnosis of the recorded cases of iron deficiency anaemia. The realization of biopsies in the recorded cases was decisive in the obvious diagnosis of the pathologies in question.

## Introduction

Anaemia is defined by the World Health Organization as haemoglobin concentration of less than 13 g/dl in men and 12 g/dl in women. Iron deficiency is one of the most common causes of chronic anaemia, estimated to affect around 15-30% of the world's population [1,2]. It has

enormous aetiologies and affects all age groups on a planetary scale. The etiological diagnosis is not always obvious but more often of digestive origin. The most common aetiology is chronic bleeding. Esophagogastroduodenoscopy is a para-clinical tool that allows an effective exploration of the upper digestive sphere in search of lesions very often the cause of occult and chronic bleeding. Its association with gastric and/or duodenal biopsies often makes the diagnosis obvious. Iron deficiency is the most widespread nutritional deficit worldwide and is estimated to affect 1 billion people [3,4]. In 2006, the national health nutrition study (NHNS), involving a sample of 3,100 adults' representative of the French population estimated that the total iron depletion evaluated by ferritin of less than 15 µg/l affected 5.1% of adults between the ages of 18 to 74 years old, while low reserves, evaluated by a ferritin between 15 and 30 µg/l, were found in 10.5% of cases [5].

In West Africa, some studies reported that 22 to 78% of pregnant women were anaemic [6] while others reported up to 99% [7]. In Mali, work on anaemia showed its importance in both rural and urban areas. A 2005 survey in Bamako district reported that 73% of anaemia cases in women are largely due to iron deficiency [8]. Another survey conducted in Bandiagara showed a prevalence of 40.1% among pregnant women, including 12.8% among first-time mothers [9]. Also, another study aiming to assess the frequency of anaemia during pregnancy in 52 women living in two villages in Mali showed that 65% of pregnant women and 58% of non-pregnant women in the control group were anaemic [10]. Another more recent study in Bamako showed that 58.4% of pregnant women were anaemic, or more than one in two women [11]. We carried out this study in order to determine the value of esophagogastroduodenoscopy in the diagnosis and management of iron deficiency anaemia at the Sikasso hospital.

## Methods

**Study design:** a retrospective, descriptive study was conducted to determine the value of esophagogastroduodenoscopy in the diagnosis and management of iron deficiency anaemia at the Sikasso Hospital.

**Study setting and population:** the Sikasso region which is the 5<sup>th</sup> administrative region of Mali has 10 health districts and a regional hospital. Regional hospitals are the 2<sup>nd</sup> level of health reference in Mali. This study, conducted between November 2016 and March 2018 in the hepatogastroenterology unit of Sikasso Hospital was focused on patients referred for esophagogastroduodenoscopy for the exploration of anaemia. Data from patients with iron deficiency anaemia who performed esophagogastroduodenoscopy (EGD) with systematic gastric biopsies (two antral biopsies, two fundal biopsies and duodenal biopsies) were used. Patients who performed the EGD without a biopsy and those with an incomplete file were not included.

**Data sources and means of collection:** the data sources were the digestive endoscopy and anatomo-pathological examinations registers and medical records. A standardized questionnaire was used for data collection.

**Variables:** variable included age, sex, the results of EGD such as erythematous gastritis, lumpy gastritis, petechial gastritis, ulcerative gastritis, chronic gastric ulcer, gastric budding process, crenellated duodenal mucosa, rarefied duodenal folds, squamous appearance duodenal mucosa, bulbar ulcer, uncomplicated hiatus hernia, reflux esophagitis, grade I esophageal varicose veins. Also, variables included histological data from gastric and duodenal biopsies such as the presence of helicobacter pylori, villous atrophy, chronic antritis, chronic funditis and celiac disease.

**Data collection procedure:** data were collected from medical records, digestive endoscopy and

anatomopathological examination records. The data were then transcribed into questionnaires drawn up for this purpose. Then they were entered into Microsoft Excel.

**Sample size:** the study being descriptive, there was no calculation for the sample size. A total of 219 files were exploited for this study. Among the 219 files, only 57 met the inclusion criteria. The study therefore involved 57 patients in question.

**Statistical analysis:** the collected data was analysed with the Epi-info version 7 software. Given the purpose of the study and the small sample size, the data analysis was based on descriptive analysis. The quantitative variables were described as mean plus extreme and qualitative variables in terms of percentage.

**Ethical aspect:** the verbal agreement of patients on the use of their medical data in order to contribute to the dissemination of scientific data has been obtained.

