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Epidemiology, Risk Factors, Clinical-Imaging Features And Priorities For The Prevention Of Esophageal Cancer In The Fergana Valley Of Uzbekistan

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ABSTRACT

Cancer of the digestive system is the most common cause of death among malignant neoplasms (Table 1). According to the International Agency for Research on Cancer (IARC) for 2008, the incidence of cancer of the digestive system was 49.2 people per 100 thousand people per year, the mortality rate was 34.3 people per 100 thousand. At a relatively low incidence rate, esophageal cancer is the seventh most common cause of death from malignant tumors, giving way to lung, breast, stomach, liver, prostate, and colon cancers. This is due to the extremely malignant nature of the course, early metastasis, and late diagnosis of esophageal cancer. The aggressiveness index, calculated as the ratio of deaths to new cases, is extremely high in esophageal cancer and is about 95%.

The absolute number of deaths from esophageal cancer in 2008 in the world was 406 thousand people. In developing countries, morbidity and mortality from esophageal cancer are significantly higher than in developed countries (Table 2). The most common two histological types of esophageal cancer are squamous cell carcinoma and esophageal adenocarcinoma. Despite the similarity of the clinical picture, diagnostic and therapeutic tactics, an extremely unfavorable prognosis for both forms of esophageal cancer, these malignant neoplasms have different risk factors, socio-geographic and ethnic characteristics, knowledge of which is necessary for the timely establishment of the diagnosis and preventive measures. Squamous cell carcinoma of the esophagus (Fig. 1) is an extremely aggressive epithelial malignant tumor of stratified squamous epithelium, in most cases localized between the middle and lower third of the esophagus, the tumor is rare in the cervical esophagus.

KEYWORDS

Esophageal cancer, mediastinal tumors, cardiospasm, polymetallic.

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INTRODUCTION

In the Republic of Uzbekistan, esophageal cancer is one of the most frequent localizations of tumors; in the structure of oncological morbidity, it ranks first (19.7%). At the same time, the frequency of the spread of this form of cancer in certain geographical regions of the republic has significant differences. When analyzing the statistical data on the incidence of malignant neoplasms in the population over 20 years and materials from a number of expeditions carried out in the regions of Uzbekistan, the staff of the Uzbek Research Institute of Oncology and Radiology managed to identify a high incidence of esophageal cancer in two zones of the republic - western (Karakalpak ASSR) and eastern (Andijan region). When comparing the data on the incidence of this cancer (per 100,000 population) in individual regions, the following pattern was revealed: the Karakalpak Autonomous Soviet Socialist Republic (50.2), the second - Andijan region (26.4), the third - Namangan (20.7) and fourth - Fergana (19.1); the lowest indicators for the republic are recorded in the Samarkand and Syrdarysh regions (7.6). This pattern is also confirmed by comparing the indicators of the specific weight of esophageal cancer in the structure of the incidence of malignant tumors in the republic: for example, in the Karakalpak Autonomous Soviet Socialist Republic, the specific weight of esophageal cancer in the structure of oncological incidence was 47.5%, in Andijan region - 35.3%, in Namangan - 31.7%, in Fergana - 23.7%, in Syrdarysh - 19.9%, in Samarkand - 10.6%. This report presents the registration data by the Andijan Regional Oncological Dispensary of newly diagnosed large esophageal cancer over the past 5 years (1966-1970), as well as materials of the expeditionary survey of the urban and rural population of the region, conducted in 1970 by the Institute together with the Andijan Regional Department of Health. An important criterion for determining the characteristics of the spread of malignant tumors is the assessment of the incidence and mortality of the population from them in different age groups. It is believed that most often people aged 40-60 years are affected by cancer of the esophagus (A. V. Chaklin, 1963). At the age of up to 29 years, 0.1 large cancers were detected per 100,000 of the population, 30-39 years - 3.8, 40-49 years - 31.1, 50-59 years - 120.5, 60-69 years - 143 , 1, 70 years and older - 247.5. According to A.I.Savitsky (1959), A.V. Chaklin (1963), and others, in areas of increased incidence of the population with esophageal cancer, young age groups are often affected. Our data confirm this position: in 1970, 20 patients under the age of 40 were registered in the Andijan region, 4 of them were under 30 years old. It should be noted that out of the total number of patients under the age of 40 with tumor lesions of the esophagus registered by oncological institutions of the Uzbek SSR, 50% are in the zones with a high incidence of this form of cancer (Karakalpak ASSR and Andijan region).

