Serum Iron, Ferritin and Hb Status among Sudanese Patients with Colonic Cancer

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Abstract: Colon cancer is currently the third most common cancer in both men and women after lung and breast cancer. Incidence and mortality rates have been declining since the 1980's, partially due to improvements in screening and prevention. Colon cancer is the cancer that formed in the tissues of the colon (the longest part of large intestine). Most colon cancers are adenocarcinomas. Many studies have been done to elucidate the ability of iron to rule out colon cancer. Some of these studies encouraged using iron status as early predictors of gastrointestinal tumors. The aim of this study was to estimate level of serum iron and ferritin among colonic cancer patients according to gender, age, Hb and weigh levels. This study included 100 patients diagnosed as a colonic cancer. The majority of patients were male, 67 representing 67 % of respondents and only 33 were female representing 33%. Age distribution among patients demonstrates a majority of the age interval (40-60) years representing 46 %. The association between serum iron and ferritin was found to be significant with the level of Hb. In the distribution of study population according to weight, the majority was shown in weight between (51-70) kg representing 57 % of total respondents. Regarding correlation between serum iron, ferritin and weigh, no significant was found to be observed.
Keywords: Colon cancer, Hb, anemia, serum iron, serum ferritin, weight.

INTRUDUCTION

Colon cancer is currently the third most common cancer in both men and women after lung and breast cancer. Incidence and mortality rates have been declining since the 1980's, partially due to improvements in screening and prevention [1].

In 2008, the most recent year for which there are reliable statistics, 142,950 people were diagnosed with colorectal cancer and 52,857 people died from the disease. This is despite the fact that the incidence has dropped from 59.5 per 100000 people in 1975 to 44.7 per 100000 people in 2007 while mortality has decreased from 28.6 per 100000 people in 1976 to 16.7 per 100000 people in 2007 [2].

The aim of this study was to estimate level of serum iron and ferritin among colonic cancer patients according to gender, age, Hb and weigh levels at Radiation and Isotope Center-Khartoum, Ibn cina and Khartoum teaching hospital, during the period from March 2014 till July 2014.

This study included 100 patients diagnosed as a colonic cancer. The study was conducted in patients with colon cancer in duration from 5-10 years. The colon is the part of the body's digestive system. The digestive system removes and processes nutrients (vitamins, minerals, fats, proteins and water) from foods and helps pass waste material out of the body. The digestive system is made up of the esophagus, stomach and the small and large intestines. The first 6 feet of the large intestine are called the large bowel or colon and the last 6 inches are the rectum and anal canal [3]. Colon cancer is the cancer that formed in the tissues of the colon (the longest part of large intestine). Most colon cancers are adenocarcinomas (cancer that begins in cells that make and release mucin and other fluids) [3, 4].Cancer cases can be grouped into two broad categories, sporadic and familial. Sporadic cancers are those in which the affected individual does not have a known family history of the disease. Familial cancers tend to occur in several generations of a family and affected individuals often have close relatives (brother, sister, father) with the same cancer type. It is possible that these individuals inherit defective genes that lead to the development of a particular cancer type. Individuals with a family history of colorectal cancer are at an increased risk of developing the disease [5].

The more closely related an individual is to someone with colorectal cancer, the more likely they will share the defective genes. Inherited colorectal cancer accounts for about 5% of all colorectal cancer cases [6]. Incidence of colon cancer correlates greatly with certain lifestyle factors, including diet. It is very difficult, however, to identify dietary items that cause a particular cancer.

Studies show correlations between chronic heavy alcohol consumption and low folate intake and an increased risk of colorectal cancer [7]. On the other hand, some dietary factors are associated with a decreased risk of colorectal cancer. Research suggests that a diet rich in fruits and vegetables may provide a protective effect against the disease [8]. Several studies have found an association between increasing body mass (BMI) and risk of colorectal cancer [9].

The association has been found more consistently in men than in women, however, this difference may be caused by the effect of the female hormone estrogen, which is thought to have a protective effect against colorectal cancer. Women with high body mass indexes tend to have higher estrogen levels compared to women with lower body mass indexes. The higher estrogen levels may counteract the negative effects of an elevated BMI [10].

Studies have found an association between tobacco use and an increased number of hyperplasic polyps in the colon and rectum. While most do not, hyperplastic polyps may sometimes develop into colorectal cancer. The link between tobacco and hyperplasic polyps appears to be more dependent upon how recently the smoking occurred rather than duration of smoking [11]. Otherwise, Groups that have a high incidence of colorectal cancer include those with hereditary conditions. Together, these groups account for 10% to 15% of colorectal cancers [12]. For the great majority of people, the major factor that increases a person's risk for colon cancer (CC) is increasing age.

