ISSN: 2469-5807

Mohamed et al. Int J Pathol Clin Res 2024, 10:155
DOI: 10.23937/2469-5807/1510155
Volume 10 | Issue 2
Open Access

International Journal of
Pathology and Clinical Research

RESEARCH ARTICLE

Histopathological Findings of Colonoscopic Biopsies from Sudanese Patients

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Abstract

Background: Colorectal cancer (CRC) is the third most common malignancy and the second major cause of cancer deaths worldwide. The main aim of this study was to assess the histopathological findings of colonoscopic samples collected from Sudanese patients.

Methodology: This study employed a retrospective descriptive research design, which involved the extraction of materials from 266 colonoscopic biopsies. The materials were gathered from Aliaa Hospital in Omdurman, Sudan. The sample encompassed the complete dataset spanning from January 2018 to May 2023.

Results: The prevailing diagnoses were inflammatory bowel disease, accounting for 178 out of 266 cases, or 67%. Following that, there was a polyp and a mass of 32 units, which accounted for 12% of the total. Active colitis was the most frequent histological diagnosis, including 67% of cases. Malignancy and polyp were the next most common diagnoses, accounting for 14.3% and 9.8% of cases, respectively. Out of the total 38 malignant tumors, 34 (89.5%) were adenocarcinomas and 2 (5.3%) were lymphomas.

Conclusion: A prevalent concern for younger Sudanese patients is colorectal cancer. Many individuals had a spectrum of disorders that matched colorectal cancer, maybe pointing to disease risk factors. Screening these patients should take these elements into great attention.

Keywords

Colorectal cancer, Colonoscopy, Sudan, Histopathology

Introduction

Colorectal Cancer (CRC) ranks third in terms of cancer diagnosis and is the second leading cause of cancer-related deaths globally. It contributes to almost 1.9 million cancer cases annually, which represents 10% of all new cancer cases worldwide. The occurrence of a particular event or phenomenon significantly rises as individuals grow older. Historically, this has been most prevalent in prosperous Western nations. However, there is now a rapid growth in many underdeveloped countries and among younger generations in both developed and developing nations [1,2].

Colorectal carcinogenesis involves various pathophysiological pathways, including aberrant cell proliferation, cell differentiation, resistance to apoptosis, invasion of nearby structures by colorectal tumor cells, and the spread of cancer to distant locations. The initiation of these processes is influenced by a complex interplay of several genetic and environmental variables, such as a sedentary lifestyle, obesity, alcohol intake, smoking, and gut microbiota [3]. Disparities in the epidemiology of colorectal cancer (CRC) exist among various populations, likely attributed to variations in exposure to lifestyle and environmental variables associated with CRC. The most efficient approach to managing CRC is through prevention.

Citation: Mohamed SBS, Eltayeb SAM, Osman SHM, Nour FEM, Bashier HAH, et al. (2024) Histopathological Findings of Colonoscopic Biopsies from Sudanese Patients. Int J Pathol Clin Res 10:155. doi.org/10.23937/2469-5807/1510155

Accepted: July 31, 2024: **Published:** August 02, 2024

Primary prevention involves identifying and avoiding risk factors that may be changed, such as alcohol intake, smoking, and dietary factors. It also involves boosting protective factors, such as engaging in physical activity and taking aspirin [4,5].

Research has shown that colorectal cancer has a higher incidence among Sudanese patients in younger age groups, with 43.84% of cases occurring in individuals below the age of 50. The highest frequency of cases is observed in the fifth and sixth decades of life. A study conducted in Sudan revealed that patients with colorectal cancer typically seek medical attention at a later stage, after the symptoms have already shown. Furthermore, these patients often have an advanced stage of the disease and have an aggressive pattern of tumor growth. Additionally, a significant proportion of these patients are younger individuals [6,7]. Therefore, the primary objective of this study was to evaluate the histological observations of colonoscopic samples obtained from Sudanese patients.

Materials and Methods

This was retrospective descriptive research that involves extracting materials from 266 colonoscopic biopsies. The materials were collected at Aliaa Hospital in Omdurman, Sudan. The sample contained all data from January 2018 to May 2023. The obtained data contains the patient's primary identity, clinical information, and histopathological data.

Statistical analysis

The information obtained was organized on a datasheet and then entered into a computer software program (SPSS) for analysis. The analysis included calculating frequencies, cross-tabulations, and proportions.

