Thursday, February 26, 1998 9.00–18.00

Public Health / Genetics

P1 Epidemiology and adjuvant therapy in early breast cancer: A prospective randomised study of 300 Indian patients

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A prospective randomised trial was started in IRCH, AIIMS, New Delhi, India in October, 1993. The trial included only female patients of early breast cancer (T1–3, N0–1, M0) Selection criteria included an exhaustive metastatic work-up. All patients were supplied a 3 monthly supply of tamoxifen free of cost. All patients had surgery (MRM or QUART). Till date 365 patients have been randomised. Premenopausal patients were randomised to 4 groups:-(1) Tamoxifen alone, (2) Tamoxifen+Chemotherapy, (3) Tamoxifen+Ovarian ablation (4) Tamoxifen+Chemotherapy+Ovarian ablation. The postmenopausal patients were randomised to 2 groups only:- (1) Tamoxifen alone, (2) Tamoxifen+Chemotherapy. Radiotherapy was given as and when indicated. (ie, breast conservation, T3 disease, >4 nodes positive, >50% nodes positive, an inadequate axillary clearance or margin positivity. Chemotherapy was administered to the respective randomised patients (CMFx6 or CAFx6) Following treatment patients were called every 3 months. Average no. of nodes resected was 10.4 in our centre.

Results: Of all 365 patients, the age range was 23–75 yrs. (median 45 yrs.) The commonest age incidence was 40–50 yrs. Distribution of pre- and post-menopausal was identical. The upper outer quadrant was the commonest site of presentation. Nipple discharge was seen in 4.2%, parily did not appear to have an influence on risk of disease. 14.7% had a positive family history. 75% patients were of urban background. Survival analysis was done comparing treatment groups, age, menopausal status, node positivity, no. of nodes positive. Maximum follow-up was 48 months and minimum was taken as 6 months for meaningful analysis. Thus 275 patients were analysed. The period of follow-up, and the sample size are inadequate, however, statistically significant results were seen considering age menopausal status, node positivity and no. of nodes +ve. Node positivity, increasing no. of nodes +ve was associated with a poor prognosis ($p = 0.0011$).

P2 Cost of adjuvant chemotherapy (CT) with CMF and tamoxifen in breast cancer (BC)

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Annually, 150–160 BC patients receive adjuvant CT with CMF (cyclophosphamide, 600 mg/m2; methotrexate, 30 mg/m2; 5-FU, 600 mg/m2 on days 1 and 8) and 70 pts receive long-term adjuvant tamoxifen, 20 mg/day in the Kyrgyz Institute of Oncology and Radiology. The cost of 6 CMF couses for one patient is estimated at $274.01 and that of tamoxifen, 20 mg/cay (2 years)- $185.41 (according to the 1997 prices) (Table).

Drugs CMF	Average (mg) of a course (S = 1.7 m^2)	Cost of one bottle (US$)	Quantity (b) or (tab)	Total cost for 1 patient per annum ($)
Cyclophosphamide	12,240	81 (200 mg)	61 b	110.77
Methotrexate	612	0.52 (5 mg)	122.4 b	64.26
5-Fluorouracil	12,240	2.02 (250 mg)	49 b	98.98
Tamoxifen (2 yrs)	14,600	7.62 (10 mg)	60 tab	185.41
(1 year)	7,300	7.62 (10 mg)	60 tab	92.70

To provide 160 pts with 6 courses of CMF per annum, it is required $43,841.60, in addition to $12,979.70 needed for 70 pts receiving tamoxifen, in total $56,820.30. The cost of the FAC regimen, another widely-used in the CIS drug combination, for one patient is $708.21 per year. The average monthly wages in Kyrgyzstan do not exceed US $45–$50, and the budget deficit does not allow to provide all the pts with the CT drugs in a required quantity. Thus, the BC pts cannot afford receiving adjuvant CT at a full value due to economic reasons.

P3 The effect of medical information on womens opinion about breast cancer

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In October and November 1997 in Oberösterreich (Austria) information campains about breast cancer are arranged by the Oberösterreichische Krebshilfe and the Country of Oberösterreich. To control the effect of the medical information a questionnaire about the change of thinking about early detection of breast cancer including self examination of the breast was designed for the participants.

The first experiences with women answering the questionnaires *before* and *immediately after* the information showed a very high return rate (90%) and documented the benefit of this program.