## Results

**Socio-demographic characteristics:** fifty-seven patients taking the inclusion criteria were included in this study after initial analysis of 219 dossiers. The average age was 40.2 years (range 16-83 years) with a female predominance (66.6%).

**Results of esophagogastroduodenoscopy (EGD):** the results of the EGD done were pathological in 54 patients (94.6%). It objectified antro-fundic gastritis in 80.70% of cases including erythematous gastritis in 75.43% of cases, nodular gastritis in 12.2% of cases and petechial gastritis in 7.01%. Also, ulcerative gastritis was found in 3 patients (5.26%), a crenelated appearance of the duodenal mucosa in 17% of cases, rarefaction of the duodenal folds in 5 patients (8.77%), a squamous appearance of the duodenal mucosa in 3.35% of cases, villous atrophy in 2 cases, uncomplicated hiatus hernia in 10.52% of cases and reflux esophagitis in 4 patients. Bulbar ulcer in 3 patients (5.26%), chronic gastric ulcer in 1.75%

of cases, gastric budding process in 2 cases, grade I oesophageal varices in 2.50% of cases were also observed in the EGD (Table 1).

**Data of anatomo-pathological examinations:** all the patients included in our study had carried out anatomo-pathological examinations. These examinations revealed helicobacter pylori in 31 patients (54.38%), chronic antritis in 57.89% of cases, chronic funditis in 49.12% of cases, nonspecific interstitial duodenitis in 43, 85% of cases and villous atrophy in 18 patients (31.57% of cases). Celiac disease was reported in 5.26% of cases, gastric kitten ring cell tumour was present in one patient (Table 2).

## Discussion

In this study, we will mainly discuss the diagnostic strategy for iron deficiency anaemia with upper gastrointestinal endoscopy in relation to clinical and biological data for the simple fact that it is the only endoscopic tool currently available in our establishment. According to the high authority for health/service of evaluations of professional acts in its report of March 2011, the search for iron deficiency constitutes an essential step in the aetiological exploration of anaemias, in particular microcytic anaemia for which iron deficiency anaemia (anaemia iron deficiency) and/or inflammatory is suspected. The challenge is to recognize the iron deficiency component so as not to ignore a bleeding digestive lesion, and to correct the iron deficiency in order to improve clinical symptoms [12]. In our study, esophagogastroduodenoscopy found 94.6% of lesions which could explain the origin of the iron deficiency anaemia, i.e. 54 cases. Iron deficiency anaemia results from one of the following three main mechanisms: i) either a deficiency of intake linked to an unsuitable diet, duodenal malabsorption; ii) either there is an increase in needs in relation to growth, especially in children, pregnancy, etc; iii) or finally an increase in losses linked to occult or gynaecological digestive bleeding, inadequate blood donation.

The importance of prioritizing the means of endoscopic exploration for iron deficiency anaemia was reviewed in the recent British recommendations on the exploration for iron deficiency anaemia vol. 21 No. 9, November 2014 "Iron deficiency anaemia has a prevalence of 2 to 5% in men and postmenopausal women and is a frequent cause of gastroenterology consultations. These recent recommendations can help us prioritize our endoscopic investigations knowing that iron deficiency anaemia of gastrointestinal origin is most often due to blood loss in colon cancer or gastric cancer and to malabsorption in celiac disease [13]. In fact, in the literature review, digestive lesions are less frequent in the colon (18 to 30% of cases) than in the upper digestive tract (41 to 60% of cases) [14-23]. The average age of our patients was 40.2 years with extremes of 16 years and 83 years. A female predominance (38/19) was noted with a sex ratio F/M of 2. Sex with a predominance especially in sexually active women linked to pregnancy, breastfeeding and menstruation [7], due to an increase in iron requirements. Our series corroborates this frequency of the female sex (38 women/19 men) found in the literature, in particular in the study by Ruivard with 62.37% of women [24]. This could be explained in our series by the low socio-economic level, the insufficiency of awareness campaigns for women of childbearing age, the lack of regular monitoring and the presence of taboos in some regions. In our series, the results of EGD were pathological in 94.6% of cases with polymorphism of the lesions of the oesophageal gastroduodenal mucosa. Our data are comparable to those found in the literature because several studies have shown that even in the absence of anaemia, upper endoscopy diagnoses numerous lesions responsible for bleeding [25-27].

