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## CHARACTERISTICS OF ESOPHAGEAL CANCER AMONG SYMPTOMATIC PATIENTS REFERRED FOR ENDOSCOPY IN ELDORET, KENYA

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### ABSTRACT

**Background:** Esophageal cancer (EC) ranks number 8 in incidence among all cancers worldwide and was the 6<sup>th</sup> most common cause of cancer mortality in 2020. In Kenya, EC is the fourth most common cancer. EC has uneven geographical, age and gender distribution and establishing local characteristics would contribute to the overall management.

**Objective:** To describe the characteristics of Esophageal cancer among Kenyans.

**Design:** Retrospective chart review.

**Setting(s):** Institutions offering endoscopy services in Eldoret.

**Participants:** Patients who had undergone upper gastrointestinal tract (GI) endoscopy between May 1993 and April 2003.

**Methods:** Records of patients who underwent upper GI endoscopy between May 1993 and April 2003 in Eldoret were reviewed. Information on age, gender, endoscopic diagnosis, site of esophageal lesion, biopsy and histology report was abstracted. STATA statistical software was used for analysis. Means and proportions were calculated to describe the patients.

**Results:** Of the 1,690 patients who underwent endoscopy, 199 (11.8%), mean age of  $58.87 \pm 14.89$  (18 – 91 years), 56.8% (113) males had lesions consistent with EC. Reasons for referral for endoscopy were: dysphagia; 127 (63.8%) and clinical diagnosis of cancer of esophagus; 40 (20.1%). Fifty three percent of the lesions were situated between 25 - 33 centimeters and 30.6 % between 34- 42 centimeters of the esophagus. Biopsy reports were available for 158 patients, which showed squamous cell carcinoma in 99 (62.7%); and adenocarcinoma in 5 (3.2%) participants.

**Conclusion:** Squamous cell carcinoma is the commonest histopathological type in these patients and mainly affects the lower 2/3 of the esophagus.

## INTRODUCTION

Globally esophageal cancer (EC) ranks number 8 in incidence among all cancers, causing 544,076 (5.5%) cancer deaths. The EC was the 6<sup>th</sup> most common cause of cancer mortality in 2020<sup>1</sup>. There are two main histological types of EC; squamous cell carcinoma (SCC) and adenocarcinoma (AC)<sup>2</sup>. The SCC is most common worldwide (90%), particularly, in less developed countries where it accounts for 80% of incidence<sup>3,4</sup>.

It is also established that EC has uneven geographical distribution with high prevalence in sharply demarcated confines of countries and regions such as the Asian EC belt and the African EC corridor<sup>5,6</sup>. In addition, EC exhibits variation across gender and age<sup>7</sup>. In Kenya, EC is more prevalent in the central and western parts of the country and is the fourth most common cancer after Breast, Cervical and Prostate cancers<sup>8,9</sup>. Characteristics of EC have not been comprehensively described among Kenyan patients.

The clinical presentation of both AC and SCC of the esophagus are similar. Common clinical presentations include progressive dysphagia and weight loss. Dysphagia connotes advanced tumor that can be diagnosed with conventional white light endoscopy (WLE)<sup>10</sup>. However, the two major cancers of the esophagus show differences in histological appearance, risk factors and site of occurrence along the esophagus<sup>11</sup>. AC is found in the distal third and SCC is more frequent in the proximal to middle esophagus<sup>3</sup>.

Upper GI endoscopy was introduced in Eldoret in the early 1990's<sup>12</sup>, since then many patients have undergone the procedure. Dysphagia in combination with weight loss are the second most common symptoms and EC is the most common endoscopic diagnosis

among such patients who were referred for upper gastrointestinal (GI) endoscopy in Eldoret<sup>13</sup>. However, the histological types of EC among these patients in Eldoret have not been clearly described. Information on the frequency, histological types and location of EC will empower clinicians in their decisions and management of suspected EC patients where histopathological diagnosis is not possible for one reason or the other, hence this study.

## MATERIALS AND METHODS

This was a retrospective study that analyzed data from the records of patients who underwent upper GI endoscopy during 10-year period, from May 1993 to April 2003. The endoscopies were performed using either video-scope or flexible fiber-optic upper GI scope. The scopes were graduated, and measurements taken from the upper incisor teeth per standard. Endoscopy registers were obtained with permission from Moi Teaching and Referral Hospital (Government hospital), Uasin Gishu Memorial Hospital (Private hospital) and the Eldoret Medical Services (a private clinic). All 1,690 available records from the registers were studied and information regarding age, sex, symptoms, and endoscopic diagnosis was extracted and entered into a special data form before being entered into a Microsoft access database by a trained research assistant. For those whose endoscopy diagnosis was indicated as cancer of esophagus, further information on level of esophageal lesion, whether biopsy was taken, and histology report was abstracted. STATA® version 13 was used for data handling and analysis. Means and proportions were calculated to describe the patients.

