Quality Assurance of Histopathologic Diagnosis in the British Army: Role of the Army Histopathology Registry in Completed Case Review

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SUMMARY: The purpose of this study was to assess the clinical and pathological value of reports resulting from review of all completed surgical pathology cases submitted to the Army Histopathology Registry (AHR). All histopathological cases completed in the British Army are sent to the AHR for archiving; prior to placing cases in the archive both microscopic material and submitted reports are reviewed by staff of the AHR. A "nonagreed" report is produced for those cases in which the reviewing pathologist has a dissenting opinion or for which he thinks other comments may be helpful. All nonagreed reports produced over a 19 month period were subjected to a further pathological and clinical review. The original surgical pathology reports were compared with AHR reports and the significance of the differences in diagnosis assessed. During the study interval, 4.0% of total cases reviewed were identified as nonagreed record cases. The clinical and pathological reviews placed the nonagreed cases into significant categories in 2.1% and 1.9% of instances respectively. These findings suggest that nonselected review of completed surgical pathology cases identifies a significant proportion of cases for which dissenting opinions may have important clinical and pathological consequences.

(Key words: surgical pathology; quality assurance).

Introduction

The Army Histopathology Registry (AHR), located at the Royal Army Medical College, Millbank, London is the central repository for all histopathological material obtained throughout the British Army. In addition to this central repository function, the AHR is fully integrated into the reporting of both surgical pathology and cytology for the British Army. All cytology material submitted to the AHR is received as either unstained prepared slides or tissue fluids; the smears are then screened and final reports prepared and distributed.

In contrast, surgical pathology cases may come in any one of three distinct request modes. Firstly, formalin fixed wet tissue may be sent directly to the AHR for a primary histopathological opinion (prime opinion case); such specimens invariably arrive from relatively remote locations where local case loads are insufficient to warrant a full time, in-post histopathologist (eg Nepal, Falkland Islands). Secondly, cases may be referred to the AHR as completed cases for which the submitting

pathologist desires a second opinion (secondary opinion case). Finally, by Army Regulations, all other surgical pathology cases completed by pathologists throughout the Army are forwarded to the AHR for final review and archiving (record case).

Both secondary opinion cases and record cases typically arrive at the AHR with a copy of the completed surgical pathology report, a set of routinely stained microscopic sections and all remaining paraffin embedded tissue. Prior to placing record cases in the AHR's archive, a final review of microscopical material and surgical pathology reports is conducted by a member of the AHR staff. If the reviewing histopathologist is in essential agreement with the submitting pathologist, the case is filed (agreed record case). If, on the other hand, the reviewing pathologist has a sufficiently different opinion regarding the interpretation of case material, or if he thinks that an instructional or educational comment is desirable, a report is sent to the submitting pathologist detailing the alternative opinion or additional features (nonagreed record case).

All prime opinion and secondary opinion cases result in generation of a formal written AHR opinion. These relationships are graphically represented in Figure 1.

In recent years, there has been increased interest in quality assurance procedures for surgical pathology^{1,2,3,4,5,6,7}. Nonselected review of surgical pathology cases by histopathologists is one tool which has been shown to identify a proportion of cases for which differences of diagnostic opinion may be significant⁷. Because of the regulatory requirement to submit all completed surgical pathology cases to the AHR for central archiving, the AHR staff have been conducting a nearly total re-examination of cases completed by pathologists throughout the British Army for many years.

The purpose of this report is to examine retrospectively the results of completed case review in the AHR over a 19 month period.

Methods

All cases coded as nonagreed record cases for the period 1 January 1984 to 20 August 1985 were identified for inclusion into the study. For all cases in which records were complete, copies of both the original surgical pathology report and the AHR report were reproduced and the paired reports were subjected to a further pathological and clinical review. One of us conducted the pathological review (MR), and another (MP) an independent clinical review. During this process, the two reports were carefully examined, compared, and the differences evaluated with emphasis placed on the pathological or clinical significance of alternative diagnoses. Microscopic material was not re-evaluated.

