RESEARCH ARTICLE

Does the Increasing Trend of Colorectal Cancer Incidence in Jeddah Reflect a Rise in the Kingdom of Saudi Arabia?

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Abstract

Background: The aim of this study was to outline the trend in the incidence of colorectal cancer (CRC) in the city of Jeddah, Kingdom of Saudi Arabia (KSA), for comparison with previously published national CRC data. Materials and Methods: A retrospective data analysis was performed on all cases of CRC diagnosed between January 2000 and December 2006 amongst Saudi patients in Jeddah using data retrieved from the Saudi Cancer Registry (SCR). Descriptive analysis was performed and results were compared to national CRC data from the SCR. Results: In Jeddah, 644 cases of CRC were diagnosed during the time period, accounting for 15% of all CRC cases in KSA. Males were more commonly affected than females (58% versus 42%). The male preponderance of CRC was similar to that observed at a national level. In Jeddah, the incidence was higher among those >45 years (77.0%), and the mean age at diagnosis was 57 years. At diagnosis, 10% of patients presented with localized disease; 25% presented with distant metastasis and the remaining patients had various stages of regional extension. Adenocarcinomas accounted for 72% of cases. Statistical analysis did not reveal any clinically significant differences between cases diagnosed in Jeddah and those diagnosed throughout KSA. Conclusions: The increased trend in the incidence of CRC in Jeddah between 2000 and 2006 mirrors the recent trend in KSA. This highlights the magnitude of this healthcare hazard, not only in Jeddah, but also across the country and supports the need for preventive measures and early detection of the disease.

Keywords: Colorectal cancer - epidemiology - incidence - Jedda - Saudi Arabia

Asian Pacific J Cancer Prev, **13 (12)**, 6285-6288

Introduction

Jeddah is a large city located on the coast of the Red Sea, which represents the major urban center of the western region of the Kingdom of Saudi Arabia (KSA). It is the largest city in Makah Province, the largest seaport on the Red Sea, and the second largest city in KSA after the capital city, Riyadh. The population of the city currently stands at 3.2 million (Jeddah, 2006).

Colorectal cancer (CRC) has recently been recognized as a major health concern worldwide (Sankaranarayanan et al., 2010). The Saudi Cancer Registry (SCR) is a definitive guide to the population-based incidence of cancer in KSA (Registry, 2012). The 2007 SCR report indicates that CRC is the second most common malignancy in the country and the most common malignancy amongst Saudi males between the ages of 45 and 74 years. The report also found CRC to be the second most common malignancy in the Makkah region, with the highest incidence present among males. There are few reports that describe the epidemiology of CRC in Jeddah (Ayyub, 2002) or KSA. (Ibrahim, 2008; Mosli, 2012) In this report, we analyze the epidemiology of CRC in Jeddah and compare it with the epidemiology of CRC in KSA as a whole. Our aim was to establish if the pattern of CRC in Jeddah is representative of the Kingdom as a whole, including the recent rise in the incidence of CRC, as part of an attempt to identify factors, which may account for the patterns of CRC and suggest a public health response to it.

Materials and Methods

We performed a retrospective analysis of data for Saudi patients diagnosed with CRC in the city of Jeddah during the period from January 2000 to December 2006. All data were collected from the SCR – a population-based registry that records all cases of cancer reported by the Ministry of Health, government and private health institutions, clinics and laboratories from all regions of KSA. We collected data on age, sex, tumor pathology, tumor location and TNM stage at the time of diagnosis for all cases of CRC diagnosed during the study period.

We compared our data with those on Saudi patients with CRC throughout KSA, which were also obtained from the SCR. Data on CRC cases in KSA covered the period from January 2000 to December 2006. Our analysis

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included the incidence of CRC based on sex and age (<45 and ≥45 years), the tumor location and pathological type.

Statistical analysis

Descriptive analysis was performed using Microsoft Excel 2007 (Microsoft, Seattle, WA, USA). Data were presented as incidences (percent) and frequencies. All data were subsequently analyzed using SPSS software version 12.0 (SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as percentages and compared using Pearson's Chi-square or Fisher's exact test when appropriate. Linear variables were expressed as mean±standard error of the mean and compared using Student's t test. A two-tailed p-value<0.05 was considered statistically significant.

Results

In Jeddah, a total of 644 CRC cases (15% of all CRC cases in KSA) were registered on the SCR between January 2000 and December 2006. The incidence of CRC was higher in males than in females; 58% versus 42% (Figure 1). This male preponderance of CRC was also observed in a previously reported analysis of CRC cases among Saudi patients in KSA during the same time period. The mean age of patients at the time of diagnosis of CRC were 58 years for males and 53 years for females (mean, 57 years) residing in Jeddah. At the national level, the mean age at diagnosis of CRC in patients with CRC was 57.95 years during the same period. With regard to age groups, the incidence of CRC was higher in patients over 45 years than in younger patients (77% for patients aged 45 or over and 23% for patients less than 45 years old) (Figure 2). At the national level, the incidence of CRC was 79.1% in patients above the age of 45 years and 20.9% for those younger than 45.

