

Prevalence of prostate cancer among the population of sumy region

A.M. Romaniuk, MD, Professor;

A.O. Shkroba, postgraduate.

Medical Institute, Sumy State University, Sumy;

INTRODUCTION

Prostate cancer is considered one of the most important health problems of the male population. In Europe, prostate cancer is the most common malignant tumor, whose incidence is 214 cases per 1000 men, surpassing lung cancer and colorectal cancer [2]. In addition to prostate cancer is currently the second place among the leading causes of death from cancer in men [8]. Since 1985 in most countries, an increase in the number of deaths from prostate cancer, including countries and regions with low prevalence of prostate cancer [10].

Prostate cancer occupies the sixth place in general, among men the third place in the global structure of the oncological morbidity [14]. Every year, this pathology is diagnosed in more than half a million people, or about one tenth of all oncological diseases in men. In developed countries, the proportion of prostate cancer in the structure oncological morbidity is one-sixth, in developing countries is less than one twentieth. Mortality from prostate cancer is much lower than morbidity. Prostate cancer is second in the list of causes of cancer death in the United States. Proportion tumors of the prostate is a little less one-tenth of fatal cancer cases [6,7].

Approximately 40,000 men die from prostate cancer every year in the European Union. The gradual increase in morbidity and population aging will lead to an increase in the morbidity by 50% in 2020. RPS is second only to melanoma and significantly exceeds malignant disease of the lungs and stomach in Russia. Mortality from prostate cancer is 23.9% per year. This is due to the fact that over 50% of patients coming to the clinic in the T3-stage cancer process with the presence of metastases [7].

The main epidemiological feature of prostate cancer is almost exclusively defeat the elderly. Risk of prostate cancer up to 40 years is approximately 1:10,000, while every six men will be diagnosed with prostate cancer during their lives. Men under the age under 50 years make up only 0.1% of all patients with prostate cancer. A significant increase in the risk of disease is observed only after 60 years. The average age of patients with prostate cancer is 72-74 years [11].

Factors determining the risk of clinical prostate cancer are insufficiently studied yet, but a number of factors have been identified. 3 prostate cancer risk factor have been established exactly: age, ethnicity and heredity [4, 5, 12].

Historically, the study of environmental factors affecting the risk of prostate cancer was associated with habitat adult males, including factors such as food and professional activities. Demographic differences were found in morbidity prostate cancer. Case of diethylstilbestrol (DES) has demonstrated the importance of consideration external factors during fetal development. In the daughters of women who took DES during pregnancy, there was a significantly increased risk of developing cancer of the reproductive organs in adolescence or adulthood. Animal studies also suggest that intrauterine exposure to dioxin can dramatically change the differentiation of breast tissue, which increases sensitivity to the effects of carcinogens in adult animals [3]. Today researchers often pay attention to the impact of the environment on the early stages of life; it will affect the risk of cancer many years later. Therefore to study the effect of environmental factors on the risk of prostate cancer is extremely important in understanding the etiological factors of the disease.

Several studies have addressed the impact of meat consumption and found that red meat significantly increases the risk of prostate cancer. Many animal studies found that when cooking red meat formed various aromatic amines have carcinogenic effect [9].

Cadmium is carcinogenic to humans and is associated with prostate cancer according to epidemiological observations and studies on laboratory animals. The relevance of some studies in rodents to humans questionable because the prostate in some rodent species significantly different from human prostate. One species of rodent with dorsolateral prostate have similar to human prostate cancer. Exposure of cadmium in food leads to proliferative processes depending on the dose reminiscent of precancer conditions in this part of the prostate. Some studies have found higher concentration of cadmium in the tissues of affected cancer compared to normal prostate tissue. Studies in vitro also show that cadmium causes malignant degeneration of healthy human prostate cells [1].

A number of publications confirmed the causal link between pesticide exposure and prostate cancer. For example many studies of occupational diseases point to higher morbidity of prostate cancer and / or mortality among farmers working in pesticide industry. Some of these studies relate to correlation and do not include data on actual pesticide exposure. Variations in exposure assessment in the epidemiology analysis are likely false negative rather than false positive. Of particular interest are studies related to workers who apply pesticides because among them there is an overall positive effect due to a healthier lifestyle and reduce morbidity associated with alcohol and smoking. Study of human prostate cancer cells in vitro has shown that several organochlorine pesticides (pyrethroids and one each fungicide) has caused proliferation of androgen-dependent cancer cells [13].

