282 Poster

Clinical application of ultrasound Elastography for detection of ductal carcinoma in situ of the breast

H. Katayama[1], H. Bando[1], E. Tohno[2], T. Umemoto[1], M. Noguchi[3], E. Ueno[1]. *[1]Tsukuba University Hospital, Breast and Endocrine Surgery, Tsukuba Ibaraki, Japan; [2]Tsukuba University Hospital, Radiology, Tsukuba Ibaraki, Japan; [3]Tsukuba University Hospital, Pathology, Tsukuba Ibaraki, Japan*

Background: Diagnosis of ductal carcinoma in situ (DCIS) reduces the subsequent incidence of invasive ductal carcinoma, but it remains difficult to detect. We have reported the ultrasound Elastography has been useful to detect invasive breast cancers. [1] The purpose of this study is to investigate the clinical application of ultrasound Elastography for evaluation of DCIS.

Material and Methods: Thirty-nine female with pathologically confirmed DCIS (median age, 54.2 years; age range, 32−81 years) were included in the study. Conventional ultrasonography (US) was applied for screening and real-time US Elastography (Hitachi, 7.5- to 13-MHz probe) was applied for evaluation at Tsukuba University Hospital between August 2003 and November 2007. The results were compared to those of the ACR's BI-RADS sonography categories (benign = 2 and 3, malignant = 4 and 5) and to the results of Elastography by Tsukuba elasticity score (1 to 5, scores 1−3 = benign, 4−5 = malignant) according to the degree and distribution of strain induced by light compression. Non-mass image-forming lesions described by Japan Association of Breast and Thyroid Sonology was categorized independently. [2] In the guidelines, non-mass image-forming lesions are classified as follows: duct dilatation, multivesicular pattern, low echo area in the mammary gland, and architectural distortion.

Results: Breast conserving operation was performed in 25 patients (64.1%) and mastectomy was performed in 14 patients (35.9%). Median size of the lesion was 13.0 mm (4.0 mm to 28 mm). Fifteen cases (38.5%) were categorized as non-mass image-forming lesion by ultrasound. Of 39 cases, the sensitivity of US (Category 4 and 5) was 79.5%, and of Elastography (Score 4 and 5) was 53.8%. Among 8 cases with diagnosis of category-3, 5 cases were scored 4 or 5 by Elastography. Integrated US and Elastography diagnosis achieved sensitivity of 92.3% (36/39 cases). As for 15 cases of the non-mass image-forming lesions, sensitivity of US, Elastography, and integrated US/Elastography were 86.7%, 46.7%, and 93.3% respectively.

Conclusion: Elastography with the proposed imaging classification showed slightly lower sensitivity for evaluation of DCIS compared to conventional US by single modality. However the integration of two modalities achieved higher sensitivity. Elastography is easy to perform and offers additional information to conventional US for DCIS detection.

References

[1] Itoh A, Ueno E, Tohno E, et al. Breast disease: clinical application of US elastography for diagnosis. *Radiology* 2006;239:341−50.
[2] Japan Association of Breast and Thyroid Sonology. *Guideline for Breast Ultrasound-Management and Diagnosis*. 2004, pp. 35−37, 53−60.

283 Poster

Relatively high local recurrence rates following mastectomy for high grade pure Ductal Carcinoma In-Situ (DCIS) with very close or positive margins – a potential indication for postmastectomy radiotherapy

S. Iganej[1], A. Rashtian[1]. *[1]Southern California Kaiser Permanente, Radiation Oncology, Los Angeles, USA*

Background: Mastectomies generally result in very high local control rates for pure DCIS. However, close or involved tumor margins are occasionally encountered despite this radical procedure. Although close margins and high grade disease are known predictors of local recurrence after a lumpectomy, data regarding the rate of relapse following a mastectomy is essentially non-existent.

Materials and Methods: From 1994–2002, the pathology reports of 574 patients who underwent mastectomies at our institution for pure DCIS were retrospectively reviewed. Eighty-four patients were found to have margin of less than 10 mm. Four patients who underwent postoperative radiotherapy were excluded, leaving 80 patients for this analysis. Thirty-one patients had margin <2 mm whereas 49 patients had margin 2.1−10 mm. High grade disease was observed in 47 patients.

Results: With a minimum follow up of 60 months, 6 of 80 (7.5%) patients had local recurrences. In 16 patients who had both a very close margin (ie <2 mm) *and* high grade disease, five local recurrences (31%) were noted, as opposed to one local recurrence in 64 patients (1.5%) who had lacked both risk factors, $P < 0.001$.

