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Status of oncological care and epidemiology of prostate cancer in the republics of Central Asia

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This article presents the data on the state of oncological care in patients with cancer, particularly prostate cancer in some countries of Central Asia – Republic of Uzbekistan, Kazakhstan and Kyrgyzstan. We have listed data on detectability during preventive examinations, morbidity, mortality, morphological verification, 1-year mortality, structure, distribution by stages, dispensary groups in patients with prostate cancer in these countries.

Keywords: *prostate cancer, countries of Central Asia, morbidity, mortality*

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Introduction

The number of patients with newly diagnosed malignant tumors, including prostate cancer (PC), is growing worldwide. In the majority of developed countries, PC is one of the most common cancers [1, 2]. According to Z.O. Taoc et al. [3], PC is the most common type of malignant tumors in men. Annually 1,100,000 new cases of PC are registered, and about 300 people die of this nosology [3]. Increased lifespan leads to higher incidence of PC. Thus, in Japan 25 % of people are 75 and older, i.e. in almost a third of patients PC is diagnosed in old age [4]. In Denmark in 1980, 1,297 patients with PC were registered, but in 2012 morbidity grew almost fourfold (4,315 patients). Mortality remains high, especially among people of 80 and older [5]. Standardized by age morbidity grew in Italy from 31 per 100,000 people in 1984 to 93 in 2005. However, since 1970 mortality was decreasing by on average 2.3 % a year [6].

Diagnosis of new cases of PC is associated with active implementation of screenings and preventive examinations [7, 8]. In the USA from 1992 to 2012, screening frequency grew from 55.3 to 70.0 % [9]. In Switzerland, screening frequency depended on education level, profession. Thus, it was higher in people with large income (> 6000 US dollars a month) compared to people with low income (< 2000 US dollars a month) [10].

The PC problem is important not only for the developed countries, but also for the developing ones. Thus in 2012, 191,054 cases of the disease and 81,229 cases of death were registered in the Asian countries. Among these countries, the highest standardized morbidity was in Israel, Turkey, Lebanon, Singapore, and Japan; mortality in Turkey, Lebanon, East Timor, Armenia, and Philippines. Significant and positive correlation was observed between the standardized morbidity and the Human Development Index ($p < 0.001$) characterizing the expected lifespan at birth, years of education, and income level [11].

In the CIS countries, growth of the main forms of malignant tumors is observed. In 2012, 29,082 patients with newly diagnosed PC were registered. In the period from 2007 to 2012, the increase in the total number of patients was 43.8 % (1st place among the fastest growing cancers). In the structure of oncological morbidity, PC held the 2nd ranked place in the Republic of Belarus (15.3 %) and Russia (12.1 %), 3rd place in Kazakhstan (6.3 %), 4th in Armenia (6.5 %), and 5th in Kyrgyzstan (4.5 %) [12–15].

There are racial and ethnic differences in PC distribution. In California (USA), 98,484 cases of morbidity and 8,997 cases of mortality were studied. High incidence was observed among the African-American males aged 45–64 years (risk ratio (RR) 1.28; 95 % confidence interval 1.25–1.30). However, in the age group of 75–84 years, the highest morbidity was among white Hispanics [16].

Analysis of 891,100 cases of PC from the period from 1988 to 2010 showed ethnic differences in incidence and clinical aspects of PC. Compared to white Hispanics, Asian males had significantly worse prognosis. Thus, in Filipinos, Haitians, Pakistanis, and Indians, metastatic disease was observed more frequently (increase in RR from 1.4 to 1.9) [17].

The study objective is to investigate epidemiological aspects of PC in some countries of the Central Asia.

Materials and methods

In the study, we used data on all cases of PC provided by the state medical institutions to the Cancer Register of the Kazakh Research Institute of Oncology and Radiology, the National Oncology Center of the Ministry of Health of the Kyrgyz Republic, and the Republican Oncology Research Center of the Republic of Uzbekistan, as well as data from the annual statistical reports from the N.N. Blokhin Russian Cancer Research Center. Calculations of PC morbidity characteristics were performed using

annual data on population structure by age, sex, and regions within the countries. Standardized morbidity ratios were evaluated by the direct standardization method using the world standard population.

Evaluation and calculation of any standardized characteristics involves some errors and mistakes. To minimize their impact, we calculated standard errors with 95 % confidence interval. Standard error was evaluated using variation in the standardized morbidity (Poisson method). Statistical data processing was performed using common software widely used in medical and biological statistics (SPSS 16.0).