The cases were coded A, B, C or D by the reviewing pathologist with the letter codes defined as follows:

A: No significant change in classification of disease or guidance to clinician. Report possibly of educational intent.

B: Minor change in diagnosis or guidance.

C: Significant change in diagnosis or guidance.

D: Very significant change in diagnosis or guidance.

Similarly, the cases were classified during the clinical review as follows:

0: No clinical significance.

1: Intermediate clinical significance.

2: Definite/substantial clinical significance.

Further, each case was assigned an indicator of clinical urgency with "N" indicating "non-urgent" and "U" indicating "urgent".

During the study period, the AHR was routinely staffed by two pathologists: one consultant level United States Army exchange officer and one consultant or senior specialist level British officer.

For purposes of comparison, all secondary opinion cases submitted during the study period were identified and tabulated.

Results

During the interval of the study, 12,934 record cases were filed. Of these, 521 (4.0%) were identified as nonagreed record cases. The nonagreed record cases were submitted to the AHR from a total of 20 different pathologists. The qualifications and experience level of those contributing nonagreed record cases varied considerably, some being senior pathologists with many years experience, while others were relatively junior pathologists.

The matrix of result possibilities along with the number of cases classified into each is shown in Table 1. Various conditional probabilities calculated from the resultant data are shown in Table 2.

During the study period, 1116 secondary opinion cases were accessioned and reported by the AHR.

Discussion

Quality of diagnosis in histopathological practice depends upon an array of variables, many of which are only partially under control of the histopathologist. Completeness and timeliness of correlative clinical information, selection and preparation of the biopsy site, specimen procurement with proper fixation and orientation, production of high quality microscopic preparations, timely and typographically corrected surgical reports, and availability of appropriate reference material are some of the areas where the histopathologist must exercise his communication and management skills to maximise the quality of his diagnostic opinion. Several methods have been suggested whereby the quality and consistency of the direct professional component of histopathology consultations may be enhanced. This paper describes the various functions of the Army Histopathology Registry and evaluates one of these, namely, review of previously completed surgical pathology consultations.

We think it is important to emphasize that review of completed cases prior to archiving is integral to the practice of histopathology in the British Army and is not a procedure instituted for the purposes of this study only. Army pathologists rendering histopathological opinions are all fully aware that their case work is reviewed, and must themselves specify for each case whether that particular case is referred to AHR for secondary opinion or simply as a record case. Submitting pathologists are advised that consultative opinions from the AHR should not be regarded as the "correct opinion" but rather "another opinion" and such reports should ideally prompt review of the case material with final results forwarded to clinical personnel as indicated. In our opinion, the submitting pathologist has final responsibility to his clinical colleagues and indeed the patient for the pathological opinion upon which clinical management may depend.

During the interval under study, 1116 cases were referred to the AHR for secondary opinion compared

Organisation of Army Histopathology

Figure 1.

with only 521 for which AHR review of record cases necessitated a consultative (nonagreed record) opinion.

Thus, 68% of the further opinions resulting from completed cases sent to the AHR were requested by the submitting pathologist. Considering that many Army pathologists are assigned to single handed positions in relatively small hospitals, we think that figure represents a very reasonable selection rate. Factors which influence the decision to send cases for secondary opinion versus for record only were not studied but would obviously be of some interest.

Since secondary opinion cases are given priority over record cases in handling at the AHR, the turn around time for such cases is typically less than that for record cases. Moreover, it should be noted that there is no additional expense to the submitting pathologist or the

patient for choosing to send a case to the AHR for secondary opinion rather than for record. On the other hand, it seems possible that some submitting pathologists may experience embarrassment or feelings of inadequacy when sending cases for further consultation. Also, the certainty or confidence of the submitting pathologist in his diagnostic opinion probably plays an important role in the decision to forward cases for record versus those sent for a secondary opinion.