With regards to tumor location, the left side of the colon was the most common site of CRC (60%). This included tumors located distal to the splenic flexure. In 11% of the cases, the tumor was located in the right side of the colon, proximal to the hepatic flexure. The most common location of CRC was the rectum (24%) followed by the sigmoid colon (16%). A total of 165 (26%) patients presented with localized disease and 160 (25%) patients had distant metastasis at the time of diagnosis. The rest of the patients had various degrees of regional extension or an unknown stage (Figure 3). Patients aged

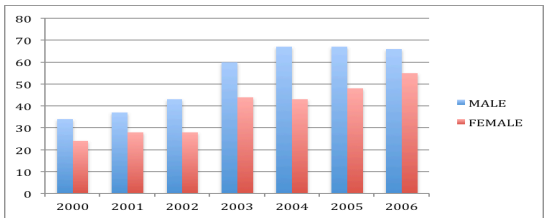

Figure 1. Annual Incidence of Colorectal Cancer Amongst Saudi Patients in Jeddah between 200 and 2006 Divided by Gender

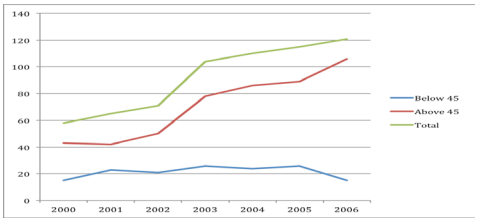

Figure 2. The Trends of Colorectal Cancer Incidence between 2000 and 2006 According to Age

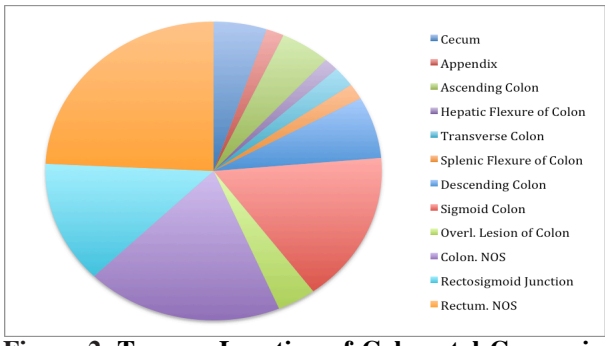

Figure 2. Tumour Location of Colorectal Cancer in Saudi Patients in Jeddah

Table 1. Comparison Between Colorectal Cancer Cases in Jeddah and the Kingdom of Saudi Arabia[a]

	KSA (n=4201)	Jeddah (n=644)
Age (±) in years	57.95±25.67	57.03±14.94
Gender		
Male	2274 (54.0)	374 (58.1)
Female	1927 (45.9)	270 (41.9)
Location (A)[b]		
Colon	2412 (57.4)	403 (62.6)
Rectosigmoid junction	633 (15.1)	85 (13.2)
Rectum	1156 (27.5)	156 (24.2)
Location (B)[c]		
Cecum	261 (6.2)	33 (5.1)
Appendix	55 (1.3)	11 (1.7)
Ascending colon	206 (4.9)	31 (4.8)
Hepatic flexure of colon	64 (1.5)	9 (1.4)
Transverse colon	111 (2.6)	14 (2.2)
Splenic flexure of colon	75 (1.8)	11 (1.7)
Descending colon	219 (5.2)	43 (6.7)
Sigmoid colon	788 (18.8)	105 (16.3)
Overl. lesion of colon	146 (3.5)	24 (3.7)
Colon NOS	487 (11.6)	122 (18.9)
Rectosigmoid junction	633 (15.1)	85 (13.2)
Rectum	1156 (27.5)	156 (24.2)
Type of cancer		
Neoplasm, malignant	114 (2.7)	21 (3.3)
Carcinoma, NOS	76 (1.8)	5 (0.8)
Carcinoma, undifferentiated, NOS	3 (0.1)	1 (0.2)
Squamous cell carcinoma, NOS	6 (0.1)	2 (0.3)
Adenocarcinoma, NOS	3069 (73.1)	464 (72.0)
Adenocarcinoma intestinal type	35 (0.8)	8 (1.2)
Adenocarcinoma in adenomatous polyp	47 (1.1)	8 (1.2)
Tubular adenocarcinoma	9 (0.2)	0 (0.0)
Adenocarcinoma in multiple adenomatous polyps	4 (0.1)	0 (0.0)
Carcinoid tumor, NOS	20 (0.5)	3 (0.5)
Composite carcinoid	5 (0.1)	1 (0.2)
Adenocarcinoid tumor	4 (0.1)	0 (0.0)
Neuroendocrine carcinoma, NOS	8 (0.2)	1 (0.2)
Papillary adenocarcinoma, NOS	38 (0.9)	13 (2.0)

*KSA, Kingdom of Saudi Arabia; NOS, not otherwise specified; overl., overlying; [a]Data are presented as frequency (percent) unless otherwise stated; [b]p<0.05; [c]p<0.01

less than 45 years did not show advanced disease at the time of diagnosis when compared with patients older than 45 years of age. The most common pathological variant reported was adenocarcinoma (72%) with grade 2 (moderately differentiated) being the most common grade among all variants (76%). The most common pathological variant in Saudi patients with CRC across KSA was also adenocarcinoma (73.1%). A comparison between CRC cases in Jeddah and in KSA is shown in Table 1.

