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Dysphagia in Endoscopic Practice: Etiologies and Factors Associated with Esophageal Cancer in Bouaké (Côte d'Ivoire)

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Abstract

Objective: To determine the etiologies of dysphagia and identify factors associated with the occurrence of esophageal cancer in Bouaké. **Methods:** This was a retrospective descriptive and analytical study conducted over a five-year period in three digestive endoscopy centers in Bouaké. All patients aged over 18 years who underwent upper gastrointestinal endoscopy for dysphagia were included. Sociodemographic, clinical, and endoscopic data were collected and analyzed using SPSS software. Univariate analysis followed by multivariate logistic regression was performed to identify factors associated with esophageal cancer, with a significance level set at $p < 0.05$. **Results:** A total of 163 patients were included out of 6,183 endoscopies performed, corresponding to a prevalence of 2.6%. The mean age was 49.8 ± 17.6 years, with a male predominance (54%). Inflammatory lesions were the most common etiology (21.5%), followed by esophageal cancer (15.3%). Esophageal cancer was significantly associated with age ≥ 50 years (adjusted OR = 6.84; 95% CI: 1.82 - 25.68; p = 0.004), smoking (adjusted OR = 3.91; 95% CI: 1.36 - 11.21; p = 0.011), and undernutrition (adjusted OR = 2.87; 95% CI: 1.08 - 7.63; p = 0.034). Alcohol consumption was not independently associated after adjustment. **Conclusion:** Dysphagia is mainly caused by inflammatory conditions but remains frequently associated with esophageal cancer. Age, smoking, and poor nutritional status appear to be major factors associated with esophageal cancer. These findings highlight the importance of early upper gastrointestinal endoscopy in patients presenting with dysphagia, particularly in the presence of risk factors.

Keywords

Dysphagia, Upper Gastrointestinal Endoscopy, Esophageal Cancer, Risk Factors, Sub-Saharan Africa

1. Introduction

Dysphagia is defined as difficulty or discomfort during swallowing, reflecting an impairment in the transit of the food bolus from the oropharynx to the stomach. It is a common symptom in gastroenterology and represents a major indication for upper gastrointestinal endoscopy, which is a key investigation in the assessment of esophageal disorders [1]. The etiologies of dysphagia are diverse, including both functional and organic causes. Organic causes are mainly dominated by esophageal strictures, severe esophagitis, sequelae of caustic ingestion, and malignant tumors of the esophagus. In low-resource settings, particularly in sub-Saharan Africa, certain etiologies show specific patterns related to the socio-economic context. Caustic injuries therefore represent a frequent cause of dysphagia, due to domestic exposure to corrosive substances and inadequate storage conditions [2]. Several African studies have demonstrated that upper gastrointestinal endoscopy helps to clarify the causes of dysphagia and reveals a substantial proportion of normal findings, suggesting the presence of functional or motility disorders that are not detectable by endoscopy [3] [4]. These findings highlight the importance of endoscopy as a first-line investigation in the evaluation of dysphagia in clinical practice. However, in any patient presenting with dysphagia, the clinician's primary concern remains the possibility of esophageal cancer, a condition characterized by late diagnosis and poor prognosis. Globally, esophageal cancer is one of the most aggressive gastrointestinal malignancies, with high mortality. In Africa, it represents a growing public health concern, with a notable incidence in certain regions and a diagnosis frequently made at an advanced stage [5]. Several risk factors have been identified in the pathogenesis of esophageal cancer, including alcohol consumption, tobacco use, nutritional deficiencies, and dietary habits. In African populations, these factors are often associated with unfavorable socio-economic conditions, contributing to both the occurrence and progression of the disease [6] [7]. The combined effect of alcohol and tobacco plays a major role in esophageal carcinogenesis, particularly in squamous cell carcinoma, which is the predominant histological type in Africa [8]. In Sub-Saharan Africa, dysphagia often represents the initial presenting symptom of esophageal cancer, reflecting delayed diagnosis. Several studies have shown that limited access to specialized healthcare facilities and endoscopic examinations contributes significantly to this diagnostic delay [5] [9]. In Côte d'Ivoire, particularly in the city of Bouaké, data on the etiologies of dysphagia and factors associated with esophageal cancer remain scarce. A better understanding of these aspects could improve diagnostic strategies and strengthen preventive measures. Thus, the aim of this study was to

identify the etiologies of dysphagia and determine the factors associated with the diagnosis of esophageal cancer in patients undergoing upper gastrointestinal endoscopy in the city of Bouaké.

