ORIGINAL ARTICLE

Does histopathological examination of breast reduction specimens affect patient management and clinical follow up?

I S Cook, C E Fuller

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See end of article for authors' affiliations

Correspondence to:
Dr I S Cook, Department of
Histopathology,
Southampton General
Hospital, Tremona Road,
Southampton, Hampshire,
SO16 6YD, UK; iscook@
doctors.org.uk

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Aim: To assess the value of the histopathological examination of routine breast reduction specimens.

Methods: All patients who underwent breast reduction surgery over a 10 year period were identified. The histopathology report for each patient was analysed. For all cases with important microscopic abnormalities, the patient's medical notes were examined to identify whether clinical follow up was arranged.

Results: Histopathology reports for specimens from 1289 patients were examined. One thousand, two hundred and fifty eight of these specimens (97.6%) were reported microscopically as showing normal breast tissue or benign breast disease, 26 cases (2.0%) showed lesions of uncertain malignant potential, four cases (0.3%) showed ductal carcinoma in situ (DCIS) or microinvasive malignancy, and there was one case (0.1%) of invasive malignancy. Important diagnoses were made in 2.1% of cases with no macroscopic abnormality. Clinical follow up was arranged for all patients with a diagnosis of DCIS, microinvasive carcinoma, or invasive malignancy. There were 26 patients diagnosed with lesions of uncertain malignant potential; 11 had follow up arrangements made and 13 patients were discharged. Follow up data was not available for two patients.

Conclusions: Histopathological examination of breast reduction specimens may reveal important pathological diagnoses. In some cases, patients were discharged from medical care despite histopathological examination revealing lesions associated with an increased risk of developing breast carcinoma.

In 2002, the Royal College of Pathologists' document "Histopathology of limited or no clinical value"¹ was circulated to all pathologists in the UK. This document gave examples of histopathological specimens where examination was of doubtful clinical usefulness and made little or no contribution to patient care. The aim of this document was to redirect pathologist's time to examinations of greater clinical use.

One investigation highlighted as making little contribution to patient care was the histopathological examination of breast reduction specimens (reduction mammoplasty). The document stated that sections from macroscopically abnormal areas were justified, but that the value of random histology appeared minimal.¹ There is little evidence to support or refute this statement and a college audit was recommended.

Previous studies have shown that important diagnoses can be made on pathological examination of breast reduction specimens. In 1998, Jansen and colleagues² reported an incidence of occult invasive breast carcinoma in 0.16% of 2576 specimens and, in 1985, Bondeson and colleagues³ reported seven cases of lobular carcinoma in situ (LCIS) in 200 consecutive patients. A large study published in 1960⁴ of 5008 reduction mammoplasty procedures identified 14 (0.28%) cases of malignancy, either intraoperatively by frozen section, or postoperatively by pathological examination. In all three studies, there was no mention as to how pathological diagnoses affected patient management and follow up.

"Previous studies have shown that important diagnoses can be made on pathological examination of breast reduction specimens"

Salisbury District Hospital provides a regional plastic surgery service with a breast reduction surgery practice. Breast reduction specimens received by the histopathology department are sliced, examined macroscopically and, if no lesion is identified, two random blocks of breast tissue are taken from each breast. If a macroscopic lesion is present, sampling is concentrated on this area, with selection of an appropriate number of blocks as considered necessary by the pathologist. If an important microscopic finding is identified, further tissue blocks are taken. In most cases, the specimens are received as multiple fragments and are not orientated.

This examination is performed most often by consultant histopathologists, or less frequently, by trainee histopathologists. All pathologists report the specimens they personally sample.

The aim of our study was to assess the value of histopathological examination of routine breast reduction specimens.

METHODS

A search of the histopathology computerised archive of specimen reports using specimen type codes was performed to identify all patients who had undergone breast reduction surgery over the 10 year period 1 January 1992 to 31 December 2001. The histopathology report for each of these patients was analysed. The data recorded were the specimen number, patient age, macroscopic findings, and microscopic

Abbreviations: ADH, atypical ductal hyperplasia; ALH, atypical lobular hyperplasia; DCIS, ductal carcinoma in situ; LCIS, lobular carcinoma in situ

diagnosis. A macroscopic abnormality was defined as the presence of a discrete mass, cysts, or calcification. Fibrosis was not included in this definition.

The microscopic diagnosis for each case was divided into one of four groups:

- (1) Normal or benign breast disease.
- (2) Lesions of uncertain malignant potential (including atypical ductal hyperplasia (ADH), atypical lobular hyperplasia (ALH), intraductal papilloma, and LCIS).
- (3) Ductal carcinoma in situ (DCIS) or microinvasive carcinoma.
- (4) Invasive carcinoma.

