

Risk factors of colorectal cancer and its clinical epidemiological study.

Yi Liu¹, Wen bin Ding², Chengqiu Yan¹, Han Bao¹, Kai Li³, Cheng Wang^{4*}

¹Department of Anorectal, Affiliated Hospital of Changchun University of Traditional Chinese Medicine, Changchun, Jilin Province, China

²Department of Endoscopy, the Affiliated Hospital of Changchun University of Traditional Chinese Medicine, Changchun, Jilin Province, China

³Department of Surgery, Dehui People's Hospital, Changchun, Jilin Province, China

⁴Fourth Department of Internal Medicine, Jilin Tumor Hospital, Changchun, Jilin Province, China

Abstract

Objective: To explore risk factors of colorectal cancer and its clinical epidemiological study.

Methods: This study analysed clinical data of 1860 colorectal cancer patients retrospectively, its epidemiological characteristics, compared them with 1725 non-tumor patients, risk factors which caused colorectal cancer.

Results: There were significant differences in sex ($\chi^2=204.404$, $P<0.05$), age ($\chi^2=-0.208$, $P<0.05$), years ($\chi^2=4.254$, $P<0.05$), primary focus location ($\chi^2=73.050$, $P<0.05$) and pathological type distribution ($\chi^2=22.066$, $P<0.05$) of colorectal patients; there were significant differences in basic diseases ($\chi^2=35.623$, $P<0.05$; $\chi^2=13.359$, $P<0.05$), colorectal cancer family history ($\chi^2=18.628$, $P<0.05$), cholecystectomy history ($\chi^2=27.420$, $P<0.05$), appendectomy between patients in colorectal group and the control group ($P<0.05$), which given single factor and multiple factors logistic analysis, it was found that diabetes, hypertension, colorectal cancer family history and appendectomy all can be risk factors which induced colorectal cancer. Diabetes (OR 95% CI=1.019-2.299, $P=0.039$) and colorectal cancer family history (OR 95% CI=3.769-21.380, $P<0.001$) were the main risk factors which induced colorectal cancer.

Conclusion: The high group of colorectal cancer are male. The onset age is mainly middle and old age group. Primary focal location is mainly in rectum. Pathological type is canal adenocarcinoma mostly. Diabetes and colorectal cancer family history are main risk factors which induced colorectal cancer.

Keywords: Colorectal cancer, Risk factors, Epidemiological characteristics.

Accepted on October 16, 2017

Introduction

Colorectal Cancer (CRC) is one common malignant tumor with relative high incidence rate and death rate around the world. CRC is one of the most frequent cancers in the world and a significant cause of human mortality and the second and third leading cause of cancer-related deaths in males and females, respectively, in the United States [1,2]. Poor prognosis and consequences of its metastatic spread make CRC the second most common cause of cancer-related deaths in western countries [3]. Increasing evidence suggests a pivotal role for intestinal microbiota in the development of colitis and CRC [4,5]. For this purpose, the research of the etiologies and risk factors of colorectal adenomas have taken on broader significance. Clinical data of 1860 colorectal cancer patients for four years in our hospital are given retrospective analysis. This study explores its clinical epidemiological characteristics and risk factors.

Materials and Methods

General data

1860 colorectal cancer patients from January, 2010 to January, 2014 were selected as study objects. All patients met relevant diagnostic criteria of colorectal cancer in rectal cancer diagnostic and treatment cancer application guide [5] by American colorectal RCPSC, diagnosed by routine iconography and histopathological examination. There were 1148 male patients and 712 female patients. The age was from 16 to 93 y old. The average year was 59.26 ± 4.58 y old. 1725 non-tumor patients in rectal anal surgery of our hospital at the same time were selected as the control group. There were 1067 male patients and 658 female patients. The age was from 17 to 85 y old. The average age was 56.81 ± 4.60 y old. There were no statistical differences in sex, age etc. of patients in two groups ($P>0.05$), it had comparability. This research was approved by the Ethical Committee of Xinjiang Medical

University according to the declaration of Helsinki promulgated in 1964 as amended in 1996, the approval number is 2010004.

Methods

This study investigated clinical data of colorectal cancer patients, analysed epidemiological characteristics, compared the differences between colorectal cancer patients and relevant factors in the control group, analysed factors with statistical differences by single factor and multiple factors analysis, explore risk factors which induced colorectal cancer [7].

Statistical analysis

This study used SPSS 19.0 software to do statistical analysis. Measurement data were represented by mean and standard deviation ($\bar{x} \pm s$). Comparison between groups, before and after treatment was given t-test. Enumeration data were represented by constituent ratio and given χ^2 test. Single factor was given four-fold table χ^2 test. Logistic regression analysis was given maximum likelihood variables step by step, which brought into analysis. Then to calculate OR and CI.

Results

Epidemiological characteristics analysis of colorectal cancer patients

There were significant differences in sex, age, years, primary focal location and pathological type distribution in colorectal patients ($P < 0.05$). The high group of colorectal cancer are male. The onset age is mainly middle and old age group. Primary focal location is mainly in rectum. Pathological type is canal adenocarcinoma mostly. In recent years, the incidence rate of it increases year after year (Table 1).