Important determining factors of prostate cancer are the interaction between genes and environmental factors. The famous environmental risk factors for prostate cancer are consumption of red meat, animal fats in food and exposure of cadmium and pesticides. Some studies suggest that the risk of prostate cancer during the life depends on influence in utero, in childhood and in adulthood, including exposure environmental pollutants. In early life are important pollutants with estrogenic properties.

THE AIM OF STUDY

The aim of our study was to investigate possible factors influencing the incidence of prostate cancer among the population in different parts of Sumy region.

MATERIALS AND METHODS

Screening analysis was conducted prostate cancer incidence among the population of Sumy regional. Data were analyzed in Sumy Regional Clinical Oncology Center. Ecological situation in Sumy region was studied in recent years. Pollution of Sumy regions and incidence of prostate cancer were compared.

RESULTS AND DISCUSSION

In Sumy region the main exogenous factors increasing the risk of prostate cancer are professional effects, smoking, regular alcohol consumption and inflammatory diseases of genital organs.

The highest morbidity of prostate cancer was observed in Nedryhaylivskiyi, Bilopil's'kyi, Trostianetskyi, Putivlskiy areas and in Sumy (from 20.6 to 71.1 per 100 thousand male population) for the analysis of stantart indicators.

According to the study of ecological situation in Sumy region showed in some localities an increase emissions of nitrogen at 0.71 thousand tons (24.8%) of substances in the form of suspended solids at 0.57 thousand tons (11.8%), carbon monoxide at 0.45 thousand tons (7.2%), ammonia at 0.12 tonnes (22.9%), dioxide and other sulfur compounds at 0.69 thousand tons (23.4%), carbon monoxide at 0.45 thousand . tons (7.2%), reduce emissions of hydrogen sulfide at 0,003 thousand tons (53.5%), diethyl ether at 0,004 thousand tons (1.4%).

In cities and areas where the main air pollutants (OGPD "Okhtyrkanaftogas" Sumy linear production administration of main gas pipelines PJSC "Sumykhimprom", PJSC "Sumy SPA Frunze", Kachaniv GPP) observed the largest volumes of air emissions: Sumy – 10.36 thousand tons (32.7%) of emissions from stationary sources in the region; Sumy district - 8.977 tons (28.3%), Romenskiy district - 5.629 tons (17.8%), Akhtyrsky district - 3.7381 tons (11.8%).

Current status of surface water region is characterized by anthropogenic pressures of business entities releasing of untreated sewage that annually receives. Also causes of poor

condition of the rivers is revenues uncleaned rainwater (snowmelt) from large urban areas such as Sumy, Romney, Konotop, Shostka and others.

Considering the moral and physical aging buildings and equipment continue to work inefficiently wastewater treatment plants in Konotop, Romney, Sumy Jampol, Burin, Swan, Trostianets, Nedrigajlov. As a result of violations of technological regime wastewater treatment project did not work wastewater treatment plants SCE "Nedryhaylivvodoservis" CE "Vodokanal" Lebedyn treatment facilities KP Trostyanets City Council "Trostyanetskomunservis" penal colony № 56 (village Perehrestivka of Romny area) CE "Vodokanal" of Belopole and others. Return water coming from these companies to groundwater does not correspond to standards for phosphate, organic matter and ammonium salt.

The highest percentage of water samples that do not correspond to sanitary and chemical standards for sanitary and chemical indicators was recorded by:

- Public water in Sumy - 47.4%, Krasnopillya - 16.3%, Nedrigajliv - 27.7%, Trostianets - 15.9%;
- Departmental water in the Nedryhaylivskiy district -100%, Krasnopol'skiy district - 55.0%, Romenskiy district - 34.5%, Trostyanetskiy district - 30.3%;
- Rural water pipelines - Romenskiy district - 78.9%, Sumy - 50.5%, Krasnopol'skiy district - 49.0%;
- Wells for public use in Shostka - 84.0%, Sumy district - 74.2%, Hlukhivskiy district - 71.0% Burinskiy district - 67.9% Konotopskiy district - 65.0%;

A significant ecological problem of Sumy region is soil pollution in connection with the use of pesticides and their improper storage. Store pesticides in farms of Sumy region is not carried out because they are bought in minimal amount and used immediately. In this regard, in the first place there is the question of storage of unsuitable and banned pesticides, stored in warehouses.