*Ethical considerations*

This study was approved by Moi University School of Medicine (MUSOM) and Moi Teaching and Referral Hospital (MTRH) Institutional Research and Ethics Committee (IREC), and permission obtained from the administration of MTRH and the other institutions where patients underwent endoscopy. Waiver of consent was sought and approved by IREC. To ensure confidentiality patient identifying information was removed in the final dataset and a unique study number was used during data extraction.

## RESULTS

One thousand six hundred and ninety patients underwent upper endoscopy in the three

centers during the 10-year period. Their characteristics have been described in detail elsewhere<sup>13</sup>. Cancer of the esophagus was diagnosed at endoscopy in 199 (11.8%) of the patients comprising 113 (56.8%) males and 86 (43.2%) females (M:F ratio of 1.3:1), making up 13.1% of all males and 10.4% of all females who underwent endoscopy respectively. Mean age of those diagnosed with EC was 58.87 years  $\pm$  14.89 (range, 18 – 91 years).

Of the 199 patients, 127 (63.8%) were referred because of dysphagia, whereas 40 (20.1%) were referred with clinical diagnosis of cancer of esophagus. Table 1 shows reason for referral and endoscopy findings.

**Table 1**  
*Reason for referral and endoscopy findings.*

Reason for endoscopy	Total referred n	Cancer at esophagus at endoscopy n (%)
Dysphagia	224	127 (56.7)
Cancer of esophagus	61	40 (65.6)
Dyspepsia	1065	13 (1.2)
Vomiting	78	7 (9.0)
Haematemesis	102	6 (5.9)
Cancer of stomach	81	4 (4.9)
Heart burn/reflux	28	1 (3.5)
Unclear	51	1 (2.0)
Total	1690	199 (11.8)

Majority (53.3%) of the cancers were situated between 25 and 33 centimeters from the incisor teeth (Table 2). In 13 (6.5%) patients the level of the lesion was not available in the records. Over three quarters (83.9%) of the cancers were seen in the middle and lower thirds of the esophagus (between 25 and 42 centimeters).

Among the 199 patients with endoscopic diagnosis of EC, biopsy reports were available for 158 patients and indicated adenocarcinoma in 5 (3.2%), squamous cell carcinoma in 99 (62.7%) and others in 54 (34.2%). Table 3 shows the level of occurrence of EC histological types.

**Table 2***Level of esophageal cancer and histological type*

Distance of lesion (upper incisor) (cm)	N (%)	N (with histology)	SCC	AC	Others*
15 - 24	19 (9.6)	13	10	0	3
25 - 33	106(53.3)	91	54	2	35
34 - 42	61 (30.6)	48	30	3	15
Un-recorded	13 (6.5)	6	5	0	1
Total	199 (100)	158	99	5	54

Legend: SCC = squamous cell carcinoma; AC = adenocarcinoma; \* reported; normal, inadequate sample, inflammation (unspecified); no neoplasm.

The proportion of those with cancer increased with age, the majority 70 (35.2%) occurring in those older than 65 years as shown in table 3. Adenocarcinoma did not occur in ages below 36 years.

**Table 3***Age and esophageal cancer histological type*

Age (yrs.)	N (%)	Number with histology	Histological diagnosis		
			SCC	AC	Others*
≤25	6 (3.0)	4	2	0	2
26 – 35	11 (5.5)	10	5	0	5
36 – 45	18 (9.0)	14	5	1	8
46 - 55	41 (20.6)	33	23	1	9
56 - 65	53 (26.6)	43	29	1	13
>65	70 (35.2)	54	35	2	17
Total	199 (100)	158	99	5	54

Legend: SCC = squamous cell carcinoma; AC = adenocarcinoma; \* see table 2

## DISCUSSION

This study was designed to provide information on the frequency of EC and the characteristics that would guide clinicians on the most appropriate approach to their management. It involved retrospectively reviewing data from endoscopy registers from facilities with endoscopic capabilities in Eldoret. The findings suggest that, among this

cohort of patients, EC which is mainly of the squamous cell type is confined to the lower two thirds of the esophagus occurs in about a third of the individuals. Over half of endoscopic findings of EC are not supported by histology.