Consequently an input of at least 300 answered questionnaires is expected and the results will be presented in detail.

P4 Ought the impact of different types of consumer involvement in various research activities (commissioning, trial protocol planning, Cochrane research reviews, etc.) be evaluated?

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"Consumers", like "trialists" or "health professionals" are not a homogenous group: they also vary enormously in terms of their level of knowledge, the skills and expertises they bring, and their attitudes and beliefs.

Dr. Iain Chalmers, Director of the UK Cochrane Centre, at a Consumer Workshop at the 5th Cochrane Colloquium in Amsterdam in October 1997, asked: "Do we need randomised controlled trials to look at the impact of consumer involvement in [Cochrane] reviews? There are different methods of achieving improvements: we need to explore this. E.g. some [consumers] might have expert knowledge, other do not. We need to be clear what one is testing and what the outcome is."

The *Cochrane Collaboration* has always emphasised the importance of consumer input and feedback and affirms in its brochure that this is "essential in order to fulfil its goals."

The *Consumers' Advisory Group for Clinical Trials (CAG-CT)* is a unique working group of profession and patient whose aim is to "initiate, facilitate and produce high quality research that meets the needs of patients, the public and health professionals by advancing education in medical research methodology." Their main activity is to act as a "facilitator for progress" by being used as a resource by those involved in devising randomised controlled trials. Their ethos is one of shared responsibility and collaboration to produce trial protocols which blend scientific expertise with qualitative issues which are of importance to patients. Their concern is to develop methodologies to enable and facilitate this process to achieve "jointly-owned" rather than "imposed" trials, which they have reason to believe will therefore accrue more rapidly.

As Iain Chalmers has said, we need to explore different ways of achieving involvement and to subject such methods to rigorous evaluation to assess their impact. This may accord with *The Lancet* editorial recommendation that "...just as patients' consent must be informed, so must their advocacy." (Vol. 349. p.1635. 1997). By what criteria are such studies to be peer-reviewed?

Why indeed should patients/consumers escape rigorous evaluation of the benefit/harm of their involvement? But, also, why should they be separated out for special scrutiny, any more than any other participant in a truly collaborative, multi-disciplinary research team, where no category should either demand or expect special quarter in a truly iterative process?

P5 Time trends in systemic adjuvant treatment of early-stage node-negative breast cancer in Québec

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To assess compliance with the 1992 St-Gallen Conference recommendations for systemic adjuvant therapy of node-negative breast cancer, we conducted a population-based study among residents of five regions of Québec, Canada. A stratified random sample was selected among all women with node-negative breast cancer newly diagnosed in 1988/89, 1991/92 and 1993/94. Information on the patient, her tumor, the source of care and all treatments received was abstracted from medical charts. Patients were classified as being at minimal, low or high risk of recurrence based on criteria proposed at the St-Gallen conference, and systemic adjuvant treatments received were dichotomized as consistent or not with the conference recommendations. Overall, 1,732 cases of breast carcinoma (1,578 invasive and 154 DCIS) were included in the analysis. The proportion of patients given hormonal or cytotoxic systemic treatment increased from 51.7% to 73.1% from 1988 to 1993. Among women with invasive carcinomas, 23.5% were classified at minimal, 12.9% at moderate and 50.0% at high risk of recurrence. Throughout the study period, virtually all women at minimal risk, including 100% of DCIS, were treated according to the consensus statement. However, the proportion of women so treated increased from 58.8% to 71.4% in the moderate risk group, and from 43.2% to 67.0% in the high risk category. This increase occurred before the publication of the St-Gallen conference. Thereafter, the proportion of moderate and high risk patients treated according to the consensus statement remained stable. Compliance increased with age (69.7%, 78.0% and 78.7% among women under 50 years, 50 to 69, and

70 years or more). It was lower in larger tumors (88.8%, 68.0% and 74.1% for tumors 1 cm or less, 1 to 2 cm and over 2 cm) and among estrogen receptor (ER) negative ones (61.5% versus 80.8% for ER-positive tumors). It also decreased with years in practice of the attending physician (83.5% and 74.6% for those having less versus 10 or more years of experience). Participation of a hospital in multicenter clinical trials had little or no impact on the proportion of patients treated according to the consensus statement. Systemic adjuvant therapy of node-negative breast cancer remains underutilized, especially among high-risk women. Better understanding of the clinical decision process and alternative strategies for the dissemination of practice guidelines are needed.