Ethical consideration

Consent was received from the authorities at Alyaa hospital, Omdurman, Sudan to access the sample.

Ethical approval

The Human Ethics Committee of Prof Medical Research Consultancy Centre approved the protocol for this study. Approval #: 0010/MRCC.6/24.

Results

This study examined 266 patients with colonic anomalies aged 18 to 80-years, with a mean age of 49-years. The majority of patients were aged 56-65 years, followed by 36-45 and 46-55 years, accounting for 66/266 (24.8%), 64(24.1%), and 57(21.4%), respectively, as shown in Table 1 and Figure 1. Out of the 266 patients, 142 (53.4%) were men and 124 (46.6%) were women. The age distribution is comparable between boys and females. The vast majority of patients visited in 2022, followed by 2021 and 2020, with 155/266 (58.3%), 42(15.8%), and 39(14.7%), respectively, as shown in Table 1 and Figure 1.

Regarding the initial clinical presentation, the vast majority of patients (242/266) reported stomach pain. However, around 17/266 patients (6.4%) presented with rectum bleeding (see Table 2). The ascending colon was the most prevalent site for the complaint, followed by the rectum and the sigmoid colon, with 192/266(%), 32(%), and 23(%), respectively, as shown in Table 2 and Figure 2.

As shown in Table 3, the most common clinical

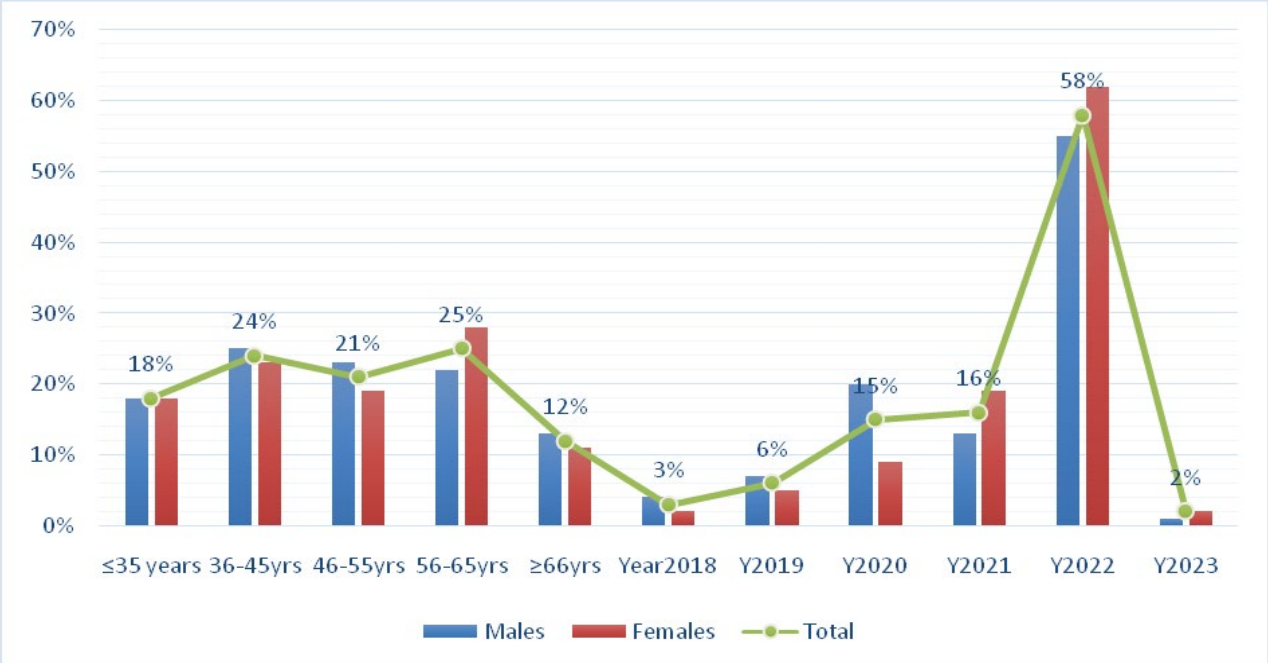

Figure 1: Description of the study subjects by sex, age, and the year of diagnosis.

