relation of subsequent invasive grade to DCIS grade is known and therefore the survival of these according to grade can be calculated. This calculation shows that of every 100 cases diagnosed without screening 4 deaths would have been prevented by screening diagnosis of DCIS. Although screening has diagnosed 11% more in the best 21 prognostic groups and 11% less in the worst 2, this only increases survival by 4%.

NPI	Prior to screening 1980–86		Invited for screening 1993–96	
Group	% in grp	Observed 10yr n surviving (no adjuvant therapy)	% in grp	Expected 10yr n surviving (adjuvant therapy)
E	12	10	19	16
G	19	12	23	14
MI	30	18	29	17
MII	24	10	16	7
P	15	2	12	2
Overall	100	52%	100	56%

Conclusion: Population Breast Screening in women aged 50–65 is making an absolute reduction in deaths from breast cancer of 8% (Relative risk reduction 16%). Half of this is due to earlier detection of invasive tumours and half from the diagnosis of DCIS.

113 POSTER HIGHLIGHT

Increased breast cancer incidence but decreased rates of advanced disease due to mammography screening

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Background: In the period 1989–1997, a nation-wide mammography breast cancer screening programme for women aged 50–69 was implemented in the Netherlands. In this descriptive study, we analyze changes in breast cancer incidence and in tumour stage distribution in the 7 out of 9 regions in which no screening took place before 1990.

Methods: Annually, tabulated regional cancer registry data on breast cancer incidence and tumour stages were collected after linkage of records of screened women to the cancer registry. Based on population data from Statistics Netherlands, annual incidence rates were calculated for 3 age categories (40–49, 50–69 and 70–79), 3 cancer categories (screen-detected, interval cancer and breast cancers in not-screened women), and 6 tumour stages. The incidence rates are based on annual female population data from Statistics Netherlands and age-adjusted using the European standard population.

Results: In general, breast cancer incidence rates including DCIS rose strongly (14 to 42%) up to 1994, followed by a slight decrease or constant rates up to 1997, reflecting the change from predominantly prevalent screen examinations in the early nineties to predominantly incident screens after 1994. The proportion of screen-detected and interval cancers gradually increased: in 1997, 2 out of 8 breast cancers were screen-detected and one was an interval cancer; in women aged 50–69 these were 2 and 2, respectively. Incidence rates of small invasive cancers free from lymph node metastases (T1N0) showed the strongest increase, in particular in women aged 50–69. In this same age category, incidence rates of large and lymph node positive cancers (T2+N+) decreased by 13%.

Conclusion: Population-based breast cancer screening has a large impact on breast cancer incidence. In our study, the strong increase in incidence of in-situ and small invasive cancers went together with important decreasing incidence rates of advanced tumour stages.

114 POSTER HIGHLIGHT

Stereotactic vacuum-assisted breast biopsy (VB) in 2874 patients: a multicenter study

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Background: Vacuum assisted breast biopsy (VB) can replace surgical biopsy for diagnosis. We evaluated accuracy and clinical utility of VB in a multi-center setting according to a strict quality assurance protocol.

Material and methods: 2874 successful Mammotome(r)174;-VB were performed at five sites. Lesions were categorized as BI-RADS IV (85%), BI-RADS V (6%), and BI-RADS III (9%) lesions. 58% of lesions were <10 mm, 70% concerned microcalcifications. For malignancies and borderline lesions, surgery was recommended. Benign lesions were verified by follow-up.

Results: 7% invasive carcinomas, 15% ductal carcinoma in-situ (DCIS), 5% atypical ductal hyperplasias (ADH), and 0.6% lobular carcinoma in-situ were identified. Operative results necessitated an upgrade of 24% ADH to DCIS or DCIS and invasive carcinoma. 12% of DCIS patients proved to have invasive carcinoma. 73% of lesions were benign. Only a single false-negative result was encountered (negative predictive value, 99.95%). Minor side effects occurred in 1.4% of cases, 0.1% required a subsequent intervention. Scarring relevant for mammography was rare at 0.3%.

Conclusions: Quality-assured VB was highly reliable. VB effectively identified patients with benign lesions and assisted therapeutic decisions. Only a single case of malignancy was missed. A close interdisciplinary approach assures optimal results.

115 POSTER HIGHLIGHT

Use of intra-operative ultrasound to guide excision of impalpable breast lesions

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Purpose: The methods commonly utilized to guide surgical excision of impalpable breast lesions include preoperative placement of hookwires, carbon injections, and more recently radio-isotope injections. However, all of these techniques have disadvantages, not the least of which is the subjection of the patient to an additional stressful and often traumatic procedure preoperatively. The use of intraoperative ultrasound to guide the excision of sonographically visible impalpable lesions is a new technique which avoids the need for a preoperative localization procedure. This report describes the author's personal series of ultrasound guided breast excisions collating data collected prospectively and reviews the efficacy of this technique.