Recently, increased degradation processes of pollution chemicals, petroleum and petroleum products unfit other wastes. The greatest manifestation of man-made pollution is observed in oil and gas production areas and in areas with developed industry. Condition associated with soil contamination area is characterized as tense, sometimes with a tendency to worsening.

One of the most pressing environmental problems in the region is waste management. Today accumulated in 28,971,529.7 tons of waste hazard classes 1-4. The main sources of waste are chemical, machinery, fuel and energy, construction, agriculture and areas of public utilities. The largest amount of waste produced in the chemical and engineering industries area.

The largest volume of waste generation and accumulation observed in industrialized areas, such as Sumy and Sumy region, Konotop and Konotopskiy district, Okhtyrka and Okhtyrskiy district, Romney and Romny district, Shostka and Shostkinskiy district.

CONCLUSIONS

The study of the ecological situation in the region and analysis of environmental pollution individual districts showed that the high incidence of prostate cancer common in areas with poor ecological condition of water resources - Trostyanetskyi and Nedryhaylivskyi areas. It was also found significant level variations of prostate cancer morbidity in different districts.

Thus, morbidity of prostate cancer among the population of Sumy region is often associated with poor ecological factors. Dependence was found between the state of water resources and morbidity of prostate cancer.

PROSPECTS FOR FURTHER RESEARCH:

1. To study the role of demographic, environmental, social, hygienic, individual factors in causing of prostate cancer in Sumy region.
2. Improve and substantiate principles of forming the populations at high risk of prostate cancer.
3. Suggest a rational diagnostic algorithm and treatment for prostate cancer in order to improve aid effectiveness in this disease.
4. To conduct the experimental research about effect of heavy metals on prostate morphology.

REFERENCES

1. Achanzar W, Diwan B, Liu J, et al. 2001. Cadmium-induced malignant transformation of human prostate epithelial cells. *Cancer Res* 61(2):455-458.
2. Boyle P, Ferlay J. Cancer incidence and mortality in Europe 2004. *Ann Oncol* 2005 Mar;16(3):481-8.
3. Brown, N, P Manzolino and J Zang *et al.* 1998. Prenatal TCDD and predisposition to mammary cancer in the rat. *Carcinogenesis* 19(9):1623-1629.
4. Carter BS, Beaty TH, Steinberg GD, Childs B, Walsh PC. Mendelian inheritance of familial prostate cancer. *Proc Natl Acad Sci USA* 1992 Apr;89(8):3367-71.
5. Gronberg H, Damber L, Damber JE. Familial prostate cancer in Sweden. A nationwide register cohort study. *Cancer* 1996 Jan;77(1):138-43.
6. Haas G.P., Sakr W.A. Epidemiology of prostate cancer // *CA Cancer. J. Clin.* – 1997. – Vol. 47. – P. 273-287. Grönberg H. Prostate cancer epidemiology // *Lancet.* – 2003. – Vol. 361. – P. 859-864.
7. Hsing A.W., Chokkalingam A.P. Prostate cancer epidemiology // *Front Biosci.* – 2006. – Vol. 11. – P. 1388-1413.
8. Jemal A, Siegel R, Ward E, Hao Y, Xu J, Murray T, Thun MJ. Cancer statistics, 2008. *CA Cancer J Clin* 2008 Mar;58(2):71-96.
9. Nelson C, L Kidd and J Sauvageot *et al.* 2001. Protection against 2-hydroxyamino-1-methyl-6-phenylimidazo[4,5-b]pyridine cytotoxicity and DNA adduct formation in human prostate by glutathione S-transferase P1. *Cancer Res* 61(1):103-109.
10. Quinn M, Babb P. Patterns and trends in prostate cancer incidence, survival, prevalence and mortality. Part I: international comparisons. *BJU Int* 2002 Jul;90(2):162-73.
11. Ries L.A.G., Melbert D., Krapcho M., Mariotto A., Miller B.A., Feuer E.J., Clegg L., Horner M.J., Howlander N., Eisner M.P., Reichman M., Edwards B.K. (Eds). *SEER Cancer Statistics Review, 1975-2004*. National Cancer Institute, Bethesda, MD, 2007
12. Steinberg GD, Carter BS, Beaty TH, Childs B, Walsh PC. Family history and the risk of prostate cancer. *Prostate* 1990;17(4):337-47
13. Tessier D, Matsumura F. 2001. Increased ErbB-2 tyrosine kinase activity, MAPK phosphorylation, and cell proliferation in the prostate cancer cell line LNCaP following treatment by select pesticides. *Toxicol Sci* 60(1):38-43.
14. Zakharava V. Interobserver reproducibility in the diagnosis of prostate cancer / V. Zakharava, T. Liatkouskaya, E. Cherstvov, A. Portyanko, D. Nitkin, L. Pashkevich, O. Sukonko, A. Rolevich, I. Masanskiy, L. Sagalchik, M. Ivanovskaya // *Virchows Archiv* (2009). – Vol. 455. – Suppl 1:S1-S482. – Abstracts XXIIInd European Congress of Pathology. – Florence, Italy, 4-9 September 2009. – P. S145.