2. Patients and Methods

This was a retrospective, descriptive, and analytical study conducted in three digestive endoscopy centers in the city of Bouaké, Côte d'Ivoire. The study was carried out over a five-year period, from January 1, 2018, to December 31, 2022. Data were collected from upper gastrointestinal endoscopy registers and patients' medical records in these facilities. The study population consisted of all patients who underwent upper gastrointestinal endoscopy for dysphagia during the study period. Inclusion criteria were patients of either sex, aged over 18 years, presenting with dysphagia as the primary indication for upper gastrointestinal endoscopy, and whose medical records contained complete and usable clinical and endoscopic data. Patients under 18 years of age, those whose indication for endoscopy was not dysphagia, and those with incomplete or unusable records were excluded. In this study, dysphagia was defined as a subjective sensation of difficulty experienced by the patient during the passage of the food bolus from the oral cavity to the stomach, involving solids, liquids, or both. Data were collected using a standardized data collection form derived from medical records and endoscopy registers. The variables studied included sociodemographic characteristics (age, sex, occupation, and place of residence), clinical data (alcohol consumption, smoking status, and Body Mass Index [BMI]), and endoscopic findings, including the identified cause of dysphagia when applicable. Alcohol consumption was defined as any reported regular intake of alcoholic beverages as documented in the medical records, without reliable quantification due to the retrospective design. Smoking status was categorized as current smoker, former smoker, or non-smoker based on patient's self-report recorded at admission. However, in our study, current smokers and former smokers were grouped together and classified as smokers, without taking pack-year exposure into account. Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m^2) and categorized according to World Health Organization criteria: underweight (<18.5 kg/m^2), normal weight (18.5 - 24.9 kg/m^2), overweight (25 - 29.9 kg/m^2), and obesity (≥ 30 kg/m^2). Weight and height measurements were obtained during the initial clinical assessment at admission, prior to the endoscopic procedure. Risk factors were defined as regular alcohol consumption reported in the medical record and current or past smoking. Fungal esophagitis was suspected based on the presence of characteristic whitish plaques or pseudo-membranes adherent to the esophageal mucosa. Viral esophagitis was suggested by the presence of ulcerative lesions, typically well-circumscribed or volcano-like ulcers, depending on the suspected etiology. The diagnosis of esophageal cancer was established based on suggestive endoscopic findings confirmed by histopathological examination of biopsy specimens. The primary outcome variable was the presence of esophageal cancer

in patients undergoing endoscopic evaluation for dysphagia. Data were entered and analyzed using SPSS software, version 2022. Quantitative variables were expressed as means with ranges, while qualitative variables were presented as frequencies and proportions. Associations between explanatory variables and the presence of esophageal cancer were assessed using the chi-square (χ^2) test. Statistical significance was set at $p < 0.05$. Variables with a p-value < 0.2 in univariate analysis were included in a multivariate logistic regression model. All data were collected anonymously and confidentially from medical records. This retrospective study was conducted using anonymized medical records, without direct patient contact or any intervention in patient management, and was carried out in accordance with the principles of the Declaration of Helsinki. Authorization to access the medical records was obtained from the Medical and Scientific Directorate of the supervising hospital administration, and all data were handled confidentially.

3. Results

A total of 6,183 patients underwent upper gastrointestinal endoscopy during the study period. Among the 174 identified cases of dysphagia, 163 had complete and usable records and were included in the study, corresponding to a prevalence of 2.6%. The mean age of the patients was 49.8 ± 17.6 years, with a range of 18 to 87 years. The most represented age groups were 30 - 50 years and 50 - 70 years, accounting for 34.4% and 33.7% of cases, respectively. Males accounted for 54.0% of the study population, corresponding to a sex ratio of 1.17. Urban residents represented more than two-thirds of the cases (67.5%). Housewives were the most represented occupational group (25.2%), followed by farmers (17.1%). The sociodemographic characteristics of the study population are summarized in **Table 1**.