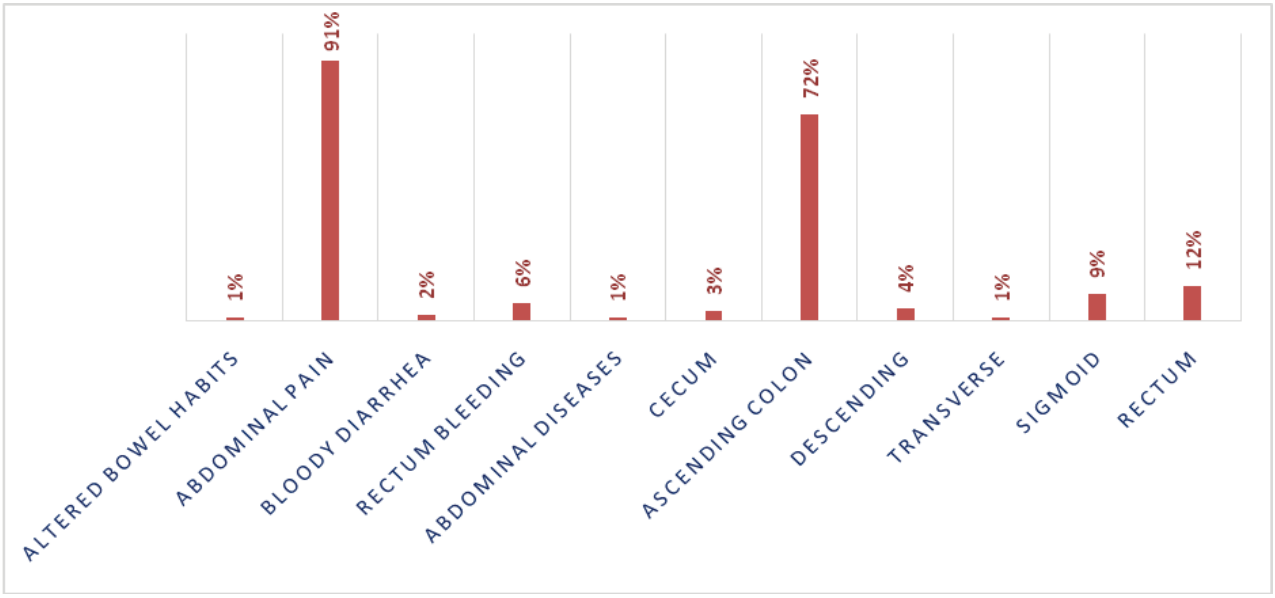

Figure 2: Description of patients by clinical presentation and the site.

Table 1: Distribution of the study subjects by sex, age and the year of diagnosis.

Variable	Males	Females	Total
Age			
≤ 35 years	25	22	47
36-45	35	29	64
46-55	33	24	57
56-65	31	35	66
≥ 66	18	14	32
Total	142	124	266
Year of diagnosis			
2018	6	3	9
2019	10	6	16
2020	28	11	39
2021	18	24	42
2022	78	77	155
2023	2	3	5
Total	142	124	266

diagnosis was inflammatory bowel (178/266, 67%). Polyp and mass 32 (12%) came next. The most common histological diagnosis was active colitis, followed by malignancy and polyp, which accounted for 178/266 (67%), 38(14.3%), and 26(9.8%), respectively. As shown in Table 3 and Figure 3, 34/38 (89.5%) of the malignant tumors were adenocarcinomas and 2/38 (5.3%) were lymphomas.

Table 4 displays the distribution of patients based on histological diagnosis, clinical diagnosis, place, and age. In terms of clinical presentation, the majority of active colitis patients (166/178, 93.2%) reported stomach pain. All patients (100%) with irritable bowel illness (IBS) reported abdominal pain. About 30/38 (79%) of cancer patients reported stomach pain. Approximately 25/26 (96%) of individuals with polyps reported stomach pain.

The ascending colon was the most prevalent site for all diagnosed diseases, followed by the rectum and sigmoid. Most conditions, on the other hand, became more common as people aged. Although malignancy increased with age, it was more common in younger adults, as seen in Table 4 and Figure 4.

Discussion

Colorectal cancer is quite prevalent in Sudan, mostly due to the presence of many risk factors such as a sedentary lifestyle, obesity, alcohol consumption, and smoking. The majority of patients exhibited advanced stages of the disease. The prevalence of colorectal cancer in this cohort group of patients was 14.3%. Colorectal cancer is a prevalent kind of cancer that occurs globally, representing 10.7% of all newly diagnosed cancer cases in 2022 [8-10].