SUMMARY

A.N. Romaniuk, MD, PhD

A.A. Shkreba, a graduate student

Medical Institute of Sumy State University.

Prostate cancer is one of the most serious medical problems among the male population. It is the most common solid cancer. The incidence of prostate cancer is 214 per 1000 males in Europe. Prostate cancer is the second highest of cancer mortality among men. Morbidity and mortality of prostate cancer increases in Ukraine and it is the same in most countries of the world. According to the National Cancer Registry in 1989 the morbidity of prostate cancer was 10.1 per 100 thousand men but in 1996 the morbidity rate was 13.4 per 100 thousand men, so the growth rate for this period was 4.7 %. This indicator significantly increased by 33% and the risk of morbidity increased by 1.5 times. Further analysis of prostate cancer morbidity shows tend to increase.

The aim of the study was to investigate the possible factors influencing the prostate cancer morbidity among the general population in different areas of Sumy region. Screening analysis of prostate cancer morbidity among the population of Sumy region was conducted and the data of the Sumy Regional Oncology Center on the prevalence of cancer among the population of the Sumy region in the last 10 years were studied. The environmental situation of the Sumy region in recent years was studied; areas with the highest pollution of surface waters and soils were identified. Comparison of pollution of Sumy regions and prostate cancer morbidity were conducted.

The study of the ecological situation in Sumy region and analysis of the level of environmental pollution in some areas showed that the highest incidence of prostate cancer observed in areas with poor ecological state of water resources and soil. Significant fluctuations in the level of breast cancer morbidity in different areas of Sumy region were also found. The study showed that the incidence of prostate cancer among the population of Sumy region associated with adverse environmental factors.

Keywords: *prostate cancer, epidemiology, morbidity, mortality, ecology, environment.*

РЕЗЮМЕ

А.Н. Романюк, д.м.н., профессор

А. А. Шкрёба, аспирант

Медицинский институт Сумского государственного университета.

Рак предстательной железы сегодня является одной из самых серьезных медицинских проблем среди мужского населения. В Европе он является наиболее распространенным солидным раком, заболеваемость которым составляет 214 случаев на 1000 мужчин. По онкологической смертности у мужчин рак простаты занимает второе место. В Украине, как и в большинстве стран мира, отмечается тенденция к увеличению заболеваемости и смертности от рака предстательной железы. Так, если в 1989 г. по данным Национального канцер - реестра заболеваемость была на уровне 10,1 на 100 тыс. мужчин, то в 1996 году этот показатель составил 13,4 на 100 тыс. мужчин, темп прироста за указанный период - 4,7%. То есть рассматриваемый показатель статистически достоверно вырос на 33 %, а риск заболеть увеличился в 1,5 раза. Дальнейший анализ уровня заболеваемости раком простаты свидетельствует о явной тенденции к росту.

Целью исследования было изучение вероятных факторов, влияющих на заболеваемость населения разных районов Сумской области раком предстательной железы. Был проведен скрининговый анализ онкологической заболеваемости предстательной железы среди населения Сумщины, изучены данные Сумского областного онкологического диспансера о распространенности рака среди населения Сумской области за последние 10 лет. Изучена экологическая ситуация в Сумской области за последние годы, выявлены районы с наибольшим загрязнением поверхностных вод и грунтов. Сделано сопоставление загрязнения районов Сумщины и заболеваемости раком предстательной железы.

Исследование экологической ситуации в области и анализ уровня загрязненности окружающей среды отдельных районов показали, что высокий уровень заболеваемости раком предстательной железы встречается в районах с плохим экологическим состоянием водных ресурсов и грунтов. Также обнаружено значительное колебание уровней заболеваемости РПЖ в различных районах области. Исследование показало, что заболеваемость раком предстательной железы у населения Сумской области очень часто связана с неблагоприятными экологическими факторами.