The overall rate at which nonagreed record reports were produced from cases submitted for record only was about 4.0% during the interval of the study. While that figure may at first appear high, it must be remembered that upon review, 174 cases were placed in the A and O categories for pathological and clinical significance (i.e. not significant). Also, a number of nonagreed record

Table I
Pathological and Clinical Review Grades
of Nonagreed Record Cases

Clinical/ Pathological	0	1	2	U	N	Total
A	174	66	31	18	253	271 (52.0)
B	63	77	33	9	164	173 (33.2)
C	17	8	43	27	41	68 (13.1)
D	0	0	9	9	0	9 (1.7)
Total	254 (48.8)	151 (29.0)	116 (22.3)	63 (12.1)	458 (87.9)	521

(%) as % of total cases.

reports primarily of educational intent were graded in the B and 1 categories. Data relating to the frequency of non-concurrence amongst pathologists reviewing colleagues' work in unselected cohorts of cases is scarce. One recent paper⁷ suggests that non-concurrence rates among cases subjected to review by multiple colleagues may be as high as 7.8%; although cases for which the alteration in diagnosis was considered significant comprised only about 0.96% of the total. Our clinical review grade 2 and pathological grade C or D cases comprise in aggregate 141 cases or 1.1% of the total. These figures compare well with previously reported data⁷.

The clinical review of our nonagreed record cases resulted in classifying the difference in AHR and the submitted diagnosis as clinically significant (clinical review categories 1 or 2) in 51.3% of cases. Of the cases reviewed, 22.3% were allocated to clinical category 2 and 12.1% were placed in the clinically urgent group. The data from the pathological review are similar, with 48.0% of cases in pathological categories B, C or D. Thus, both the clinical and pathological reviewers put about half of the cases evaluated into one of the significant categories. It is of note that all pathological group D cases were assigned a clinical category of 2/U. Further, as might be expected, there was a tendency for higher pathological grades to be associated with higher clinical grades and vice versa. It should be mentioned that at least one pathologist (ie the reporting pathologist in the AHR) thought that the difference in content of the nonagreed record report warranted preparation of a written opinion, and thus the pathological review described in this paper represents a further opinion on cases already vetted for pathological significance.

Despite the association between significance level assigned to each case in both the pathological and

clinical reviews, it is important to note that the correspondence is not complete. For example, of those cases which were reviewed and placed into pathological category A, 7% were assigned to a clinical urgent category and 36% were assigned to clinical categories 1 or 2. Conversely, of those in the clinical category 0, 31% were in pathological categories B, C or D. Obviously, some of these differences may be reviewer and specialty specific; for example, benign skin lesions which were completely excised were invariably graded 'O' in clinical significance even though pathologically distinct lesions were under consideration. Nevertheless, the implication of these findings is that neither a single clinical nor pathological reviewer is able to identify completely the significance of all differences of opinion. Furthermore, attention should be drawn to the fact that as far as the clinical utility of further pathological opinions is concerned, the clinical significance of some pathological reports may well be dependent on the treatment plan for the patient in question, the structure of which may or may not be known to the reporting pathologist. This can be a particular problem for pathologists rendering opinions on cases originating from geographically remote locations.

Finally, we wish to mention that this report deals with the more positive results of the functioning of the Army Histopathology Registry and makes no attempt to assess the cost of completing review of record cases.

In summary, the functioning of the Army Histopathology Registry is outlined, and results from a retrospective 19 month study of nonagreed record cases is presented. It is hoped that the data presented augments the rather meagre statistical data available concerning review of previously completed surgical pathology cases. The Army Histopathology Registry has been functioning as outlined in this paper for many years and has, we think, performed a valuable consultative and quality assurance function for British Army Histopathology.

Table II
Various Conditional Probabilities Relating to the Pathological
and Clinical Review of Nonagreed Record Cases

*P (B or C or D) 2	=	0.73
P (B or C or D) 1	=	0.56
P (B or C or D) U	=	0.71
P (1 or 2) D	=	1.00
P (U) D	=	1.00
P (1 or 2) B or C or D	=	0.68
P (U) A	=	0.07
P (1 or 2) A	=	0.36
P (B or C or D) 0	=	0.31
P (0 or 1) A	=	0.89

* Example: Probability of pathologic grade B or C or D amongst cases placed in clinical grade 2 only.

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ACADEMIC ACHIEVEMENTS

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