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EPIDEMIOLOGICAL STATUS OF SOFT TISSUE SARCOMAS IN THE REPUBLIC OF KAZAKHSTAN IN 2013-2023

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ABSTRACT

Relevance: *Soft tissue sarcomas (STSs) are rare, aggressive malignant neoplasms that arise from mesenchymal tis-sues. They account for no more than 1% of all malignant tumors, can develop at any age, and are more common in mid-dle-aged and older people.*

The study aimed to *obtain a complete epidemiological picture of soft tissue sarcomas in the Republic of Kazakhstan for 11 years, including data analysis for 2023. It considered various parameters such as age, gender, ethnicity, region, and tumor type.*

Methods: *The presented study included all patients registered in the national cancer registry of Kazakhstan from 2013 to 2023, with a diagnosis of STS (ICD-10 code: C49). The number of STS cases is presented as absolute crude rates per 100,000 population. Standardized morbidity and mortality rates were calculated using the World standard.*

Results: *From 2013 to 2023, 4697 cases of STS were reported, with an average increase in incidence of 13%. The STS incidence was 2.4 cases per 100 thousand population. In terms of prevalence among other types of cancer, STSs ranked 19th in incidence and 18th in mortality and were not among the top 10 causes of mortality and morbidity. The incidence rate of STS for both sexes was 2.1 per 100 thousand population; mortality was 0.8 per 100 thousand popula-tion. Morbidity and mortality were higher among men compared to women by 30% and 35%, respectively. Peaks in the incidence of STS were observed in the age groups 55-64 years (23.6% of cases) and 65-74 years (24%). Mortality from STS was observed in the age groups 55-64 years (24.3% of cases) and 65-74 years (17.5%).*

Conclusion: *STSs are varied, and their diagnosis can be difficult in the early stages. The increasing incidence with age, especially in middle-aged people, emphasizes the importance of active prevention and early diagnosis in older peo-ple.*

Keywords: *epidemiology, morbidity, soft tissue sarcoma, mortality.*

Introduction: Soft tissue sarcomas (STSs) and extraosseous sarcomas are a group of rare, aggressive malignancies that arise from mesenchymal tissues, often presenting diagnostic and therapeutic challenges. STS can develop at any age but is most common in middle-aged and older people. In pediatric oncology, STSs account for 7-10% of all childhood cancer cases. The most common sites of their localization are the extremities (60%) and retroperitoneal space (15%). The average age at diagnosis is 54 years. The five-year relative survival rate for all stages of STS is 58%, and the overall five-year survival rate is about 50% [1].

From 1990 to 2021, the global incidence of soft tissue and extraosseous sarcomas increased from 54,631 to 96,201. The crude incidence rate increased from 1.02 to 1.22 per 100,000 population. From 1990 to 2021, there was an increase in the incidence and crude mortality rates of soft tissue and extraosseous sarcomas, while the age-standardized rate decreased. The incidence rate is higher in males compared to females. Compared with 1990, the incidence rate among older people increased in 2021, while the incidence rate among children under 5 years decreased, and little change was observed in other age groups. The mortality rate among children and older people decreased [1].

In recent years, the STS incidence has been steadily growing worldwide, with significant differences in incidence rates between regions [2]. The overall incidence rate in Japan was 3.4 per 100,000 from 2016 to 2019 [3]. According to epidemiological studies, STS overall incidence in adults ranged from 4.2 to 4.7 per 100,000 persons per year from 1995 to 2007 [4].

A retrospective registry study conducted by the National Institute for Epidemiology and Registry Initiatives in Switzerland between 1996 and 2015 found improvements in the 5-year comparative survival rate for soft tissue sarcoma, which increased from 56.4% in the period 1996–2001 to 61.6% in 2011–2015 due to advances in the treatment of STS. It is worth noting that despite the increase in the overall population, the number of deaths from STS has increased significantly [5].

In the United States, 26,758 cases of STS were reported between 1978 and 2001, with a higher incidence in males than females [6]. A study by the North American Association of Central Cancer Registries examined the incidence of STS among adolescents and young adults aged 15–29 years from 1995 to 2008 and found a 34% higher incidence in males than females [7]. The male-to-female ratio in Northern India was 1.73:1 [8]. In the Veneto region of Italy, STS incidence rates were higher among males across all age groups between 1990 and 2018, with a moderate upward trend over the past three decades in males, while the incidence of STS among females remained stable. These findings may be related to environmental toxicants and occupational exposures, mainly involving men. In addition, the locations and subtypes of STS differ by gender. Retroperitoneal STS is more common in women, whereas men are more likely to develop tumors in the extremities, head, and neck [12]. Undifferentiated sarcomas and liposarcomas are more common in men, while leiomyosarcomas, especially uterine leiomyosarcomas, are most common in women [9].

In 2020, there were 13,130 cases of soft tissue cancer (STC) in the United States. The 5-year survival rate for STC patients was approximately 15%, with a median survival of 8 to 16 months. The most common sarcomas in adults are undifferentiated pleomorphic sarcoma, liposarcoma, and leiomyosarcoma. Distant metastases are most commonly seen in the lungs (43%), liver (14%), and bones (13%) [1].

