Contribution of mammography to diagnosis of breast tumours in women under the age of 30

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Mammograms of 274 patients aged between 15 and 30 years were analysed retrospectively. The analysis of 176 (64.2 %) mammograms was unreliable because of radiographically dense breasts. In addition to mammography, ultrasound (n = 42), needle biopsy (n = 98), cytologic examination of secretion from the breast-nipple (n = 28) and open biopsy (n = 17) were used as diagnostic methods. Diagnosis of the only carcinoma in the group (carcinoma intraductale) was set on the basis of positive mammographic, cytologic and echographic findings.

Because of the low percentage of breasts suitable for radiographic analysis, echomammography is the method of choice for the visualization of breasts in women younger than 30 years.

Key words: breast neoplasms-diagnosis; mammography

Introduction

Breast cancer is the most frequent malignancy in women; it represents about 20 % of all cancers in the female population.

According to the statistics of the Cancer Registry of Slovenia,[1] the incidence of breast cancer is 66 per 100.000 of Slovenian women. Every year more than 650 women are afflicted – 96 % of them older than 35. Women from the age group between 15 and 29 years represent 23 % of the Slovenian female population, or less than 1 % of breast cancers. Breast cancer incidence grows at the rate of 5 % per year in the Republic of Slovenia and the tendency shifts from the older to the younger age group.[2]

At present, mammography is the most important method for early detection of breast cancer. As regards its effectiveness, no other method has come even close to it.

There are several facts speaking against the use of mammography in women younger than 35 years: morphologic characteristics of the breast, because of which mammograms are often inadequate for analysis, the potential risk represented by exposure to radiation, and the fact that carcinoma of the breast in younger women is so rare that screening in this group of the population is ecconomically unjustified.

In our retrospective study we wanted to evaluate the contribution of mammography to diagnostic treatment of tumours in patients younger than 30.

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Material and methods

The medical documentation of women aged 30 years or less, investigated radiographically during the past 11 years at the Breast Diagnostic Center in Maribor, was reviewed. We wanted to know which data from medical history and clinical status were an indication for mammography. Mammograms, echomammograms, cytologic findings of aspiration biopsies, cytologic findings of breast secretion smears and findings of open biopsy were analysed. The patients were x-rayed by means of a Senographe 500T CGR device using the cassette technique with unilayer films.

The classification of breast parenchymal patterns as suggested by Wolfe[3] was used in the analysis of mammograms.

Subjectively we evaluated whether the mammogram was suitable for analysis or not, whether the tumour was visible on the mammogram and how the findings influenced the decision about further diagnostic treatment.

Results

Our analysis comprised 274 mammograms of patients aged between 15 and 30 years. The indications for mammography were as follows: clinically determined tumour and/or marked nodosity ($n = 125$), pain ($n = 78$), nipple secretion ($n = 30$), preventive examination prior to plastic surgery ($n = 3$) and others (family history of breast cancer, inverted nipple, cancerophobia etc. ($n = 40$).

Classification of mammograms according to Wolfe showed that the fewest mammograms are in groups N ($n = 28/10.2\%$) and P1 ($n = 70/25.5\%$) and a little more in P2 ($n = 75/27.4\%$). Most mammograms were evaluated as DY ($n = 101/36.8\%$).

Of the clinically determined tumours and prominent nodosity ($n = 125$), only 25 (20%) were mammographically visible, 10 of them partially.

Ten of the 15 mammographically determined tumours were clinically unpalpable. They all had mammographic characteristics of cysts or benign solid tumours. Only one patient was referred for biopsy.

Echographically we examined the breasts of 42 patients. In 12 cases we found a benign solid tumour, in 11 a cystic lesion, in 3 ductectasia, in one dilated ducts in the first quadrant of the breast and in 16 normal parenchymal structure. All clinically manifest tumours ($n = 16$) were echographically visible.

In 98 palpable solid lesions (tumours and prominent nodosity) a needle biopsy was done. The cytological results were in 23 cases PAPA I, 35 times PAPA II, 4 times PAPA II-III, 36 punctures (36.7%) were inadequate for analysis.

In 28 secreting nipples a smear was taken. The cytological results were as follows: 14 times PAPA I, 8 times PAPA II, once II-III, once PAPA V, 3 smears were inadequate for analysis.

In the analysed group of patients, 17 open breast biopsies were carried out. Seven of them were made only on the basis of clinical results, because the lump was not mammographically visible. Histological findings were: two cases of fibroadenoma, 4 of fibrocystic breast disease, one of normal gland parenchyma. Of the remaining biopsies there were 5 cases of palpable solid lesions, which were also mammographically visible. Histological findings were: fibroadenoma in two cases, papilloma intraductale in one, unspecific granulation tissue in one, whereas in one case the result was not obtained.

