

Pathological prognostic factors in breast carcinoma

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ABSTRACT

Objective: Pathological prognostic factors in breast cancer are now widely used to predict biological behavior of cancer and to plan its effective management. In this paper, we attempt to evaluate the reports from our histopathology laboratory spanning over a period of 4 years, to assess completeness in recording these factors. It will enable us to improve and standardize reporting on breast cancer.

Methods: The pathology reports of primary carcinoma of the breast diagnosed in our laboratory from 1st January 1994 to 31st December 1997 (4 year period) were reviewed for details on tumor size, histological type and grade, presence or absence of tumor emboli in vascular channels, proximity of the tumor to resection margins and lymph node status.

Results: Tumor size was not recorded in 1 case each in 1994, 1995 and 1996 and 2 cases in 1997. Histological type was mentioned in all cases in 1995 and 1997. It was not mentioned in 1 case in 1994 and 3 cases in 1996. Out of 77 cases with axillary clearance, the total number of

lymph nodes was recorded in 83% of cases. The number of lymph nodes with metastasis was recorded in 71% of cases.

Conclusion: Our histopathology laboratory receives the majority of surgical biopsies carried out in the Sultanate of Oman. During our study period we received a total of 45354 biopsies. From 1993 onwards, pathological prognostic factors of breast carcinoma were incorporated in our pathology reports following the publication of major and leading articles regarding the same. This study shows an improvement in the quality of reports after introducing this concept in 1994. This study clearly reveals the necessity for written protocols to be established, to standardize and improve the quality of reporting.

Keywords: Carcinoma breast, prognostic factors, tumor size, histological type, grading, tumor emboli, proximity of tumor to resection margins, lymph node status.

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Pathological prognostic factors in breast cancer are now widely accepted and are used to predict biological behavior of the cancer and to plan its effective management. The essential factors expected in a pathology report on breast cancer are tumor size, histological type, grade and lymph node status. Histopathologists are expected to include these factors plus other important observations like involvement of resected margins, vascular/lymphatic tumor emboli etc. in their reports. Here, we attempt to evaluate reports on breast cancer from our histopathology laboratory regarding completeness of

recording this information. This study will enable us to detect drawbacks in our reports and also in turn guide us to formulate ways to improve and standardize reporting on breast cancer. In a general histopathology laboratory like ours, where a wide variety of biopsies are being reported daily, to maintain quality such a study will be complimentary. In other words this is an attempt at auditing a particular group of pathology reports issued by general histopathologists dealing with a variety of biopsies.

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Methods. All new cases of primary carcinoma of breast diagnosed from 1st January 1994 to 31st December 1997 (4 year period) were identified through the computerized SNOMED coding system of the histopathology laboratory of the Royal Hospital, Muscat. From these, excision biopsies [lumpectomy] and mastectomy [simple/radical] cases were taken for further analysis. Tru-cut and wedge biopsies were excluded. Cases with axillary clearance were noted separately to study the information on lymph nodes. For each case under analysis, pathology reports were reviewed for information on: tumor size, histologic type and grade, the presence or absence of tumor emboli in vascular channels and comment on the proximity of tumor to the surgical resection margin. If a report stated that it was not possible to assess a specific histologic feature, it was taken as a positive comment. Reports on axillary clearance were analyzed for the following information i.e., recording of total number of lymph nodes sampled, number of lymph nodes involved and reasons for not stating the number of lymph nodes involved.

Results. One hundred and two cases of primary carcinoma of breast were analyzed during the 4 year period of study. Table 1 shows the total number of cases for each year and the nature of specimens received. Table 2 shows the different histological types of carcinoma breast during that period. Table 3 shows the number of reports in which tumor size, histological type and grade, vascular/lymphatic emboli and comments on resected margin are recorded. The number of cases in which axillary clearance was carried out, and the details of information recorded on axillary lymph nodes is shown in Table 3.

In 1994 only half the number of cases had axillary clearance carried out either along with lumpectomy or simple/modified mastectomy (10 out of 21 cases i.e. 50%); whereas in 1995, 1996 and 1997, 20 cases (83%), 22 cases (88%) and 25 cases (78%) had axillary clearance carried out. Table 3 shows frequency of recording of histological prognostic factors. Out of 102 cases, tumor size was mentioned in 97 cases (95%). Histological type was mentioned in 99 cases (97%). Grading of tumors was carried out in 82 reports (80%), tumor emboli were recorded in 51 reports (50%) and proximity of the tumor to resection margins was mentioned in 98 cases (96%). Tumor size was not recorded in 1 case each in 1994, 1995 and 1996, and in 2 cases in 1997. Histological type was mentioned in all cases of 1995 and 1997. In 1 case in 1994, it was mentioned in the report that it was difficult to give a definite histological type, but favouring lobular carcinoma.* In 1996, out of 3 cases** one was given as 'Invasive carcinoma of uncertain type'. In the two other cases, the

Table 1 - Nature of specimen.

