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Breast cancer – an epidemiological and social problem in Poland

Rak gruczołu piersiowego – problem epidemiologiczny i społeczny w Polsce

INTRODUCTION

Breast cancer is the most common female malignant neoplasm. In recent years research was undertaken into the aetiology and development of cancer which has changed the views on the recommended forms of treatment. The perception of the illness in the constitutional aspect, not only locoregional, is reflected in modifications in surgical methods and a change in chemotherapy schemes. Implementation of the operational techniques of plastic surgery in breast cancer surgery has fulfilled the aesthetic expectations of female patients. However, the formation of distant metastases, which are the main reason for failure in treatment, is still a problem that remains unsolved. An early diagnostics in the detection of metastases and prevention of their formation started a new direction in the research on breast cancer. One thing that seems to be a comfort is the fact that despite the increase of the incidence of this cancer, mortality rates begin to indicate a decrease in the tendency.

EPIDEMIOLOGY OF BREAST CANCER IN POLAND AND WORLDWIDE

The incidence of breast cancer constitutes approx. 23% of the incidence of female malignant neoplasm worldwide [1, 2]. They are among the major risk factors in female mortality in the highly-developed countries. The risk of the incidence of this type of cancer increases each year [2, 3, 4]. Diagnostics, treatment and preventive programmes for breast cancer play a decisive part in the oncological policy of many countries. Due to a high incidence of breast cancer among American women, the analysis of the epidemiological situation in this country facilitates world preventive actions. According to Chu and associates [5], due to the progress in the diagnostics and treatment

of breast cancer, the mortality rate in USA decreased between 1989 and 1993 by 6.8%. According to Jansen and associates [6], based on the Scandinavian countries, this form of action may reduce the mortality rate even by 20–30%. Currently, the 5-year-survival predictor for different European countries is about 79%. In Sweden, however, it is as high as 86% [2]. In Poland, the incidence of breast cancer constitutes 19.7% of malignant tumour incidence among women. Deaths caused by this cancer is estimated to be approx. 13% of all cancer deaths [7] (Fig. 1).

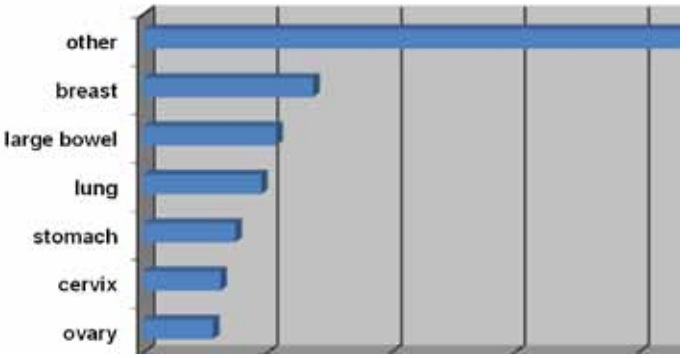

Fig. 1. Annually frequency [thousands] of malignant neoplasm cases among women in Poland [7]

It is estimated that the number of new breast cancer cases reaches about 13500 women each year in Poland [8]. The study of incidence in patients diagnosed between 1996–1999 reported an increase by almost 4% [7]. However, since the beginning of the 80's, there has been an increase in the incidence from about 25 to 42 people in 100000 residents. The majority of incidences concerned the group of women aged between 45 and 69 [8]. Over 50% of all incidences occurred in the 50–69 age group. Incidence rates increase with age between 40 and 59 and stabilise and decrease after the age of 70 [9]. It is estimated that the problem of breast cancer currently concerns about 55000 Polish women.

Fortunately, mortality rates seems to be different. Over the thirty year period 1963–1992, the risk of death increased by 1.6% annually. This increase concerned mainly women aged 50 or over, while in the younger groups there was a stabilisation in mortality, particularly after the 1980s. The mortality rate in 1963 was 9 people per 100,000. In the following years, there was a major increase in the mortality rate to up to 15/100000 and this number is rather constant, with a slight tendency to decrease [9, 10]. The mortality rates increase linearly with women aged from 35 to 80.