Discussion

Colorectal cancer is a cause for concern worldwide. The disease is associated with a high incidence of morbidity and mortality (Ministry of Health K, 2007). An increasing trend in the incidence of CRC in KSA has been observed since 1994 (Mosli, 2012; Registry, 2012) This observation is largely due to better detection and registration of cases on the SCR. The SCR was established in 1992 and started registering cases on January 1, 1994 (Registry, 2012). An earlier study described this increased trend in CRC incidence, especially in the western region of the country (Ayyub, 2002). A more recent research paper notes that CRC incidence, morbidity and mortality in KSA have been increasing steadily now for more than twenty years (Abdul, 2011). The same trend has also been previously reported in a data analysis from the National Cancer Registry between 1994 and 2003 (Mansoor, 2002) and in a more recent analysis of cases reported between 2000 and 2006 (Mosli, 2012). Our analysis, which is more current, also finds the trend continuing up to 2006. This observed change in the trend of CRC incidence has been previously reported in surrounding countries as well such as Yemen and Kuwait with some variation seen between the urban and rural populations (Salim et al., 2009; 2010).

In our analysis, the mean age of patients at the time of diagnosis was 57 years. This finding concurs with a data analysis of 111 patients with CRC performed between 1993 and 2002 from two hospitals in the western region of KSA (Ministry of Health K, 2007) The authors reported that the mean age at diagnosis was 59 years in males and 56 years in females. In our study cohort, the incidence of CRC was higher in males than females, which is not only in line with reports from KSA but is also consistent with reports worldwide (Al-Ahwal, 2005).

The location of the disease in the colorectal area and its clinical features are also not very different from what has been described in the past (Isbister, 1992; 2000; Mansoor, 2002; Al-Ahwal, 2005; Abdul, 2011).

All previous literature on CRC describes left-sided lesions to be more common, especially in patients from developing countries, with the rectum being the most likely affected site (Ministry of Health K, 2007) Similar to reports based on national data from countries like Turkey, Japan and Brazil, adenocarcinoma was found to be the most frequent pathological variant observed in the patients in our study (Eser, 2010; Matsuda, 2010; 2011; Epub, 2012; Zandonai, 2012) These reports also report that well differentiated to poorly differentiated adenocarcinomas are the most common type similar to the pattern of CRC observed in KSA (Al-Ahwal, 2005)

The etiology and risk factors of CRC in Jeddah are unlikely to differ from the risks behind the increased trend reported at the national level in KSA even though Jeddah is known for its diversified population with people of different ethnic backgrounds. High consumption of red meat and processed meat has been recently linked to the development of colonic polyps and CRC (Genkinger, 2007; Zandonai, 2012). Interestingly, a change in dietary habits has been observed over the past decade with a trend towards westernization in foods with the introduction of fast food and a sway from more ethnic cooking. This might be a direct factor leading to this phenomenon. Studies done in neighboring countries with similar demographics have shown an association between this trend and the increasing rise in colorectal cancer incidence (Arafa, 2011). Whether or not the trend is influenced by urbanization and if the incidence is lower among rural communities in the Arab peninsula is a question yet to be answered. This phenomenon has been reported in neighboring countries such as Iran and China (22-25) as well as in other areas of the world such as Africa and The United States (; Chen et al., 2012; Dai et al., 2012; Fan, 2012; Hines and Markossian, 2012; Lam, 2012; Miller et al., 2012; Wu et al., 2012; Rohani-Rasaf, 2012). If that is the case, then larger and more urbanized cities like Jeddah would be at a higher risk for this phenomenon with western foodstuffs being more available and more often consumed.

Finally, the previous recommendations that have been suggested at a national level for initial screening to commence at age 50 years in individuals with an average risk and as early as the age of 10 years in those with familial adenomatous polyposis or in an individual's early twenties for hereditary non-polyposis CRC (Lynch syndrome) and colonoscopy annually after age of 35 years, would be of great benefit to the people of the western region (Mansoor, 2002; Al-Ahwal, 2005). The need of the hour is an organized national campaign that would target preventive measures such as CRC screening programs and public awareness and education while considering well described cultural barriers (Ravichandran, 2010; 2011).

Acknowledgements

Dr. Princila Mukoka and Dr. Ali Kabouche for their efforts in assisting the authors with the preparation of this manuscript.

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