Results

In the Central Asia, the most populated countries are the Republic of Uzbekistan (30 million people), Kazakhstan (17 million people), and Kyrgyzstan (6 million people). In the recent years in the Republic of Uzbekistan, the main characteristics of mortality and morbidity of oncological pathologies remain relatively constant. Thus, in 2008, 18,758 patients (in 2007 – 19,089) were diagnosed with malignant tumors, predominantly women (54.8 %; men – 45.2 %). Intensive morbidity rate was 68.1 (in 2007 – 71.0) per 100,000 people. Disease prevalence in the Republic of Uzbekistan remains stable, in 2008 it was 331.6 (in 2007 – 328,4). In 2008, 9,442 patients died of malignant tumors, and mortality rate was 35.6 (2007 – 35.1)

In Kazakhstan, oncological mortality is the 2nd most frequent cause of death. Annually, about 17,000 people die of cancer, and 42 % of them are people of productive age. In the last 5 years, the total number of patients with malignant tumors has increased: In 2006 28,573 patients were registered, while by the end of 2011 there were 30,299 of them. Annually the percentage of patients with malignant tumors increases by 5 %. Mortality rate for malignant tumors has decreased in the last 5 years by 11.9 %: from 113.7 per 100,000 people in 2006 to 101.6 per 100,000 people in 2011.

Study results for the main parameters characterizing PC epidemiological situation in the Central Asian countries are presented in Table 1. Morphological verification was the highest in Kazakhstan (89.1 %). In Kyrgyzstan it was 87.6 %, and in Uzbekistan it was relatively low (67.3 %). Morphologically verified diagnosis characterizes quality of diagnostics and credibility of data on newly diagnosed patients. A low value accompanied by high registration suggests inadequate qualification of the doctor, limited diagnostic capabilities, or underdeveloped specialized service of the general network if it provides oncological treatment. Furthermore, the value shows doctors' "motivation" to confirm diagnosis in older patients, patients with contraindications, and it depends on the quality of paperwork.

In Kazakhstan, detection during preventive examinations is more frequent than in other countries. Of note is low percentage of patients with early stages of PC in Uzbekistan (29.2 %) and Kyrgyzstan (27.8 %) compared to Kazakhstan (42.7 %). In Kyrgyzstan, the percentage of patients with undetermined stages is relatively high, which supposedly is associated with diagnostic problems. Also, in this country, high 1-year mortality is observed: 50 %, i.e. every 2nd patient with PC dies in the course of a year. Number of patients with advanced PC was higher in Uzbekistan than in Kazakhstan, but 1-year mortality in Uzbekistan was lower. Percentage of patients with stage I–II tumors characterizes timeliness of the diagnosis. This value is determined by the state of organization of early diseases detection, level of diagnostics, scale and quality of preventive examinations and screenings.

Mortality in the 1st year after disease registration characterizes the level of late detection, as well as the state of specialized care as a whole. This value is determined by the factual advancement of the disease, treatment quality. The value is affected by biological characteristics of the tumor, quality of patient care, accuracy of cause of death determination (for example, cancer or myocardial infarction), frequency of refused treatments, size of the posthumously registered group, and percentage of them who died in the 1st year after diagnosis.

Table 1. *Main characteristics of the state of oncological care for patients with prostate cancer in Uzbekistan, Kyrgyzstan, and Kazakhstan (2012)*

Parameter		Uzbekistan	Kyrgyzstan	Kazakhstan
Morphological verification		67.3	87.6	89.1
Detection at preventive examinations	% to new patients	6.2	2.1	5.5
	Structure	0.4	0.5	1.9
Stage	I–II	29.2	27.8	42.7
	III	46.9	39.2	37.4
	IV	23.8	29.9	19.8
	Not determined	0	3.1	0.1
Mortality (1-year)		14.1	50.0	20.0
Under observation by the end of the year	Total	928	326	2923
	Per 100,000	3.1	5.8	17.4
	Structure	0.9	1.5	2
Among them for 5 years and longer	Total	312	80	854
	% to number of observations	33.5	24.5	29.2
	Structure	0.7	1.0	1.2
Accumulation index		3.5	3.3	3.3
Contingent mortality		17.9	14	13.6
Cumulative criterion		0.424	0.403	0.547

A relatively more favorable state of specialized care for patients with PC is Kazakhstan compared to other countries is substantiated by a relatively high (17.4 %) percentage of people who have been under observation for 5 years or longer. This value is more than 3 times higher than in Uzbekistan and Kyrgyzstan.

