Histopathology reporting of mastectomy specimens—an assessment of inter-hospital variation

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SUMMARY The routine histopathological reporting of mastectomy specimens at a typical District general hospital and a London teaching hospital have been reviewed. Deficiencies in the assessment of prognostically important variables were revealed. Ways of improving standards are discussed.

Attempts to resolve the controversy surrounding the treatment of cancer of the breast¹ require that the histopathological data derived from surgical specimens must be accurate, in order to allow the clinician to base his treatment on precise pathological information. Medical audit in histopathology²⁻⁴ suggests that current standards may be less than optimal.

In this report we analyse multiple variables in a retrospective review of the histopathology reports of mastectomy specimens at a district general hospital and a London teaching hospital, and discuss ways in which standards might be improved.

Material and methods

Chase Farm Hospital, Enfield and The London Hospital, Whitechapel are part of the North-East Thames Regional Health Authority (NETRHA) and, in our view, represent a typical district general hospital and a typical London teaching hospital. Both derive the great majority of their breast cancer patients from surrounding areas. The catchment area of The London Hospital includes socially deprived inner city areas with a large recent immigrant population whereas Chase Farm Hospital draws its patients predominantly from a stable, well-educated community. This difference might be expected to produce later clinical presentation at The London Hospital.

The method of surgical treatment of carcinoma of the breast is similar in the two centres. Inoperable patients and those unfit for anaesthetic are treated

by a combination of radiotherapy and chemotherapy and do not form part of this study. All other patients are treated by mastectomy, with resection of the axillary lymph nodes in approximately 80% of cases. Segmental mastectomy is performed in approximately 5% of cases, usually older patients. Radical mastectomy is not in use.

At both hospitals histopathology reporting during the periods of study has been the responsibility of pathologists of varying experience, including all authors. Five pathologists have been involved at Chase Farm Hospital and 12 at The London Hospital.

All the initial cryostat or conventional biopsy and subsequent mastectomy histopathology reports of malignant tumours of the female breast seen at Chase Farm Hospital from 1977 to 1981 inclusive and The London Hospital from 1978 to 1980 inclusive were reviewed. All sarcomas and metastatic tumours were excluded. The reports were subjected to detailed analysis and all the variables enumerated in Tables 1 to 4 determined for each case. In 11 cases it was necessary to examine the original sections to determine the number of lymph nodes examined microscopically but in all other categories only the information available on the report forms (and hence available to clinicians) was assessed. In all cases it was possible to ascertain from the reports whether sections of the nipple and apparently normal breast had been taken. The biopsy and mastectomy reports were regarded as integral but in the small number of cases in which there was a difference between the two in histological typing or grading, the mastectomy report was regarded as the definitive assessment. Table 1 is adapted from the classification of primary breast cancer used by Azzopardi.⁵

Table 1 *Assessment of the primary tumour*

	Chase Farm Hospital		The London Hospital	
Number of mastectomies	176		338	
Tumour size recorded	113	(64.2%)	218	(64.5%)
Contour recorded	38	(21.59%)	61	(18.05%)
Completeness of excision assessed	52	(29.55%)	189	(55.92%)
Histological grading assessed	92	(52.27%)	164	(48.52%)
Well differentiated	15	(8.52%)	4	(1.18%)
Moderate	29	(16.48%)	60	(17.75%)
Poor	38	(21.59%)	100	(29.59%)
Moderately well	4	(2.27%)	0	
Moderate to poor	4	(2.27%)	0	
"Average"	1	(0.57%)	0	
"Not very well"	1	(0.57%)	0	
Blood vessel invasion identified	1	(0.57%)	7	(2.07%)
Lymphatic invasion identified	2	(1.14%)	24	(7.1%)
Lymphocytic reaction assessed	28	(15.91%)	68	(20.12%)