Risk increases dramatically after age 50 years; 90% of all colon cancer are diagnosed after this age. The history of colon cancer in a first-degree relative, especially if before the age of 55 years, roughly doubles the risk. Other risk factors are weaker than age and family history. People with inflammatory bowel disease have a much higher risk of colon cancer [13]..A small percentage (<5%) of colon cancers occur in people with a genetic predisposition, including familial adenomatous polyposis and hereditary nonpolyposis coli [14].

There is evidence that taking non-steroidal anti-inflammatory drugs (NSAIDs), such as aspirin, can reduce the development of colon and rectal cancer, but because taking NSAIDs is linked to increased bleeding risk, the US Preventive Services Task Force (in 2007) published their recommendations against routine use of NSAIDs for the prevention of colorectal cancer [15].

According to the 2013 American Cancer Society Report, consumption of milk and calcium as well as higher blood levels of Vitamin D also appears to decrease colorectal cancer risk [16]. Many studies have been done to elucidate the ability of iron to rule out colon cancer. Some of these studies encouraged using iron status as early predictors of gastrointestinal tumors.

One of these studies was retrospectively investigated 359 consecutive elderly patients, aged 70 year and more, who presented to a geriatric department and who underwent a total colonoscopy [17]. Presence was compared with the iron status, evaluated by serum ferritin and hemoglobin levels.

They found that, less than half of the patients with colorectal carcinoma had iron-deficiency anemia. Those with a proximal colorectal carcinoma had a lower hemoglobin and ferritin level and a higher prevalence of iron-deficiency anemia compared with Patients with a distal colorectal carcinoma. They found that, the prevalence of colorectal cancer is high in anemic and non- anemic elderly symptomatic patients, irrespective of the iron status. Therefore, the decision to order a colonoscopy in older patients should not only be considered in patients with anemia or iron deficiency but also in patients with suspicious symptoms without anemia or iron deficiency [18].

Also another prospective study was made by (Department of Prosthetic Dentistry, Medical University of Silesia, 41-902 Bytom, and Poland.) to see the concentration of iron in intestinal cancer and colorectal polyps. The study investigated 67 patients with colorectal cancer and they found that, the level of serum iron and ferritin were statistically lower [19].

MATERIALS AND METHODS
Sample collection
5.0 ml venous blood with drawn from patients with colon cancer attending the Radiation and Isotope Center-Khartoum, Ibn cina and Khartoum teaching hospital. Collection was obtained by disposable plastic syringe, the collection area was cleaned by cotton contain 70% alcohol and then allowed to dry before being punctured, and then the blood transferred into EDTA anticoagulated container for Hb and plan container for serum iron ,ferritin.

Laboratory investigation
The Sysmex sodium lauryl sulfate (SLS) method for hemoglobin analysis was a non-cyanide method. Hemoglobin was determined in a separate channel, minimizing interference from high leukocyte concentrations. The SLS method showed excellent correlation with the reference method. The semi-

automated A15 device was used for serum iron, while (TOSOH AIA 360) were used for serum ferritin.

Data collection

Data was collected through precoded questionnaire and was filled for each patient, which contains general information about patient personal information (age, weight and gender), clinical information (date of investigation.).

Ethical Consideration

Ethical consent was approved and signed for the implication of this study by all study population.

DATA ANALYSI

DATA was presented in form of tables. A statistical analysis was then made depending on computerized programs mainly excel and SPSS to utilize the results which were obtained at the end of the study.

RESULTS

This Prospective hospital based cross-sectional study was done to measure the serum iron and ferritin among colonic cancer patients attending Khartoum Teaching Hospital, RICK hospital and Ibn Cina hospital at March 2014 until July 2014.This study included 100 patients diagnosed as a colonic cancer. The majority of patients attended to these three hospitals were male, 67 representing 67 % of respondents and only 33 were female representing 33%, and this shown in table (1). In table (2) shows age distribution among patients and the majority of patients were between 46-60 years representing 46 % followed by 61-80 years representing 26 % and the last were between 41-45 years only 7 % of total respondents. Table (3) represents association between serum iron and ferritin and level of Hb and this is shown in high mean level 2.1 and significant P value 0.000. The correlation between serum iron, ferritin and age of patients appear with insignificant P value 0.097 as shows in table (4). In table (5) shows distribution of study population according to weight, 35% of patients were in weight between (30-50) and 8 patients were in weight between (71-91) representing 8 % of respondents while the majority was shown in weight between (51-70) representing 57 % of total respondents. Regarding correlation between serum iron, ferritin and weight of patients, study shows p value of 0.06 % which is insignificant as shown in table (6).