It is also important to trace the formation of incidence and mortality trends in the last 50 years. Until the end of the 70's, the mortality and incidence rates were increasing. In the 90's, there was a slowdown in mortality with an increase in its incidence since the 80's.

Currently, the incidence is increased, while the mortality rates are stable. The incidence and mortality trends "diverged". It seems that the undisputed reason for this situation is an improvement in diagnostics and treatment. The major role in this process is ascribed to the national screening

programmes. In Poland, this programme was started in 2006. The details of the benefits are not prepared yet. However, it is clear, that only 31% of females take part in this programme, which according to the estimates, will not ensure the expected populational advantages. Currently, the 5-year-survival predictor for the period of time before 2006 is 72% for Poland.

The mortality rate is higher in the major Polish cities. The Eastern regions of Poland and the villages are characterised by a lower mortality rate from breast cancer. The incidence of a malignant breast cancer is 1.5 times higher for the population of the cities than of villages. Men have this cancer 100-times less often than women and constitute approx. 0.5% of the ill [11].

THE RISK FACTORS OF BREAST CANCER

Defining the factors that increase of the risk of being affected by breast cancer made it possible to isolate the group of women who were especially in the risk of cancer. This group of patients should be included in the special programmes for early breast cancer detection or recently developed and controversial preventive programmes.

Among the major factors increasing the risk of breast cancer are: genetic factors, age, past breast cancer, family history of breast cancer, minor proliferative diseases of the breast, exogenous and endogenous sex hormones, ionizing radiation, obesity, alcohol.

Genetic factors. It is estimated, that about 5–10% of breast cancer are caused by a hereditary mutation of the embryonic stem-cell line of breast cancer susceptible genes - *BRCA1* and *BRCA2*. The mutation is inherited in an autosomatic, dominating way with varying penetration. The woman that inherits the mutated gene *BRCA1* is in the 56–85% risk of being affected by breast cancer and 15–45% by ovary cancer [1, 12].

Breast cancer developing from the *BRCA1* mutation is most often low diverse. It is characterised by aneuploid and cells devoid of hormonal receptors, a huge percentage of which is in the S phase of the cell cycle. The *BRCA1* and *BRCA2* genes are the suppressors, inhibiting the development of cancers. As a result of the mutation within these genes, the carcinogenesis is initiated. The proteins coded by these genes take part in the response processes of a cell to DNA damage [13].

Currently-employed preventive actions concerning inheritors of the mutated *BRCA* gene include: 1) preventive mastectomy with simultaneous reconstructive surgery, 2) preventive ovary resection and hormonal supplementary therapy, 3) regular health examinations, 4) chemoprevention. The recently-published results from the randomised, multicentre clinical examinations run by *the National Surgical Adjuvant Breast and the Bowel Project* (NSABP) under the leadership of Bernard Fisher, MD, as a *Breast Cancer Prevention Trial* (BCPT) revealed a substantial 49% decrease in the frequency of the incidence of breast cancer among women from the risk group taking tamoxifen [13].

Age. The rate of the incidence of breast cancer increases with age. In Poland, 80% of women with cancer are over 50 [9]. The phenomenon is explained by the aging processes of cells and apoptosis disorders.

Past breast cancer. The risk of developing cancer in the other breast is approx. 1% [14].

The family history of breast cancer. 25% of breast cancer incidence is with a family background [15]. The major risk of developing cancer is among women whose mother or

sister had this cancer and is 14 times higher than the risk of the women without a family history of cancer. The risk of breast cancer among the women whose closest relative developed cancer before menopause increases 3 times. In the case when relatives are affected by cancer after menopause the risk increases 1.5 times [14].

Minor proliferative diseases of the breast. The presence of duct hyperplasia increases the risk by a factor of 2. The presence of atypical duct hyperplasia means a 4- to 5-fold higher risk. Diagnosis of *ca ductale in situ* is connected, according to Pieńkowski [14], with an 8–11 times increase in the risk of developing an invasive cancer.