Table 2 *Assessment of histological type of tumour*

	Chase Farm Hospital		The London Hospital	
Number of mastectomies	176		338	
Lobular carcinoma				
In-situ	0		2	(0.59%)
Invasive	3	(1.7%)	5	(1.48%)
Ductal carcinoma				
In-situ	12	(6.82%)	7	(2.07%)
Invasive; NOS	24	(13.64%)	155	(45.86%)
Colloid	7	(3.98%)	7	(2.07%)
Medullary	4	(2.27%)	4	(1.18%)
Infiltrating comedo	3	(1.7%)	3	(0.89%)
Infiltrating cribriform	2	(1.14%)	0	
Tubular	2	(1.14%)	3	(0.89%)
Papillary	0		2	(0.59%)
Adenoid cystic	1	(0.7%)	0	
Mixed lobular-ductal	3	(1.7%)	2	(0.59%)
Adenocarcinoma				
Invasive; NOS	24	(13.64%)	38	(11.24%)
"Fibrous and trabecular"	47	(26.7%)	0	
"Sclerosing"	7	(3.98%)	0	
Carcinoma				
Invasive; NOS	17	(9.66%)	41	(12.13%)
Schirrhous	16	(9.09%)	8	(2.37%)
Simplex	3	(1.7%)	0	
"Polygonal cell"	0		59	(17.46%)
"Spheroidal cell"	1	(0.57%)	0	
Malignant tumour; NOS	0		2	(0.59%)

Results

The results are tabulated in Tables 1–4. Variables may be grouped into two broad categories. Firstly, there may be objective failure to apply basic macroscopic and microscopic techniques, of which the most important are recording of tumour size, contour, completeness of excision, vascular invasion, identification of normal and tumour containing axillary lymph nodes and description of the normal breast. Secondly, there may be subjective variation in observer interpretation, mainly of the histopathological type and grade of tumour, or lymph node reaction patterns.

The failure to record tumour size in all cases (Table 1) is probably due in part to the fact that some tumours are diffuse in nature, and the piecemeal presentation of others for cryostat diagnosis, rendering accurate measurement difficult. However, description of tumour contour in only one-fifth of cases indicates poor technique. Although colour and consistency were not part of our detailed analysis, the subjective impression is that these factors were just as poorly described. Similarly, the low percentage of cases where the margin of excision was defined indicates poor macroscopic and microscopic technique. The figures are worse than would appear at first since a significant

Table 3 *Assessment of axillary lymph nodes*

	Chase Farm Hospital		The London Hospital	
Number of mastectomies	176		338	
Lymph nodes included	139	(78.98%)	224	(72.19%)
Sections taken	138	(99.28%)	243	(99.59%)
Mean number identified	6.86		4.84	
Range	1-17		1-18	
Divided in levels	93	(66.91%)	36	(14.75%)
Number of cases with metastases	54	(38.85%)	138	(56.56%)
Mean number of metastases identified	3.5		3.05	
Range	1-12		1-14	
Reactive changes recorded	42	(30.22%)	33	(13.52%)

Table 4 *Assessment of the nipple and normal breast*

	Chase Farm Hospital		The London Hospital	
Number of mastectomies	176		338	
Type of mastectomy described	7	(3.98%)	18	(5.33%)
Normal breast sampled	70	(39.77%)	274	(81.07%)
Nipple included with mastectomy specimen	165	(93.75%)	321	(94.97%)
Nipple sections taken	68	(41.21%)	309	(96.26%)
Paget's disease identified	4	(2.42%)	9	(2.8%)

number of cases were only assessed macroscopically, microscopic extension may therefore have been missed. Identification of lymphatic and blood vessel invasion is subject to considerable inter-observer variation in identification⁶ but our figures for blood vessel invasion fall far short of the 35% claimed by Weigand *et al*⁷ and could undoubtedly be improved by careful search of a representative number of sections, possibly with the use of elastic stains. Lymphocytic infiltration of the tumour is of disputed prognostic significance^{8,9} and many pathologists would consider its assessment of little practical relevance.

Lymph nodes were sampled in all but two cases. The differing numbers of cases identified are all probably related in part to minor differences in surgical technique as well as dissection of the surgical specimen. The total number of lymph nodes involved is now considered to be more important than the level of spread⁸ and the former information was available in 97% of our reports. The difference in the number of cases with metastases may be due to later disease presentation at The London Hospital.

The gross specimens were generally adequately described but in very few was the type of mastectomy specified, probably due to lack of familiarity with the precise extent of the various surgical procedures. Sectioning of the macroscopically normal breast provides minimal prognostic information and is useful mainly for research purposes. Nevertheless, in our view it is part of the complete pathological assessment of a mastectomy specimen, although the selective sectioning of cases at Chase Farm Hospital

and to a lesser extent at The London Hospital, while unsatisfactory, cannot be considered a serious clinical fault. It is interesting to note the similar incidence of Paget's disease of the nipple, at the two centres, which suggests that this disease is recognisable macroscopically.

Recording of histological grade in only half the cases is clearly unsatisfactory, allowing for the fact that a grade is not usually assigned to carcinoma-in-situ and sub-groups such as colloid and medullary carcinomas. Furthermore, such terms as "average differentiation" and "not very well differentiated" add nothing to already arbitrary divisions of an histological spectrum. The figures show perhaps remarkable concordance in grading, but there was no particular relation between histological type and grade, moderately and poorly differentiated tumours being more or less randomly distributed between the invasive ductal; "not otherwise specified", carcinoma and adenocarcinoma categories.

