Results: SNOLL was utilised on 79 patients (median age, 63; range 57−68) between 2007 and 2009. 76 procedures were for invasive breast cancers. The median primary tumour size was 12 mm (range, 10 -17 mm). Over two thirds of the lesions were in the upper half of the breast. Of these 54.4% were located in the inner quadrant while 15.5% in the outer quadrant. The mean number of SLNBs retrieved was 1.86. In addition to SLNBs, 12 patients (15.2%) had non sentinel lymph node biopsies performed. Of note, none were positive. The number of SLN positive patients was 7 (8.9%) with a mean retrieval of 2.

Conclusion: SNOLL successfully localised all lesions. The combined use of radio-isotopes for lesion and sentinel lymph node removal in early breast cancer is feasible and reliable. Such a technique could rapidly become a standard practice within the NHS.

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Intra-operative Detection of Sentinel Lymph Node Metastasis in Breast Cancer by One Step Nucleic Acid Amplification (OSNA)

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Background: Despite recommendations from international and national breast cancer guidelines there is no standardised histopathological procedure for intra-operative and post-operative analysis of the sentinel lymph node (SLN). In this OSNA study/routine use overview we used the molecular diagnostic OSNA assay for intra-operative SLN analysis in breast cancer patients. OSNA is based on CK19 mRNA amplification and has shown to be as accurate as intensive post-operative histology.

Methods: Eighty SLNs from 47 breast cancer patients were included in the study. A 1 mm middle slice was reserved for intra-operative frozen section staining. The rest of the SLN was homogenised and analysed with the automated OSNA system.

For routine use in 28 patients (45 SLNs) the whole node was dedicated for OSNA without conserving any tissue for histology.

Results were displayed as (++) equivalent to a macrometastasis, (+) for a micrometastasis, (−) for negative, and led to direct axillary dissection if positive.

Results: In the study phase, 20 patients gave a positive OSNA result (22 SLNs with ++, 12 SLNs with +), resulting in a positivity rate of 42.6%. In 27 patients OSNA was negative, with one patient having a very small micrometastasis in the 1 mm middle slice. 6 patients were OSNA positive/histology negative, thereby avoiding a second surgical intervention as axillary dissection was performed intra-operatively. In 14 patients 1 SLN was analysed, in 19 patients 2 SLNs, in 11 patients 3 SLNs, in 3 patients 4 SLNs with the mean analysis time of 29.5, 37, 40, and 51 minutes, respectively.

In OSNA whole node use, 10 patients had a positive OSNA result (8 SLNs with ++, 3 SLNs with +) with a positivity rate 35.7%. 18 patients showed a negative OSNA result.

Conclusions: OSNA is a standardised technique for intra-operative SLN investigation which could replace both intra-operative and post-operative histology as most or all of the tissue can be analysed during the primary surgery.

Wednesday, 21 March 2012 12:00–13:15

POSTER SESSION

Epidemiology, Prevention, Screening

119 Poster discussion

Efficacy of Bilateral Risk-reducing Mastectomy on Primary Breast Cancer Risk in Healthy BRCA1 and BRCA2 Mutation Carriers

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Objective: To assess the efficacy of bilateral risk-reducing mastectomy (BRRM) on primary breast cancer (PBC) risk in healthy BRCA1 and BRCA2 mutation carriers.

Methods: In total 552 proven BRCA1/2 mutation carriers under surveillance at the Erasmus MC Family Cancer Clinic (395 BRCA1 and 157 BRCA2) were followed up until June 30, 2011. Participants had no history of breast or ovarian cancer, and had both breasts as well as both ovaries in situ at DNA diagnosis. Eventually 152 BRCA1 and 50 BRCA2 mutation carriers underwent BRRM. Women contributed person-years of observation (PYO) to the surveillance group from the date of DNA diagnosis to the date of PBC, BRRM, ovarian cancer, death, or last FU. Contribution of PYO to the BRRM group started at the date of BRRM until similar endpoints as described for the surveillance group.

Results: During 3051 PYO, 54 PBC cases were observed in the surveillance group (median age at diagnosis 43 years), while no PBC cases occurred during 1283 PYO in the BRRM group (median age at BRRM 35 years), corresponding with incidence rates per 1000 PYO of 18 and 0, respectively. In the BRRM group, one woman presented with distant metastases of BC almost 4 yrs after BRRM (no PBC found at BRRM), and died afterwards. After a mean FU of 11.5 years, 4 women died of BC in the surveillance group. With an overall mean FU of 10.3 years, the mortality rate per 1000 PYO was 1.0 in the surveillance group versus 0.6 in the BRRM group. To estimate the effect of BRRM (versus surveillance) on mortality, a multivariate Cox model with BRRM as a time-dependent covariate was performed and revealed a hazard ratio of 0.58 (95% CI, 0.05–6.90).