In Europe, the incidence of sarcoma is 4-5 per 100,000 people per year. STSs account for about 1% of all malignant tumors in adults and up to 15% of malignant tumors in children aged 0-4 years [3].

In France, approximately 4,000 new STS cases are diagnosed annually, of which 23% are localized in the abdomen and pelvis [10].

From 2013 to 2017, 19,717 patients with STS were diagnosed in England (3943 patients per year), representing approximately 0.8% of malignancies. The most common diagnoses were gastrointestinal stromal tumors (20.2%), leiomyosarcoma (13.3%), and undifferentiated sarcoma (12.7%) [11].

The study aimed to obtain a complete epidemiological picture of soft tissue sarcomas in the Republic of Kazakhstan for 11 years, including data analysis for 2023. It considered various parameters such as age, gender, ethnicity, region, and tumor type.

Materials and methods: The presented study included all patients registered in the national cancer registry of Kazakhstan from 2013 to 2023 with a diagnosis of "Soft tissue sarcoma" (ICD-10 code: C49). Information in the cancer registry reflects demographic data, disease stage, histological type of tumor, treatment methods, and survival data throughout the country. Demographic variables included gender, age, and region of residence [12-18]. The number of STS cases is presented as absolute and crude indicators per 100,000 population. Standardized incidence and mortality rates are calculated using the world standard (World) and are given as absolute values. MS Excel 2013-2023 was used to visually display the calculated indicators [12-18].

Results: *Dynamics of incidence of soft tissue sarcomas in the Republic of Kazakhstan (RK) from 2013 to 2023.*

From 2013 to 2023, 4,697 cases of STS were registered, with an average increase in incidence of 13%. High incidence rates were recorded in 2015 (475 cases) and 2023 (473 cases). A decline in incidence was noted in 2017 and 2020, but since 2021, a stable incidence of more than 400 cases per year has been observed.

The mortality rate from 2013 to 2017 was high and varied from 188 to 200 cases. However, since 2018, mortality has decreased consistently from 177 to 138 cases in 2022. In 2023, there was an increase in mortality to 156, although 22% lower than the 2013 mortality, despite the increase in incidence in 2023 (Figure 1).

Oncological morbidity structure. In 2023, 37,038 new malignant neoplasms (MN) cases were registered in the Republic of Kazakhstan. Of these, 473 cases are soft tissue malignancies, which is 0.8% of the total number and ranks 19th in prevalence among other types of cancer. The STS incidence was 2.4 cases per 100 thousand population (Figure 2).

Statistics of incidence by gender and age groups. STS standardized incidence in both sexes was 2.1 per 100 thousand. STS incidence was higher in men – 2.4 per 100 thousand, compared to 1.8 per 100 thousand women.

STS peak incidence was observed at 55-64 years (23.6% of cases) and 65-74 years (24%). In the age groups of 35-44 years and 45-54 years, the incidence was 12.9% and 12.3%, respectively. The incidence among men exceeds the indicators among women in most groups and amounts to 30%. The lowest incidence is observed in the younger age categories (0-19 years) and the older group (85 years and older). (Figure 3).

Statistics of incidence by ethnicity. Statistics of STS incidence in women by ethnicity in 2023 were as follows: Kazakhs – 126 cases, Russians – 76 cases, other nations – 25 cases, Ukrainians – 9 cases. Among men, by ethnicity in 2023: Kazakhs – 134 cases, Russians – 67 cases, other nations – 29 cases, Ukrainians – 6 cases.

Thus, the highest STS incidence was observed in Kazakhs in both sexes (Figures 4, 5).

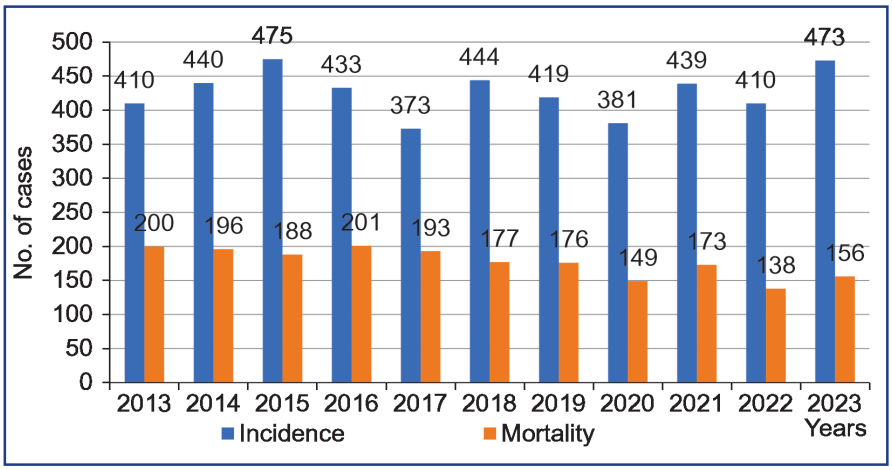

Figure 1 – Incidence and mortality rates from soft tissue sarcomas in the Republic of Kazakhstan 2013-2023 (absolute number of cases)

