International Journal of Medical Science and Clinical Invention 5(05): 3848-3851, 2018
DOI:10.18535/ijmsci/v5i5.19 **ICV 2016: 77.2**
e-ISSN:2348-991X, p-ISSN: 2454-9576

Research Article

CEA Value Based on Age, Location and Histopathology Degree of Tumor Factors in Colorectal Cancer Patients at Haji Adam Malik General Hospital Medan in 2011-2015

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Abstract:

Introduction : The American Society of Clinical Oncology (ASCO) recommends periodic postoperative CEA examination because postoperative CEA levels have a prognostic value for assessing cancer recurrence. Several factors affecting CEA levels in colorectal cancer patients are: tumor size, tumor stage, degree of tumor differentiation, liver function, location of tumor, intestinal obstruction, smoking history and metastatic status.

This study aims to assess CEA value based on age, location and histopathology degree of tumors factors in colorectal cancer patients at Haji Adam Malik General Hospital Medan in 2011-2015.

Methods : This study is an descriptive analytical study. Data were taken from patient's medical record with diagnosis of colorectal cancer that taken by total sampling at Haji Adam Malik General Hospital Medan from January 2011 until December 2015. The data obtained then presented descriptively and analyzed by Mann Whitney test and Kruskal Wallis test using SPSS software ver.20.

Results : Mann Whitney test results concluded there was no difference in CEA levels before treatment according to age in colorectal cancer patients (p = 0.613).

The result of Kruskal Wallis test showed there was no difference of CEA level before therapy according to tumor location, and there was a difference of CEA level before therapy according to tumor histopathology degree in colorectal cancer patients (p = 0,184 and 0,031, respectively).

Conclusion : There was no difference in carcinoembryonic antigen (CEA) levels before therapy according to age and location of colorectal cancer, but there was a difference in CEA levels before therapy according to histopathologic degrees of colorectal cancer.

Keywords: colorectal cancer, carcinoembryonic antigen (CEA), age, tumor location, histopathology degree

Introduction

Colorectal cancer is the third most common malignancy of all cancer patients and the fourth leading cause of death in all cancer patients in the world. In the Asia-Pacific region, events vary, with high incidence in Australia and East Asia, and low incidence is present in South-Central Asia. In Indonesia, according to data from Cipto Mangunkusumo Hospital, colorectal cancer tends to arise at a younger age, for age under 40 years obtained 35.2%, and from data Pathology Anatomy Faculty of Medicine University of Indonesia 2003-2007, the number of colorectal cancer patients under the age of 40 reached 28.17 %.

The most common location of colorectal cancer is in rectosigmoid colon that is about 70-75%. The location of the cancer may affect the prognosis of colorectal cancer. Tumors in the rectum have a worse prognosis than tumors in the colon. Cytology and histopathology are standard in determining malignant diagnosis. In addition to determining the diagnosis of malignancy, histopathologic features also have a major effect on the determination of prognosis and recurrence. Some of the things assessed in histopathologic examinations include type and histopathologic grade. Histopathologically colorectal cancer can be divided into well differentiated, moderately differentiated, poorly differentiated, and undifferentiated. Generally undifferentiated tumors are increasingly invasive from the time of diagnosis, and the more invasive the tumor, the worse the prognosis.

Carcinoembryonic antigen (CEA) is detectable in large numbers in patients with gastrointestinal malignancies (including pancreas), lung, breast, and ovaries. CEA is a complex glycoprotein (200KD) formed by various neoplasms, and normally produced by intestinal tissue, pancreas, and embryonic liver. CEA is reported to be positive in 60% to

90% of colorectal cancers, 50% to 80% in pancreatic cancers, and 25% to 50% in gastric cancers, depending on serum levels considered significant.

Recommendation from The American Society Of Clinical Oncology (ASCO) states that the use of CEA for screening is not recommended, because of its characteristic of high specificity and low sensitivity for colorectal cancer. However, ASCO recommends postoperative periodic CEA testing because postoperative CEA levels have a prognostic value for assessing cancer recurrence.

Several factors affecting CEA levels in colorectal cancer patients are: tumor size, tumor stage, degree of tumor differentiation, liver function, tumor location, intestinal obstruction, smoking history and metastatic status. Cancer patients with tumors in the left colon tend to have higher levels of CEA than tumors in the right-handed colon. The better tumor differentiation (well differentiation) results in CEA greater than poorer differentiation (moderately and poorly differentiated).

This study aims to assess CEA value based on age, location and histopathology degree of tumors factors in colorectal cancer patients at Haji Adam Malik General Hospital Medan in 2011-2015.

Methods

This study is an descriptive analytical study. Data taken from the patient's medical records. The sample of this study was taken in total sampling, ie patients who had been treated in Digestive Surgery Clinic Haji Adam Malik General Hospital Medan from January 2011 to December 2015 with a diagnosis of colorectal cancer that met the inclusion and exclusion criteria.

The inclusion criteria for this study were patients diagnosed with colorectal cancer based on histopathology examination and had complete medical records including sex, age, CEA levels before therapy, and tumor location. Samples are excluded when there was other malignancies, patients have other chronic diseases, synchronous tumors or other gastroenteric inflammation, smoking history, and patients who have undergone definitive therapy.

The data obtained are then presented descriptively in the form of narrative, proportion distribution tables, and analyzed by Mann Whitney test and Kruskal Wallis test using SPSS software ver.20.

Results

During the period of January 2011 to December 2015, 76 colorectal cancer patients who met the inclusion and exclusion criteria were included in this study. The majority of patients were male 43 patients (56,6%), aged over 40 years 64 patients (84.2%), tumors in the rectum of 36 patients (47.3%), diagnosed with stage II colorectal cancer 58 patients (76.3%), and have well differentiated histopathology as many as 40 patients (52.6%) (Table 1).

