Evaluation of turnaround times as a component of quality assurance in surgical pathology

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Abstract

Objective. As a part of a quality assurance program in anatomic pathology, a study was conducted to determine intralaboratory components of turnaround time according to specimen type, and to compare the present data with results obtained 2 years after implementing the program.


Setting. Surgical specimens and biopsies accessioned at the Department of Anatomic Pathology of a 913-bed acute-care teaching hospital in the city of Barcelona, Spain.

Study sample and participants. The sample was selected from the total number of biopsies and surgical specimens accessioned on specific days by applying a table of random numbers. Data were collected from the request forms, final report copies, and laboratory registries of turnaround time-points by two resident physicians.

Interventions. All relevant information concerning turnaround times was recorded following a standardized questionnaire developed specifically for the study.

Main outcome measures. The basal determination for turnaround time for pathologic diagnosis in 1992 was 5.7 days.

Results. The mean turnaround time for the 501 specimens was 6.24 days (SD = 3.16; range = 2—27 days). Turnaround times varied substantially according to specimen type. Endoscopic biopsy samples were completed by 5.19 days (SD = 2.18). Bone biopsies were finalized within a mean of 8.11 days of receipt (SD = 3.18). For the diagnosis of lymphoproliferative disorders, most lymph node specimens required special histochemical or immunohistochemical stains. The mean turnaround time for results reporting/results transmittal to the ordering physician varied between 1.14 and 1.66 days. The 1992 annual mean turnaround time for a total of 14,862 surgical pathology specimens was 5.7 days as compared with 4.2 days for a total of 17,931 surgical pathology specimens in 1994.

Keywords: anatomic pathology, biopsy, quality assurance, surgical specimen, turnaround time

One of the fundamental objectives of quality assurance programs in anatomic pathology is to provide the referring physician with an accurate, timely, and clinically relevant diagnostic report based on the interpretation of optimal technical preparations [1]. The quality of this service is therefore related, among other factors, to timeliness of result reporting. For a surgical pathology report to be useful to the clinician, results should be available in a timely fashion.

Although the turnaround time has been identified by a consensus process of quality assurance experts as one of the indicators of laboratory quality [2—4], most attempts to assess quality in histopathology concentrate on technical and procedural elements and diagnostic accuracy. In recent years, some studies have examined turnaround times and those reports in the literature have focused their discussions on statistical testing [5,6]. Other authors have developed
A descriptive study of 501 surgical pathology specimens (biopsies and surgical specimens) analysed at the department of anatomic pathology of Hospital Clinic i Provincial between January and December 1992, was carried out. This institution is a 913-bed acute-care university hospital in the city of Barcelona, Spain. The hospital has 42 different medical services offering specialized high-technology care which includes a neurosurgery department, a transplantation unit, and a radiation oncology service. The hospitalization area includes 31 different medical services, while the remaining 11 services (department of diagnostic radiology, blood bank, laboratory, department of anatomic pathology, etc.) provide care for both outpatients and inpatients.

A random sample was taken from the total number of 14,862 biopsies and surgical specimens accessioned in the department of Anatomic Pathology on days 2, 12, and 22 of March, June, and September 1992. A table of random numbers was used for selecting the specimens included in the study. Holidays were excluded and substituted by the next working days. Distribution by issuing department and specimen type in this sample was similar to the values for the whole year. All information was collected on a standardized questionnaire developed specifically for the study. Relevant information included the following: issuing service; day of the week; specimen type according to dimensions, diagnostic priority or specific technical requirements (endoscopic biopsy, non-endoscopic biopsy, surgical specimen, lymph node, and calcified tissue); procedure (paraffin embedding and Haematoxylin and Eosin stain, special staining methods, immunohistochemical stains, electron microscopy); accessioning date; signing date; and transmittal date. For lymph nodes specimens, ancillary studies such as flow cytometry or gene rearrangement analysis were not included in the analysis. In these cases, an additional report was delivered following the initial report with a generic diagnosis of the process. For the purpose of the present study only this initial report was considered. Endoscopic biopsies included bronchial, transbronchial, digestive tract, genitourinary tract, and uterus and cervix specimens as well as needle biopsies of solid organs. Pre- and post-laboratory time-points of turnaround times were not registered. Review of the original request cards and department copies of the final reports was carried out by two resident physicians who were unaware of the purpose of the study. The number of request forms with machine-generated labels containing patient registration data, name of referring clinician, and a summary of relevant clinical data was recorded in the 1992 sample. The Tissue Committee provided the same information on all cases accessioned in 1994. There were no substantial changes in case mix in the interval between 1992 and 1994. The number of pathologists on staff (n = 12), residents (n = 5), histotechnologists (n = 17), and secretaries (n = 4) did not vary from 1992 to 1994. No changes in laboratory hardware with direct or indirect impact on the activity of the surgical pathology area occurred between 1992 and 1994. The number of cases sent for outside consultation in both time periods was also comparable. Turnaround time analysis was made using the SPSS/PC 4.0 statistical package.