Conclusions: This review strongly suggests that patients with pure high-grade DCIS who have undergone mastectomies with margin <2 mm have a significantly higher-than-usual incidence of local recurrence, and should receive serious consideration for postmastectomy radiotherapy.

Thursday, 17 April 2008 12:30–14:30

POSTER SESSION

Local regional treatment/Radiotherapy

284 Poster Discussion

The effects of radiotherapy on normal tissues in early breast cancer: results of the UK standardisation of breast radiotherapy (START) trials.

G. Sumo[1], J. Haviland[1], J. Mills[1], J.M. Bliss[1], J. Yarnold[2], P. Hopwood[3], reported on behalf of the START trial management group. *[1]Institute of Cancer Research, ICR-CTSU, Sutton, United Kingdom; [2]Royal Marsden NHS Foundation Trust, Academic Radiotherapy, Sutton, United Kingdom; [3]Christie Hospital NHS Foundation Trust, Psycho-oncology Service, Manchester, United Kingdom*

Background: To determine normal tissue damage following radiotherapy (RT) fractions >2 Gy in women with early breast cancer. In the UK START trials (ST-A and ST-B) a randomised comparison of 41.6 Gy or 39 Gy each in 13 fractions was tested against a control dose of 50 Gy in 25 fractions (ST-A) and 40 Gy in 15 fractions against the same control (ST-B).

Methods: Women in the quality of life (QL) sub-study completed the Body Image Scale (BIS), the EORTC BR23 QL, and protocol specific items for post RT effects, namely skin appearance and (breast conserving surgery (BCS) patients only) breast appearance, shrinkage and hardness. QL was completed after surgery +/− chemotherapy but before RT and at 6, 12, 24 and 60 months follow-up. For BIS and BR23 breast and arm symptoms comparison of subscale scores between RT schedules and change from baseline were tested using weighted GEE models including type of surgery. Individual breast and arm symptom items were classified as to whether patients had ever reported levels of "quite a bit" or "very much", and survival analyses used to compare schedules.

Results: 2180 (99%) women completed baseline QL (mean age 56.9 years, range 26−87). 82.9% of patients underwent BCS and 33.3% received adjuvant chemotherapy. In both ST-A & -B, there was no significant impairment of BIS or in breast or arm symptom scores by any one of the regimens compared with the others. Across regimens a sustained improvement from baseline was observed for BIS scores ($p < 0.001$). Rates of change in skin appearance following RT were significantly lower in 39 Gy vs 50 Gy (ST-A) (HR 0.63 (0.47−0.84)) and 40 Gy (ST-B) vs 50 Gy (HR 0.76 (0.60−0.97)). There was a suggested dose-response relationship for breast hardness for 39 Gy vs 50 Gy (ST-A) (HR 0.79 (0.61−1.04)) and overall change in breast appearance for 40 Gy vs 50 Gy (ST-B) (HR 0.84 (0.69−1.03)).

Conclusions: Patient self-assessments showed small differences in the impact of different RT regimens on normal tissues, consistent with the clinical outcomes of similar rates of tumour control and normal tissue damage in the hypofractionated schedules compared with the standard RT schedule.

285 Poster Discussion

The impact of a boost dose on the local recurrence rate in high risk patients after breast conserving therapy – results from the EORTC boost–no boost trial

H. Jones[1], N. Antonini[2], L. Collette[3], A. Fourquet[4], W.J. Hoogenraad[5], J.J. Jager[6], H.L. Peterse[7], P.M. Poortmans[8], H. Struikmans[9], H. Bartelink[2]. *[1]University of Pittsburgh Medical Center-Cancer Center Natrona Heights, Radiation Oncology, Natrona Heights, USA; [2]The Netherlands Cancer Institute/Antoni, Radiotherapy, Amsterdam, The Netherlands; [3]EORTC Data Center, Radiotherapy, Brussels, Belgium; [4]Institut Curie, Radiotherapy, Paris, France; [5]UMC St. Radboud, Radiotherapy, Nijmegen, The Netherlands; [6]RTIL, Radiotherapy, Heerlen, The Netherlands; [7]The Netherlands Cancer Institute/Antoni van, Radiotherapy, Amsterdam, The Netherlands; [8]Dr. B. Verbeeten Instituut, Radiotherapy, Tilburg, The Netherlands; [9]UMC Utrecht, Radiotherapy, Utrecht, The Netherlands*

Background: To investigate the long term impact of a boost dose on the local control rate, in patients who had breast conserving therapy (BCT) for stage I and II breast cancer, with a special emphasis on a subset analysis to identify the effect of the boost on high risk patients.

