Routine breast cancer staging with chest radiography by the ambulatory care pre-operative team: a judicious use of resources?

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Keywords: Surgery, breast cancer, staging, pre-operative assessment.
Summary: Until recently, routine chest radiography to stage patients undergoing surgery for breast cancer was recommended, and no firm guidelines existed. We believed this step to be of limited use, so analysed all recent breast cancer surgery admissions. Of 149 patients, 136 had normal chest x-rays. Of the abnormal, none had a change of management. Of the patients not imaged, none show any concurrent evidence of metastasis. Of the 5 patients with evidence of metastases, only 1 had abnormal pre-operative results. We therefore believe that pre-operative staging chest radiography is unnecessary, and a detrimental step in the patient journey.

Introduction
Breast cancer is the most common cancer in the United Kingdom, with over 48,000 new cases per annum. It is increasingly being treated with day case procedures, and recently the British Association of Day Surgery and the NHS Improvement scheme jointly endorsed a day surgery/one night stay model for breast cancer care. The Department of Health has made reducing length of stay a focus of their Cancer Reform Strategy, and this year have published an update promoting day case/23 hour stays for breast surgery and other procedures and “reducing lengths of stay for those who do need to be admitted as emergencies.”

Successful day-case surgery depends upon efficient pre-operative assessment, and until recently routine pre-operative chest radiography was recommended during this assessment as screening for metastatic disease on all patients undergoing surgery for breast cancer. The current British Association of Surgical Oncology guidelines do not include or exclude its use, recommending instead development of local protocol, with no guidance on how to shape that protocol.

In our experience, routine chest radiography has a very low yield for detecting metastases, and does not significantly alter patient’s management. Its use has generated debate amongst the chest physicians for decades, current opinion regarding screening for disseminating tumours favours computed tomography. Other authors regard it as useless in cancer staging. In addition, chest radiography brings with it significant costs – in terms of patient radiation exposure, stress, and through utilisation of resources and administrative time.

We therefore performed an analysis of our recent experience of breast cancer surgery, focussing on the patient investigations performed and their impact on the subsequent management and outcome, to assess their desirability.

Methods
Patients
A retrospective analysis was performed of all patients undergoing breast cancer surgery between March 2007 and June 2009. A local database comprising patient details, operation performed and histology was used to identify relevant patients. Patients were included who had histological evidence of breast cancer and underwent surgery in this hospital. Patients were excluded if their radiographic history was not available or was not performed for staging purposes, such as emergency admissions under different specialities. 14 patients with locally advanced disease had pre-operative CT imaging arranged by the oncologists and were also excluded.

Radiography
Patients fitting the inclusion criteria had their pre-operative investigations reviewed for abnormal findings, with reports from consultant radiologists, and were categorised as normal or abnormal. They then had their post-operative investigations scrutinised, and further categorised as having any evidence of metastases.

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Clinical results
The case notes were reviewed to confirm any radiographic findings, and also to assess any impact on management from the investigations performed.

Results
A total of 149 patients were identified as fitting the inclusion criteria. The histology findings are summarised in Table 1.

<table>
<thead>
<tr>
<th>Histology</th>
<th>Frequency (percent in brackets)</th>
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<tbody>
<tr>
<td>Invasive ductal</td>
<td>96 (65.8%)</td>
</tr>
<tr>
<td>Invasive ductal and DCIS</td>
<td>15 (10.1%)</td>
</tr>
<tr>
<td>Invasive lobular</td>
<td>15 (10.1%)</td>
</tr>
<tr>
<td>DCIS</td>
<td>10 (6.7%)</td>
</tr>
<tr>
<td>Papillary</td>
<td>4 (2.7%)</td>
</tr>
<tr>
<td>Tubular</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Cribriform</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Invasive lobular and ductal</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Invasive ductal + cribriform</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Neuroendocrine</td>
<td>1 (0.7%)</td>
</tr>
</tbody>
</table>

Of the 149 patients, 140 had undergone a staging pre-operative chest radiograph. 136 of these were considered normal by both the consultant surgeons and consultant radiologists. Of the 4 patients with abnormal radiography, only 2 were consistent with metastases and neither of these underwent a change of management because of the findings.

9 patients did not undergo routine pre-operative staging. None of these show any evidence of metastases currently.

5 patients of this cohort show current signs of metastases. All of them underwent pre-operative imaging, with only 1 patient showing abnormalities. Concerns at surgery, not the pre-operative radiography, prompted further investigation which at the time did not confirm spread of the disease. Subsequent follow-up only revealed metastases more than 1 year after the operation.

The results are summarised in Figure 1.

Discussion
Our results confirm that the significant yield from a routine pre-operative staging chest radiograph is very low. Only 3% of patients demonstrated any abnormality, and only half of these were consistent with lung metastasis.

Further, no patients had a change of management based solely on the radiographic findings; all patients who are fit need to have a tissue diagnosis so will undergo surgery, and post-operative investigation and management will be driven primarily by patient choice, the clinical condition of the patient and surgical findings. It should be self-evident that an investigation with very little chance of identifying a significant result, and with no chance of influencing management, ought to be avoided. This will improve the efficiency of the pre-operative assessment department, allowing greater capacity for the increasing number of day surgery patients the government expects.

Further, chest radiography is not without its cost. On a human level, it means a further attendance at the hospital for patients who are already under intense emotional stress, as well as the concomitant anxiety about the results. There is also a risk to the patient’s health. It is estimated that 0.6% of de novo cancers in the UK are caused by medical irradiation, representing 1,700 cases per year. Although the majority of these will be from radiation-intense investigations, it is paramount that we as clinicians do as much as we can to reduce this exposure. On a monetary level, a chest radiograph (at the time of the analysis) cost £2.64. Expanded to the whole country, this equates to a total of over £1 million annually spent on routine staging radiography. The savings from avoiding this can be funnelled into improvements elsewhere in the day surgery journey, simplifying budgets and improving outcomes.

Our experience since removing routine chest radiography from our pre-operative assessment protocol echoes the statements above. It has not only improved patient enjoyment of the more streamlined Ambulatory Care Pathway, but it has saved money and reduced the burden on local resources, including radiology and the pre-operative assessment department. Our recommendations
are therefore that protocols for the management of breast cancer should not include routine staging chest radiography pre-operatively unless there are compelling clinical indications such as a requirement for the anaesthetic assessment.

References

13. Local hospital management report this figure as including the estimated cost of the staff wages to perform and analyse the investigation, and some allowance for the cost of the hardware.

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