The annual mean turnaround time for all biopsies analysed by the department of anatomic pathology in 1992 and 1994 was provided by the Tissue Commission of the hospital. The turnaround time for each biopsy was obtained by two resident physicians in the department of anatomic pathology and calculated from the date the specimen was accessioned in the laboratory to the date the final report was delivered to the ordering physician. In a single specimen in which the procedure took 123 days, the diagnosis was particularly difficult requiring among other actions, ultrastructural studies and resubmission of biopsies to establish the definitive diagnosis. This outlier case was not included in the final calculations.

Materials and methods

Results

Of the total sample of 501 surgical pathology specimens selected in 1992, 87 (17.4%) corresponded to endoscopic biopsies, 279 (55.7%) to non-endoscopic biopsies, 100 (20%) to surgical specimens, 26 (5.2%) to lymph node biopsies, and 9 (1.8%) to bone specimens. Ninety-seven per cent of samples were only fixed in buffered formal, embedded in paraffin, and stained with Haematoxylin and Eosin. Other special staining methods, such as histochemical or immuno-histochemical stains, ultrastructural examination or special techniques for the assessment of metabolic bone disorders were used in 3% of the samples. During the study period the hospital services that requested a higher number of anatomic pathology studies were obstetrics and gynaecology (28.5% of the overall activity), gastrointestinal and respiratory endoscopy (15.2%), urology (15.1%), and otorhinolaryngology (9.1%).

The mean intradepartamental turnaround times in working days for the 501 specimens are shown in Table 1. There was a 5.0 day standard for turnaround time for surgical pathology reports after accessioning within the laboratory with a range of 2–6 days.

The mean turnaround times from accession to results reporting varied substantially according to specimen type (Table 2). Endoscopic biopsy samples were completed by
Table 1  Mean intradepartamental turnaround times in working days for 501 surgical pathology specimens

<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accession/results reporting</td>
<td>5.00 (2.91)</td>
<td>2–16</td>
</tr>
<tr>
<td>Results reporting/results transmittal</td>
<td>1.24 (1.10)</td>
<td>0–11</td>
</tr>
<tr>
<td>Accession/results transmittal</td>
<td>6.24 (3.16)</td>
<td>2–27</td>
</tr>
</tbody>
</table>

3.86 days. Most of these samples were obtained from patients awaiting for his/her disease to be diagnosed and therefore processed as a priority. Bone biopsies are usually complex requiring decalcification before embedding in paraffin and were finalized within a mean of 6.33 days of receipt. For the diagnosis of lymphoproliferative disorders, most lymph node specimens required special histochemical or immunohistochemical stains. The mean turnaround time for final error check and signature (results reporting/results transmittal) varied between 1.14 and 1.66 days. Total mean turnaround times are shown in Table 2.

The 1992 annual mean turnaround time for a total of 14,862 surgical pathology specimens was 5.7 days as compared with 4.2 days for a total of 17,931 surgical pathology specimens in 1994.

Only 57% of request forms in the 1992 sample met all the accession criteria, as compared with 98.7% of cases in 1994. In the latter, a small proportion of request forms were accepted in spite of lacking machine-generated labels, because patient data had been clearly written.

Discussion

Quality control measures were well established in clinical laboratory operations long before being implemented in anatomic pathology. Although the first comprehensive reports addressing quality control and quality assurance issues began to appear in Australia and the United States in the late 1960s, increasing attention has been focused recently on the quality of diagnostic performance in anatomic pathology certainly related in part to proficiency testing programs [4], accrediting agencies, professional organizations, third party payers, and health care consumers [9]. An important determinant of the clinical usefulness of pathology reports is timeliness. Although the Laboratory Accreditation Program of the College of the American Pathologists requires that routine surgical pathology reports be completed within 2 working days, more complicated cases may require additional time for complete processing and/or special studies. Zarbo et al. [7] have reported recently the results of two College of American Pathologists Q-Probes studies of biopsies and complex specimens. In an effort to create reference databases that laboratories may find useful in benchmarking their performance, 1014 surgical pathology laboratories mainly located in the USA tracked the number of days from specimen accessioning to report completion for routine biopsies and complex specimens. The standard of report completion time of within 2 working days for the intralaboratory component of turnaround time was successfully met by participants in 95% of 15,725 routine biopsy cases and in 91% of 14,298 complex specimen cases evaluated. Special handling procedures for complex specimens contributed, on average, an additional delay of 1.3 days.