Material and Methods: Patients underwent tumorectomy followed by whole breast irradiation of 50 Gy with 2 Gy per fraction. Patients having a microscopically complete excision (N = 5318) received no boost or a 16-Gy boost, while patients with a microscopically incomplete excision received a boost dose of 10 or 26 Gy (N = 251). In a subgroup of 1725 patients with central pathology review, clinical and pathologic characteristics were evaluated in relation to final margin status (FMS) including age, tumor size, volume of excision, receptor status, histology, and use of adjuvant systemic therapy. In the study population, the FMS was negative in 73% (n = 1162), positive in 6% (n = 102), and close (<2 mm) in 21% (N = 332) of patients respectively.

Results: The 10 year cumulative risk of ipsilateral breast tumor recurrence (CR-IBTR) was 10.2% vs. 6.2% for the no boost and the boost group, respectively (P < 0.0001). The hazard ratio for local recurrence was 0.59 (0.46−0.76) in favour of the boost. The absolute risk reduction at 10 year per age group was the largest in patients 40 years or less: 23.9% to 13.5% (P = 0.0014). In a subgroup analysis of patients with central pathology review, the 10 year CR-IBTR was 6%, 8% and 11% for negative, close and positive margin involved with invasive carcinoma (IC) respectively (P = 0.24). For margins involved with ductal carcinoma in situ (DCIS) the 10 year CR-IBTR was 8%, 10%, 14% for negative, close and positive margin groups respectively (P = 0.02). The 10 year CR-IBTR was 4% vs. 13% for the no boost vs the boost groups for patients with margins involved with IC (P = 0.0001). For margins involved with DCIS the 10 year CT-IBTR was 6% vs. 15% for the no boost vs. boost groups (P = 0.0001). In a multivariable analysis of local control, an IC tumor of grade 3 (P = 0.0004, HR2.01) and presence of DCIS (P = 0.05, HR 1.40) were associated with an increased risk of local failure.

Conclusions: Young age is the most important risk factor. High grade of invasive tumor and/or DCIS is a more significant risk factor than margin status. A boost dose of radiation ameliorates the effects of involved margins and significantly lowers the risk of IBTR in patients with high risk features.

286 Poster Discussion

DCIS with close or focally involved margins following breast-conserving surgery (BCS): reexcision or radiotherapy with boost?

A. Bouyon[1], B. Sigal-Zafrani[2], V. Fourchotte[3], Y. Kirova[1], M.A. Bollet[1], R. Dendale[1], F. Campana[1], R.J. Salmon[3], A. Fourquet[3]. *[1]Institut Curie, Radiation Oncology, Paris, France; [2]Institut Curie, Pathology, Paris, France; [3]Institut Curie, Surgical Oncology, Paris, France*

Background: In patients (pts) treated with BCS and radiotherapy for DCIS, additional surgery (reexcision or mastectomy) is recommended when margins are narrow or involved. We investigated whether, in patients with DCIS and close (<2 mm) or focally/minimally involved margins, an additional radiation dose to the tumor bed could avoid secondary surgery.

Patients and Methods: This study included 208 women with DCIS of the breast treated with BCS between 1992 and 2002 and found to have close (<2 mm) (89 pts) or involved margins (119 pts). Only cases with focally (<1 mm) or minimally (1−15 mm) involved margins were included. Sixty-one pts (29%) underwent a re-excision (REEX) followed either by whole breast irradiation (55 pts) or by mastectomy for persistent margin involvement (6 pts). The other 147 pts (71%) received breast irradiation (RT) with a boost to the tumor bed, without re-excision. Comparisons of clinical and histological features were done using a chi-square or Fisher's t-test. Event rates were determined with Kaplan–Meier estimates, and comparisons of outcome were performed with a log-rank test.

Results: Median age of the whole group was 53 yrs (28−82). Only 7 pts (3.4%) had less than 41 years. The rate of involved margins was lower in the RT group than in the REEX group (50% vs 74%, respectively, p = 0.0019). All other clinical and histological features were comparable between both groups. Median whole-breast radiation dose was 50 Gy in both groups. Median total doses to the tumor bed were 67 Gy (45−77) in the RT group and 60 Gy (46−74) in the REEX group (p < 0.0001). Among the 61 re-excised pts, 56% had residual DCIS and 6% had invasive cancer. Median follow-up was 89 months (5–180). Seven-year local failure rates were 9.3% in the RT group, and 9.6% in the REEX group (ns). Recurrence rates were not influenced by age, margin status, necrosis or nuclear grade. No differences in survival and metastasis-free survival were observed. Seven-year breast preservation rates were 91.4% and 82.8% (p = 0.017).

Conclusions: This retrospective analysis of 208 pts with DCIS treated in a single institution strongly suggest that, in carefully selected pts with close (<2 mm) or focally/minimally involved margins, reexcision could be avoided and satisfactory local control achieved with increasing radiation dose to the tumor bed. Because of the limited data available, this should concern only patients older than 40 years. These results need to be confirmed on independent series.