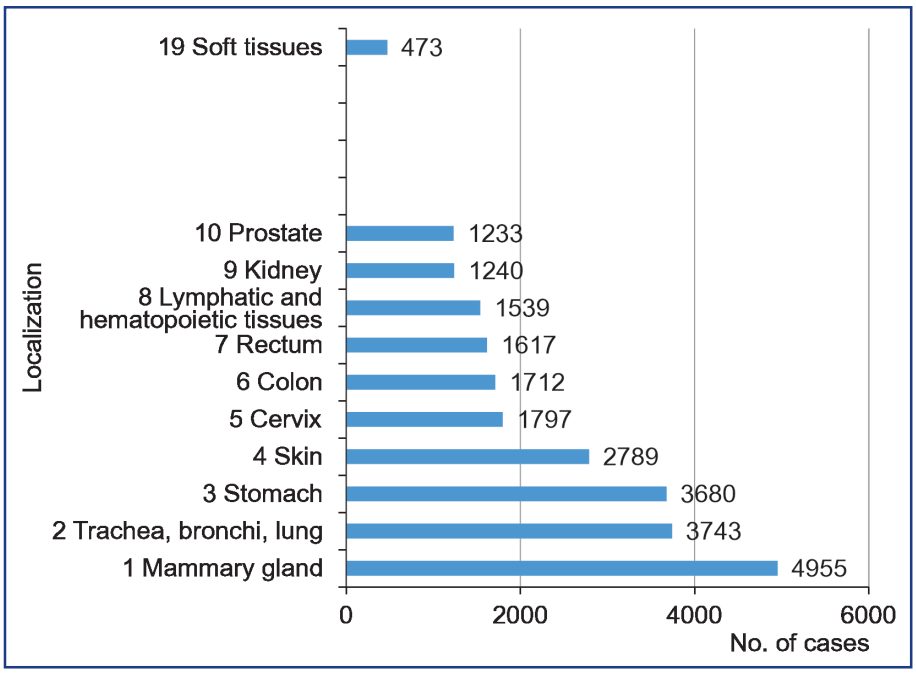

Figure 2 – Structure of cancer incidence in the Republic of Kazakhstan, 2023 (absolute number of cases)

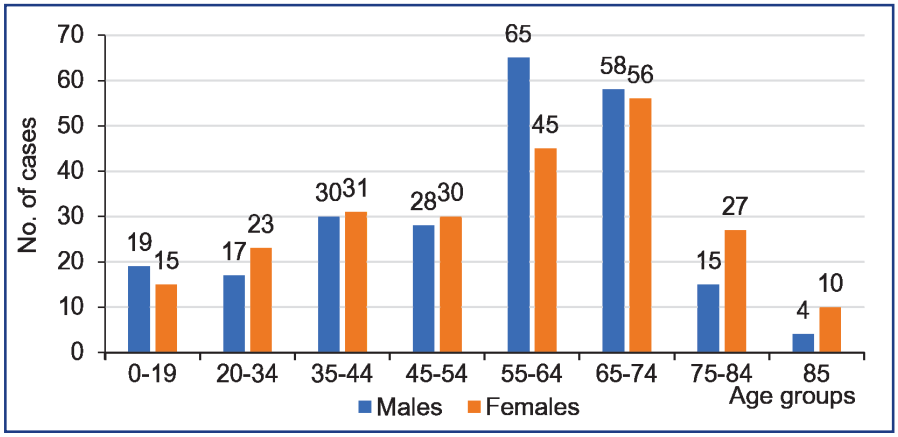

Figure 3 – Incidence rates of soft tissue sarcomas in the Republic of Kazakhstan, by gender and age groups, 2023 (absolute number of cases)

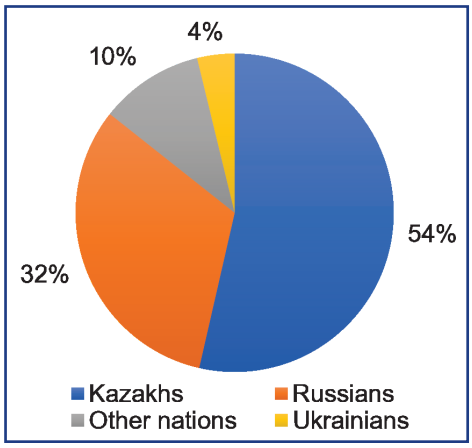

Figure 4 – Incidence of soft tissue sarcomas among women in the Republic of Kazakhstan, broken down by nationality, 2023 (% of cases)

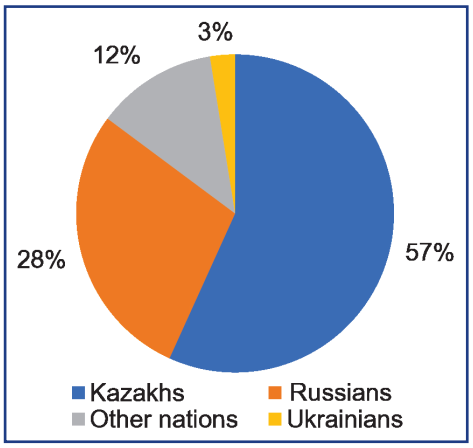

Figure 5 – Incidence of soft tissue sarcomas among men in the Republic of Kazakhstan, broken down by nationality, 2023 (% of cases)

Statistics of incidence by stages. The largest number of cases of STS were detected at stages II-III, which is 62%, at stage I – 23%, and at stage IV - 10%, which indicates the difficulty of STS early diagnosis.