In the Andijan region, relatively high incidence rates of esophageal cancer are noted among both men and women. It should be emphasized that among rural residents of the Andijan region, as in other regions of the republic, the specific incidence of esophageal cancer in the structure of the incidence of malignant tumors is higher than among the urban population (38.6 and 28.7%, respectively), and in some rural areas this the

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indicator is almost the same. When analyzing the materials of the Andijan Oncological Dispensary, it was found that in 6.9% of patients, an x-ray revealed tumors in the upper third of the esophagus, in 27% in its middle third, and in 66.1% in the lower third. To exclude possible errors of radiologists in determining the level of damage to the esophagus, we specially studied the frequency and characteristics of damage to various parts of the stomach (based on materials from the Andijan Oncological Dispensary). At the same time, it was found that cancer of the cardiac part of the stomach with or without transition to the esophagus occurs in the Andijan region much more often than the defeat of its antrum and the body of the stomach. In this regard, of course, it became necessary to conduct an expeditionary study of the living conditions of the population of the Andijan region, to study their life, habits, dietary habits in order to identify possible factors contributing to the development of esophageal cancer. The examination teams included mainstream doctors. Along with interrogation, examination, and application of physical methods, fluorography of the chest and contrasted esophagus was performed for all examined. 8673 people over the age of 20 were examined (4878 rural residents and 3795 urban). For each subject, a specially developed epidemiological map was filled out in order to obtain the necessary information. If necessary, additional X-ray, cytological and endoscopic studies were carried out. Among the examined 66 people complained of dysfunction of the esophagus - dysphagia, a feeling of pain or burning behind the sternum when swallowing a food lump, etc. cardio esophageal transition - in 3); in 12 - traction diverticula, in 8 - segmental spasm of the esophagus, in 2 - deformation of the esophagus due to mediastinal tumors, and in 7 - cardiospasm. In the remaining 30 individuals, no focal pathology was established. It should be noted that among the patients in whom various lesions of the esophagus were identified, the vast majority were residents of rural areas. In addition, the incidence of esophageal cancer in various ethnic groups (Uzbeks and Russians) was studied. It has been established that the incidence of esophageal cancer among Uzbeks is almost 2 times higher than among Russians (26.4 and 14.1 per 100,000 population, respectively). When studying the peculiarities of everyday life and nutrition, it was found that the local population of the Andijan region several times a day drinks hot tea and in large quantities as a seasoning for various dishes uses bitter red pepper. Apparently, this systematic effect on the mucous membrane of the esophagus of hot tea and its constant irritation with red pepper does not pass without a trace. And although we were unable to establish the presence of a clear correlation between these factors and the frequency of detection of esophageal cancer, one cannot exclude their influence and a possible stimulating role in the development of tumors of this localization. The studies carried out in the Andijan region indicate the need for further deep development of this issue with the involvement of specialists in various fields. The obtained data on the spread of esophageal cancer in the Andijan region, dietary habits, and habits among the population can be used for purposeful planning of anticancer measures and further development of the oncological service in the region.

According to the methodological recommendations of V. V. Dvoirin, N. M. Barmina, N. M. Zaichenko [7, 8, 10].

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Study design. For the first time, indicators of cancer incidence in the Fergana Valley (using the example of three regions) have been combined into a single group (the studied group); for comparison, the data of a large industrial region of the Tashkent region were studied (comparison group); for control, data are given, studied and compared for the whole Republic of Uzbekistan (main control group).

At this stage of the presentation of the material, I would like to give the reasoning for the chosen research design to achieve the set goal, taking into account the influence of the following factors.