Table 1. Epidemiological investigation of colorectal cancer patients.

Items	Cases	%	χ^2	P
Sex			204.404	<0.001
Male	1148	61.72		
Female	712	38.28		
Age/y old			0.208	0.040
≤ 29	55	2.96		
30~39	178	9.57		
40~49	287	15.43		
50~59	483	25.97		
60~69	447	24.03		
70~79	323	17.37		
≥ 80	87	4.68		
Year/year			4.254	0.039
2010	274	14.73		

2011	318	17.10		
2012	367	19.73		
2013	411	22.10		
2014	490	26.34		
Tumor type			3.135	0.077
Colon cancer	903	48.55		
Rectal cancer	957	51.45		
Primary focal location			73.050	<0.001
Ascending colon including splenic flexure of colon)	246	13.23		
Transverse colon (including splenic flexure of colon)	219	11.77		
Descending colon	75	4.03		
Sigmoid colon	363	19.52		
rectum	957	51.45		
Blood type			3.094	0.377
A type	470	25.27		
B type	443	23.82		
O type	844	45.38		
AB type	103	5.54		
Pathological type			22.066	<0.001
Canal adenocarcinoma	1345	72.31		
Papillary adenocarcinoma	226	12.15		
canal papillary adenocarcinoma	57	3.06		
Mucous adenocarcinoma	197	10.59		
Signet-ring cell carcinoma	35	1.88		

Risk factors analysis of colorectal cancer

There were significant differences in basic diseases, colorectal cancer family history, cholecystectomy history, appendectomy between patients in colorectal group and the control group ($P < 0.05$), seen in Table 2, which given single factor, it was found that diabetes, hypertension, colorectal cancer family history and appendectomy all can be risk factors which induced colorectal cancer, seen in Table 3. In multiple logistic regression analysis, in order to select risk factors from diabetes, hypertension, colorectal cancer family history and appendectomy, only diabetes (OR 95% CI=1.019-2.299, $P=0.039$) and colorectal cancer family history (OR 95%

CI=3.769-21.380, P<0.001) were related to the presence of CRC (Table 4).

Table 2. Comparison of relevant factor of patients in two groups.

Relevant factors	Colorectal cancer group (n=1860)	The control group (n=1725)	χ^2/t	P
Sex				
Male	1148 (61.72)	1067 (61.86)	0.007	0.934
Female	712 (38.28)	658 (38.14)		
Average age/ years old	59.26 ± 4.58	56.81 ± 4.60	19.267	1.028
Blood type				
A type	470 (25.27)	393 (22.78)	3.027	0.082
B type	443 (23.82)	387 (22.43)	0.961	0.327
O type	844 (45.38)	786 (45.57)	0.013	0.910
AB type	103 (5.54)	159 (9.22)	17.899	0.052
Basic diseases				
Hypertension	189 (10.16)	84 (4.87)	35.623	<0.001
diabetes	95 (5.11)	47 (2.72)	13.359	<0.001
Colorectal cancer family history	49 (2.63)	13 (0.75)	18.628	<0.001
Cholecystectomy history	12 (0.65)	7 (0.41)	0.973	0.324
Appendectomy history	60 (3.23)	13 (0.75)	27.420	<0.001

Table 3. Single logistic analysis results of colorectal cancer.

Relevant factors	Wald	P	OR	95% CI
diabetes	36.45	<0.001	4.967	2.951~8.358
hypertension	29.601	<0.001	0.524	0.415~0.661
Colorectal cancer family history	1.242	0.002	3.464	1.576~7.610
Cholecystectomy history	0.471	0.481	1.603	0.248~5.992
Appendectomy history	1.459	<0.001	4.307	2.015~9.201

Table 4. Multiple factors logistic results of colorectal cancer.

Relevant factors	Wald	P	OR	95% CI
diabetes	4.215	0.039	1.53	1.019~2.299
hypertension	0.051	0.817	0.958	0.670~1.369

Colorectal cancer family history	24.577	<0.001	8.977	3.769~21.380
----------------------------------	--------	--------	-------	--------------

Discussion

Colorectal cancer is the third malignant tumor after lung cancer and breast cancer. Clinical incidence rate and death rate are relative high. To grasp its epidemiological characteristics and risk factors for benefiting screen and prevention of colorectal cancer [8].