Methodology: Data in relation to 115 ultrasound guided breast excisions performed in 103 patients was reviewed. The technique of utilizing a high frequency real-time ultrasound probe intraoperatively to localize and guide excision breast abnormalities is described.

Results: There were no failed excisions as confirmed by specimen sonography, pathology findings and/or follow-up ultrasound. Breast malignancies comprised 42% of all excised lesions, and of these adequate margins of excision were achieved at the first operation in 93% of cases. Direct ultrasound localization of the lesion at the time of surgery allowed a more optimal placement of the incision and delays in theatre time were avoided as specimens did not have to be sent to the Radiology Department for confirmation of excision.

Conclusions: Intraoperative ultrasound guided excision is a safe and efficient technique in the management of impalpable sonographically breast visible lesions, and early reports in the world literature support the findings of this series which show it to have significant advantages over other current methods, particularly with respect to a reduction in patient anxiety and improved surgical resection margins.

116 POSTER

The variation of process indicators between ten Finnish screening centres in 1991–2000

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The aim of this study is to assess quality of the Finnish mammography programme by estimating the individual-level process indicators of ten breast cancer screening centres and to compare these centre-specific figures to each other and to the European standards. The centres invited over 1,000,000 mainly 50–64 years old women in 1991–2000. The mean compliance was 88%, and on average 2.8% of screened women were recalled for further assessment in each round. The average breast cancer detection rate was 0.38%. The centre-specific attendance rate varied from 84% to 92%, the recall rate from 1.2% to 4.3%, the surgical biopsy rate from 0.51% to 0.73%, the breast cancer detection rate from 0.32% to 0.47%, the positive predictive value (PPV) of mammography from 10% to 26%, and the PPV of biopsy from 47% to 77%. The differences in positive predictive values of mammography between the centres were statistically significant and relevant in practice. Irrespective of variability in the PPV, the relation between the detection rate and the expected breast cancer incidence rate was, however, on the recommended level in each of the centres. The average and centre-specific figures fulfilled mainly the quality assurance criteria of the European commission (2001). The wide variation by screening

centres in quality parameters, as seen also in comparisons between other European mammography programmes, indicates differences in diagnostic criteria, costs, and adverse effects between the Finnish centres. Parallel follow-up information on the interval cancers and particularly on the mortality outcome are needed for final evaluation of the quality of the programme.

117 POSTER

Screening women under age 50 with a family history of breast cancer: recommendations for general practice

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Objective: To assess for which women under age 50, presenting with a family history of breast cancer in general practice, mammographic screening is indicated.

Methods: We performed a simulation study in which the following features were taken into account: incidence of breast cancer (BC) under age 50, the association between BC onset and a family history of BC, screening detection rates, sensitivity and specificity of mammography depending on age, induction of BC due to radiation, tumour growth rates depending on age, and prognostic characteristics after BC diagnosis. For this, several groups of women, 30 to 50 years of age, with varying lifetime risks for BC were simulated. The life-time risks for BC were based on the women's family history of BC among first and second degree relatives, using a genetic estimation model. BC screening with mammography was simulated in these groups of women. Both screening interval (6, 12, 18 and 24 months) and screening cohorts (30, 35, 40, and 45 to 50) were varied. Gains and losses in life years due to screening and costs of screening were compared with current screening strategies within the nation-wide BC screening programme of the Netherlands. Sensitivity analyses were performed to test assumptions regarding factors related to age, prognosis, induction of BC, and screening techniques.

Results: In about 77% of the women with a family history of BC, screening before age 50 the gains do not outweigh the costs. Thus having a single first degree relative with BC – even at young age – without any affected second degree relatives does not indicate BC screening before age 50. In about 7% (i.e. two or more first degree relatives with BC before age 40 combined with affected second degree relatives) screening before age 50 is cost-effective without any doubt, while cost-effectiveness of BC screening with mammography in the remaining group of women (i.e. 15%) depends on the assumptions made in the analyses, especially related to low sensitivity of mammography. Furthermore, screening women under age 50 at 12 months intervals is the best option, as 6 months intervals result in higher radiation doses, and intervals of 18 or 24 months result in many interval cancers.

Conclusion: Breast cancer screening with mammography before age 50 is cost-effective in only a small group of women with a strong family history of breast cancer. Further research should reveal whether other screening techniques may be more gainful than mammography in this respect.

118 POSTER

Breast carcinoma presenting as a benign appearing mass: a radiological–pathological pictorial review

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Background: Radiologically well defined breast masses (BI-RADS category R3) usually favour a benign diagnosis at biopsy. We present a radiological–pathological pictorial review of such lesions comparing those with malignant histology versus those which were biopsy proven benign. We analyse the radiological features which may better predict malignancy.