Climatogeographic. The Fergana Valley, due to its geoecological location, differs from other regions of Central Asia in a milder, continental climate. The average January temperature is -3.2 ° C, the absolute minimum is -25 ° C. The average July temperature is +28 ° C, the maximum temperature is +42.4 ° C. The unfavorable side of climatic conditions, as already mentioned, are increased solar radiation, high seismic activity, etc. Under certain weather conditions (temperature inversion, etc.), which reduce the potential for atmospheric pollution, the content of "acidic" gases in its surface layer sharply increases, primarily sulfur dioxide. This natural and anthropogenic phenomenon is notoriously known as toxic smog, toxic fog [12]. During these periods, the number of people, especially chronically ill people, who seek medical help for respiratory and cardiovascular diseases increases sharply; the mortality rate of the population is increasing. Toxic fogs with a certain frequency, mainly in the autumn-winter seasons, are recorded everywhere and are considered as a temporary environmental emergency for public health.

Industrial. There are about two thousand large and medium-sized enterprises operating in the Republic of Uzbekistan, having more than seventy thousand stationary sources of pollution, which emit more than 150 types of harmful substances into the atmosphere, of which about 50 are priority ones. The main contribution is made by carbon monoxide and suspended solids (oil refining and construction complexes of the Fergana Valley), sulfur dioxide (enterprises of Uzbekenergo, ferrous and non-ferrous metallurgy), hydrocarbons (oil and gas industry), nitrogen oxides (chemical complex). According to the Uzhydrometeorological Center, in 1999 in the atmospheric air of the Fergana Valley, the proportion of suspended solids was 5%, sulfur dioxide 72%, carbon monoxide 9%, nitrogen oxides 14%. In 2004, the proportion of suspended solids was 13%, sulfur dioxide 64%, carbon monoxide 12%, nitrogen oxides 11%. In Fergana and Tashkent regions, there are regular exceeding of maximum permissible emissions and maximum permissible concentrations (MPC) in the atmospheric air for carbon monoxide, nitrogen oxides, sulfur dioxide, and dust. As mentioned above, several facilities are a source of soil pollution: tailing dumps and sludge ponds of large industrial enterprises, oil refineries and oil depots, large warehouses of mineral fertilizers, pesticides, and poisonous burial grounds. The results of observations of the state of the Bogibaland poisonous cemetery in the Turakurgan district of the Namangan region show that in soil samples taken in its immediate vicinity, the content of DDT metabolites reaches 91 MPC. Average DDT values vary from 3.2 to 7.5 MPC. It was also found that the existing standards for the Namangan region near the Uzolmosoltin tailing dump of the Pap

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district were exceeded by 8.3 times with copper and 5.3 times with zinc.

Non-industrial. Concerning the occurrence of malignant tumors, it is extremely interesting to study the influence of solar radiation, which is due to the high location of the Fergana Valley above sea level. The duration of sunshine in the republic per year reaches 2 thousand hours in the north and more than 3 thousand hours in the south. The duration of the daily aurora is 7-10 hours, the annual amount of total radiation varies from 4,800 MJ / m2 in the north to 6,500 MJ / m2 in the south [12]. In people, the skin is primarily exposed to harsh sunlight. Ultraviolet radiation leads to a change in the structure of DNA, as a result of which a normal cell can become insensitive to natural genetic regulation, a mutation process occurs, which can lead to the development of skin cancer.

RESULTS

The problem of the prevention of malignant neoplasms is global, its severity is currently determined by the acceleration of the growth rate of cancer. The International Agency for Research on Cancer (IARC) reports that the annual growth of cancer is 2.1%, outstripping population growth (1.7%) [10, 15].