Statistics of incidence by localization. STSs most often affect the soft tissues of the lower extremities (41%) and upper extremities (17%), as well as the head, face and neck (14.6%). 27.4% of sarcomas are located in other localizations (Figure 7).

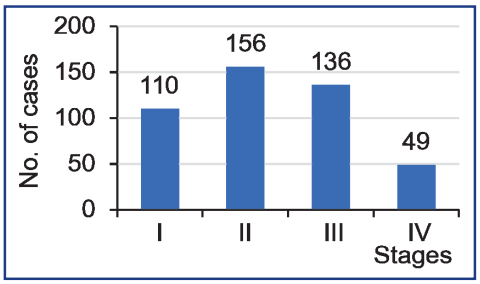

Figure 6 – Incidence of soft tissue sarcomas in the Republic of Kazakhstan, broken down by stages, 2023 (absolute number of cases)

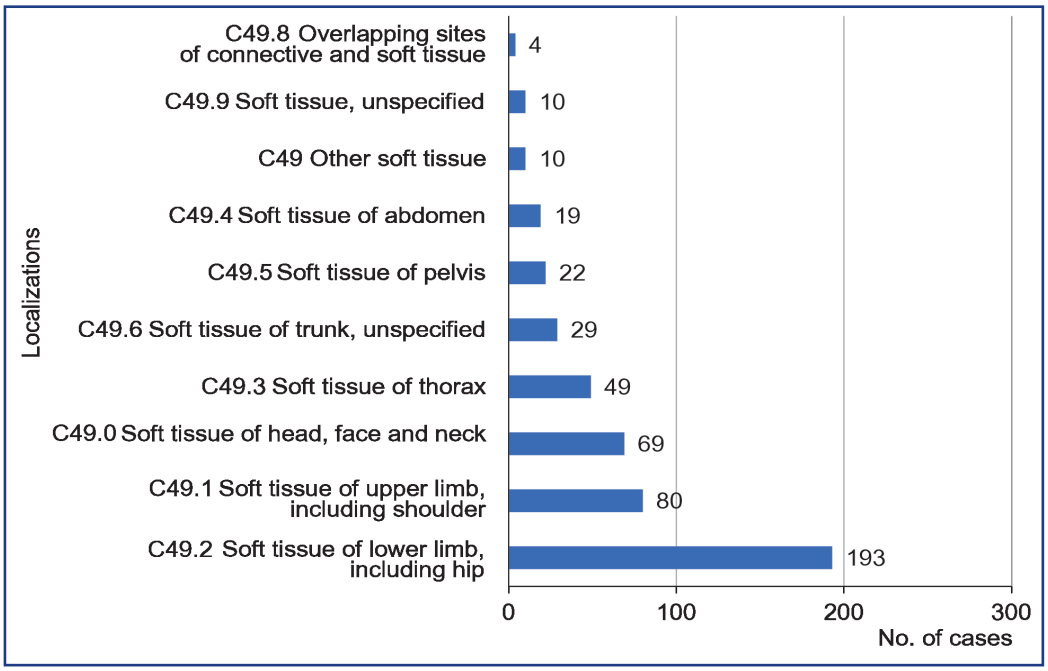

Figure 7 – Incidence of soft tissue sarcomas in the Republic of Kazakhstan, broken down by localization according to ICD 10, 2023 (absolute number of cases)

Statistics of incidence by histological type. By STC histotype, fibrosarcoma (25.6%), liposarcoma (20.6%) are most common, synovial sarcoma (11.8%), fibrous histiocytoma (10.6%). The remaining histological types account for 31.4% of the total number of cases of STS (Figure 8).

