EPIDEMIOLOGY OF BREAST CANCER

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MOST FREQUENT CANCER SITES IN FEMALES. SLOVENIA, 1999

Breast 21%
Skin 14%
Corpus ut. 7%
Colon 6%
Cervix ut. 5%
Rectum 5%
Lung 5%
Stomach 5%
Ovaries 4%
Melanoma 3%
Other 25%

Cancer Registry of Slovenia, 2002.
AVERAGE AGE-SPECIFIC BC INCIDENCE RATES IN SELECTED CE COUNTRIES, 1988-92

Parkin DM et al, eds. CI5CVII, 1997.
WORLD BREAST CANCER BURDEN

Total number of estimated annual new cases

- **1980**: 389,200
- **1985**: 422,000
- **1990**: 472,200
- **2000**: 579,285

Year

- “Developing” world
- “Developed” world

WHO, 2000
RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF BREAST CANCER

Reported range of risk estimates: 2-4

- family history and genetic factors
- previous history of breast cancer in one breast
- fibrocystic disease (atypical hyperplasia)
- ionizing radiation
FAMILY HISTORY AND GENETIC FACTORS

- Environmental and lifestyle factors rather than inherited genetic factors account for most cases of BC.

- Twin studies (45,000 pairs of twins in three Nordic countries): hereditary factors were estimated to contribute to around 1/4 and environmental and lifestyle factors to around 3/4 of the interindividual differences in susceptibility to BC.

- Global variation in BC rates and migrant studies: importance of hereditary factors even smaller.
FAMILY HISTORY AND GENETIC FACTORS

Evidence for genetic predisposition to BC derives from:

- observations of cancer clustering in families
- cancer risk increasing in individuals with some genetically determined syndromes

Familial aggregation can be attributed both to:

- shared genes and
- shared physical environments and lifestyles
GENETIC FACTORS: HIGH-RISK MUTATIONS

- mutations in the genes: BRCA1, BRCA2, p53, ATM

High-risk alleles probably account for:

- most of the families with 4 or more BC cases
- 20-25% of the familial BC risk overall
- around 5% of all BC cases
- life-time risk of BC in mutation carriers: 37%-70% by age 70
Breast cancer risk may be determined by the combined effect of many low-risk polymorphisms in common genes that:

- encode enzymes involved in the metabolism of steroid hormones or carcinogenic substances
- are involved in DNA repair
RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF BREAST CANCER

Reported range of risk estimates: 1.1-2

Hormonal and reproductive factors

- age at menarche and menopause
- age at first full-term pregnancy
- nulliparity

- oral contraceptives and hormone replacement therapy
ORAL CONTRACEPTIVES AND BREAST CANCER

Combined results of more than 10 cohort and 50 case-control studies, including over 50,000 women with BC:

- the risk of BC is increased by around 25% in current users
- the excess risk falls after cessation of use
- 10 or more years after stopping no increase in risk is evident
- risk does not vary significantly with duration of use
- the effect of OCs does not vary according to other risk factors
ORAL CONTRACEPTIVES AND BREAST CANCER

- The effect on risk of BC does not vary with the type of oestrogen or progestagen used.
- The effect of progestagen-only OCs is similar to that of combined OCs.
- Use of combined OCs is associated with larger excess of localised cancers.
- The increased risk in recent users may be partly due to increased surveillance.

IARC Monographs 1999; 72.
HORMONE REPLACEMENT THERAPY AND BREAST CANCER

- Use of ERT for about 10 years among current and recent users increases risk of BC by 35%.
- Use of combined oestrogen and progestagen preparations increases risk of BC more than use of oestrogen alone.
- Effect of HRT is greater in lean than in overweight and obese women.
- HRT has greater effect on the risk of localised cancer than the one that has spread beyond the breast.

IARC Monographs 1999; 72.
RISK FACTORS ASSOCIATED WITH THE DEVELOPMENT OF BREAST CANCER

Reported range of risk estimates: 1.1-2

Life-style related factors

- anthropometric factors
- diet
- alcohol
- physical activity
Anthropometric factors and breast cancer

Adult height

- Increasing height - increasing risk of BC in pre- and postmenopausal women.

- Attained height may be influenced by childhood and adult nutrition, genetic predisposition, prenatal exposures and IGF levels.
ANTHROPOMETRIC FACTORS AND BREAST CANCER

Obesity

- In obese postmenopausal women the risk of BC is about 50% higher (BMI > 30 kg/m²) than in lean women (BMI 20 kg/m²).
- In obese premenopausal women the risk is slightly lower than in those with normal weight.
DIET AND BREAST CANCER

- high fat diet
- meat
- fibre
- fruit
- vegetables
- phyto-estrogens
- alcohol intake
PHYSICAL ACTIVITY AND BREAST CANCER

- Moderate physical activity is associated with a lower risk of BC.
- Magnitude of the effect varies between studies: about 30% reduction in risk in association with a few hours per week of vigorous activity versus none.
OTHER FACTORS INVESTIGATED IN THE ETIOLOGY OF BREAST CANCER

- breastfeeding
- spontaneous and induced abortion
- breast implants
- electromagnetic fields
- some chemicals: organochlorines (DDT, PCBs)
FURTHER EPIDEMIOLOGIC RESEARCH OF BC

- Identification of causes of the substantial proportion of BC that remains unexplained.
- More research on initiation and on genetic and environmental determinants of the specific hormonal patterns that increase risk.
- Interrelations among dietary factors, physical activity and anthropometric characteristics at specified points during woman’s lifetime.
- Evaluation of major genes associated with high risk of BC and many genes suspected of conferring low to moderate risk.
- Better models for individual risk assessment.