Table-1: Distribution of the study sample according to (Gender)

Gender	Frequency	Percent
Male	67	67%
Female	33	33%
Total	100	100%

Table-2: Distribution of the study sample according to (Age)

Age (Years)	Frequency	Percent
20-40	21	21%
41-45	7	7%
46-60	46	46%
61-80	26	26%
Total	100	100%

Table-3: Relationship of hemoglobin with serum iron and ferritin

	Test	N	Mean	Std.Deviation	Std. Error Mean	*P value*
Hb	Iron	100	34	2.1	2.1	0.000
	Ferritin	100	96	1.4	1.4	

p. value less than 0.05 that's considered as statistically significant

Table-4: Relationship of age with serum iron and ferritin

T-Test	Age	N	Mean	Std. Deviation	Std. Error Mean	P value
Iron	40-45	7	34	2.1	2.1	0.097
	46-60	46	96	1.4	2.1	
Ferritin	61-80	26				

P. value less than 0.05 that's considered as statistically significant

Table-5: Distribution of the study sample according to (Weight)

Weigh (kg)	Frequency	Percent
30-50	35	35%
51-70	57	57%
71-91	8	8%
Total	100	100%

Table-6: Relationship of weight with serum iron and ferritin

T-Test	Weight	N	Mean	Std. Deviation	Std. Error Mean	P value
Iron	30-50	7	34	2.1	2.1	
	51-70	46	96	1.4	2.1	0.06
Ferritin	71-91	26				

P value less than 0.05 that's considered as statistically significant

DISCUSSIONS

This as hospitals – based cross-sectional study, among patients with colonic cancer not exceeding three months duration. More than two third 67% of study population were male while only one third 33% were female .This agrees with study conducted in Poland by Taipei Veterans General Hospital in 2005[17].VIt is clear that; male is the predominant to visit the hospital because they are usually outdoor as well as well some traditional habits in the some parts of the country prevent women to seek medical treatment unless she is asymptomatic. Since the majority of patients ages between 46-60 years representing 46% of respondents and the less percentage represent patients who at age between 40-45 years and this representing only 7% of total respondents, this agree with study conducted in gastric department in Poland in 2003, regarding association between serum iron, ferritin and level of hemoglobin, low level of Hb has direct effect on level of serum iron and ferritin, because iron enters in the formation of Hb, and this was shown with higher mean and significant P .value (0.000). So there was correlation between serum iron, ferritin and level of Hb and this agree with study conducted in Bytom in Poland in 2005 [19]. With regard to the association between age and concentration of serum iron and ferritin shows insignificant mean with P. value (0.097) and there was no study so far in literature search analyzing variable. More than half of patient's weight between 52-70 Kg representing 57 % and 35 of respondents were 30-50 kg representing 35 % and the last were 71-91 representing 8% of respondents and there was no study so far in literature search analyzing variable. There was no association between serum irons; ferritin and weight of patients which appeared with insignificant mean (P .value 0.06).

CONCLUSIONS

In this prospective hospital based study, two third of respondents were male 67% while the others were female 33%.The study showed low level of serum iron and ferritin in colonic cancer patients. Colon cancer was rare in ages below 30 years and this represented only 7%.The study showed significant association between serum iron, ferritin and Hb level p.value 0.000.We can use iron status to detect colon cancer especially in anemic patients above 50 years, 46% of patients were 40-60 years. There was insignificant association between serum iron, ferritin and weight of patients, p. value 0.06, and insignificant association between serum iron, ferritin and age of patients, p .value 0.097.

RECOMMENDATIONS

Further study with large sample size using to detect colon cancer through serum iron, ferritin and total iron binding capacity estimation. Early diagnosis of colorectal cancer is important in at risk individuals. Awareness and teaching of the patients about the risks that may occur after 50 years and regular follow-up. Routine check of colon cancer in all individuals who in age above 50 years. We recommend the doctors and patients to follow protocol and testing to consider colon cancer as one of the fatal disease also colonoscopy for patients over 50 years is recommended.

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