Lots of reports at abroad, which show there are estrogen expression in tissue of colorectal tissue [9,10], the hormone level in young female high generally. So incidence rate of female lower than male [11]. Shiovitz et al. [12] study points out estrogen receptor in colorectal cancer tissue has positive correlations with progesterone receptor in quantitative experiment of rectal estrogen receptor and progesterone receptor, but it has no correlations with tumor malignant degree. Incidence rate of male colorectal cancer higher than female in this study, which is similar to study reports above. In this study, incidence rate of colon and rectum are 48.55% and 51.45% respectively, they are similar, which has great differences from study reports at abroad [13,14]. Incidence of colorectal cancer has relation with heritage, environment and diet etc. There are great differences between China and foreign countries above, which is the reason of causing great differences in report results at home and abroad [15,16]. From the year distribution, incidence rate of colorectal cancer increases year after year. The main reasons are improvement of life quality of people at home and changes of diet [17]. In addition, the development of clinical diagnostic technology, such as coloscope can find colorectal cancer earlier, it also one of important factors [18]. From onset age, colorectal cancer is mainly in middle and old age people, which provide important group for early screening, is benefit for precancerous lesions in early stage to avoid delaying treatment time [19]. This study compares colorectal cancer with relevant factors of non-colorectal cancer patients. The results show that diabetes and colorectal cancer family were the risk factors of CRC. Some studies are similar to our results. Li et al. [20] reported that preexisting diabetes mellitus in CRC patients is severely associated with the worse overall survival. And a cohort study showed that the risk of CRC mortality is significantly increased in both sexes and women with diabetes [21]. For relevant risk factors of colorectal cancer above, this can guide early general surgery, screen and prevention of colorectal cancer.

In conclusion, colorectal cancer has significant epidemiological characteristics. Diabetes and colorectal cancer are then main risk factors which induce colorectal cancer. Medium-elderly men, patients with diabetes and colorectal cancer family history are included into important group of general survey and screening, which has great significance on early discovery and treatment of colorectal cancer.

References

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 2015; 136: 359-386.
2. Siegel RL, Miller KD, Jemal A. Cancer Statistics, 2017. *CA Cancer J Clin* 2017; 67: 7-30.
3. Favoriti P, Carbone G, Greco M, Pirozzi F, Pirozzi RE. Worldwide burden of colorectal cancer: a review. *Updates Surg* 2016; 68: 7-11.
4. Drewes JL, Housseau F, Sears CL. Sporadic colorectal cancer: microbial contributors to disease prevention, development and therapy. *Br J Cancer* 2016; 115: 273-280.
5. Tlaskalova-Hogenova H, Vannucci L, Klimesova K. Microbiome and colorectal carcinoma: insights from germ-free and conventional animal models. *Cancer J* 2014; 20: 217.
6. Fu CG, Yu ZQ. Point introduction and explanation of colorectal cancer in rectal cancer diagnostic and treatment cancer application guide (2013 edition) by American colorectal RCPSC. *Chinese J Pract Surg* 2013; 33: 645-649.
7. Zhu Y, Zhang HP, Wang YC. Serum cystatin C level is associated with carotid intima-media thickening and plaque. *Scandinavian J Clin Lab Investig* 2015; 75: 265.
8. Gan JL, Gao F, Cao YF. Clinical epidemiologic analysis of 1 278 cases of elderly patients with colorectal carcinoma in guangxi region. *Cancer Res Prev Treat* 2013; 40: 98-101.
9. Stigliano V, Sanchez-Mete L, Martayan A, Anti M. Early-onset colorectal cancer: a sporadic or inherited disease? *World J Gastroenterol* 2014; 20: 12420-12430.
10. Sharma A, Ng H, Kumar A, Teli K, Randhawa J. Colorectal cancer: histopathologic differences in tumor characteristics between patients with and without diabetes. *Clin Colorectal Cancer* 2014; 13: 54-61.
11. Zhang YZ, Li SR, Sheng JQ. Clinical epidemiological features of 594 patients with primary colorectal cancer. *Chinese J Gastroenterol Hepatol* 2010; 19: 103-107.
12. Shiovitz S, Copeland WK, Passarelli MN, Burnett-Hartman AN, Grady WM. Characterisation of familial colorectal cancer Type X, Lynch syndrome, and non-familial colorectal cancer. *Br J Cancer* 2014; 111: 598-602.
13. Zhao B, Zhong HG, Wu W. Epidemiological study progress of risk factors in colorectal cancer. *Colorect Anal Surg* 2013; 19: 199-202.
14. Li L, Huang HL. Epidemiological study progress of risk factors in colorectal cancer. *Colorect Anal Surg* 2010; 16: 397-401.
15. Shao HM, Fen R, Zhu H. Meta-analysis of the risk factor of colorectal cancer in China. *Chinese J Prev Contr Chronic Dis* 2014; 22: 174-177.
16. Gu HP, Shang PZ. Relationship between expression of EGFR, VEGF and PTEN with clinicopathological characteristics in colorectal carcinoma. *Pract J Cancer* 2011; 26: 259-262.
17. You Y, Zong HF. Study status of colorectal cancer screening. *Colorect Anal Surg* 2013; 19: 197-198.
18. Yusup A, Wang HJ, Rahmutula A. Clinical features and prognosis in colorectal cancer patients with different ethnicities in northwest China. *World J Gastroenterol* 2013; 19: 7183-7188.
19. Zhou J, Bao ZJ, Zhen SB. Multiple regression analysis of factors in diagnosis of colorectal cancer. *Chinese J Gastroenterol* 2010; 15: 355-357.
20. Li J, Liu J, Gao C. Increased mortality for colorectal cancer patients with preexisting diabetes mellitus: an updated meta-analysis. *Oncotarget* 2017; 8: 62478-62488.

*Correspondence to

Cheng Wang

Fourth Department of Internal Medicine

Jilin Tumor Hospital

Jilin Province

China