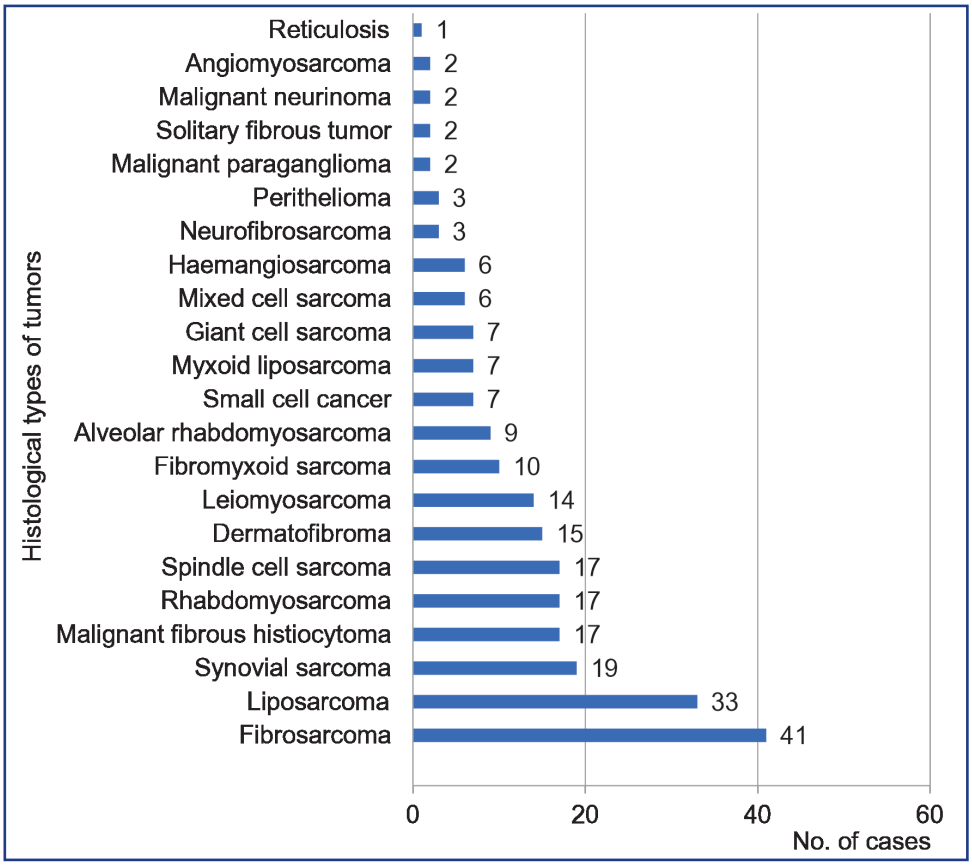

Figure 8 – Incidence of soft tissue sarcomas in the Republic of Kazakhstan, broken down by histological type according to ICD 10, 2023 (absolute number of cases)

Morbidity statistics by region. In the Republic of Kazakhstan in 2023, a high incidence rate of STS was observed in the city of Almaty (11.7%) of the total number of cases, Karaganda region (8%) and East Kazakhstan region (8%). A high rate in the city of Almaty indicates a high population density, the presence of an oncology center, and the potential for a more efficient early diagnosis and treatment system (Figure 9).

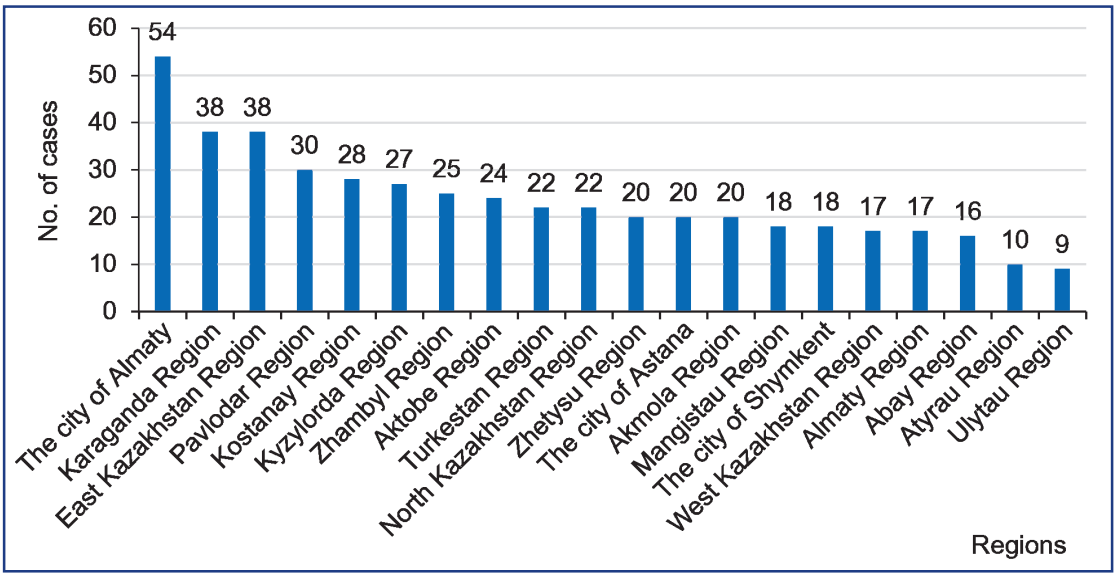

Figure 9 – Incidence of soft tissue sarcomas in the Republic of Kazakhstan, broken down by region, 2023 (absolute number of cases)

Mortality statistics by gender and age groups. STS standardized mortality rate in both sexes was 0.8 per 100,000 population. The peaks in STS mortality were observed in the age groups of 55-64 years (24.3% of cases) and 65-74 years (17.5%). In the age groups of 45-54 years and 75-84 years, mortality was 11% and 13%, respectively. Mortality rates were higher in men in most age groups and amounted to 35%. In the age groups of 45-54 years and older people and senile groups of 65-74 years and 75-84 years, the mortality was higher among women. The lowest mortality was observed in junior and young age groups (0-19 and 20-34 years) (Figure 10).

