Temporal Epidemiological Assessment of Colorectal Cancer Incidence and Mortality in East Kazakhstan, 2004-2013

Kuantkan Zhabagin1, Nurbek Igissinov2, Zukhra Manambayeva1, Tasbolat Adylkhanov1, Marat Sandybayev3, Murat Nurgazin1, Adilzhan Massadykov4, Sayat Tanatarov1, Daniyar Aldyngurov5, Nailya Urazalina1, Aizhan Abiltayeva1, Ainoor Baissalbayeva1, Almagul Zhabagina1, Dinara Sabitova1, Nurgul Zhumykbayeva3, Dinara Kenbayeva6, Alexander Rakhimbekov1

Abstract

Colorectal cancer incidence and mortality in Kazakhstan are relatively high but exact statistics have hitherto been lacking and trends over time are unclear. The present study was therefore undertaken to retrospectively assess data for East Kazakhstan, accessed from the central registration office, for the period 2004-2013. Approximate age standardized data for incidence and mortality were generated and compared across age groups, gender and year. It was determined that during the studied period 3,417 new cases of colorectal cancer were registered and 2,259 died of this pathology. Average cancer cancer incidence and mortality over the ten years were 24.1/105 and 15.9/105 respectively, and the overall ratio of mortality/incidence (M/I) was 0.69:1 (range 0.58-0.73). Both incidence and mortality tended to remain constant in both males and females. The male to female ratios also did not significantly vary over time but a trend for improvement of the mortality to incidence ratio was observed, especially for rectum. Whether this might be related to screening remains unclear. These preliminary data indicate that whereas colorectal cancer continues to be important, change in environmental factors are not having a great impact on incidence in East Kazakhstan.

Keywords: Colorectal cancer - incidence - mortality - trends - age dependence - East Kazakhstan

Introduction

Colorectal cancer is generally less common in Asia than in the Western world (Ferlay et al., 2013; 2013; Liu et al., 2015) but is becoming of greater importance and is generally on the increase, for example in Korea (Jung et al., 2015), Turkey (Seydaoğlu et al., 2013) and in Iran, for example in Kermanshah and Hamadan provinces; however, change did not reach significance in Ilam and Kurdistan provinces (Abdifard et al., 2013), increasing East Azerbaijan (Somi et al., 2014) and Kerman (Roya and Abbas, 2013). In China, age-specific rates of colorectal remained relatively stable in one study (Zhou et al., 2015) and in Japan, colorectum and lung (males), showed a pattern of increasing incidence and mortality rates until the mid-1990s, stabilizing or decreasing thereafter (Katanoda et al., 2013). Thus there are considerable differences across Asian countries. Males and people in high income Asia Pacific and East Asia countries appear at greater risk of death from colon and rectum cancer, while South Asia region have the lowest rates of mortality due to this cancer (Zayeri et al., 2015).

Concerning colorectal cancer incidence in South-East Sibiria, it was lower during 2001-2005 and 2006-2010 as compared to the period of 1991-1996 (Kutikhin et al., 2012), where risk factors include smoking and being overweight. In the Aral-Syr Darya region of Kazakhstan, slight increase of colon and decrease of rectal cancer has been described over time (Igissinov et al., 2011), in line with data for the country as a whole (Igissinov et al., 2012).

Since very limited information is available in the international literature regarding recent colorectal cancer statistics in Kazakhstan, the present descriptive study was performed to provide baseline data for more analytical analyses in the future, focusing on any change over the the last decade.

Materials and Methods

The main sources of information for this research were materials of the state registration about colorectal
Table 1. Colorectal Cancer Incidence Data for East Kazakhstan, 2004-2013, According to Age Group