287 Poster Discussion

Invasive lobular cancer and re-do surgery – extent of the problem!

H. Hoque[1], N. Ahmad[1], H. Sran[2], S. Patel[2], S. Gurjar[2], D. Kulkarni[1]. *[1]Queen Mary's Hospital, Breast Unit, Sidcup, United Kingdom; [2]Medway Maritime Hospital, Breast Unit, Gillingham, United Kingdom*

Background: Invasive lobular cancer (ILC) is the second commonest form of breast cancer after invasive ductal cancer, accounting for 10−14% of cases.

Standard imaging in the triple assessment pathway of a suspicious breast lesion will consist of mammography and/or ultrasound. However these modalities can underestimate the extent of ILC and lead to inappropriate selection of breast-conserving surgery, and a subsequent requirement for completion mastectomy or re-excision of margins to achieve adequate clearance. There is a growing trend for patients diagnosed with ILC to have a dynamic contrast-enhanced MRI as part of the pre-operative investigative work-up. MRI offers greatly improved staging accuracy but is associated with disadvantages of cost, difficulty in rapid access and false positives which may lead to investigative delay.

We retrospectively analyzed the management of patients diagnosed with ILC to assess the need for this extra imaging modality prior to surgery. A low re-excision rate would question its need.

Materials and Methods: All ILC patients who underwent primary breast surgery over a five-year period, in two district general hospitals (DGH's) in the south-east of England were identified. Patients underwent either wide local excision & axillary dissection (WLE+AxD) or formal mastectomy (MAST) as per multi-disciplinary team decision. If margin involvement was found, subsequent re-excision of margins (REM) or completion mastectomy was performed.

Histological data was analysed to determine type of surgery, tumour size, grade, multicentric, multifocality, ER&PR status, number of lymph nodes involved and margins of excision.

Results: 186 patients with ILC were treated by primary surgery (92 in DGH A and 94 in DGH B). Histology confirmed 149 ILC's, 34 mixed and 3 bilateral ILC's. The average tumour size was 23.9 mm. With regard to tumour grade, 16 cases were histologically grade I, 152 cases were grade II and 18 cases were grade III tumours. Three patients had multicentric disease and 42 had multifocal disease.

112 patients (60%) underwent (WLE+AxD) while 8 patients (4%) had WLE only. 66 patients (35%) had primary mastectomy. In the breast conserving group, 12 patients (10%) required re-excision of margins and 27 patients (23%) required a completion mastectomy. Overall revision surgery rate was noted to be 32.5%.

Conclusion: Our results show a high rate of breast re-do surgery in a bid to achieve disease clearance. MRI is known to improve staging and may substantially reduce the re-excision and completion mastectomy rate. A prospective audit is being carried out to assess the use of MRI in all patients with ILC to aid staging and reduce the burden associated with re-do surgery.

288 Poster Discussion

The role of radiotherapy in the local control of lobular breast cancer

A.C. Voogd[1], L. Diepenmaat[2], L.V. van de Poll-Franse[3], G.A.P. Nieuwenhuijzen[4], M.W.P.M. van Beek[5], M.J.C. van der Sangen[6]. *[1]Maastricht University, Department of Epidemiology, Maastricht, The Netherlands; [2]Maastricht University, Faculty of Health Medicine and Lifesciences, Maastricht, The Netherlands; [3]Comprehensive Cancer South, Eindhoven Cancer Registry, Eindhoven, The Netherlands; [4]Catharina Hospital, Department of Surgery, Eindhoven, The Netherlands; [5]Catharina Hospital, Regional Institute of Pathology (PAMM), Eindhoven, The Netherlands; [6]Catharina Hospital, Radiotherapy, Eindhoven, The Netherlands*

Background: Results of subgroup analyses of randomized clinical trials have raised questions about the role of radiotherapy after mastectomy for invasive lobular breast cancer.

Patients and Methods: Between January 1995 and December 2002 4947 patients were diagnosed with breast cancer in the South-Eastern part of the Netherlands, of whom 969 had ILC or mixed (with a ductal component) ILC (19.6%). After exclusion of patients with previous invasive (breast) cancer, synchronous bilateral, multicentric, locally advanced or metastatic breast cancer, 805 remained available for analysis. Of these patients, 416 underwent lumpectomy with radiotherapy (L with RT), 217 mastectomy without (M without RT) and 172 mastectomy with radiotherapy (M with RT) to the chest wall and/or regional nodal areas. Complete follow-up was obtained for more than 95% of the patients.