The number of sub-categories of histological diagnosis in Table 2 is the result of simultaneous usage of the traditional morphological and more recent histogenetic classification at both hospitals and is a reflection of the reporting of routine surgical material over a period of years by 17 different pathologists. Closer analysis of the data revealed no particular trend in usage of diagnostic categories during the period.

Reactive lymph node patterns were only recorded in a small proportion of cases (Table 2) and suffered from the use of widely varying and poorly quantified terminology.

Discussion

This study has revealed deficiencies in the application of basic macroscopic and microscopic techniques to the histopathological assessment of mastectomy specimens. To be of maximum value to the clinician in estimating prognosis and planning adjuvant therapy, the ideal histopathology report on a mastectomy should contain an accurate assessment of all prognostically important variables, the best recognised of which¹⁻⁸ have been discussed above. Recognising the need for greater uniformity in reporting of mastectomy specimens, the Pathology Working Group of the Breast Cancer Task Force of the American National Cancer Institute¹⁰ published a guide to the standardised management of breast specimens in 1973. This remains an excellent treatment of the subject and has been adapted by Rosai in his guide to handling surgical specimens.¹¹ Clearly, rigorous adherence to this scheme would result in a much more uniform assessment of mastectomy specimens, and careful attention at the surgical cut-up to objective variables such as tumour size and axillary lymph nodes would result in improved performance in these aspects of reporting. However, these measures would not solve the problem of widely different interpretation of subjective variables such as histological type and grade.

No classification of breast cancer is perfect⁵ and none has gained widespread acceptance.¹¹ However, the use of outmoded descriptive terminology such as "fibrous and trabecular adenocarcinoma", "sclerosing adenocarcinoma", "polygonal or spheroidal cell carcinoma", "carcinoma simplex" and "scirrhous carcinoma" should now be abandoned.¹¹ These and other similar terms mainly reflect the difficulty in diagnosis of lobular carcinoma and the subclassification of carcinomas with diffuse fibrosis, which include both lobular and ductal types.⁵ The incidence of invasive lobular carcinoma varies widely in the literature, ranging from 0.7 to 20%,¹² reflecting the difficulty in defining this entity. In two recent studies which include more recently recognised variants of invasive lobular carcinoma, the incidence was found to be 14.7%,¹² and 10.3%.¹³ In the opinion of Martinez and Azzopardi¹² an incidence of less than 8% indicates that diagnostic criteria need revising. Our figures of 1.7% and 1.5% are apparently too low and are an indication for re-examination of diagnostic criteria, with particular reference to the solid, alveolar, trabecular and tubular variants of invasive lobular disease described since these reports were made.¹²⁻¹³ The correct classification of most of the remaining tumours with productive fibrosis should follow naturally on the recognition of lobular variants, although true mixed

lobular and ductal types exist, and some carcinomas will always remain unclassifiable.⁵⁻¹²

Interpretation of histological grade in breast cancer is highly subjective. Most formal grading systems are based more or less closely on the principles outlined by Bloom and Richardson¹⁴ but Delides *et al*¹⁵ have recently demonstrated considerable intralaboratory variation in application of the WHO grading system¹⁶ itself based on that of Bloom and Richardson. Our data demonstrate a similar variation. Lymph node reaction patterns are not easy to define and quantify in a reproducible way but the more widespread adoption of a system such as that of Tsakraklides *et al*¹⁷ would bring greater uniformity to this area of reporting.

These problems are not confined to breast cancer. Significant discrepancies in the reporting of epithelial abnormalities of the bladder¹⁸ and uterine cervix¹⁹ and cancer of the large bowel² have been convincingly demonstrated and this situation probably applied to most fields in histopathology. Quality control systems in clinical biochemistry, haematology and bacteriology are of proven value³⁻²⁰ but histopathology and cytology have been slow to apply routine schemes spanning more than one department. A major problem is the existence of far more subjective variables in histopathology and cytology than in the other laboratory specialties.

This study and that of Blenkinsopp *et al*² revealed unsuspected deficiencies in the routine reporting of common specimens and will hopefully lead to a long term improvement in standards. While slide clubs, slide seminars, "workshops" and other similar forms of peer review have proven value in improving standards in reporting²⁰ they suffer from the disadvantage of taking the sections out of the routine framework, where pressure of work needs to be taken into account, and cannot be an adequate substitute for the type of programmes in routine use in the other pathology disciplines. Computerisation of reporting and record keeping in histopathology is a recent development²¹⁻²² permitting certain "standard" questions to be asked about surgical specimens. We believe that it has great potential for the development of an interlaboratory quality control system.