| Year | Both sexes | Males | Females |
|------|------------|-------|--------|
|      | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|      | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) |
| Till 30 | 3 (0.4) | 4 (0.6) | 1 (0.2) | 2 (0.3) | 1 (0.2) | 1 (0.2) | 3 (0.5) | 2 (0.3) | 0 (0.0) | |
| 30-39 | 10 (4.9) | 3 (1.5) | 5 (2.5) | 4 (2.0) | 2 (1.0) | 11 (5.4) | 7 (3.4) | 12 (5.9) | 11 (5.4) | 4 (2.0) |
| 40-49 | 26 (11.7) | 29 (13.2) | 27 (12.5) | 24 (11.3) | 28 (13.5) | 19 (9.4) | 22 (11.1) | 26 (13.4) | 22 (11.6) | 19 (10.1) |
| 50-59 | 61 (43.1) | 63 (41.2) | 54 (33.3) | 61 (36.1) | 63 (36.5) | 65 (36.7) | 61 (34.3) | 67 (36.8) | 74 (40.1) | 90 (48.3) |
| 60-69 | 110 (97.5) | 101 (94.3) | 105 (103.8) | 95 (98.5) | 83 (88.8) | 84 (91.0) | 83 (91.2) | 95 (103.4) | 100 (105.2) | 106 (105.7) |
| 70+ | 140 (161.6) | 151 (177.3) | 147 (172.3) | 155 (153.3) | 131 (142.4) | 135 (141.0) | 143 (148.2) | 170 (171.6) | 171 (172.0) | 141 (143.6) |
| total | 350 (24.0) | 351 (24.3) | 339 (23.7) | 323 (22.7) | 309 (21.8) | 315 (22.2) | 317 (22.7) | 373 (26.7) | 380 (27.2) | 360 (25.8) |

Table 2. Colorectal Cancer Mortality Data for East Kazakhstan, 2004-2013, According to Age Group

| Year | Both sexes | Males | Females |
|------|------------|-------|--------|
|      | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|      | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) | N (Inc) |
| Till 30 | 0 (0.0) | 1 (0.3) | 1 (0.3) | 3 (0.9) | 1 (0.3) | 0 (0.0) | 1 (0.3) | 1 (0.3) | 1 (0.3) | 0 (0.0) |
| 30-39 | 4 (3.9) | 2 (1.9) | 3 (2.9) | 4 (3.9) | 1 (1.0) | 7 (6.8) | 1 (1.0) | 5 (4.8) | 9 (8.7) | 3 (2.9) |
| 40-49 | 15 (12.9) | 18 (15.6) | 11 (9.7) | 9 (8.1) | 14 (12.8) | 9 (8.4) | 12 (11.5) | 13 (12.8) | 11 (11.0) | 4 (4.1) |
| 50-59 | 36 (46.4) | 52 (38.2) | 33 (57.0) | 33 (35.5) | 31 (32.5) | 39 (39.9) | 37 (38.0) | 37 (37.2) | 43 (42.7) | 53 (52.1) |
| 60-69 | 55 (82.5) | 60 (94.6) | 57 (93.9) | 53 (91.1) | 44 (77.9) | 40 (72.0) | 48 (89.2) | 45 (83.3) | 53 (95.1) | 57 (96.8) |
| 70+ | 84 (140.3) | 88 (149.4) | 86 (146.2) | 73 (120.9) | 72 (114.6) | 83 (127.1) | 88 (134.9) | 89 (133.0) | 90 (133.7) | 80 (120.1) |
| total | 194 (25.4) | 201 (26.6) | 191 (25.4) | 175 (23.4) | 163 (21.9) | 178 (23.9) | 187 (25.5) | 190 (25.9) | 207 (28.3) | 197 (26.9) |

N (Inc), number (incidence)
The mortality:incidence ratio for colon cancer was approximately 0.68:1 for the entire period with very little change over time (see Figure 2). In contrast, that for rectal cancer showed a tendency for decrease, from 0.9 to 0.6, over the ten year period. The gender distribution (see Figure 3) was equal for rectal cancer but a slight predominance on females was noted for the colon cases. A similar situation was found for mortality but here the difference was less pronounced. There did not appear to be any variation over time in these ratios, with the exception of peaks observed in 2011 for male incidence and in 2012 for mortality.

Discussion

The present study showed that the average incidence of colorectal cancer in East Kazakhstan was around 24/100,000 with very little change over time, with again a relatively constant value of 15.9/100,000 for mortality. Comparison with other countries in the region is made difficult by the fact that our data are not age-adjusted.

A large number of questions remain to be answered. For example, it is well known that ethnicity can play a role in determining risk and future work should focus on any differences between the main Russian and Kazakh populations. Regarding age dependence, we did not observe any clear shift over time. This is in contrast with Australia, for example, where examined trends in national incidence rates for CRC demonstrated that rates in people under age 40 years have been rising for the last two decades (Young et al., 2015).