Variables	n (%)
Sex	
Male	43 (56,6)
Female	33 (43,4)
Age	
< 40 y.o	12 (15,8)
≥ 40 y.o	64 (84,2)
Tumor location	
Caecum	2 (2,6)
Ascendens	8 (10,5)
Transversum	10 (13,1)
Descendens	9 (11,8)
Sygmoid	6 (7,8)
Rectosigmoid	5 (6,5)
Rectum	36 (47,3)
Cancer stadium	
II	16 (21,1)
III	58 (76,3)
IV	2 (2,6)
Histopathology degree	
Well differentiated	40 (52,6)
Modearately differentiated	24 (31,5)
Poorly differentiated	8 (10,5)
Undifferentiated	4 (5,2)
Total	76 (100)

Mann Whitney test results obtained p value = 0.613 so it can be concluded that statistically there is no difference in CEA levels before therapy according to age in colorectal cancer patients (Table 2).

Table 2. Differences in CEA Levels Before Therapy According to Age Group

Age (y.o)	Median	p Value
< 40	18,85 (3,40 – 64,00)	0,613
> 40	19,00 (3,10 – 189,70)	
Mean age (y.o)	53.82±12.33	

The result of Kruskal Wallis test to assess statistically the difference of CEA level before therapy according to tumor location and tumor histopathology degree was found no difference of CEA level before therapy according to tumor location, and there was a difference of CEA level before therapy according to tumor histopathology degree in colorectal cancer patients (p value = 0.184 and 0.031, respectively) (Table 3).

Table 3. Differences in CEA Levels Before Treatment According to Location and Degree of Tumor Histopathology

	Total	Mean Rank	p value
Tumor Location			
Caecum	2	64.00	0,184
Ascendens	8	27.75	
Transversum	10	39.05	
Descendens	9	40.78	
Sigmoid	6	55.67	
Rectosigmoid	5	38.80	
Rectum	36	35.85	
Histopathology degree			
Well Differentiated	40	31,46	0,031
Moderately differentiated	24	46,81	
Poorly differentiated	8	47,63	
Undifferentiated	4	40,75	
Total	76		
CEA level before therapy (µg/ml)	14.7(0.00-693.20)		

Discussion

Carcinoembryonic antigen (CEA) is now more widely used to assess postoperative recurrence and is still rarely used to determine colorectal cancer prognosis and preoperative diagnosis. CEA also does not use as a screening test because of the low sensitivity and specificity of this examination for screening. Fletcher obtained CEA sensitivity as many as 36% and specificity as many as 87% in screening for Duke's A and B colorectal cancer cases. With very low sensitivity at this early stage, CEA was not used for screening.

The study found that by sex, colorectal cancer is more prevalent in males than in females. More men who suffer from colorectal carcinoma are also statistically described by the American Cancer Society which states that more men suffering from colorectal carcinoma than women occurs in all races / ethnicity in America. Koo and Leong found the incidence of colorectal carcinoma in the early 1970s was relatively similar for both sexes, but subsequently experienced a shift in the last three decades with more men than females; this happens on five continents.

Distribution of age-based samples obtained the most detectable colorectal cancer patients was over the age of 40 years as many as 64 patients (84.2%). Although colon and rectal malignancies are most prevalent at age above 40 years, colorectal cancer is also found at a young age. In this study, 12 patients (15.8%) had colorectal cancer under age 40. The difference of CEA level with patient age was not statistically significant (p value = 0,613) so it can be concluded that statistically, there is no difference of CEA level according to age in colorectal cancer patients. The American Society of Clinical Oncology states that the risk of developing colorectal cancer increases with age, can affect teens and young adults, but more than 90% occur in those over 50 years of age.

This study found 2 patients had colorectal cancer in the ascending colon, 10 patients in transverse colon, 9 patients in descending colon, 6 patients in sigmoid, 5 patients in rectosigmoid, and 36 patients in the rectum. The difference of CEA level according to tumor location was not statistically significant (p value = 0.184) so it can be concluded that statistically there is no difference of CEA level with tumor location in colorectal cancer patients. Similarly, the Dbouk et al's study found that there was no significant difference between preoperative CEA levels and tumor sites in colorectal cancer patients (p = 0.357). Similarly, Filiz et al's study stated that there was no significant difference between preoperative CEA levels and tumor sites in colorectal cancer patients (p = 0.35). Bin bin Su et al's study also found that there was no significant difference between preoperative CEA levels and tumor sites in colorectal cancer patients (p = 0.223). However, in a study conducted by Rizaldi et al showed that there was a significant difference between preoperative CEA levels and tumor sites in colorectal cancer (p = 0.038).

In this study it was found that most histopathologic images were well differentiated as many as 40 patients (52.6%), followed by moderately differentiated in 24 patients (31.6%), then poorly differentiated as many as 8 patients (10.5%) and last undifferentiated with 4 patients (5.3%). The difference of CEA before theraphy level according to histopathology degree was statistically significant (p = 0.031), so it can be concluded that statistically there is difference of CEA pretreatment level according to histopathology degree in patients with colorectal cancer. The data distribution obtained is slightly different from the research conducted in China by Lee et al. They found that the most histopathologic degree was moderately differentiated as many as 52% of patients, well differentiated in 26% poorly differentiated by 17.9%, and the least undifferentiated of only 7%.

Conclusion

There was no difference in carcinoembryonic antigen (CEA) levels before therapy according to age and location of colorectal cancer, but there was a difference in CEA levels before therapy according to histopathologic degrees of colorectal cancer.

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