Year	Simple Mastectomy/ Sector resection/ lumpectomy only	Lumpectomy carried out along with sampling of lymph nodes only	Lumpectomy/ Mastectomy with axillary clearance	Total
1994	9	2	10	21
1995	4	-	20	24
1996	3	-	22	25
1997	6	1	25	32

Table 2 - Histological types - total of 102 cases.

Histological types	1994	1995	1996	1997
Invasive ductal Ca	14	11	14	18
Invasive carcinoma -NOS	3	7	3	1
Invasive lobular Ca	2	0	1	7
Mixed ductal-lobular Ca	-	4	-	1
Mixed tubulo-lobular Ca	-	1	-	-
Colloid/Mucinous Ca	-	-	-	2
Adenoid cystic Ca	-	-	-	1
Medullary/Atypical medullary Ca	-	-	1	1
Intraduct Ca	1	1	3	1
Equivocal Diagnosis	1*	-	3**	-
TOTAL NUMBER	21	24	25	32
Ca - Carcinoma */** See text				

Table 3 - Frequency of recording histological prognostic features (except lymph node status). Number of cases - total 102.

Year	Total number	Tumor size mentioned	Histological type recorded	Grade	Tumor emboli	Resected margin
1994	21	20	20	13	15	19
1995	24	23	24	20	10	23
1996	25	24	23	19	9	25
1997	32	30	32	30	17	31
TOTAL	102	97	99	82	51	98

Table 4 - Recording of lymph node involvement.

Year	Total number of specimens with axillary clearance	Number of specimens in which number of lymph nodes were			Number of cases with lymph nodes showing tumor		Negative cases	Remarks
		Recorded	Discrete but not recorded	Not responding due to matting	Recorded	Not responding due to matting		
1994	10	8	-	2	8	2		* in 2 of these specimens
1995	20	12	4*	4	12	4	4	total number was not counted, but involved lymph nodes were counted
1996	22*	19	2	-	17	-	4	* in one specimen, no lymph nodes were identified in the axillary fat
1997	25	25	-	-	18	-	7	

Pathologists had difficulty in deciding between atypical medullary carcinoma and infiltrating duct carcinoma NOS (Not otherwise specified).**

Table IV shows details of lymph node involvement with regard to total number of lymph nodes counted and total number of lymph nodes showing tumor deposits. Out of a total of 77 specimens with axillary clearance, the total number of lymph nodes was recorded in 64 cases (83%). The number of lymph nodes showing metastasis was recorded in 55 cases (71%). In 6 cases, the number was not recorded due to matting. In 15 cases, the lymph nodes did not show any evidence of metastasis. In 6 cases, the total number was not recorded due to no obvious reasons.

Discussion. Effective management of patients with breast cancer depends heavily on the quality of histopathology reporting. The criteria for recording these features became well defined by 1991-1993.^{1,2} More reviews and study reports appeared by 1995.^{3,4,5} The optimum, prognostically important, parameters needed for diagnosis include: Tumor size, differentiation (tumor type and histological grade) and lymph node status. Additional useful information is provided by presence or absence of vascular/lymphatic emboli and comments on the proximity of the tumor to the resection margin as well as hormone receptors studies.

The histopathology laboratory of the Royal Hospital, Muscat, the Sultanate of Oman receives the majority of surgical biopsies carried out in the various hospitals of the Sultanate, except some cases from the Sultan Qaboos University Hospital, Royal Oman Police Hospital and Armed Forces Hospital. Hence we conclude that our laboratory provides the major histopathology service for the whole country. The nature of specimens received in our laboratory