For all cases with important microscopic abnormalities, the patient's medical notes were then examined to identify any further clinical follow up and/or family history of breast cancer.

RESULTS

The total number of patients with breast reduction specimens examined over the 10 year study period was 1289. The patients had an age range of 14–78 years (mean, 36.8). Most specimens were received from women of reproductive age. In most cases, the procedure was bilateral.

Of the 1289 cases, 1258 (97.6%) were reported as microscopically showing normal breast tissue or benign breast disease, 26 cases (2.0%) showed lesions of uncertain malignant potential, four cases (0.3%) showed DCIS or microinvasive malignancy, and there was one case (0.1%) of invasive malignancy (table 1). The single case of invasive carcinoma was a 15 mm, grade 2, invasive ductal carcinoma.

Of the 31 patients with an important microscopic finding, eight patients had no family history of breast carcinoma, whereas this information was not recorded for the remaining 23 patients.

In only 83 of the 1289 cases (6.4%) was a macroscopic abnormality recorded in the pathology report and only six of these had important microscopic findings. Five of 83 were lesions of uncertain malignant potential and one case was an invasive malignancy. The other 77 cases were in the microscopically normal/benign diagnostic category.

Conversely, there were 25 cases (2.1%) with significant microscopic findings out of the 1206 cases that had no recorded macroscopic abnormality. These included the four cases with DCIS or microinvasive malignancy and 21 cases with lesions of uncertain malignant potential.

Clinical follow up with local breast surgeons was arranged for all patients with a diagnosis of DCIS, microinvasive carcinoma, or invasive malignancy. The single patient with invasive malignancy was treated by mastectomy and breast reconstruction. There was no evidence of residual tumour in the mastectomy specimen. No axillary sampling of lymph nodes was performed. Of the four patients with DCIS or microinvasive carcinoma, one was managed with regular mammography, two with regular mammography and hormonal treatment (tamoxifen), and one had a mastectomy.

Table 1 Number of cases for each diagnostic category

Diagnostic category	Number of cases (total = 1289)	Per cent of total
Benign/normal	1258	97.6
Uncertain malignant potential	26	2.0
DCIS/microinvasive	4	0.3
Malignant (invasive)	1	0.1

DCIS, ductal carcinoma in situ.

No evidence of residual DCIS or invasive malignancy was detected in the mastectomy specimen.

There were 26 patients diagnosed with lesions of uncertain malignant potential. Eleven had follow up arrangements with regular mammography performed under the care of local breast surgeons. Thirteen of these 26 patients were discharged from clinical follow up. Follow up data were not available for two patients.

Table 2 shows the number of patients who had follow up arrangements for each diagnosis. Follow up arrangements were not related to the age of the patient.

For all 31 patients with lesions of uncertain malignant potential, DCIS, or invasive malignancy, no further specimens were received within our laboratory that contained intraductal or invasive malignancy.

DISCUSSION

The natural history of the development of breast carcinoma is beginning to be understood. It is thought that there is a stepwise progression from normal epithelium via non-atypical hyperplasia and atypical hyperplasia, to in situ carcinoma.⁵ Studies have shown an increased relative risk of developing invasive carcinoma of four to five times that of the normal population in patients with a biopsy diagnosis of ADH or ALH.^{6–8} This risk is doubled if there is also a positive family history of breast carcinoma.⁹ The presence of an intraductal papilloma has also been reported to be associated with an increased relative risk of cancer of three times that of the normal population.¹⁰ Both LCIS and DCIS are estimated to incur a relative risk of double that of atypical hyperplasia—that is, eight to 10 times relative risk.¹¹ Molecular pathology studies have shown that shared genetic alterations may be found within cases of ADH, DCIS, and invasive carcinoma.¹² Similarly, shared genetic alterations may be found within cases of ALH, LCIS, and invasive carcinoma.¹³

Therefore, the detection of lesions associated with an increased risk of cancer in breast reduction specimens provides prognostic information.