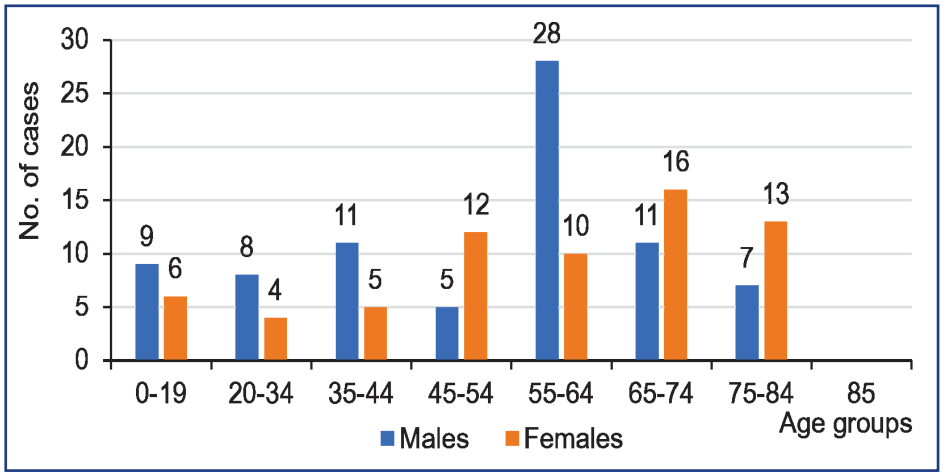

Figure 10 – Mortality rates from soft tissue sarcomas in the Republic of Kazakhstan, broken down by gender and age groups, 2023 (absolute number of cases)

In 2023, in the structure of deaths from malignant neoplasms by localization, STSs ranked 18th in mortality (156 cases). They were not among the top 10 causes of death from malignant neoplasms in Kazakhstan (Figure 11).

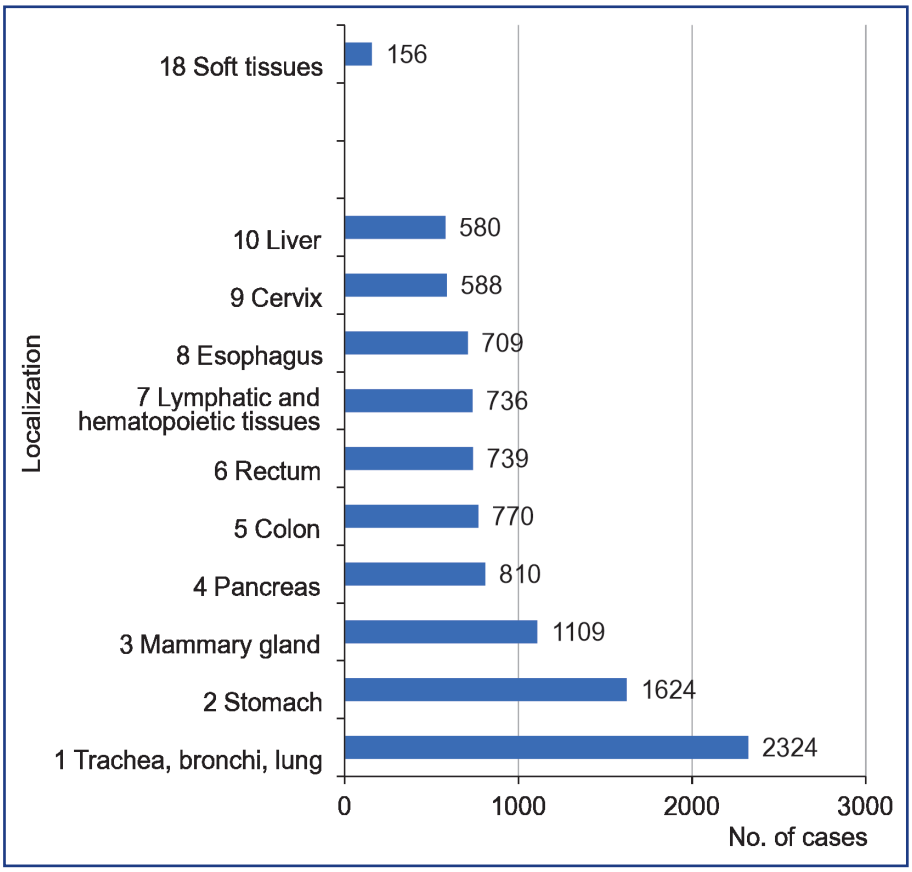

Figure 11 – Structure of mortality from malignant neoplasms in the Republic of Kazakhstan, broken down by localization, 2023 (absolute number of cases)

Mortality statistics by region. In the Republic of Kazakhstan in 2023, high mortality rates from STS were observed in the Zhambyl region (3.3% each), as well as in the Abay region and Almaty city. High rates in the Zhambyl and Abay regions may be due to the level of diagnosis, which leads to late detection of sarcomas, which worsens the prognosis (Figure 12).