The GLOBOCAN database provided data on CRC cases and deaths in 2020. The data on CRC cases and fatalities were collected from the GLOBOCAN database for 2020. In 2020, it was expected that there will be over 1.9 million new cases of CRC and over 930,000 deaths from this illness. The highest incidence rates were seen in Australia/New Zealand and Europe, with a male rate of 40.6 per 100,000. The lowest rates were recorded in various African locations and Southern Asia, with females having a rate of 4.4 per 100,000. Death rates followed similar patterns, with the highest rates recorded in Eastern Europe (20.2 per 100,000 males) and the lowest in Southern Asia (2.5 per 100,000 females). According to predictions, the number of new CRC cases is predicted to reach 3.2 million by 2040, with 1.6 million deaths. The majority of these cases are expected to occur in nations with high or extremely high Human Development Indexes.

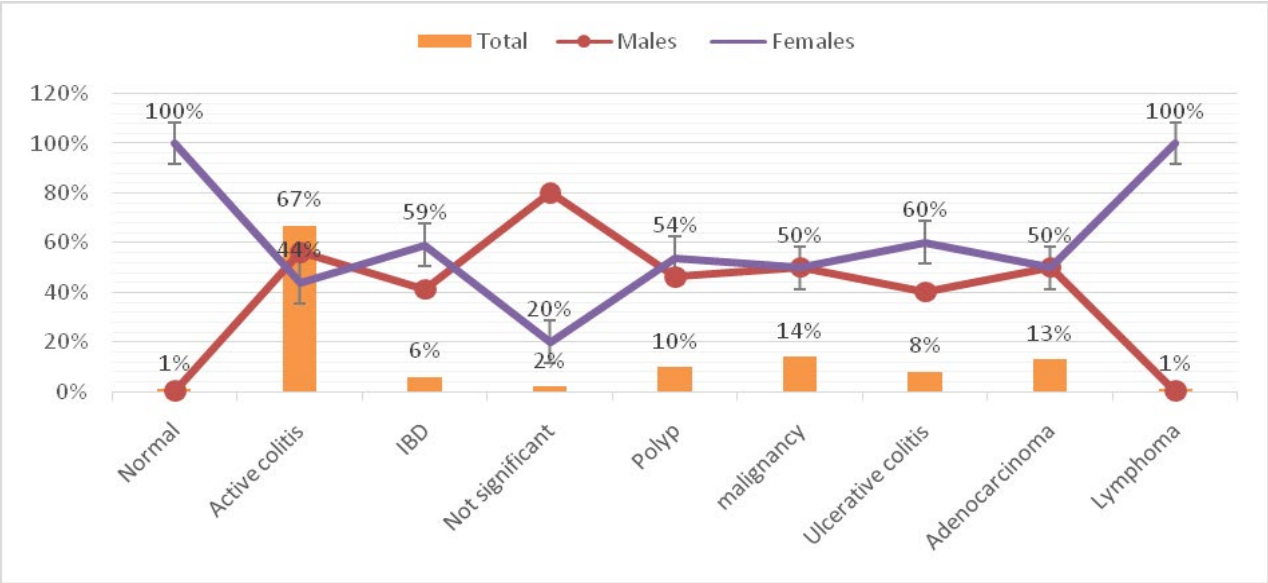

Figure 3: Description of the patients by histopathological diagnosis.