P6 The breast-cancer susceptibility genes association to epidermal growth factor receptor (EGFR) & to oncogenes

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The breast-Cancer Susceptibility genes BRCA1 & BRCA2 are biochemicals with biological functions that are relevant to tumorigenesis with many functional domains. The present studies examined the relation between the susceptibility genes and the Oncogenes. Breast cancer cells (BCC) were obtained from fresh biopsies of tumors from patients with benign (10), primary (25) and metastatic (18) and from breast cancer established cell lines MCF-&, T4TD & MDR-MB-231. Normal Breast Cells (NBC) were obtained from normal breast tissue biopsies. The cells were cultured in standard & estradiol supplemented media. The cell lysates were used for BRCA1, BRCA2, c-Ha-Ras, HER/Neu & EGFR. Monoclonal anti-BRCA1, Ab-2 antibody clone MS13;c-Ha-Ras (Ab-1) clone F235-1.7.1 with P21-RasGly-12 as Western Blott standard; c-erbB-2/c-Neu monoclonal 40 mer Prob, Human; EGF-Receptor 40 mer Ab-2 monoclonal clone 455; were used in Western Blott analysis (Hakim, J. Surg. Oncology 40: 21–31, 1989; ibid Diagnostic & Clinical Testing 2: 30–39, 1989). When cultured in standard media, cell lysates of normal breast tissue biopsies, & benign tumors were negative for BRCA1, BRCA2, c-H-Ras & for c-ErbB-2/Neu, but when cultured in estradiol supplemented media, cells of benign tumors showed the presence of c-H-Ras followed by BRCA1/BRCA2 & c-ErbB-2/Neu after 4, 8 & 16 weeks of in vitro culture in presence of estradiol, respectively. Lysates of NBC remained negative to the appearance of the oncogenes during this period. RasP21 and c-ErbB-2/Neu & BRCA1/BRCA2 were undetectable in cells from normal and benign tissues, but significantly elevated (overexpressed) in 21/25 & 15/18 primary & metastatic biopsies. Cells from metastatic breast tumors were ER negative & had c-ErbB-2/Neu amplified in 15/18, while cells from primary tumors were ER^+ and had c-ErbB-2/Neu amplified in 19/25 tumors. The presence of estradiol in the culture medium increased c-ErbB-2/Neu and decreased responsiveness to estrogen in the ER^- established BC cell lines. The results suggest that appearance of BRCA1/BRCA2 genes point to an already elevated levels of mutated RasP21 with activated Protein Tyrosine Kinases & require aggressive treatment with inhibitors of PTK as adjuvant.

P7 BRCA1 and BRCA2 germline mutations in early-onset breast carcinoma patients

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Two different cancer susceptibility genes, *BRCA1* and *BRCA2*, have been found to be responsible for approximately 70% of site-specific breast cancer families. However, only a small proportion of all breast cancers (about 6–10%) appears to be linked to *BRCA1* and *BRCA2*. Recent reports have demonstrated the presence of germline mutations in the latter genes in early-onset breast cancer cases regardless of a family history of breast cancer (*BRCA1*: 12–13%, *BRCA2*: 2.7%). In order to estimate the frequency of germline mutations in breast cancer predisposing genes associated with early-onset breast carcinoma in Italian women, we analyzed 57 patients with breast cancer diagnosed before 36 years old, unselected for family history of cancer. All cases were examined in *BRCA1* exon 11 and *BRCA2* exons 10 and 11 by Protein Truncation Test (PTT). In addition, 25 cases, which were wild-type in the above exons, were analyzed by sequencing of all coding exons and flanking intronic regions, whereas the remaining 32 patients were selectively screened for the presence of the common 5382insC mutation in *BRCA1* exon 20. Germline truncating alterations in the *BRCA1–2* genes were identified in 9 (15.7%) and 4 (7.0%) cases, respectively. These frequencies are higher than those previously reported by similar studies in other populations. Family history of cancer, age at onset of breast carcinoma, clinical and pathological features and follow-up of patiens with *BRCA1–2* germline mutations were the follow. In 3 cases the family history was negative for cancer in first degree relatives while in 1 case the family history was negative also in second degree relatives. On the contrary, 9 cases were positive for family history of breast and/or ovarian cancer in first and/or second degree relatives. The age at onset of breast cancer in mutation carriers was ranging between 23 and 34 years. All tumors were infiltrating carcinomas of the following types: 9 ductal, 1 lobular, 1 medullary and 2 non otherwise specified. During follow-up, in 6 cases a second cancer arised: 2 contro-lateral breast cancers, 2 ipsi-lateral breast cancers, 1 ovarian cancer, 1 case with an ipsi-lateral relapse followed by a contro-lateral breast cancer. Our results suggest that *BRCA1–2* genetic test should be recommended to women with early-onset breast carcinoma, independently of family history of cancer.