Table 1. Sociodemographic characteristics of patients.

Variables	Number (n)	Percentage (%)
Sex		
Male	88	54.0
Female	75	46.0
Age		
<50 years	81	49.7
≥50 years	82	51.3
Residence		
Urban	110	67.5
Rural	53	32.5
Occupation		
Unemployed	11	6.7
Trader	20	12.3

Continued

Farmer	28	17.2
Civil servant	23	14.1
Housewife	41	25.2
Worker	17	10.4
Student	10	6.1
Retired	13	8.0
Employment sector		
Formal	46	28.3
Informal	106	65.0
Unemployed	11	6.7

Patients working in the informal sector accounted for 65% of cases. A history of significant alcohol consumption was reported in 27.6% of patients, while 20.9% were confirmed smokers. Combined alcohol and tobacco use was observed in 12.9% of the study population. The risk factors identified in our patients are summarized in Table 2. Nutritional status was normal in 51.5% of patients; however, 22.1% were undernourished. The assessment of the patients' nutritional status is presented in Table 3. Only 17.2% of patients required hospitalization. In the majority of cases, lesions were located exclusively in the lower third of the esophagus. Lesions were extensive in 22% of cases. Inflammatory lesions (esophagitis) accounted for 21.5% of cases, while 15.3% were tumoral lesions suggestive of malignancy, subsequently confirmed by histopathological examination. Endoscopic findings and their anatomical locations are listed in Table 4.

Table 2. Distribution of patients according to risk factors.

Variables	Number (n)	Percentage (%)
Alcohol consumption		
Yes	45	27.6
No	118	72.4
Smoking status		
Yes	34	20.9
No	129	78.5

Table 3. Distribution of patients according to nutritional status.

Variables	Number (n)	Percentage (%)
Nutritional status (BMI)		
Underweight	36	22.1
Normal	84	51.5
Overweight	25	15.3
Obese	18	11.1

Table 4. Endoscopic findings and lesion characteristics.

Variables	Number (n)	Percentage (%)
Lesion location		
Upper third	26	16.0
Middle third	44	27.0
Lower third	57	35.0
Extensive lesions	36	22.0
Endoscopic findings		
Inflammatory lesions (esophagitis)	35	21.5
Fungal infection	15	9.2
Esophageal cancer	25	15.3
Megaesophagus	13	8.0
Caustic lesions	12	7.4
Viral lesions	6	3.7
Other lesions*	9	5.5
Normal endoscopy	53	32.5

*Other lesions included Zenker's diverticulum, foreign bodies, and congenital stenosis.

Univariate analysis showed a significant association between age over 50 years, alcohol consumption, smoking, and weight loss with the presence of esophageal cancer in patients presenting with dysphagia. Multivariate analysis demonstrated that esophageal cancer was independently associated with age ≥ 50 years (adjusted OR = 6.84; 95% CI: 1.82 - 25.68; p = 0.004), smoking (adjusted OR = 3.91; 95% CI: 1.36 - 11.21; p = 0.011), and underweight status (adjusted OR = 2.87; 95% CI: 1.08 - 7.63; p = 0.034). The findings from the univariate and multivariate analyses are reported in Tables 5 and Table 6, respectively.

Table 5. Univariate analysis of factors associated with esophageal cancer.

Variables	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Male sex	1.54	0.64 - 3.69	0.32
Age ≥ 50 years	8.92	2.56 - 31.02	<0.001
Alcohol consumption	2.51	1.02 - 6.19	0.044
Smoking	5.32	2.06 - 13.73	<0.001
Underweight (BMI)	4.78	1.95 - 11.69	<0.001
Informal sector	1.63	0.53 - 5.00	0.39

Table 6. Multivariate analysis of factors associated with esophageal cancer.