Conclusions: BRRM in healthy BRCA1/2 mutation carriers can reduce the probability of PBC occurrence to zero. Longer FU is warranted to confirm survival benefits.

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BRCA1 Carriers and Oral Contraceptives − Risk-benefit Calculation on Breast and Ovarian Cancer

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Background: The weak association between oral contraceptive (OC) use and risk of breast cancer is not regarded as a contraindication for OC use in the general population. This is partly because it is still not certain whether the association is causal. Even if it were, the absolute excess risk of breast cancer would be small, and might be outweighed by its contraceptive effects and positive health outcomes as the substantial protection against ovarian cancer. The implications of the OC-cancer risk associations may differ between the general population and BRCA1 carriers because of the higher risk of the disease during reproductive years in carriers.

Methods: To illustrate potential implications, we calculated the excess number of breast and ovarian cancers that would arise in the 20 years following a 5 year period of use of OC at six 5-year age ranges under the assumption that the associations of breast and ovarian cancer associated with OC use are the same among BRCA1 carriers as estimated for the general population. Incidence rates of breast/ovarian cancer among BRCA1 carriers are based on Antoniou et al. AJHG 2003. When estimating the absolute numbers of breast or ovarian cancer cases we took into account the decreasing population at risk due to the mortality to other causes. The BRCA1-related excess breast cancer mortality was incorporated in the ovarian cancer model, as was the benefit on ovarian cancer mortality in the breast cancer model. We assumed that the risks of the two cancers are independent and that the survival of breast and ovarian cancer is similar for carriers and women in the general population.

Results: Based on these calculations, the estimated extra cases of cancer per 10,000 women during 20 years of follow-up, for use of OC between the ages 20−24, 25−29, 30−34, 35−39, 40−44, 45−49, were 0, 2, 8, 17, 28, and 38 respectively, in the general population and -109, -172, -210, -286, -312, and -288 respectively, in BRCA1 carriers. We conducted several sensitivity analyses.

Conclusions: Assuming that the associations of OC and risk of breast and ovarian cancer are the same for BRCA1 carriers as for women in the general population, the protective effect on ovarian cancer might outweigh the risk increasing effect on breast cancer.

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Risk Factors Associated with Lobular Carcinoma in Situ: Results of the GLACIER Study

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Background: Lobular carcinoma in situ (LCIS) is a form of non-invasive breast cancer that is often clinically undetectable and confers an increased risk of subsequent invasive breast cancer in either breast. Approximately 50−70% of subsequent cancers are invasive lobular carcinomas (ILC), suggesting that LCIS is a precursor lesion in a similar manner to DCIS. However, it is also argued that LCIS may be a marker for the subsequent development of invasive breast carcinoma, as LCIS increases the risk of invasive cancer in both breasts and of all morphological subtypes. Currently, in the UK, LCIS is considered a risk factor for subsequent

invasive disease rather than a true precursor lesion and no treatment is offered, other than standard breast screening, following its diagnosis.

Material and Methods: We have collected blood and tumour samples from patients 60 years of age or younger with LCIS (with and without invasive disease) as part of the GLACIER study, from hospitals throughout the UK, supported by Cancer Research UK. Clinico-pathological data and data on known risk factors (menopausal status, oral contraceptive and HRT use, parity, breast feeding and family history) have been collected by questionnaire. Here we present the clinico-pathological data on 1266 cases of LCIS (490 without invasive disease, 776 associated with invasive disease).

Results: Of the 490 cases of LCIS without invasion 279 (57%) were found to also have synchronous DCIS. Women who presented with pure LCIS were more likely to be premenopausal than those who presented with both LCIS and DCIS ($p = 0.04$ χ^2 test), but mean age was similar (50.5 and 51 years respectively, $p = 0.5$, t-test).

Of the 776 cases of LCIS with invasion, 575 (74%) were associated with ILC and 201 (26%) with invasive ductal carcinoma, including 63 mixed ductal-lobular and 13 tubulo-lobular. There was no difference in the above risk factors between these two groups.

Comparing the LCIS with no invasion to LCIS with invasion, the former were more likely to be premenopausal ($p = 0.03$) and nulliparous ($p = 0.05$) see table. There were 35 cases with bilateral disease and these cases were more likely to have a family history of breast cancer ($p = 0.002$).

Conclusions: In conclusion LCIS commonly presents with DCIS and this may explain the finding that LCIS can predispose to either ILC or IDC. It is unknown whether these two lesions come from a common precursor. Cases of LCIS without invasion are more likely to be premenopausal (but not younger) and nulliparous. It is possible that a change in hormonal levels associated with the menopause or pregnancy may influence the progression of LCIS to ILC.