P8 High rate of one specific haplotype in the 13q12–13 region in breast cancer

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Aim: It is uncommon to find descriptions of the differences in germline rates of homozygosity and heterozygosity, or in the allelic frequencies for a specific marker between patients suffering breast cancer and the general population. The possible implication of these factors in the pathogenesis of the tumor remains unknown. The present study was undertaken to compare the rates of homozygosity and heterozygosity in patients with breast cancer and controls.

Methods: We investigated these parameters at loci of the 13q12–13 in 89 breast cancer patients and 62 controls. Two markers (D13S260 and D13S310) were used to assess the allelic status, and β-globin primers were employed for multiplex PCR to detect hemizygous deletions. The amplified products were electrophoresed on non denaturing 6%–12% polyacrilamide gels. The allelic bands were detected by a commercially available silver staining method.

Results: At locus D13S260, we found homozygosity in 30% of patiens *versus* 22% of controls, and heterozygosity in 70% *versus* 78%, repectively. At locus D13S310, the homozygosity rate was 49% in patients *versus* 32% in controls, and the rates of heterozygosity were 51% *versus* 68%, respectively. These differences were statistically significant at marker D13S310 and close to the significance in D13S260 marker. Double homozygosity was found in 16% of patiens and in 6% of expected cases; double heterozygosity in 39% and 54% respectively. In multiplex PCR analysis, no hemizygous deletions were observed in doubly homozygous patients. This allelic selection showed an abnormal distribution of the alleles that consequently offer one haplotype 4/4, the prevalence of which was statistically significant in our breast cancer patients.

Conclusions: These data reveal that the high rate of homozygosity observed at the 13q12–13 region is not related to hemizygous deletions and suggest that an abnormal allelic distribution could explain this homozygosity, as well as the presence of specific haplotypes associated with the disease.

P9 High risk breast/ovarian cancer families: Genetic counselling, testing and early cancer detection program

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Goals: Germline mutations of the cancer susceptibility genes BRCA1 and BRCA2 seem to be a major part of the hereditary breast/ovarian cancer syndrome. Genetic counselling and identification of high-risk families may be essential (1) to offer the opportunity to participate at a specific early cancer detection program, (2) to inform about prophylactic medication or surgery and (3) to provide individualized psychological support. An interdisciplinary counselling approach (gynecological oncology, human genetics, molecular biology, psychotherapy) was established.

Methods: From August 1994 until August 1997 305 consultees presented at the cancer genetics clinic, who were all couselled prospectivly applying the proposed approach. In case of positive inclusion criteria prospective predictive testing for BRCA1/2 was offered. Participation at the established early cancer detection program [palpation, ultrasound (US), mammography (MG), magnetic resonance tomography (MRT)], (prophylactic) medication or surgical procedures were discussed with all consultees. 141 consultees (families) met the inclusion criteria for genetic testing. For diagnostic genetic testing for BRCA1/2 mutations direct DNA sequencing is used.

Results: Detailed data about participation at the early cancer detection program, prophylactic medication or the surgery are available 70 consultees without and 101 with inclusion criteria remained in the recommended early cancer detection program and under surveillance. 9 prophylactic and 21 indicative operations were performed. Genetic testing of 32 families is completed. For BRCA1, 6 mutations and 15 polymorphisms, for BRCA2 no mutations and 4 polymorphisms could be detected.

Conclusions: Genetic testing for BRCA1/2 is technically challenging. In this study group an interdisciplinary approach proved helpfull for counselling, surveillance and individualized support for consulting women. Women with a family history of multiple sporadic breast/ovarian cancers and those with a hereditary BRCA1/2 defect may be distinguished, but incividual fear is a common phe-