Ключевые слова: *рак предстательной железы, эпидемиология, заболеваемость, экология, окружающая среда.*

რეზიუმე

ა.ნ. რომანიუკი, მ.მ.დ., პროფესორი

ა. ა. შკრიობა, ასპირანტი

სუმის სახელმწიფო უნივერსიტეტის სამედიცინო ინსტიტუტი.

წინამდებარე ჯირკვლის კიბო დღესდღეობით წარმოადგენს ერთ-ერთ ყველაზე სერიოზულ სამედიცინო პრობლემას მამაკაცებში. ევროპაში ის მეტად გავრცელებული სოლიდური კიბოა, რომლითაც 1000 მამაკაცში დაავადების 214 შემთხვევა აღინიშნება. ონკოლოგიური სიკვდილიანობით მამაკაცებში პროსტატის კიბო იკავებს მეორე ადგილს. როგორც მსოფლიოს უმრავლეს ქვეყანაში, უკრაინაშიც აღინიშნება წინამდებარე ჯირკვლის კიბოთი დაავადების და სიკვდილიანობის ზრდის ტენდენცია. ასე, თუ 1989 წელს ეროვნული კანცერ-რეესტრის მონაცემებით 100 ათას მამაკაცზე დაავადების დონე იყო 10,1, 1996 წელს ამ მაჩვენებელმა შეადგინა 13,4 100 ათას მამაკაცზე, მატების ტემპი აღნიშნულ პერიოდში - 4,7%. ესეიგი განხილული მაჩვენებელი სტატისტიკურად ნამდვილად გაიზარდა 33%-ით, ხოლო დაავადების რისკი გაიზარდა 1,5-ჯერ. პროსტატის კიბოთი დაავადების დონის შემდგომი ანალიზი მოწმობს ზრდის ტენდენციას.

გამოკვლევა მიზნად ისახავდა შესაძლებელი ფაქტორების შესწავლას, რომლებიც გავლენას ახდენენ სუმის ოლქის სხვადასხვა რაიონის მოსახლეობის წინამდებარე ჯირკვლის კიბოთი ავადობაზე. ჩატარებულ იქნა წინამდებარე ჯირკვლის ონკოლოგიური ავადობის სკრინინგული ანალიზი სუმშიჩინის მოსახლეობაში, შეისწავლა სუმის საოლქო ონკოლოგიური დისპანსერის ბოლო 10 წლის მონაცემები სუმის ოლქის მოსახლეობას შორის კიბოს გავრცელებაზე. შესწავლილი იქნა სუმის ოლქის უკანასკნელი წლების განმავლობაში ეკოლოგიური სიტუაცია, გამოვლენილ იქნა რაიონები ზედაპირული წყლების და გრუნტების უმეტესი დაბინძურებით. გაკეთდა სუმშიჩინის რაიონების დაბინძურების და წინამდებარე ჯირკვლის კიბოთი ავადობის შორის შედარება.

ოლქში ეკოლოგიური სიტუაციის გამოკვლევამ და ცალკეული რაიონების გარემოს დაბინძურების დონის ანალიზმა აჩვენა, რომ წინამდებარე ჯირკვლის კიბოთი ავადობის მაღალი დონე გვხვდება იმ რაიონებში, სადაც წყლის რესურსების და გრუნტების ცუდი ეკოლოგიური მდგომარეობაა. აგრეთვე აღმოჩენილ იქნა ოლქის სხვადასხვა რაიონებში წინამდებარე ჯირკვლის კიბოთი ავადობის დონეების

მნიშვნელოვანი რხევა. გამოკვლევამ აჩვენა, რომ სუმის ოლქის მოსახლეობაში წინამდებარე ჯირკვლის კიბოთი ავადობა ძალიან ხშირად დაკავშირებულია არახელსაყრელ ეკოლოგიურ ფაქტორებთან.

საკვანძო სიტყვები: წინამდებარე ჯირკვლის კიბო, ეპიდემიოლოგია, ავადობა, ეკოლოგია, გარემო.

Romaniuk A. Prevalence of prostate cancer among the population of sumy region / A. Romaniuk, A. Shkroba // Georgian med news. - 2013. - Vol. 225, No. 12. - P. 12-16.