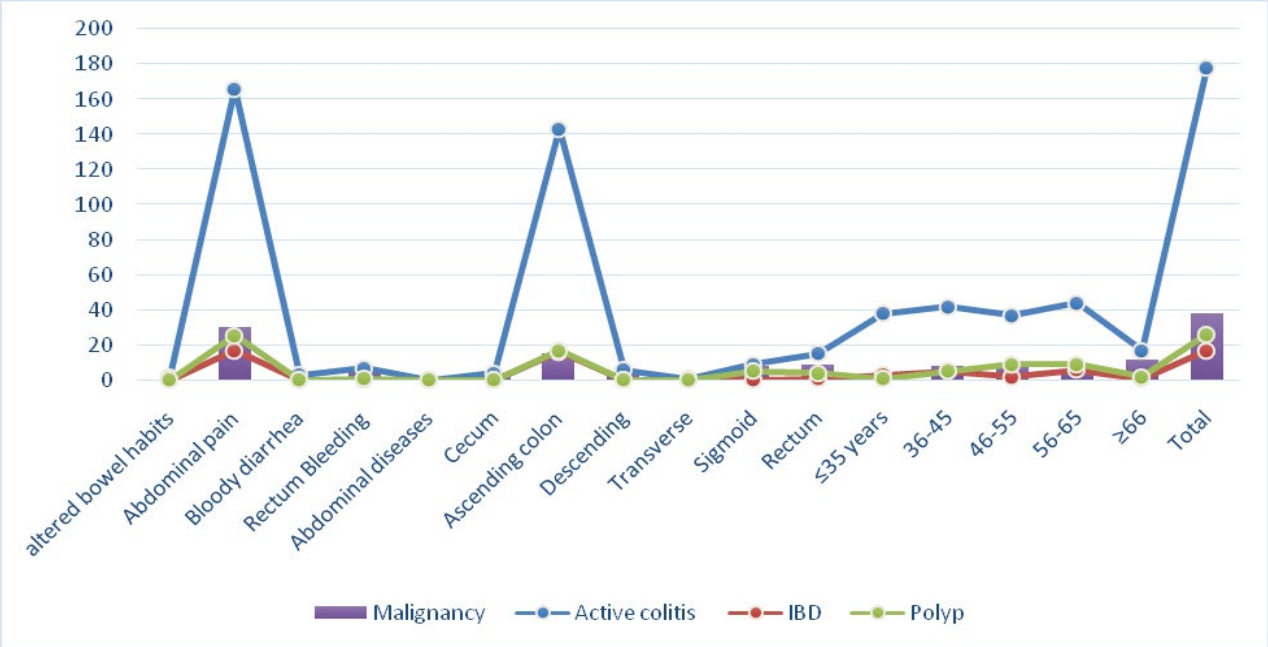

Figure 4: Description of the patients by histopathological diagnosis, clinical diagnosis, site, and age.

Based on GLOBOCAN 2022 data, the incidence rate of colorectal cancer in Sudan was 6.0% per 100,000 individuals [11]. Nevertheless, there is a lack of data from Sudan about cancer registry. These encompass the scattered knowledge about several cancer centers in the country, in addition to the current hostilities in the nation. The results of the current study indicate that colorectal cancer is diagnosed at an equal rate in both males and females. According to the findings, men had a greater occurrence and death rate of colorectal cancer (CRC) compared to women [12]. CRC is a disease that is heavily impacted by sex and gender, with males having much greater fatality rates compared to females. There is currently a lack of understanding regarding the specific locations where sex differences occur along the progression from first manifestation to long-term survival. The limited variations in sex-related parameters, such as pathways to diagnosis and survival, suggest that the increased mortality rate of colorectal cancer in men can be attributed to external and/or internal factors that occurred before diagnosis and resulted in higher incidence rates. Nevertheless, there are distinct variations in sex and gender that indicate the need for more specific interventions to enhance prevention and early detection in both males and females [13].

The incidence, spectrum, and outcomes of cancer are influenced by sex, while the specific biochemical

Table 2: Distribution of the study subjects by sex, clinical presentation and the site.

Variable	Males n = 142	Females n = 124	Total n = 266
Clinical presentation			
Altered bowel habits	2	0	2
Abdominal pain	129	113	242
Bloody diarrhea	2	2	4
Rectum Bleeding	9	8	17
Abdominal diseases	0	1	1
Site			
Cecum	3	4	7
Ascending colon	99	93	192
Descending	6	5	11
Transverse	1	0	1
Sigmoid	14	9	23
Rectum	19	13	32

Table 3: Distribution of the study subjects by sex, clinical and histopathological diagnosis.