Risk Factor	LCIS No invasion (n = 490)	LCIS With invasion (n = 776)	P value χ^2 test
Mean age at diagnosis	50.5yrs	51yrs	0.38 (t-test)
Premenopausal	47% (229)	40% (313)	0.03
Positive Family history	49% (239)	45% (346)	0.15
Used oral contraceptive	76% (374)	79% (610)	0.37
Nulliparous	21% (105)	17% (131)	0.046
Breast fed	71% (275/385)	75% (485/645)	0.19
Used HRT	28% (137)	28% (217)	1

122 Poster

Effects of Education Based on the Health Belief Model (HBM) on Screening Behaviors in High Risk Women for Breast Cancer, Tehran, Iran

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Background: Breast cancer is the most common malignancy in women. Early diagnosis allows efficient treatment and increases survival, but the efficacy of breast self examination (BSE) is not sufficiently well established. With the Health Belief Model, people's health perceptions and attitudes influence their practices, for example with screening.

The purpose of this randomized controlled clinical trial was to determine the effect of education based on this model on breast cancer screening in high risk Iranian women.

Material and Methods: Upon receipt of ethical approval from an institutional Ethics Committee of Reproductive Health Research Center of Shahid Beheshti University of Medical Sciences, the main researchers commenced to recruit the eligible subjects and data collection. Participants were 100 women with a family history of breast cancer (mother, sister, and daughter). After explanation of the study objectives to participants, they were recruited on obtaining oral consent and each filled out the study questionnaire based on the Health Belief Model.

Allocation was into two groups by computerized randomization, control and intervention, (50 participants in each arm of study) receiving education on breast cancer screening. Women in experiment group were educated for breast screening methods in sessions concluded 10−15 participants located in the radiation ward of a central teaching hospital in the north of Tehran. Participants in control group did not instruct such an education based on HBM. All of the participants were assured that their responses to the questionnaires would be kept confidential, that their participation was entirely voluntary and they could withdraw at any time.

The registration code is: IRCT201101015525N1.

Perceived susceptibility to and seriousness of breast cancer, perceived usefulness of and barriers to Breast Self Examination (BSE), clinical breast examination, and mammography, and self-efficacy in the ability to perform these, were assessed, with comparison of scores for BSE practice before and after education and doing mammography and clinical examination by a physician in intervention and control group.

Results: The mean age was 37.8±11.7 (range 19−60). The mean rank of the main variables scores as 'knowledge, perceived severity, perceived barriers, perceived susceptibility, BSE and clinical examination practice' in the intervention group significantly differed before and after the education, but variables 'perceived threat 'and 'perceived usefulness of breast self examination', did not differ statistically. However, we did not find any significant differences for the main variables amongst participants of the control group.

Conclusion: According to the improvement of the variable scores of participants in the intervention group, health education based on well known psychological theories for breast cancer screening should be extended to the entire population in developing countries. In addition, we should pay more attention to barriers to women undergoing mammography, such as costs, shame and accessibility, and increase the target population awareness and positive attitudes towards benefits of early breast cancer screening.

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Inequalities in Health: Not the Case for Breast Cancer in South-East Wales?

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Background: There has always been an implied association between poor health and social deprivation. Aneurin Bevan, the founder of the National Health Service (NHS) in the United Kingdom understood this inequality and stated that one of the fundamental principles of the new NHS was to divorce the care of health from questions of personal means or other factors irrelevant to it. Our study aimed to see whether a gap in service provision and patient outcome for breast cancer truly existed between different strata of society within a specific geographical region in Wales.

Materials and Methods: A cohort of 745 patients for this retrospective study was derived from a combination of hospital admission data, operative theatre lists and cancer registry data from a single Health Board in Wales over a 37-month period from January 2008 to February 2011. Patients from both the Breast Test Wales (BTW) screening programme and symptomatic clinics were eligible. The ACORN classification and Welsh Deprivation Index were used as markers of the level of social deprivation for each patient. This census-derived data divides patients, from their postcode into one of 5 possible categories of social deprivation. Our dataset only had 4 subdivisions. The Nottingham Prognostic Index (NPI) was used as a marker of patient outcome. Statistical analysis of the data was performed using the Mann-Whitney and Spearman Rank tests.

Results: The incidence of breast cancer was highest (30%) in the least deprived category of patients (vs. 22%, 26% and 20% for the remaining categories). The mean NPI score was 3.1 for the least socially deprived patients and 3.2 for all other groups. 38% of the least socially deprived patients had an excellent prognostic outcome score (vs. 32%, 34% and 32% for the remaining categories). 11% of the least socially deprived patients had a poor prognostic outcome score (vs. 9%, 11% and 9%) for the remaining categories). When all the individual results were compared using the Welsh Deprivation Index, no correlation was demonstrated (coefficient 0.042, $p = 0.255$).

Conclusions: Our results show no statistically significant difference in either the incidence of breast cancer or outcome from treatment of the disease between different strata of society. This information can be extrapolated to infer that no patients are being left behind by the NHS in the treatment of breast cancer and that the NHS, in Wales, remains true to its founding principles.