According to other authors, the presented values differ significantly and depend on the type of cancer [16, 17, 18]. 80 patients with *ca ductale in situ* were observed for 5–28 months. 11 of them (14%) developed an infiltrating cancer.

Exogenous sex hormones. Long-term, 5–7-year hormone-replacement therapy (HRT) is connected with an increase in breast cancer risk. Multicentre research on hormonal factors carried out in recent years has shown that in women using HRT for a minimum of 5 years, the breast cancer incidence has increased by 35% [19]. The increase of its incidence in this group of women is probably caused by the mitogenic influence of estrogens and progesterone. These hormones intensify gland cell division. The cells in the proliferative phase are more prone to the influence of mutagenic factors [20. 21]. Long-term oestrogen-progestagen therapy may result in a higher breast cancer risk than using estrogens alone [22]. There are various ambiguous opinions on the influence of contraceptives with low hormone levels on the increase in breast cancer risk [23]. *Population case-control* research run by Marchbanks and associates [24] (approx. 9 thousands participants) indicated that the use of orally administered contraceptives does not increase breast cancer risk in older age.

Physiological hormones activity. First menstruation under the age of 12 and menopause over the age of 55 are connected with an increased risk of breast cancer. Having the first child under the age of 25 and breastfeeding are the factors that minimise the risk [25].

Ionising radiation. A long term exposition to the ionising radiation increases the risk of breast cancer [14].

Obesity. The consumption of considerable amounts of animal fats is connected with the increase in breast cancer risk. Most detrimental is the presence of saturated fats in the diet [26].

Alcohol. Regular, moderate consumption of alcohol increases the risk of breast cancer [25]. The reason may be an increased concentration of estrogens in blood serum caused by alcohol [27].

Finally, it is worth emphasising that only 4–8% of cases of breast cancer result from hereditary mutations. The majority of cases result from sporadic somatic mutations, influenced mainly by environmental factors. The elimination of common carcinogenic factors through the implementation of a diet, a healthy lifestyle, or ending a long-term hormone therapy can decrease the incidence rate.

Wider participation of women in preventive screening creates a real chance of decreasing the mortality rate by almost 40%.

It seems that effective preventive actions in social policy can solve this significant health problem in Poland.

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SUMMARY

Breast cancer is the most common female malignant neoplasm. Early diagnostics and effective preventive treatment help decrease the mortality rates by 30%. An estimated 55000 Polish women suffer from breast cancer. Annually, about 13500 new cases are diagnosed (42/100000 residents). Mortality rate is currently 15/100000. In recent years a stabilisation in the mortality rate despite its increasing incidence, which is thought to be the result of early diagnosis and treatment of this type of cancer, has been observed. However, the number of woman participating in population preventive screening tests is still too low and five-year survival rates are around 72% for woman in Poland based on diagnoses up to the end of 2006.

Keywords: breast cancer, epidemiology, risk factors

STRESZCZENIE

Rak gruczołu piersiowego jest najczęściej występującym u kobiet nowotworem złośliwym. Wczesna diagnostyka i efektywne działania profilaktyczne umożliwiają obniżenie wskaźników umieralności nawet o 30%. Problem raka gruczołu piersiowego w Polsce dotyczy obecnie 55000 kobiet. Rocznie stwierdza się w kraju około 13500 nowych zachorowań (42/100000 mieszkańców). Współczynnik umieralności wynosi obecnie 15/100000. W ostatnich latach obserwuje się stabilizację współczynnika umieralności pomimo wzrostu liczby zachorowań, co jak się przypuszcza jest wynikiem znacznej poprawy wczesnej diagnostyki i leczenia tego typu nowotworu. Wciąż jednak zbyt mała liczba kobiet zgłasza się na populacyjne badania profilaktyczne (31%), a wyliczony za okres przed rokiem 2006 wskaźnik 5-letniego przeżycia wynosi w Polsce zaledwie 72%. W pracy przedstawiono również poznane dotychczas główne czynniki ryzyka zachorowania na raka piersi.

Słowa kluczowe: rak piersi, epidemiologia, wskaźniki ryzyka