Index of contingent accumulation is determined by disease severity (level of mortality). Low traceability of patients, i.e. a large number of patients who weren't registered in a year, also has a significant effect. Comparison of different territories should take into account tendencies in the disease, its structure, as well as quality of patient registration and monitoring. These values are used for dynamic evaluation of oncological care. Positive dynamic shows improvement of the state of oncological care. This index was approximately the same in different republics. Results of the analysis of dynamics and rank of standardized rates of PC morbidity in the countries under study are presented in Table 2.

Table 2. *Dynamics and rank of standardized morbidity rates of prostate cancer in Uzbekistan, Kyrgyzstan, and Kazakhstan*

Country	Rate per 100,000 people		Ranked place		Increment, %
	2007	2012	2007	2012	
Morbidity					
Uzbekistan	3.2	3.6	8	8	12.5
Kyrgyzstan	4.0	7.5	6	6	87.5
Kazakhstan	11.4	14.1	5	4	23.7
Mortality					
Uzbekistan	1.7	1.6	8	7	–6.25
Kyrgyzstan	2.2	3.4	6	7	54.5
Kazakhstan	6.5	6.1	5	5	–28.6

The highest increase (87.5 %) in PC morbidity in 2012 (7.5 per 100,000 people) compared to 2007 (4.0) was observed in Kyrgyzstan. In Uzbekistan and Kazakhstan, morbidity also increased, but not as dramatically: by 12.5 and 23.7 %, respectively. Mortality analysis has shown an increase in mortality by 54.5 % in Kyrgyzstan, while in the two other countries it decreased, more so in Kazakhstan (28.6 %).

Discussion

In the CIS countries in 2012, 29,082 patients with newly diagnosed PC were registered. In the period from 2007 to 2012, the increase in the total number of patients was 43.8 % (1st place among the fastest growing cancers). In the structure of oncological morbidity, PC held the 2nd ranked place in the Republic of Belarus (15.3 %) and Russia (12.1 %), 3rd place in Kazakhstan (6.3 %), 4th in Armenia (6.5 %), and 5th in Kyrgyzstan (4.5 %). In all of the CIS countries, the percentage of PC in the structure of malignant tumors increased in the period from 2006 to 2012. In the morbidity structure in Russia, PC comprised 11.5 % of all cancers in the 55–69 age group, 18.1 % in the 70–84 age group, and 15.9 % in the 85 and older age group. Mean patient age varied from 65–68 years (in Kyrgyzstan and Azerbaijan) to 71– 74 years (in Armenia, Russia, Belarus, and Kazakhstan). Standardized morbidity rate was higher than the mean value in Russia (32.6 per 100,000 males) in Belarus (51.6 per 100,000), Moscow (46.2 на 100,000), Samara (47.4 per 100,000), Tomsk (52.2 per 100,000), Omsk (58.3 per 100,000), Murmansk (46.8 per 100,000), and Sakhalin (67.8 per 100,000) regions; it was significantly lower in Kyrgyzstan, Azerbaijan, Chechnya, and Tuva (5–12 per 100,000). In 2007–2012, growth of standardized PC morbidity rate held the 1st ranked place in Russia (35.8 %), Kazakhstan (23.7 %), and Belarus (55.9 %), 2nd ranked place in Kyrgyzstan (87.5 %), 7th in Azerbaijan (40 %); in Armenia morbidity decreased by 1.5 % [14].

Conclusion

The parallel increase in PC morbidity and mortality rates in Uzbekistan, Kyrgyzstan, and Kazakhstan suggests deteriorated health of the populations with increased number of newly diagnosed cases and recurrent tumors associated with low quality of preventive care. The situation in Kyrgyzstan is especially alarming, where the significant increase in morbidity (up to 87.5 %) is accompanied by high 1-year mortality, and a general increase in mortality in the last 5 years. In Kazakhstan, the state of oncological care is relatively high with high percentage of stage I–II diagnoses, low 1-year mortality, and a decrease in mortality from 6.5 to 6.1 per 100,000 people. Stable detection rates of stage IV tumors in Uzbekistan and Kyrgyzstan suggest that oncological vigilance of doctors in the general healthcare network and timeliness of visits to the doctor are unsatisfactory.

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