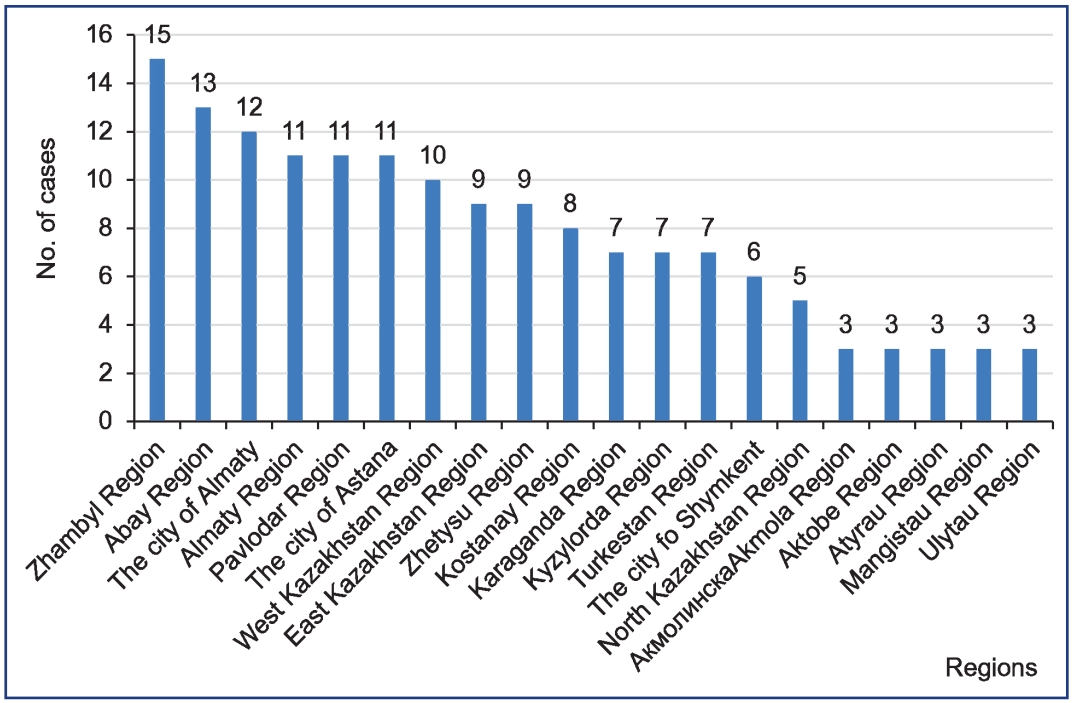

Figure 12 – Mortality from soft tissue sarcomas in the Republic of Kazakhstan, broken down by region, 2023 (absolute number of cases)

Discussion:

Despite the overall increase in STS incidence, there is a trend toward a gradual decrease in mortality. This may be due to improved treatment methods, which contribute to increased patient survival and higher awareness among physicians about sarcoma symptoms and modern diagnostic methods.

STS incidence was 2.4 cases per 100,000 population, which confirms that these tumors are a relatively rare type of malignancy. Although the focus is often on more common cancers, it is important not to forget the need for a specialized approach to rare cancers.

The increase in incidence with age, especially among the 55-74 age group, highlights the importance of active prevention and early diagnosis among older people. It is also worth noting that men are more likely to become ill and die in most age categories.

A high incidence in the city of Almaty could be due to the presence of a specialized center for treating bones and soft tissues at KazIOR, which facilitates accurate diagnosis and successful treatment of diseases.

STSs are diverse, and their diagnosis is challenging, especially in the early stages. Therefore, a multidisciplinary approach is essential, which includes teamwork between clinicians, pathologists, and radiologists.

Conclusion: Thus, from 2013 to 2023, 4697 STS cases were registered in the Republic of Kazakhstan. The incidence shows an average increase of 13%, with peaks in 2015 and 2023. At the same time, the mortality rate was high in the first years but gradually decreased since 2018. However, in 2023, the number of deaths increased, although compared to 2013, the mortality rate is still 22% lower.

In 2023, 37,038 new cases of malignant neoplasms were registered in the country, of which 473 cases were in soft tissues, which is only 0.8% of the total. At the same time, there is a high incidence in men (2.4 cases per 100 thousand population) compared to women (1.8 cases per 100 thousand). The largest number of cases was registered in the age groups of 55-64 and 65-74 years.

By ethnicity, the highest incidence is observed among Kazakhs, both men and women. It is also worth noting that 62% of cases are detected at stages II and III of the disease, which indicates the difficulties of diagnosis at early stages.

As for localization, sarcomas most often affect the soft tissues of the lower extremities, upper extremities, and head areas. The highest incidence was recorded by region in the Almaty, Karaganda, and East Kazakhstan regions.

The mortality rate from sarcomas is 0.8 per 100 thousand population, with the highest rates in the age groups

of 55-64 and 65-74 years. At the same time, mortality among men is higher than among women. In 2023, mortality from sarcomas was 156 cases, with high rates in the Zhambyl and Abay regions.

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АҢДАТПА

2013-2023 ЖЫЛДАРҒА АРНАЛҒАН ҚАЗАҚСТАН РРЕСПУБЛИКАСЫНДАҒЫ ЖҰМСАҚ ТІНДЕР САРКОМАЛАРЫНЫҢ ЭПИДЕМИОЛОГИЯЛЫҚ ЖАҒДАЙЫ

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Өзектілігі: *Жұмсақ тіндердің саркомасы – мезенхималық тіндерден пайда болатын, барлық қатерлі ісіктердің 1%-дан аспайтын, кез келген жаста дами алатын, бірақ орта және егде жастағы адамдарда жиі кездесетін сирек кездесетін агрессивті қатерлі ісіктер тобы.*