Fergana Valley - intermontane depression in the Tien Shan and the Gissar-Alai; the tectonic depression of the valley is filled with loose deposits, products of destruction of the surrounding mountains; in the foothills and mountains bordering it, there are deposits of oil, coal, iron, copper, polymetallic ores, mercury, rock salt, etc. The climate of the Fergana Valley is continental and dry. Area - 22 thousand km2 (342 people per 1 km2), densely populated (population is 7,531 thousand people, 28% of the population of the republic, 12.9% of the population of Central Asia, according to the State Statistics Committee of the Republic of Uzbekistan for 2007). The valley is a strategically important territory rich in natural resources, including water resources. The ENVSEC report on the Fergana Valley identified several environmental problems that require immediate solutions: pollution of surface and groundwater, industrial and agricultural pollution, toxic and radioactive waste, land degradation [14]. The two main reasons for concern about the environment and health of the people in the valley are industrial pollution and landfills for pesticides and hazardous chemical waste. In Uzbekistan, more than 100 million tons of industrial waste is generated annually, about 14% of which is classified as toxic. The largest amount of waste is generated at the mining and processing industries located in Navoi, Tashkent, and Fergana regions [12]. According to the IARC classification, 87 substances (factors) are assigned to the 1st group (carcinogenic to humans), which have unconditional evidence of the risk of tumors in humans. This group includes not only factors of chemical origin (arsenic, beryllium, cadmium, nickel, etc.), but also chronic infections, dust, industrial processes, everyday habits, mineral fibers, food contaminants, drugs [7, 19].

Dust settling around industrial centers contains various minerals, metal oxides, silicates, soot, fluorides, oxidesarsenic, antimony, selenium. Among the specific impurities in the dust of large industrial cities are heavy metals - zinc, copper, chromium, lead, cadmium, mercury, thallium, selenium, and many others. Arsenic (a semimetal) is usually referred to as heavy metals. The urgency of the problem of environmental pollution with heavy metals is primarily due to the wide range of their effects

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on the human body. Heavy metals affect almost all body systems, providing toxic, allergic, carcinogenic, gonadotropic effects. The embryotoxic effect of heavy metals through the fetoplacental system, as well as their mutagenic effect, has been proven.

At present, the 3rd group according to the IARC classification (475 items) includes agents (factors) that cannot be classified concerning their tumorigenic activity for humans (acrolein, fluorine, fluorides, selenium, sulfur dioxide, etc.) [3, 7, 19]. Sulfur dioxide is one of the main components that pollute the air and makes up 16% of the total emissions in the republic. Days with an excess of MPC for dioxide in the atmosphere, surface waters, and soil of the Fergana Valley were recorded.

In the Kanibadam district of the Sughd region in northern Tajikistan, there is a largely abandoned dump of pesticides and agricultural mineral fertilizers, which contains about 4 thousand tons of obsolete and banned pesticides, such as DDT, lindane and organochlorinated substances, organophosphates, arsenates, and other toxic compounds. The landfill is located near a densely populated region, just a few kilometers from the main waterways of Central Asia - the Fergana Canal and the Syr Darya River - and the Uzbek border, and is one of the critical ecological places in the intermountain basin.

Thus, the geographical location and especially the consequences of economic activity determine, as a whole in the Republic of Uzbekistan, two main exogenous factors that can contribute to the growth of oncological pathology among the population: increased solar radiation and chemical carcinogens.

Accordingly, the incidence of malignant neoplasms among the population of the Ferghana Valley, calculated in relative terms to the total population, during the analyzed period (1996-2007) was rather unstable, both downward and upward.

In 2007, 5,331 new cases of malignant neoplasm were detected in the Fergana Valley, women accounted for 55.1% of the cases, men - 44.9%. Population - 7 531 103 people

CONCLUSIONS

1. In the structure of oncological morbidity in the Fergana Valley in 1996, esophageal cancer ranked first, its share was 12.6%, stomach cancer - second (10.4%), lymphatic and hematopoietic system - third (9.6%), cervix - fourth (7.4%), lung - fifth (6.6%). In 2007, cancer of the cervix (8.2%) and lung (7.7%) remained in the same places, stomach cancer moved to the third (9.5%), the esophagus left the top five, and cancer of the lymphatic and hematopoietic system took the first position (10.1%), breast cancer rose to second (9.6%), although 11 years ago it did not appear in the top five.
2. During the study period, the standardized rates of cancer incidence in both men and women decreased by 8.2% (from 112.8 in 1996 to 103.6 in 2007), although the "rough" indicators did not change (in 1996 - 70.6, in 2007 - 70.8). Intense ("rough") incidence rates are not a sufficient tool to demonstrate the true situation. The most optimal is the study of standardized indicators.
3. Despite the existing difficulty regarding the impact of changes in the environmental review on the risk of malignant tumors, the control and monitoring of environmental

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pollution by carcinogenic substances should be strengthened.

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