Only one patient was sent for biopsy merely on the basis of mammography findings – the tumour was not clinically manifest. The histological findings confirmed a lipoma.

In the entire group, only one case of cancer was diagnosed in a 29-year old patient who came for an examination because of milk secretion from several ducts of the left breast and marked nodosity in the first quadrant of the same breast. Mammography detected a type DY with diffused microcalcifications in the left breast. The echomammogram revealed dilated ducts in the first quadrant of the breast, pathological findings because they usually can not be visualized in this area.

Discussion

At present, mammography is the very best method for early detection of breast diseases.

With reference to mammographic screening, several questions are raised: when to begin screening so it would be justified from the standpoint of the applicability of mammography at a certain age, from the standpoint of risk from radiation and from the economic standpoint.

Successful mammography, requires good technical devices, sensitive films and a physician with the required knowledge and interest, because interpretation of even technically perfect mammograms is not easy. This applies particularly to mammography in younger women where the findings are often false positive or false negative because of dense parenchyma. Radiographic density of the breast is the result of the presence of normal parenchyma in younger women, prominent ducts, dysplastic epithelium and stromal tissue. Breast tissue involutes with the age. It is replaced by fatty tissue which is radiographically transparent and facilitates the detection of pathological changes. That is a specially favourable circumstance since the age specific incidence of breast cancer shows a steep increase after the age of 35.[4] Because of the extreme radiographic density of the breasts, mammograms are frequently false negative in young women.

Hall[5] suggested the evaluation of mammograms according to whether they are, and to what extent they are adequate for analysis. He defined four categories roughly corresponding to the classification by Wolfe:

1. an adipose breast, suitable for mammographic interpretation,

2. the adipose tissue is predominant, the breast is relatively adequate for mammographic interpretation,

3. a relatively dense breast, suboptimal for mammography,

4. a dense breast, inadequate for mammographic evaluation.

According to this classification, Schutte[6] assessed a population of 938 patients. In the age group under 35 years, only 20 % of the mammograms were adequate for analysis, 26 % were relatively adequate, 29 % were suboptimal and 25 % were inadequate. This changes essentially in the age group over 35 years: 41 % were adequate for mammographic analysis, only 9 % were inadequate. Such classification should be a guide to the physician for proper treatment of the patient. Negative mammographic findings of a breast, inadequate for mammography owing to its structure, have no diagnostic value and must not cause a delay of the biopsy if it is indicated on the basis of clinical examination.[6,7]

According to the recommendation of the American Cancer Society, a base-line mammography should be done at the age of 35 to 40 years, whereas control checkups should be done once a year or every second year up to the age of 50, and after that every year.[8]

The hypothetic noxiousness of screening is based on the fact that at a yearly dose of 1 mGy (which can easily be reached using good devices and sensitive films) at the age between 35 and 75 years, the incidence increases for 1 % over the natural incidence.[9]

Feig[4] established that the risk of radiogenic cancer from small doses is neither proved nor disproved. If such risk does exist, it is negligible, particulary if compared with the high incidence of the natural occurrence of breast cancers detected by screening. The risk, if it exists, is lower in women past the age of 30, who benefit the most from mammography. Namely, the sensitivity of the breast to radiation depends on age. There are different explanations for this.

Molgavkar[10] is of the opinion that breast cancer develops in two stages. All carcinogens, including radiation, take effect during the second stage – the transformation of intermediary cells into tumours. Sensitivity to radiation or to any other carcinogen supposedly depends on the number of cells in the intermediary pool and the speed of cell division. A larger number of births and age supposedly decrease the risk for cancer. Korenman[11] is of the opinion that sensitivity to radiation depends on the estrogen-progesteron rate in blood at the moment of

exposure to radiation. This proportion is highest during adolescence, in the period of anovulatory cycles, in inadequate luteal phases and isolated estrogen stimulation. The estrogen window closes with age, births or both. Radiogenic carcinomas occur at least 10 years later. The duration of the carcinoma effect is not known, but studies show that it continues at least for the following 15 years. Owing to the unproved noxiousness of screening in older women, the question of "screening yes or no" is not raised. Since its benefit in younger women has not been proved, the risk becomes significant.

Our study confirms the assertion that tumours in dense breasts, prevailing in younger women, are mammographically difficult to diagnose. Also as a diagnostic test for the diferentiation of mammographically visible changes, mammography is far from being specific – there are numerous false positive cancer diagnoses.[12] Much more information on the nature of changes in the dense breast is obtained by ultrasound, therefore ultrasonic examination is the method of choice for the evaluation of the radiographically dense breast.

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