ranges from endometrial curettages, endoscopic biopsies and neuropathology cases to resected specimens, i.e. it is a general histopathology laboratory with no subspeciality. During the study period from 1994-1997, we received a total of 45354 specimens. Five-six pathologists were involved in reporting on these biopsies. The junior pathologists (all holding postgraduate degrees) do the routine histopathology work, consulting the 2-3 senior pathologists whenever necessary. All cases of malignancies are reported after consulting the concerned senior pathologist. In 1993, we started regularly incorporating pathological prognostic features in our reports on breast carcinoma especially regarding histological types and grading, following the publication of articles on these factors.^{1,2} By the end of 1995, the hospital tumor board was formed including a panel of Oncologists, Surgeons, Pathologists and Radiologists. The comments on the pathology reports made in the board meetings were also discussed in our departmental staff meetings which helped to improve the quality of our reports. Recent studies have indicated that not all reports issued by general histopathologists contain information essential for clinical management.⁵ So, an audit was carried out on all our reports during a period of 1994-1997, for assessing the completeness of essential information needed. The completeness of reporting on the 6 important prognostic factors are discussed under separate headings.

Tumor size. In 1994, tumor size was mentioned in 20 reports (95%). In one case, where it was not reported, it was an in-situ ductal carcinoma with suspicious foci of invasion. In 1995, tumor size was recorded in 23 cases (95%). In one case, where it was not recorded, it was again a case of in-situ ductal carcinoma with foci of invasion. In 1996, it was

reported in 24 cases (95%) and in one case it was overlooked by the Pathologist. In 1997, it was reported in 30 cases (93%). In 2 cases, where tumor size was not mentioned, one report was of multifocal lobular carcinoma and in the 2nd case, the diagnosis was queried as a multiple lobular carcinoma.

Histological type. In 1994, 20 reports (95%) recorded the histological type. In one case, it was difficult to type and was reported as favoring lobular carcinoma with foci showing in-situ carcinoma. In 1996, histological typing was carried out in 22 cases (92%). It was not reported in 3 cases** and in two of these reports, the Pathologists mentioned their difficulty in deciding between atypical medullary carcinoma and infiltrating duct carcinoma (NOS). In the third case it was diagnosed as invasive carcinoma of uncertain type.** (Table 2). In 1995 and 1997, histological typing was carried out in all the cases.

Grading. Grading of tumors was carried out in 61% in 1994, 83% in 1995, 76% in 1996 and 92% in 1997. On evaluating these results, it was noted that grading was mostly overlooked in cases of in-situ carcinomas (4 cases), invasive carcinoma with foci of in-situ carcinoma (1 case), mixed tubulo lobular (1 case), lobular (1 case) and mucinous carcinoma (1 case). This pattern shows that grading was mostly not carried out in cases with in-situ carcinomas and carcinomas of special types. In 12 cases, grading was overlooked by the Pathologists.

Tumor emboli. Tumor emboli were recorded in 51 cases (50%) only out of the total 102 cases. In 6 reports, it was mentioned that tumor emboli were not seen. This can be considered as positive comment. In the remaining 45 cases, 20 reports had further classification it as vascular emboli and in 18 reports recorded as lymphatic emboli.

The under reporting of the presence or absence of tumor in vascular or lymphatic channels may reflect the difficulty in recognizing vascular/lymphatic invasion within carcinomas, or the practice of not recording negative findings by some pathologists.⁶

Proximity of tumor to resection margins. The proximity of tumor to resection margins was commented upon in 19 cases (90%) in 1994, 23 cases (95%) in 1995, 25 cases (100%) in 1996 and 31 cases (96%) in 1997.

Lymph node status. The total number of lymph nodes were counted in each case and recorded in the reports in 64 cases (83%). In 6 cases (7%), the total number of lymph nodes could not be counted due to matting. In 6 cases (7%) the total number was not recorded by the Pathologists for no obvious reasons. For lymph nodes with metastatic deposits, the total number of lymph nodes involved in each case was

recorded in 55 cases (71%). Counting was not possible due to matting in 6 cases (7%). In 15 cases (19%), the lymph nodes did not have tumor deposits.

This survey on completeness of histopathology reporting in breast cancer shows that an improvement was seen in reports after introducing the new concept of prognostic factors in histopathology reporting, in 1994. This improved further in 1995. In 1996, the performance however deteriorated slightly. This may be explained by the fact that over a period of time, the Pathologists tend to overlook these factors as the workload increases. Another cause for this may have been the fact that new appointees were not made aware of the presence of guidelines being followed in the Department. However, 1997 has shown improvement in the quality of reporting. This study clearly shows the necessity for written protocols to be established which could produce dramatic improvement and maintain the quality of reporting thereby preventing a slump in the reporting standards. Comparison of reports with existing standards is known to have a significant effect on the reporting of important pathological features in histopathology practice.⁵ It is also important to repeat the audit process to maintain the high standards of reporting.

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