In a recent study [28], upper endoscopy alone made it possible to establish an etiological diagnosis in 98% of cases of anaemia associated with digestive signs or occult digestive bleeding in patients over 85 years of age. Our data are comparable to those found in this study despite the age differences. In a study carried out in 111



premenopausal women with a mean age of 42.5 years who had a high and low endoscopic workup for iron deficiency anaemia, the rate of lesions responsible for the anaemia was 20% (22/111) with 13% of high causes, mainly erosive lesions, and 7% of low causes including 2.7% of cancers. In this series, the presence of digestive symptoms, occult digestive bleeding and weight loss were significantly associated with the presence of endoscopic lesions [29]. The rate of the various gastroduodenal lesions observed in our cohort was much higher (94.6% against 20%) than that of this series, but this fact is explained in our study by the diversity of patients although there is a concordance in the mean age in the two series. In our series, this is explained on the one hand by the excessive use of NSAIDs by some patients and most often by self-medication and on the other hand by certain pathologies causing digestive lesions. In our cohort, histological results of gastric biopsies revealed *Helicobacter pylori* in 31 patients (54.38%).

During the endoscopic workup, the performance of systematic duodenal and gastric biopsies is fundamental since a rate of approximately 6% of celiac disease and 16% of *Helicobacter pylori* gastritis have been reported in a study of 116 premenopausal women of average age 33 years [30]. Compared to this series, our histological data on the prevalence of *Helicobacter pylori* are significantly higher, due to the monomorphism of their sampling despite its size and average age. Celiac disease was noted in 3 patients, this means 5.26% of our cohort. During the endoscopic assessment, performing systematic bulbo-duodenal and gastric biopsies is recommended, since 6% of celiac disease and 16% of *Helicobacter pylori* gastritis have been reported in a study involving 116 pre-menopausal women of same age average 33 years [30]. Our data agree with those in this series although it was only done in pre-menopausal women. In general, the rate of celiac disease found in our study is consistent with the data in the literature [31,32].

## Conclusion

Upper gastrointestinal endoscopy revealed several gastroduodenal lesions that could largely explain the origin of occult bleeding and the performance of biopsies was decisive in the definite diagnosis of the pathologies in question. All the clinical and para-clinical results have been of capital importance in the management of these iron deficiency anaemias.

### *What is known about this topic*

- *Iron deficiency anaemia is a frequent situation among the causes of anaemia of digestive origin and deficiency causing a fairly considerable morbidity and mortality rate in the groups that are exposed hence the need for a precise diagnosis for better management. Among the diagnostic tools, EGD is the first-line examination.*

### *What this study adds*

- *Our study confirmed the results of other previous studies in the field and allowed us to contribute our experience in this area, to help improve the care of patients suffering from deficiency anemia. It should also be noted that this study allowed us to develop some experience in the methods of recruiting patients for such an exploration because the EGD has always been a difficult examination to accept and especially to bear by patients because of the inconvenience it causes.*

## Competing interests

The authors declare no competing interests.

## Authors' contributions

Oumar Traore: study design, data collection, edition of the final report and edition of this manuscript; Abdoul Salam Diarra: study design,

data statistical analysis, edition of the final report and edition of this manuscript; Tawfiq Abu: reviewing and translating the manuscript in English; Kalba Tembiné, Kadidiatou Cissé, Salia Keita, Saidou Touré, Ibrahim Coulibaly, Ahmadou Ibrahim Dramé, Souleymane Sidibé, Korotoumou Wélé Diallo, Théodore Habib Maxime Coulibaly and Moussa Diarra: reviewing the article. All the authors have read and agreed to the final manuscript.

## Tables

**Table 1:** breakdown of endoscopy results (n=57)

**Table 2:** breakdown of histology results (n=57)

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**Table 1: breakdown of endoscopy results (n=57)**

Results of EGD	Number (N)	Percentage (%)
Erythematous gastritis	43	75.43
Lumpy gastritis	7	12.2
Petechial gastritis	4	7.01
Ulcerative gastritis	3	5.26
Chronic gastriculcer	1	1.75
Gastric budding process	2	3.50
Crenellated duodenal mucosa	9	17
Rarefied duodenal folds	5	8.77
Squamous appearance duodenal mucosa	2	3.50
Villous atrophy	2	3.50
Bulbar ulcer	3	5.26
Uncomplicated hiatus hernia	6	10.52
Reflux esophagitis	4	7.01
Grade I esophageal varices	2	3.50



**Table 2: breakdown of histology results (n=57)**

Biopsies	Results	Number (N)	Percentage (%)
Gastric biopsies	Helico bacter pylori positive	31	54.38
1 antral biopsy	Chronic antritis	33	57.89
1 fundal biopsy	Chronic funditis	28	49.12
1 angulusbiopsy	Gastric tumour	1	1.75
Duodenal biopsies	Nonspecific interstitial duodenitis	25	43.85
	Villous atrophy	18	31.50
	Celiac disease	3	5.26