Different mechanisms are thought to be operating in the development of colon and rectal cancer (Robshahm et al., 2013). Obesity is linked significantly to adipose tissue dysfunction and to alteration of adipokines in blood; in particular, obesity-induced inflammation is thought to be an important link between obesity and colon cancer (Janakiram and Rao, 2014; Joshi and Lee, 2014). However, the ratios of colon to rectum cancer did not appear to demonstrate any clear shift over time in the present study, in contrast to the situation in Japan which has seen a marked predominance of colon in more recent years (Long et al., 2010). In China also, the percentage of colon cancer in all CRCs increased significantly, especially in the descending colon and sigmoid colon (Zhou et al., 2015). A proximal shift of colon cancers has also been demonstrated in Turkey for females, but not for males (Seydaoglu et al., 2013). More attention needs to be directed towards understanding the reasons for these changes.
to subsite in future studies.

Regarding the relative improvement in rectal cancer mortality:incidence ratios, this could be linked to screening. The 5-year survival rates in Korea improved in all subsites between 1993 and 2010, especially in younger persons(Park et al., 2013). In the US population which suggest that more than fifty percent of the decline in colorectal cancer mortality can be attributed to the increased acceptance and uptake in colorectal cancer screening (Zauber, 2015).

In conclusion, our data provide an initial survey of colorectalin Kazakhstan, a Central Asia country with great geographical and ethnic variation. Hopefully future work will provide a clearer picture of the efficacy of screening, with possible attention to high risk groups.

References
Abdifard E, Ghaderi S, Hosseini S, Heidari M (2013). Incidence trends of colorectal cancer in the West of Iran during 2000-2005. Asian Pac J Cancer Prev, 14, 1807-11.

Austin H, Henley SJ, King J, Richardson LC, Eheman C (2014). Changes in colorectal cancer incidence rates in young and older adults in the United States: what does it tell us about screening. Cancer Causes Control, 25, 191-201.

Dudarev A, Chupakhin V, Odland J. (2013). Cancer incidence and mortality in Chukotka, 1999-2010. Int J Circumpolar Health, 2013;72:20470

Farlay J, Soerjomataram I, Ervik M, et al (2012). Cancer incidence and mortality worldwide: IARC cancerbase No. 11 [Internet]. Lyon, France.

Farlay J, Stelianova-Foucher E, Lortet-Tieulent J, et al (2013). Cancer incidence and mortality patterns in Europe: estimates for 40 countries in 2012. Eur J Cancer, 49, 1374-403.

Igissinov S, Igissinov N, Moore MA, et al (2011). Trends of prevalent cancer incidences in the Aral-Syr Darya ecological area of Kazakhstan. Asian Pac J Cancer Prev, 6, 37-40.

Igissinov S, Igissinov N, Moore MA, et al (2012). Component analysis of the incidence of malignant tumors of the population of Kazakhstan from 1999 to 2010. Oncol Radiol Kazakhst, 1, 3-8.

Janakiram NB1, Rao CV (2014). The role of inflammation in colon cancer. Adv Exp Med Biol, 816, 25-52.

Joshi RK, Lee SA (2014). Obesity related adipokines and colorectal cancer: a review and meta-analysis. Asian Pac J Cancer Prev, 15, 397-405.

Jung KW, Won YJ, Kong HI, et al (2015). Cancer statistics in Korea: incidence, mortality, survival, and prevalence in 2012. Cancer Res Treat,. doi: 10.4143/crt.2015.060. [Epub ahead of print]

Katanoda K, Matsuda T, Matsuda A, et al (2013). An updated report of the trends in cancer incidence and mortality in Japan. Jpn J Clin Oncol, 43, 492-507.

Kutikhin AG, Yuzhalin AE, Brailovsky VV, et al (2012). Analysis of cancer incidence and mortality in the industrial region of South-East Siberia from 1991 through 2010. Asian Pac J Cancer Prev, 13, 5189-93.

Liu Z, Zhang Y, Franzin L, et al (2015). Trends and variations in breast and colorectal cancer incidence from 1995 to 2011: A comparative study between Texas Cancer Registry and National Cancer Institute’s Surveillance, Epidemiology and End Results data. Int J Oncol, 46, 1819-26.