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References

- 1 Henderson IC, Canellos GP. Cancer of the breast. The past decade. *N Engl J Med* 1980;**302**:17-30, 78-90.

- ² Blenkinsopp WK, Stewart-Brown S, Blesovsky L, Kearney G. Histopathology reporting in large bowel cancer. *J Clin Pathol* 1981;**34**:509-13.
- ³ Morson BC. Editorial: Histopathology reporting in large bowel cancer. *Br Med J* 1981;**283**:1493-4.
- ⁴ Frei JV, Morson BC. Medical audit of rectal biopsy diagnosis of inflammatory bowel disease. *J Clin Pathol* 1982;**35**:341-4.
- ⁵ Azzopardi JG. Problems in breast pathology. In: Bennington JL, ed. *Major problems in pathology*. London, Philadelphia, Toronto: Saunders, 1979;**11**:240-1.
- ⁶ Gilchrist KW, Gould VE, Hirschl S, et al. Inter-observer variation in the identification of breast carcinoma in intramammary lymphatics. *Hum Pathol* 1982;**13**:170-2.
- ⁷ Weigand RA, Isenberg WM, Russo J, Brennan MJ, Rich MA. Blood vessel invasion and axillary lymph node involvement as prognostic indicators for human breast cancer. *Cancer* 1982;**50**:962-9.
- ⁸ Hutter RVP. The influence of pathologic factors on breast cancer management. *Cancer* 1980;**46**:961-76.
- ⁹ Fisher ER, Kotwal N, Hermann C, Fisher B. Types of tumour lymphoid response and sinus histiocytosis. Relation to 5 year disease-free survival in patients with breast cancer. *Arch Pathol Lab Med* 1983;**107**:222-7.
- ¹⁰ Friedell GH, Gallager HS, Hartman WH, et al. Standardized management of breast specimens recommended by Pathology Working Group, Breast Cancer Task Force. *Am J Clin Pathol* 1973;**60**:789-98.
- ¹¹ Rosai J. *Ackerman's Surgical Pathology* 6th ed. St Louis: Mosby, 1981; 1087-149.
- ¹² Martinez V, Azzopardi JG. Invasive lobular carcinoma of the breast: incidence and variants. *Histopathology* 1979;**3**:467-88.
- ¹³ Dixon JM, Anderson TH, Page DL, Lee D, Duffy SW. Infiltrating lobular carcinoma of the breast. *Histopathology* 1982;**6**:149-61.
- ¹⁴ Bloom HJG, Richardson WW. Histologic grading and prognosis in breast cancer. A study of 1409 cases of which 359 have been followed for 15 years. *Br J Cancer* 1957;**2**:353-77.
- ¹⁵ Delides GS, Garas G, Georgouli G, Jiotziotis D, Lecca J, Liva T, Elemenoelou J. Intralaboratory variations in the grading of breast carcinoma. *Arch Pathol Lab Med* 1982;**106**:126-8.
- ¹⁶ Scarff RW, Torloni H. Histological typing of breast tumours. In: *International histological classification of tumours* No 2, Geneva: World Health Organization, 1968;19-20.
- ¹⁷ Tsakraklides V, Olson P, Kersey JH, Good RA. Prognostic significance of the regional lymph node histology in cancer of the breast. *Cancer* 1974;**34**:1259-67.
- ¹⁸ Ooms ECM, Anderson WAD, Alons CL, Boon ME, Veldhuizen RW. Analysis of the performance of pathologists in the grading of bladder tumours. *Hum Pathol* 1983;**14**:140-3.
- ¹⁹ Cocker J, Fox H, Langley FA. Consistency in the histological diagnosis of epithelial abnormalities of the cervix uteri. *J Clin Pathol* 1968;**21**:67-70.
- ²⁰ Langley FA. Quality control in histopathology and diagnostic cytology. *Histopathology* 1978;**2**:3-18.
- ²¹ Swettenham KV, Nickols C, Berry CL. Computer programs in histopathology record keeping. *J Clin Pathol* 1982;**35**:40-4.
- ²² Briggs JC, Ibrahim NBN, Mackintosh I, Norris D. Practical use of a word processor in a histopathology laboratory. *J Clin Pathol* 1982;**35**:151-8.

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