Variables	adjusted Odds Ratio (aOR)	95% Confidence Interval (CI)	p-value
Age ≥ 50 years	6.84	1.82 - 25.68	0.004
Smoking	3.91	1.36 - 11.21	0.011
Underweight (BMI)	2.87	1.08 - 7.63	0.034
Alcohol consumption	1.96	0.78 - 4.91	0.15

4. Discussion

Among the 6183 upper gastrointestinal endoscopies performed during the study period, 163 were indicated for dysphagia, corresponding to a prevalence of 2.6%. This proportion is comparable to the 1.9% reported by Diakité in the same city during a different period [10]. However, it is higher than the 1.1% reported in a Ghanaian series [11], likely reflecting differences in access to healthcare. Indeed, the Ghanaian study included the general population, including individuals living in remote areas with limited access to healthcare facilities. The prevalence of dysphagia in the general population remains difficult to estimate. However, studies conducted in the United States by Wilkins and Adkins have reported rates ranging from 16% to 22.6% [12] [13], with prevalence increasing with age [14]. The mean age of patients in our series was 49.8 ± 17.6 years (range: 18 - 87 years), which is consistent with findings reported in the literature, particularly in studies conducted in India [15] [16] and the United States [13]. It is noteworthy that 50.3% of patients in our study were aged 50 years or older. This proportion is markedly lower than the 72.7% reported in American series [17]. This difference may reflect a more structured healthcare system in the United States, allowing patients particularly older individuals to receive more comprehensive medical attention. Furthermore, data from the literature confirm an increase in the prevalence of dysphagia with advancing age, particularly in Indian series [15] [18]. This increase may be largely explained by age-related changes in swallowing physiology. Indeed, reductions in muscle mass and connective tissue elasticity may lead to decreased strength and range of motion, particularly affecting the swallowing mechanism [15]. In our study, males were slightly more represented, with a sex ratio of 1.17. This modest male predominance has also been reported in Indian studies [15]. However, a female predominance has also been reported both in African studies [1] and in the United States [13] [17]. This heterogeneity in sex distribution may be explained by differences in symptom-reporting behaviors, which can vary according to cultural contexts among both men and women. In our series, alcohol consumption and smoking were reported in 27.6% and 20.9% of cases, respectively. These proportions are markedly lower than those reported in Indian studies, where alcohol use and smoking were observed in 60.7% and 67.8% of cases, respectively [15]. Indeed, alcohol and tobacco use, both in Africa and elsewhere, are strongly influenced by cultural and religious factors. Moreover, the negative social perception of these habits, particularly in African settings, may lead to underreporting by patients. In our study, inflammatory conditions were the leading cause of dysphagia, accounting for 21.5% of cases. This proportion is consistent with the 19.9% reported in the same city [10] and the 22% reported by Sahu in India [15]. However, it differs markedly from the 2.4% reported in Ghana [11]. In other settings, esophageal strictures have been identified as the predominant lesions in patients presenting with dysphagia [1] [17]. Histologically confirmed malignant lesions accounted for 15.3% of cases in our study. This finding is consistent with the 13.7% reported in Senegal for the