Materials and methods: All well defined masses from a total of 50,073 sceening mammograms reviewed in the Eccles unit of the Irish National Breast Screening Programme over a 35 month period were identified. All well defined masses were categorised R3 as per BI-RADS classification. The clinical, radiological and histological features of the malignant masses were reviewed.

Results: A total of 424 cases of malignancy were diagnosed, 24 of which were benign appearing masses. These 24 cases represent 5.7% of the total of 424 cancers diagnosed and 11.5% of the total of 209 benign appearing masses biopsied. The malignant well defined masses ranged in size from 6 mm up to 50 mm with a mean size of 14.3 mm and were situated in the upper outer quadrant in 50% of cases (n=12).

Breast clinical examination by an experienced breast surgeon revealed suspicious clinical findings in the malignant group in one patient only. The most commonly encountered histology was invasive ductal carcinoma (n=11), nine of which had either grade 2 or grade 3 histology. The next most common histology was ductal carcinoma in-situ (n=5).Invasive lobular carcinoma, tubular carcinoma, mucinous carcinoma and a phyllodes tumour represented the remainder.

Conclusion: Well defined malignant breast masses can mimic benign lesions. Although old imaging demonstrating interval development of a new mass may raise the level of suspicion, biopsy of these lesions is still mandatory in order not to overlook an underlying malignancy.

119 POSTER

An estimate of the overdiagnosis in service screening: an evaluation in the Florence City Program

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The increasing incidence of breast cancer in service screening has been considered indicator of overdiagnosis, defined as the detection by screening of lesions which would not have arisen in the hosts' lifetimes.

Methods: We studied incidence in Florence in 1990–99, following the introduction of screening in 1990. Incidence of breast cancer in this period was compared with the 1985–89 prior to screening. We calculated the probability that a case which has been screen-detected would have been identified clinically after a specific time point, the end of the study period for example. Of interest is the probability for the cases to be diagnosed over the duration of the study period. The expected number of cases which would have arisen clinically within the study period in the absence of screening may be estimated by applying the age specific incidence rates observed before the start of the screening programme to the age distribution of the target population during the study period. If the observed number of cases after correction for lead time is close to the expected number arising clinically, this indicates no overdiagnosis. If the observed number is greater than the expected, this suggests an element of overdiagnosis or insufficient follow up time. If the observed number of cases is substantially smaller than expected, then our estimated mean sojourn time may be incorrect. The difference between the observed number of cases adjusted for lead time and the expected number of cases in the absence of screening is the number of cases overdiagnosed. We divide this number by the expected number of cases to give the proportional excess due to overdiagnosis.

Main results: There were 2780 breast cancers diagnosed during the period of study (2626 invasive). There was no significant evidence of overdiagnosis of invasive cancers. When invasive and in situ cancers were considered together, an estimate of 5% of overdiagnosed cases was obtained.

Conclusions: There is a small amount of overdiagnosis of ductal carcinoma in situ in mammographic screening. This should not deter women from being screened. Training and practice in mammographic screening should emphasise detection of small invasive lesions. Research in natural history and treatment should aim at minimising overtreatment of those in situ lesions which are less likely to progress to invasive disease.

120 POSTER

Phosphor screen digital mammography: experience with 8592 screening mammographies

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Purpose: To audit the digital mammographies of 8592 cases who visited our breast center for screening between November 1999 and December 2002.

Materials and Methods: Mammographies were taken digitally using a conventional mammography (Senographe DMR, GE, Milwaukee, USA) and a Computed tomography (CR) unit. For this purpose, special mammography casettes (IP Casette 3A, Fuji, Tokio, Japan) and FCR AC-3 system (Fuji, Tokio, Japan) was used. For auditing, Positive predictive value-1 (PPV1), PPV2, PPV3 were calculated as recommended by American College of Radiology (ACR). Besides, cancer detection rate, minimal cancer rate, incidental and prevalent cancer detection rates, and recall rate was calculated. These were then compared with the desirable audit goals suggested by ACR.

Results: Parameters calculated for 8592 Phosphor-Screen digital screening mammograms were as follows: PPV1: 5%, PPV2: 30%, PPV3: 25%, cancer detection rate: 0.5%, minimal cancer rate: 40%, incidental cancer detection rate: 0.093%, prevalent cancer detection rate: 0.4%, and recall rate: 10.67%.

Conclusion: According to our knowledge, this is the first study concerning analysis of medical audit data of Phosphor-Screen digital screening mammograms. Our results are in the desired ranges recommended by ACR. Mammographic auditing is suggested to be done yearly in order to