We found that the prevalence of important pathological diagnoses in patients undergoing breast reduction surgery was 2.4%. One case out of a total number of 1289 (0.1%) contained a previously undiagnosed invasive carcinoma. This was a similar rate to that in one previous study,³ but slightly less than that seen in another study.⁴

Postmortem studies have previously been performed to identify the prevalence of breast cancer in asymptomatic patients. In one evaluation of seven necropsy based studies,¹⁴ it was stated that the prevalence of invasive breast cancer ranged from 0% to 1.8%, and the prevalence of DCIS from 0% to 14.7%. It was stated that the prevalence of malignancy in these studies was higher for women between 40 and 70 years

Table 2 Follow up arrangements for patients with important microscopic findings

Diagnosis	Number of patients with follow up	Number of patients discharged
ADH	3	2
ALH	5	3*
Intraduct papilloma	0	7
ALH and intraduct papilloma	0	1
ALH and ADH	1	0
LCIS	2	0
DCIS/microinvasive	4	0
Malignant (invasive)	1	0

*In two cases with ALH, follow up data were unavailable.
ADH, atypical ductal hyperplasia; ALH, atypical lobular hyperplasia;
DCIS, ductal carcinoma in situ; LCIS, lobular carcinoma in situ.

of age. It should be noted that most of the specimens in our study were from women of reproductive age, and therefore comparisons between these postmortem studies and our study are problematic.

"Two of the five patients with atypical ductal hyperplasia were discharged, as were three of the 10 patients with atypical lobular hyperplasia, even though these diagnoses are associated with a four to fivefold increase in the risk of breast carcinoma"

There were four cases of DCIS or microinvasive carcinoma (0.3%). These four patients and the patient with invasive carcinoma had clinical follow up arrangements made with local breast surgeons. The management of patients with lesions of uncertain malignant potential was variable. Two of the five patients with ADH were discharged, as were three of the 10 patients with ALH, even though these diagnoses are associated with a four to fivefold increase in the risk of breast carcinoma.⁶⁻⁸ All seven patients with intraductal papillomas were discharged, as was one patient with ALH and an intraductal papilloma, despite data suggesting an increased relative risk of breast carcinoma.¹⁰

At present, there is no consensus on how patients with lesions associated with an increased risk of malignancy should be managed. However, in view of the theories of the stepwise progression in the natural history of breast carcinoma, many authorities now advocate clinical follow up with regular surveillance mammography.^{15 16}

In the National Health Service breast screening programme annual review 2001,¹⁷ it was stated that the rate of detection of cancers for each 1000 women screened was 6.39. At a stated cost of £40 for each patient screened, this equates to a cost of £6260 for each cancer detected.

In comparison, the estimated cost to our laboratory for the examination of a breast reduction specimen is £50. In our study, this equates to £12 890 for each case of DCIS or invasive cancer detected by this method. In cases with no macroscopic abnormality, the cost of detection of pathologically important abnormalities (including those of uncertain malignant potential) is £2412 for each lesion. It should be noted that breast reduction specimens most commonly are received from young patients (who are outside the National Health Service breast screening programme age range), and are less likely to contain invasive malignancy or DCIS than the screening population.

Our study has shown that microscopic examination of macroscopically normal breast tissue from breast reduction specimens may provide important pathological findings. Important diagnoses were made in 2.1% of patients who had no macroscopic abnormality within their breast tissue. The finding of important pathological diagnoses in macroscopically normal breast tissue raises the possibility that important diagnoses are missed as a result of sampling errors. These specimens are often very large and the selection of two blocks of tissue for microscopic analysis means that only a very small proportion of the total tissue submitted is examined histologically. Detailed macroscopic examination with palpation of the tissue is used to identify areas that may contain microscopic abnormalities. However, unless the entire specimen is processed for microscopy, with the serious cost and time issues that this would entail, this problem cannot be completely overcome.

CONCLUSIONS

Our study has shown that histopathological examination of breast reduction specimens may reveal pathological diagnoses that have prognostic relevance for the patient. We

Take home messages

- Histopathological examination of breast reduction specimens may reveal important pathological diagnoses—we found important pathology in 2.4% of patients
- Some patients were discharged from medical care despite histopathological examination revealing lesions associated with an increased risk of developing breast carcinoma
- Our results provide the evidence base that could be used by the Royal College of Pathologists to produce guidelines on the value of histopathological examination of breast reduction specimens
- Guidelines should also be produced for plastic surgeons performing breast reduction surgery giving recommendations on the management of histopathological findings.

found important pathology in 2.4% of patients. Although all patients with DCIS, microinvasive carcinoma, or invasive malignancy were managed appropriately, in many cases, patients were discharged from medical care despite histopathological examination revealing lesions associated with an increased risk of developing breast carcinoma.

Our study was performed as a direct response to the Royal College of Pathologists document "Histopathology of limited or no clinical value".¹ The results of our study provide the evidence base that could be used by the Royal College of Pathologists to produce guidelines on the value of histopathological examination of breast reduction specimens. It is suggested that guidelines should also be produced for plastic surgeons performing breast reduction surgery giving recommendations on the management of histopathological findings.

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Authors' affiliations

I S Cook, C E Fuller, Department of Histopathology, Salisbury District Hospital, Odstock, Salisbury, SP2 8BJ, UK

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