Original Article

Histopathology Turnaround Time of Surgical Biopsies in a Nigerian Tertiary Health-Care Facility

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Abstract

Background: Turnaround time (TAT) analysis is finding increasing relevance in clinical laboratories due to its relevance in the quality of care of patients. TAT involves all the various processes that occur within the laboratory. **Aims:** The aim of this study was to analyze the histopathology TAT of surgical biopsies at the Department of Pathology, University College Hospital (UCH), Ibadan. **Materials and Methods:** This was a retrospective analysis of 1085 samples received at the Department of Pathology, UCH, Ibadan, from January to April 2020. Samples were categorized into small, intermediate, and large sizes. Average duration spent in the grossing room, processing, reporting, and result verification was calculated, and the total TAT was determined from the summation of the duration of these processes. **Results:** The mean TAT for all samples was 22 days (±10 days). Reception-grossing, histological processing, reporting, and transcription accounted for an average of 1.5 (7%), 5.9 (27%), 9.1 (41%), and 5.6 (25%) days and percentage of TAT, respectively. There was no significant difference in the mean TATs for small-, intermediate-, and large-sized samples. **Conclusion:** We identified reporting time as the largest contributor to TAT. Other areas of delay were noted at tissue processing and result verification. Adoption of new technology and staff orientation may help to reduce the observed TAT.

Keywords: Grossing, reporting, tissue processing, turnaround time

Introduction

Laboratory analysis of patient specimen plays a key role in quality health-care delivery. Timeliness in the delivery of histopathology reports is essential as it enables physicians to make patient health-care decisions efficiently.[1,2] Despite the obvious desirability of short laboratory turnaround times (TATs), there are varying perspectives on its importance. For instance, while laboratories may focus on the accuracy of reports as being the most vital outcome of the laboratory process, physicians, and patients will often place a premium on the timeliness of laboratory reports as the most significant yardstick of quality.[3]

TAT has found increasing relevance in laboratory quality management due to a number of factors. One reason is that it can be viewed as the sum of the various complex and interwoven laboratory, technical, clerical, and human interpretive processes that eventuate in the final diagnostic report.[1] Furthermore, research has shown a link between delayed TATs and increasing patient morbidity and cost of treatment.[4] Finally, TAT is easily measurable in both paper-based and laboratory information-based systems.[2]

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International pathology bodies concerned with laboratory accreditation have proposed guidelines for optimum TAT. For example, the College of American Pathologists guidelines require that a 2-day TAT is achieved for 90% of biopsy specimens.[5]

We sought to interrogate retrospective data from our laboratory in order to determine TAT and to identify if present, reasons for any delay in TATs.

Materials and Methods

This was a retrospective review of 1085 surgical specimens received at the Department of Pathology, University College Hospital, Ibadan, during January to April 2020. Surgical

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biopsies received were processed and a histopathological diagnosis was given on a routine basis in the department.

Specimen handling was investigated as a process divided into four stages: reception and grossing by pathologists, laboratory processing, reporting by pathologists, and transcription.

The total time involved in all four processes was expressed as the TAT. Details of the various duration (in days) were obtained from departmental record books.

Samples were further categorized into small, intermediate, and large-size samples. Most biopsies were classified as small samples including endoscopic gastric and colonic biopsies and needle biopsies of the liver, breast, and prostate. Biopsies and specimens typically weighing < 10 g were categorized as intermediate size. Organ excision specimens such as mastectomy, colectomy, hysterectomy as well as tumor excision specimens were categorized as large samples. All samples were analyzed excepting traumatic limb amputation specimens and specimens with missing records.

The data were analyzed using SPSS version 23(IBM, SPSS Inc., Chicago, IL, USA) and expressed as measures of central tendency (mean and median) and dispersion and presented using tables and charts that were appropriate. Analysis of variance test was conducted to compare means and level of statistical significance set as $P < 0.05$.

Results

The total number of samples meeting the inclusion criteria for the study period was 1085. Of these, 397, 563, and 125 specimens were categorized as small-, intermediate-, and large-sized specimens, respectively. The mean TAT for all samples was 22 days (±10 days). Reception-grossing, histological processing, reporting, and transcription accounted for an average of 1.5 (7%), 5.9 (27%), 9.1 (41%), and 5.6 (25%) days and percentage of TAT, respectively [Table 1]. The TAT for small-, intermediate-, and large-sized samples was 21.6, 22.4, and 22.7 days, respectively [Table 2]. There was no significant difference in the mean TATs for small-, intermediate-, and large-sized samples ($P = 0.45$).