The present study was conducted at the initial phase of implementing a quality improvement program in the Department of Anatomic Pathology in order to collect reference data for comparative analyses. The mean intralaboratory turnaround time of the study sample (6.24 days) is greater than the annual figure (5.7 days) for the year in which the study was carried out (1992). This finding may be explained by the inclusion of some complex cases requiring additional time for complete processing and/or special studies. It has been shown that turnaround times vary depending on a number of factors [3,10—12], such as the volume and type of case material, number of pathologists, representation of subspecialty interests, availability of adjunctive diagnostic services, and existence of undergraduate and/or postgraduate teaching responsibilities. In this study, mean turnaround times for the 501 specimens analysed in 1992 varied according to the specimen type, 5.19 days for endoscopic samples versus 8.11 days for calcified tissue. Endoscopic samples are processed more quickly, frequently prioritized as stat because of

Table 2  Mean intradepartamental turnaround times in working days for 501 routine surgical pathology specimens according to specimen type

<table>
<thead>
<tr>
<th>Specimen type</th>
<th>Accession/results reporting Mean (SD) days</th>
<th>Results reporting/results transmittal Mean (SD) days</th>
<th>Accession/results transmittal Mean (SD) days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endoscopic biopsy (n = 87)</td>
<td>3.86 (2.21)</td>
<td>1.33 (0.92)</td>
<td>5.19 (2.18)</td>
</tr>
<tr>
<td>Non-endoscopic biopsy (n = 279)</td>
<td>4.96 (2.67)</td>
<td>1.14 (0.93)</td>
<td>6.10 (2.76)</td>
</tr>
<tr>
<td>Surgical specimen (n = 100)</td>
<td>5.33 (3.30)</td>
<td>1.29 (1.10)</td>
<td>6.88 (3.92)</td>
</tr>
<tr>
<td>Lymph nodes (n = 26)</td>
<td>7.42 (3.77)</td>
<td>1.57 (2.21)</td>
<td>9.00 (4.46)</td>
</tr>
<tr>
<td>Calcified tissue(^1) (n = 9)</td>
<td>6.33 (3.87)</td>
<td>1.66 (2.17)</td>
<td>8.11 (3.18)</td>
</tr>
</tbody>
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\(^1\) Excluding metabolic bone disease studies.
corresponds to specimen handling and processing, and the working hours exceeded the possibilities of the secretarial existence of postgraduate teaching responsibilities (pathology information was needed, and contributing to easy retrieval labels with the patient's name and age, name of referring reports. In summary, some of the factors that more frequently prescription. However, depending on the difficulties of the completed is 2 working days. Sixty-seven per cent of the total cases, extra time should be allowed for provision of clinical information in order to ensure quality of the diagnostic reports. In summary, some of the factors that more frequently accounted for extra time in this department included inadequate fixation; the need for additional recuts, tissue decalcification, and special procedures; review and reprocessing of previous surgical pathology or cytopathology slides; existence of postgraduate teaching responsibilities (pathology residency program); and consultation with experts.

The analysis of these results generated a series of proposals for improvement. In order to facilitate the administrative aspects of the circuit, criteria for accepting surgical pathology specimens at the time of accessioning were established in early 1993. These included the use of machine-generated labels with the patient's name and age, name of referring clinician, and a summary of relevant clinical data, ensuring a single and reliable anatomic pathology file for each patient, expediting contact with referring clinician when additional information was needed, and contributing to easy retrieval and review of previous materials, and to cytopathologic–histopathologic correlations. Review of previous material and routine cytopathologic–histopathologic diagnostic comparison are considered measures of quality control in anatomic pathology [3,9,14] and have been used for comparative purposes in the chronologic evaluation of particular processes. Improvement of turnaround time in 1994 compared with 1992 might be related to the establishment of specimen acceptance criteria, since the number of technicians, administrative personnel and pathologists did not vary, and no changes occurred in case mix or laboratory hardware. The number of outside consultations was also comparable in both time periods. Although the volume of biopsies and surgical specimens has increased in recent years, the annual mean turnaround times have shown a decreasing trend reflecting a satisfactory assessment of this indicator. Thereafter, implementing criteria for accepting surgical pathology specimens at the time of accessioning helps to decrease the number of cases lacking essential information for diagnosis, contributing to an increase in the speed of administration and pathology work.

We conclude that internal assessment of turnaround times by a review of a random sample of surgical pathology specimens yields a repeatable, formal, and quantified evaluation of a diagnostic pathology service. It has enabled us to identify areas of weakness, to implement changes, and to assess the effects of these changes.

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References

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