same symptom [1], but contrasts sharply with the 0.9% reported in the United States [17]. This discrepancy is likely attributable to differences in healthcare systems, particularly the emphasis on early detection of malignant diseases in high-income settings. In the literature, particularly in Indian studies, much higher proportions of esophageal cancer exceeding 70% have been reported among patients presenting with dysphagia [16]. This marked difference may be explained by variations in recruitment methods and inclusion criteria across studies. The annual incidence of esophageal cancer in our series was estimated at 5.2 cases. This figure is comparable to the 4.64 cases reported by Darré in Togo [19], but differs from the incidence of 17.6 per 100,000 inhabitants reported by Odera in Kenya [20], a region recognized as a high-prevalence area for esophageal cancer. The mean age of patients diagnosed with esophageal cancer in our study was 63.1 years. This finding is consistent with data reported in the sub-Saharan African literature [16] [21]. In contrast, in Kenya a high-prevalence region esophageal cancer tends to occur at a younger age, around 50 years [20]. In our study, patients aged over 50 years presenting with dysphagia had a significantly higher risk of esophageal cancer (adjusted OR = 6.84; 95% CI: 1.82 - 25.68). This observation is consistent with the literature, which shows that the incidence of esophageal cancer increases markedly after the age of 40 and peaks around 75 years [7]. In our series, 53.8% of patients diagnosed with esophageal cancer reported alcohol consumption. This proportion is consistent with the 57.6% and 59.2% reported in Togo [19] and Cameroon [21], respectively. While univariate analysis showed a significant association between alcohol consumption and the occurrence of esophageal cancer ($p = 0.044$), this association was no longer significant after adjustment in the multivariate logistic regression model. Nevertheless, several studies have reported an association between alcohol consumption and esophageal cancer [15] [19]. More detailed analyses have shown that the risk of esophageal cancer related to alcohol consumption depends more on the average daily intake rather than the duration of consumption. Thus, excessive alcohol intake is associated with an increased risk of esophageal cancer [22]. Among patients diagnosed with esophageal cancer, 65.4% were smokers. This proportion is higher than the 45.8%, 44.9%, and 42.4% reported in Togolese [19], Cameroonian [21], and Indian [15] studies, respectively. Smoking was identified as an independent risk factor for esophageal cancer (adjusted OR = 3.91; 95% CI: 1.36 - 11.21). This finding is consistent with a meta-analysis demonstrating a strong association between smoking and esophageal cancer (OR = 3.15; 95% CI: 2.83 - 3.50) [7]. However, although smoking was identified as a risk factor in a Kenyan study (OR = 2.51), only 8.9% of patients were smokers in that series [23], suggesting the involvement of additional factors in esophageal carcinogenesis. Indeed, a study conducted in Tanzania reported a strong association between the consumption of very hot beverages, particularly tea with milk at temperatures ≥70˚C, and esophageal cancer [20]. Similar findings have been observed in northern Iran and southern China, where individuals consuming tea at temperatures ≥70˚C had an approximately eightfold increased risk of esophageal cancer [20].

Obesity has also been identified as a risk factor for esophageal cancer in Indian studies [15]. In our study, the combined exposure to alcohol and tobacco was observed in only 12.9% of patients, compared with 29.4% in Guinea [24] and 86.7% in Gabon [25]. This variable was not included in our analytical model. Undernutrition, reflecting poor nutritional status, was observed in 22.1% of patients in our series, compared with 75.5% in Cameroon [21] and 53% in India [15]. Undernutrition was identified as an independent risk factor for esophageal cancer (adjusted OR = 2.87; 95% CI: 1.08 - 7.63). Although it has also been reported as a risk factor in other studies [20], in this context, weight loss is likely multifactorial, reflecting both tumor-related metabolic and catabolic effects, including cancer-associated cachexia, and a progressive reduction in oral intake due to dysphagia, which may ultimately evolve to aphagia. This combination of increased metabolic demands and impaired nutritional intake likely contributes to the deterioration of the patient's nutritional status at presentation.

5. Study Limitations

This study has several limitations that should be acknowledged. Its retrospective design exposes it to a risk of information bias, particularly related to the quality and completeness of data recorded in medical files. Some important variables, such as the duration of dysphagia, dietary habits, and infectious status, could not be systematically assessed. The potential underreporting of alcohol and tobacco consumption, due to sociocultural factors, may also have led to an underestimation of their true impact. In addition, the hospital-based recruitment introduces a selection bias, with a likely overrepresentation of severe or advanced cases. Furthermore, the multicenter but hospital-based nature of the study limits the generalizability of the findings to regional population. Finally, the relatively modest sample size may have reduced the statistical power of certain analyses, particularly in multivariate models. Despite these limitations, the observed trends remain consistent with findings reported in the literature.

6. Conclusion

In our setting, dysphagia represents a common symptom with significant diagnostic value, reflecting a wide range of etiologies predominantly driven by inflammatory conditions, but with a substantial proportion of esophageal cancers. Advanced age, smoking, and underweight status emerged as the main factors independently associated with the occurrence of esophageal cancers, reflecting both cumulative exposure to risk factors and the clinical impact of the disease. These findings highlight the need for early endoscopic evaluation in all patients presenting with dysphagia, particularly those at higher risk. They also underscore the importance of targeted prevention strategies focusing on modifiable risk factors. Finally, this study emphasizes the key role of endoscopy in improving diagnostic accuracy and provides a basis for future multicenter studies aimed at better characterizing the determinants of esophageal cancer in Sub-Saharan Africa.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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