Variable	Males n = 142	Females n = 124	Total n = 266
Clinical diagnosis			
normal	11	5	16
Inflammatory	94	84	178
Erythematosus	4	3	7
polyp	14	18	32
Mass	18	14	32
Not sporadic	1	0	1
Histopathological Diagnosis			
Normal	0	2	2
Active colitis	100	78	178
IBD	7	10	17
Not significant	4	1	5
Polyp	12	14	26
malignancy	19	19	38
Ulcerative colitis	8	12	20
adenocarcinoma	17	17	34
lymphoma	0	2	2

and genetic factors, likely involving X-chromosome genes and sex hormones, remain unknown. Males have a higher incidence of metastases and mortality associated with CRC. In a mouse model of CRC, where a transgene expressing an oncogenic mutant form of KRASG12D and conditional null alleles of Apc and Trp53 tumor suppressors (iKAP)^2 were induced, it was observed that males with CRC carrying the oncogenic mutant KRAS (KRAS*) had a higher number of metastases and experienced poorer outcomes. The activation of the STAT4 transcription factor by KRAS* resulted in an increase in the expression of the histone demethylase KDM5D gene on the Y-chromosome, as observed in comprehensive molecular and transcriptome studies across different species. The presence of KDM5D led to changes in chromatin structure and gene expression, resulting in the suppression of tight junctions in epithelial cells and regulators of the MHC class I complex. Cancer cells lacking the Kdm5d gene exhibited enhanced cell-cell adhesion, reduced invasiveness, and increased susceptibility to CD8+ T cell-mediated cytotoxicity. On the other hand, when iAP mice were bred with a Kdm5d transgene to consistently express Kdm5d in iAP cancer cells, they developed more aggressive tumors in living organisms. Therefore, the increased activity of Y chromosome KDM5D, which is regulated by KRAS*-STAT4, hinders the adherence of cancer cells and weakens tumor immunity. This contributes to the observed differences between men and women in the development of KRAS* CRC. Additionally, it presents a potential treatment approach to decrease the risk of metastasis in males [14].

Table 4: Distribution of the patients by histopathological diagnosis, clinical diagnosis, site, and age.

Variable	Normal	Active colitis	IBD	Polyp	Malignancy
Clinical presentation					
altered bowel habits	0	2	0	0	0
Abdominal pain	1	166	17	25	30
Bloody diarrhea	1	3	0	0	0
Rectum Bleeding	0	7	0	1	7
Abdominal diseases	0	0	0	0	1
Total	2	178	17	26	38
Site					
Cecum	1	4	0	0	2
Ascending colon	0	143	16	17	15
Descending	0	6	0	0	4
Transverse	0	1	0	0	0
Sigmoid	0	9	0	5	8
Rectum	1	15	1	4	9
Total	2	178	17	26	38
Age					
≤ 35 years	0	38	3	1	4
36-45	1	42	5	5	8
46-55	0	37	2	9	8
56-65	1	44	6	9	6
≥ 66	0	17	1	2	12
Total	2	178	17	26	38

Approximately 31.6% of the colorectal cancer cases seen in this investigation were detected in individuals who were younger than 45-years-old. The prevalence of early-onset colorectal cancer, which refers to the diagnosis of colorectal cancer in individuals under the age of 50, has been on the rise globally [15].

Over the last few decades, the incidence rate among elderly persons has decreased, while that of teenagers and young adults has increased. Lack of frequent screening, as well as developing lifestyle concerns such as obesity, lack of exercise, and food, may be to blame for this apparent pandemic among youth. Hereditary and environmental factors contribute to an increased risk of CRC. Inherited susceptibility increases risk the most and should always be considered in young CRC patients, however most CRCs are sporadic. There is mounting evidence that early-onset CRC patients have a distinct molecular profile from late-onset CRC patients. Currently, younger and older CRC patients are treated similarly; however, as we understand more about the molecular underpinnings of CRC in the young, we will be able to adjust screening and clinical management measures to enhance outcomes. This review discusses the hallmarks of early-onset CRC, as well as current studies and evolving data [16].

The majority of colorectal cancer cases in this study were found in the ascending colon, accounting for 39.5% of the total. According to reports, the sigmoid colon is the most frequently affected site for colon cancers, accounting for 55% of cases. This is followed by the ascending colon (23.3%), transverse colon (8.5%), descending colon (8.1%), cecum (8.0%), and crossing site (2.1%) [17].

Conclusion

Colorectal cancer is a significant concern among younger Sudanese patients. Many patients displayed a range of conditions that resembled colorectal cancer, potentially indicating risk factors for the disease. These factors should be carefully considered when screening these patients.

Acknowledgement

The authors express their gratitude to the people at Aliaa hospital for their valuable assistance in data collection.

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