The Value of Yearly Chest X-Ray in Patients with Stage I Breast Cancer

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Abstract—In 263 patients with stage I breast cancer, i.e. tumour less than 5 cm in diameter, no
invasion of skin and deep fascia, and no involvement of axillary lymph nodes, X-rays of the chest
were performed at 6, 12 months and yearly thereafter to the 6th year or until recurrence, another
cancer was detected, the patient refused further follow-up or died. Among 1599 examinations, in
only 0.25% (four patients) were unsuspected malignant changes observed. Due to this low cost/benefit
ratio a fixed routine schedule of repeated chest X-rays in stage I cancer patients, otherwise apparently
free of disease, is not justified.

INTRODUCTION

THE CHEST X-ray is the imaging procedure of choice
for initial evaluation of intrathoracic tumour spread.
It is reasonably sensitive, relatively inexpensive and
easily performed. Pulmonary metastatic nodules
usually cause no symptoms in the early stages. Only
when metastases have largely replaced normal lung
tissue, are pulmonary symptoms present. On the
other hand, pleural effusion and malignant lym-
phangitis rarely occur in the absence of symptoms
such as cough and dyspnoea [1]. Sequential chest
X-rays have been an important part of the postoper-
ative control of patients in the Danish Breast Cancer
Cooperative Group (DBCG) programme since its
start [2]. From time to time it is useful to evaluate
the cost/benefit ratio of control examinations. The
present study was therefore undertaken in order to
examine the cost/benefit ratio of routine chest X-
rays performed at fixed intervals after mastectomy
in patients with primary operable stage I breast
cancer.

MATERIALS AND METHODS

From November 1977 to November 1982, a total
of 3127 patients with primary operable cancer,
DBCG stage I, i.e. tumour less than 5 cm in diam-
eter, no invasion of skin and deep fascia, and no
positive regional lymph nodes, entered the nation-
wide protocol DBCG 77 1-a. In this protocol the
patients, after mastectomy, have clinical control

only and no adjuvant radiation or systemic therapy.
The present study deals with 263 of these low-risk
patients controlled at Herlev University Hospital.
Prognostic factors such as age distribution, recurr-
ence-free survival and mortality rate in the 263
patients were not significantly different from the
total of 3127 patients. According to the protocol,
chest X-rays were performed at 6 and 12 months,
2, 3, 4, 5 and 6 years after mastectomy, provided
that (1) no metastases including local relapse were
diagnosed, (2) no other cancer had been detected
and (3) the patient did not refuse further follow-up
or died.

The DBCG's secretariat delivered a list of patients
being controlled at this centre. On the list it was
also noted whether the patient was still in protocol
or whether the patient had left the protocol and, if
so, why and when. At the Department of Diagnostic
Radiology whether the scheduled chest X-ray had
been performed was checked and if performed
whether the diagnosis was benign or malignant.
The records of all patients registered as having left
the protocol as well as of those having a malignant
diagnosis at the routine chest X-ray but still in
protocol were thereafter reviewed.

Chest X-ray in AP and lateral projections was
performed with a high (120–150) kilovoltage tech-
nique, and was always done immediately after the
clinical control at the Department of Oncology. In
the case of malignant findings, further evaluation
including conventional tomography, CT-scan,
bronchoscopy, mediastinoscopy or percutaneous
biopsy were performed.

RESULTS

During the 6-year observation period 97 patients left the protocol. The cases are shown in Table 1. During the same period a total of 1599 routine chest X-rays were performed at the scheduled time.

Unexpected positive chest X-rays

Among the 263 patients, pulmonary metastases were found in three patients and carcinomatous lymphangitis in one patient. In none of these patients were pulmonary symptoms observed at the clinical control. The incidence of these unexpected positive chest X-rays was 6 month 0.38%; 1st year 0.0%; 2nd year 0.42%; 3rd year 0.0%; 4th year 0.50%; 5th year 0.0% and 6th year 0.56% (Table 2). This results in an overall yearly frequency of 0.25% until the 6th year after mastectomy. Three of the four patients died despite chemotherapy 30, 18 and 17 months after the pulmonary metastases had been detected by the routine chest X-ray and confirmed by histology. The remaining patient is still alive 14 months after a biopsy-verified carcinomatous lymphangitis.