Table 1: Distribution of components of overall histopathology turnaround of surgical biopsies according to measures of central tendency

Components	Mean±SD (days)	Median (days)	Range (days)	Percentage of TAT
Grossing	1.5±1.0	1	1-16	7
Processing	5.9±4.2	5	1-39	27
Reporting	9.1±8.0	7	1-58	41
Transcription	5.6±6.9	3	1-50	25

SD: Standard deviation, TAT: Turnaround time

Table 2: Average turnaround times for small, intermediate, and large specimens

Category	Number of specimen	Average TAT (days)
Small	397	21.6
Intermediate	563	22.4
Large	125	22.7

TAT: Turnaround time

Discussion

The average TAT for these specimens was 22 ± 19 days. This is higher than that reported from other centers in Nigeria. Average TATs of 7.5, 8, and 11 days reported by Emmanuel *et al*.,[6] Nwafor Chukwuemeka and Ekpo Memfin,[7] and Uchendu and Eze[8] were documented in different laboratories in Nigeria. This disparity may be due to significant differences in methodology. In the study by Nwafor Chukwuemeka and Ekpo Memfin, samples that required special stains and additional processing were excluded. Uchendu and Eze excluded samples collected during public holidays and weekends.[7,8] The TAT recorded by Atanda *et al*. was particularly low (average of 3.6 days).[9] They, however, excluded weekends and public holidays which were included in the index study. It is therefore possible that these factors may play a role in explaining the relatively high TAT as documented in this study. It is our belief, however, that some of these factors may not weigh significantly on the minds of referring clinicians and patients.

The most important factor for delayed TAT in a study from India is the deficiency of automated facilities for transport of samples and report delivery.[10] This contrasts with what was found in the index study that had reporting time as the most common cause of test delay.

When broken down into parts, the greatest contributor to the TAT seen in our department is reporting by doctors, adding about 40% of the duration involved in the TAT. This is partly influenced by the number of doctors, both specialists and trainees that may need to examine the cases. It is also conceivable that, in a multifaceted department such as ours, some delay may be encountered, especially among resident doctors, who may be involved in other departmental activities such as autopsies and cytological procedures such as fine-needle aspiration cytology. Furthermore, the wait for special stains and deeper sections in the liver, renal, gastric, and bone marrow biopsies may be a factor for prolonged TAT in the index study. There is room for improvement in this regard and regular reminders sent to residents and consultants involved in handling a specimen may help to reduce reporting time. There may be a need to determine if the personnel available for this critical process are adequate.

In a similar vein, transcription contributed about a quarter of the total TAT. This is the time involved between typing by departmental secretaries, corrections by doctors, and effecting such corrections. It is conceivable that a laboratory information system can help facilitate such a process and reduce the amount of time taken for results verification in a paper-based system. Processing times also accounted for an average of 5 days. This is the time involved in specimen fixation to handling in the tissue

processor, making the histology slides and receipt by doctors. There is room for improvement in this regard as many of the other studies quoted in this work were able to reduce processing time to an average of 2–3 days. Possible avenues for this include adoption of a strict process of monitoring to ensure that sample processing does not exceed optimum TAT, increased adoption of automated processes, and improved attention to nonconforming events such as recuts/deeper section requests.

As noted in this study, there was a trend toward increasing TATs for small, intermediate, and large samples, in that order, suggesting that size of the sample may be a factor affecting TATs. There was, however, no statistical significance between the mean TATs for each of these categories of specimens. The lack of statistical significance suggests that the major factors responsible for TATs at our department are systemic. Thus, any efforts to reduce this index of quality must be well thought out and far-reaching.

Conclusion

Reporting time was identified as the largest contributor to TAT. Other areas of delay were noted at tissue processing and result verification. Improving TAT is a continuous process and the adoption of new technology and staff orientation may help to reduce the observed TAT.

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Conflicts of interest

There are no conflicts of interest.

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