Зерттеудің мақсаты *– жасы, жынысы, ұлты, аймағы және ісік түрі сияқты әртүрлі параметрлерді ескере отырып, 2023 жылға арналған деректерді талдауды қоса алғанда, Қазақстан Республикасында 11 жыл ішінде жұмсақ тіндер саркомасының толық эпидемиологиялық бейнесін алу.*

Әдістері: *Ұсынылған зерттеуге жұмсақ тіндердің саркомасы диагнозымен (ICD-10 коды: C49) 2013-2023 жылдар аралығында Қазақстанның ұлттық онкологиялық реестрінде тіркелген барлық пациенттер қамтылды. Жұмсақ тіндер саркомасы жағдайларының саны 100 000 халыққа шаққанда абсолютті өрескел көрсеткіштер ретінде берілген. Стандартталған аурушаңдық пен өлім-жітім көрсеткіштері дүниежүзілік стандартты қолдану арқылы есептелді (World).*

Нәтижелері: *2013 жылдан 2023 жылға дейін жұмсақ тіндердің саркомасының 4697 жағдайы тіркелді, аурушаңдықтың орташа өсімі 13% құрайды. Жұмсақ тіндердің саркомасымен сырқаттанушылық 100 мың тұрғынға шаққанда 2,4 жағдайды құрады. Қатерлі ісіктің басқа түрлерінің арасында таралуы бойынша аурушаңдық 19-шы орында, ал өлім-жітім 18-ші орында және өлім мен сырқаттанушылықтың алғашқы 10 себебінің қатарына кірмейді. Екі жыныс үшін де СМТ-мен сырқаттанушылық көрсеткіші 100 мың халыққа шаққанда 2,1, өлім-жітім 100 мың халыққа 0,8 құрайды. Ерлер арасында аурушаңдық пен өлім-жітім әйелдермен салыстырғанда сәйкесінше 30% және 35% жоғары. ЖТҚ-мен сырқаттанушылықтың шыңы 55-64 жас (23,6% жағдайлар) және 65-74 жас (24%) жас топтарында байқалды. СТС-дан болатын өлім 55-64 жас (24,3% жағдайлар) және 65-74 жас (17,5%) жас топтарында байқалды.*

Қорытынды: *SMT әртүрлі және олардың диагнозы ерте кезеңде белгілі бір қиындықтарды тудырады. Жас ұлғайған сайын, әсіресе орта жастағы адамдарда аурушаңдықтың артуы егде жастағы тұрғындарда белсенді профилактика мен ерте диагностиканың маңыздылығын көрсетеді.*

Түйінді сөздер: *эпидемиология, аурушаңдық, жұмсақ тіндердің саркомасы, өлім-жітім.*

АННОТАЦИЯ

ЭПИДЕМИОЛОГИЧЕСКОЕ СОСТОЯНИЕ ПО САРКОМАМ МЯГКИХ ТКАНЕЙ В РЕСПУБЛИКЕ КАЗАХСТАН ЗА 2013-2023 годы

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Актуальность: *Саркомы мягких тканей – это группа редких, агрессивных злокачественных новообразований, которые возникают из мезенхимальных тканей, составляют не более 1% всех злокачественных опухолей, могут развиваться в любом возрасте, но чаще встречаются у людей среднего и пожилого возраста.*

Цель исследования *– получение полной эпидемиологической картины сарком мягких тканей в РК за 11 лет, включая анализ данных за 2023 год с учетом различных параметров, таких как возраст, пол, этническая принадлежность, регион и тип опухоли.*

Методы: *В представленное исследовании были включены все пациенты, зарегистрированные в национальном канцер-регистре Казахстана с 2013 по 2023 гг. с диагнозом «Саркома мягких тканей» (код ICD-10:C49). Количество случаев сарком*

мягких тканей представлено в виде абсолютных грубых показателей на 100 000 населения. Стандартизованные показатели заболеваемости и смертности рассчитаны с применением мирового стандарта (World) .

Результаты: *С 2013 по 2023 годы было зарегистрировано 4697 случаев сарком мягких тканей, средний прирост заболеваемости составил 13%. Заболеваемость саркомами мягких тканей составила 2,4 случая на 100 тысяч населения. По распространенности среди других видов рака заболеваемость занимает 19-е место, а смертность – 18-е место и не входит в топ – 10 причин смертности и заболеваемости. Показатель заболеваемости СМТ для обоих полов составляет 2,1 на 100 тысяч населения, смертность составляет 0,8 на 100 тысяч населения. Заболеваемость и смертность выше среди мужчин по сравнению с женщинами на 30% и 35%, соответственно. Пики заболеваемости СМТ наблюдались в возрастных группах 55-64 лет (23,6% случаев) и 65-74 лет (24%). Смертность от СМТ наблюдалась в возрастных группах 55-64 лет (24,3% случаев) и 65-74 лет (17,5%).*

Заключение: *СМТ разнообразны, их диагностика вызывает определённые сложности на ранних стадиях. Увеличение заболеваемости с возрастом, особенно у людей среднего возраста, подчеркивает важность активной профилактики и ранней диагностики среди пожилого населения.*

Ключевые слова: *эпидемиология, заболеваемость, саркома мягких тканей, смертность.*

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