This study has shown that the prevalence of EC among patients with upper GI symptoms referred for endoscopy is 11.8% with males being affected more than females. Our finding

showing EC to be the number one endoscopic diagnosis is in support of an earlier study of the same population by Wakhisi et al.<sup>14</sup> who reported esophageal cancer to be the most common malignancy among males with a M:F ratio of 1.5:1 at the Moi Teaching and Referral Hospital in Eldoret, Kenya. However, our findings do not agree with other reports from the region. Alema et al.<sup>15</sup> in Uganda reported endoscopic prevalence of only 7.5% with a large male: female difference of 3:1. These differences could be attributed to methodological and demographic differences between the populations studied. For example, the Ugandans were younger with a mean age of 55.5 years compared to ours in whom 61.8 % were aged 56 years or more. In addition, in the Ugandan study, a good number of patients' records could not be traced resulting in analysis of records for 71 patients only. The difference among this Kenyan study and the Ugandan study if real will be intriguing since the two countries being in same region with similar population also share risk factors<sup>3</sup>. The current study indicates similar prevalence as published in Malawi cancer registry and reported by Msyamboza et al.<sup>16</sup> of 12.0% and ranking number three among common cancers in that country.

For purposes of identifying sites of esophageal lesions during endoscopy, the distance of the lesion is measured from the upper incisor teeth. This method positions the gastro-esophageal junction at approximately 40–42 cm and the 25 cm length of the esophagus is then divided into in to upper (15–24 cm), middle (25 – 33 cm) and lower (34 – 42 cm) thirds for reference, though anatomical divisions are also sometimes used<sup>17</sup>. Most of the cancers in this study were located between 25 and 33 centimeters (middle third) making up 53.3 %, followed by lower third with 30.6 %. Therefore, this study confirms reports from

other studies within and outside east African region that majority of EC occur in the middle third and lower third sections of the esophagus<sup>14, 15, 17, 18</sup>. These results add credence to an earlier study among the same population by Wakhisi et al.<sup>9</sup>. In addition, SCC is the predominant histological type that occurs mostly in the mid and lower third of the esophagus in Africa, S. America and Asia<sup>3, 7</sup>. In a review of the epidemiology of esophageal cancers Yuwei Zhang reports that, compared to AC which tends to occur in the lower third only, SCC is evenly distributed between mid and lower third with upper third cancers being very rare<sup>7</sup>. The occurrence of SCC in upper third section of the esophagus remains unsettled but may not be very rare as reported by some reviewers. In this regard, some studies have reported prevalence as high as 29 % and others as low as 5% and the current study documents 9.6% agreeing with Alema and colleague, Mchembe et.al. and Yang and colleagues who reported 8.5%, 10.4% and 18.7% respectively<sup>15, 18, 19</sup>. This variation may indicate that the frequency of SCC of the esophagus is dependent on the population being studied. More rigorous studies are therefore necessary to settle this matter.

Common presentation of EC is progressive dysphagia and weight loss; it is therefore a logical assumption that, the patients who were referred with clinical diagnosis of EC had dysphagia and weight loss. Putting together patients whose referral notes indicated EC and those who were referred due to dysphagia, our study shows that 83.9% of them had EC at endoscopy. Mchembe and colleagues retrospectively studied 328 patients with EC and reported that all of them had presented with progressive dysphagia and weight loss<sup>18</sup>. The predictability of these symptoms of EC has prompted some authors to refer to them as being pathognomonic of EC<sup>3, 20</sup>. These

symptoms also indicate late or advanced disease and occur when up to 75% of the esophageal lumen is obstructed due to the distensibility of the esophageal wall. Thus, majority of our patients referred for endoscopy have advanced disease.

#### *Limitations*

This study experienced some limitations; Endoscopy is an expensive procedure that many patients may not access, thus our results may not be generalizable, as only those who could pay for endoscopy underwent the procedure. Data from those in whom the procedure failed or was abandoned for one reason or the other were not included. In addition, being a retrospective study, this analysis relied on data from single observer, the endoscopist who may have had bias in interpretation of the results. Despite the limitations, this study provides valuable information to clinicians in resource-limited settings who are managing cancer patients with oesophageal symptoms.

### CONCLUSION

In this study squamous cell carcinoma was the commonest histopathological type and more males than females were affected. Overall, cancer of the esophagus mainly affects the lower 2/3 of the esophagus with the majority in the middle region. It is recommended that these characteristics be factored in while examining for esophageal cancer in this setting.

#### *Future directions*

Results of this study may be used to generate or domesticate protocols for management of patients with cancer of esophagus. There is need for standardization of endoscopy reporting among endoscopy doctors in Eldoret and other parts of the country. A prospective study with standardized endoscopy and

histology reporting is necessary to validate these findings.

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