Expected positive chest X-rays

At the clinical control pulmonary symptoms were present and the subsequent chest X-ray confirmed malignant pulmonary changes in six patients,

(Table 2). They died 1, 2, 6, 9, 11 and 15 months respectively after detection.

False positive chest X-rays

At four chest X-rays suspicion of malignant changes arose, causing supplementary examinations (conventional tomography, CT-scan, biopsies and bronchoscopy) which could not confirm malignancy. At the subsequent controls no recurrence has been diagnosed in these four patients with follow up of 6, 36, 36 and 72 months, respectively.

DISCUSSION

Performing a total of 1599 chest X-rays in 263 patients with stage I breast cancer revealed unexpected malignant pathology in only four patients. Thus it was necessary to perform 400 examinations to find one case of asymptomatic spread to the lungs. Others [3, 4] have reported that in up to 90% of the patients the first signs of metastatic spread to the lungs are detected by the patients themselves or at physical examination. In the present study six of 10 patients had clinical signs or symptoms of pulmonary spread of the breast cancer at time of diagnosis. Although treatment of asymptomatic metastases may result in cure, there is no evidence yet in larger materials that early chemotherapy significantly prolongs survival more

Table 1. Causes for leaving the DBCG protocol 77 1-a and time of the last scheduled chest X-ray according to the protocol of 97 patients with stage I breast cancer from 0.5 to 6 years after mastectomy

Causes for leaving the protocol	Period after mastectomy (years)							
	0–0.5	0.5–1	1–2	2–3	3–4	4–5	5–6	6–7
Relapse including lungs	2	5	10	20	13	11	2	10
Relapse excluding lungs	2	1	10	17	12	10	2	9
Another cancer	0	0	1	1	0	1	0	1
Death	0	1	2	2	0	2	1	0
Did not wish to participate any more	1	1	3	3	3	1	0	0
Total off study	3	7	16	26	16	15	3	11
Cumulative number of patients	3	10	26	52	68	83	86	97

Table 2. Number of routine chest X-rays performed in 263 patients with stage I breast cancer from 0.5 to 6 years after mastectomy and occurrence of malignant findings at the scheduled chest X-ray

	Years after mastectomy							
	0	0.5	1	2	3	4	5	6
No. of patients	263	260	253	237	211	195	180	177
Cumulative No. of examinations	0	263	523	776	1013	1224	1419	1599
Expected malignant finding at chest X-ray	0	3	0	2	1	0	0	0
Unexpected malignant finding at chest X-ray	0	1	0	1	0	1	0	1

than chemotherapy initiated when the patients are symptomatic [5]. In our small study a marginal effect was found; patients with no pulmonary symptoms died a few months later than those with symptoms at time of chest X-ray. Due to the low cost/benefit ratio and the cost of supplementary examinations such as conventional tomography, CT-scanning, bronchoscopy and percutaneous lung

biopsies in patients with false positive changes, we conclude that repeated chest X-rays in patients with stage I breast cancer are not warranted. Chest X-ray should therefore be reserved for patients with suspicion of recurrence or with pulmonary symptoms, where the cost/benefit ratio is more satisfactory [6].

REFERENCES

1. Feig SA. Imaging techniques and guidelines for evaluation and follow-up of breast cancer patients. *CRC Crit Rev Diag Imaging* 1987, **27**, 1–16.
2. Andersen KW, Mouridsen HT, Castberg T *et al*. Organization of the Danish adjuvant trials in breast cancer. *Dan Med Bull* 1981, **28**, 102–106.
3. Ojeda MB, Alonso MC, Bastus B *et al*. Follow-up of breast cancer stage I and II. An analysis of some common methods. *Eur J Cancer Clin Oncol* 1987, **23**, 419–423.
4. Pandya J, McFadden ET, Kalish LA *et al*. A retrospective study of earliest indicators of recurrence in patients on Eastern Cooperative Oncology Group Adjuvant Chemotherapy Trials for breast cancer. *Cancer* 1985, **55**, 202–205.
5. Frazier TG, Copeland EM, Gallager MS *et al*. Prognosis and treatment in minimal breast cancer. *Am J Surg* 1977, **133**, 697–701.
6. Kamby C, Rose C, Ejlertsen B *et al*. Stage and pattern of metastases in patients with breast cancer. *Eur J Cancer Clin Oncol* 1987, **23**, 1925–1934.