Intralaboratory Turnaround Time (TAT) in a Developing Country: An Audit of a Histopathology Department of a Nigerian Teaching Hospital

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Abstract

Introduction: *Timeliness of surgical reports, along with diagnostic accuracy and completeness of report content, has been recognized as one of the key indicators of quality in surgical pathology. Various methods have been used by various experts in assessing turnaround time (TAT) in surgical pathology laboratories.*

Objective: *To determine the TAT of processing surgical pathology specimen and to identify the possible sources of delay with a view to resolving them.*

Materials and method: *This is a prospective study. A total of 100 routine surgical specimens were followed up from reception to verification and dispatch of results. The average TAT is presented in days.*

Results: *The mean TAT of a surgical specimen was 11.10 days. Reception and gross handling, histology processing, resident reporting, consultant reporting, transcription and verification accounting for 23.80%, 34.10%, 18.10%, 10.00%, 11.20% and 2.70% respectively of the TAT.*

Conclusion: *This study shows that in our centre, TAT of the surgical pathology reports can be improved upon by educating and motivating the staff to mind this index of quality of performance. There is also a need to improve infrastructure and introduce ICT into routine work. This will be applicable to most laboratories of our type in developing countries.*

Keywords: Turnaround time, surgical pathology, audit

Introduction

Clinical practice is increasingly becoming more dependent on the laboratory reports for the diagnosis of diseases. In the United States, for example, reports have shown that over 70 % of medical decisions depends on the clinical laboratory.[1] This implies an increasing dependence of physicians and other health care providers on the laboratory for prevention, diagnosis, and treatment of diseases.

Despite paucity of data, it has been argued that timeliness of laboratory reports affects clinicians' efficiency and patients' length of stay in the hospital. Reports have shown that clinicians assess the adequacy of laboratory

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services by the speed with which laboratory results are made available; and that in most cases laboratories do not meet the clinicians' expectations. [2]

Timeliness of surgical reports, along with diagnostic accuracy and completeness of report content has also been recognized as one of the key indicators of quality in surgical pathology.[3] Various methods has therefore been used by various experts to assess turnaround time (TAT) in surgical pathology including retrospective statistical analysis of the intralaboratory time interval [4] and failure time analysis.[5]

This study presents the turnaround time of surgical pathology specimens, in Irrua Specialist Teaching hospital (Nigeria) as the time (in days) from specimen arrival to report signing-out. This is done with the objective to determine the impact of each component of the surgical pathology process in the overall turnaround time, to identify the possible causes of delay and suggest ways of improving the TAT.

Materials and method

This is a prospective study, conducted at Irrua Specialist Teaching Hospital (ISTH) in Edo state. ISTH is a tertiary Hospital in Nigeria, located in the central part of south-south region of Nigeria. The Anatomic pathology services are limited to postmortem examination, intra-operative consultation, histology and cytological examination of specimen.

The department receives an average of 1,000 samples annually. Surgical pathology specimens were fixed in neutral buffered formalin, embedded in paraffin and stained with hematoxylin and eosin.

Study samples included mostly routine surgical specimen from obstetrics and gynecology, general surgery, otolaryngology, cardiothoracic surgery and dermatology departments.

The handling of surgical specimen, in this study, is considered as a single production process, divided into six stages. These include reception-gross handling, histology (laboratory) processing, resident doctor(s) reporting, consultant reporting, result transcription (typing) and result verification (report review, correction and signing out). The time value of each stage is expressed in days and the total of these stated as the TAT.

A total of 100 surgical specimens submitted between the months of January and June 2012 were selected by stratified random sampling and their TAT studied prospectively. Timing of each production process stage was recorded on a time book in hours (values were later expressed in days). To eliminate bias, our assistants were blinded from the purpose of the study.

Exclusion Criteria

Samples submitted to the laboratory on holidays and days of work stoppages were excluded from the study. Complex and bone specimens were also excluded from the study. The results were analyzed using SPSS version 16 and mean time spent in each stage presented using tables.

Results

The mean TAT was 11.10 days. Reception and gross handling, histology processing, resident reporting, consultant reporting, transcription and verification accounting for 23.80%, 34.10%, 18.10%, 10.00%, 11.20% and 2.70% respectively of the TAT. (As shown in table 1 and represented in figure 1)

The timing of each stage is expressed in percentiles as presented in table 2.

Discussion

TAT is a reliable tool of quality assessment of the laboratory process.[4] Studies has shown that delay in TAT in clinical laboratories has elicited immediate complaints from users while adequate TAT goes unremarked.[6] It has also been shown to influence the perception of the

Table 1. Mean time of the surgical pathology process (in days)

COMPONENTS	MEAN±SE	MEDIAN	RANGE	%OF TAT
Reception/gross Handling	2.64 ± 0.23	2.00	0.01-11.00	23.80
Histology Pocessing	3.77 ± 0.14	3.00	1.17-10.00	34.10
Resident Reporting Time	2.00 ± 0.09	2.00	0.00 - 4.00	18.10
Consultant Reporting Time	1.11 ± 0.10	1.00	0.00 - 6.00	10.00
Transcription	1.24 ± 0.07	1.00	0.04 - 5.00	11.20
Verification	0.29 ± 0.04	0.08	0.01 - 2.00	2.70
TAT	11.06 ± 0.35	8.13	5.29 – 24.00	100

Table 2. Timing of the surgical process expressed in percentiles (in days)

COMPONENTS	10^{TH} PERCENTILE	50^{TH} PERCENTILE	90^{TH} PERCENTILE
Reception/Gross Handling	0.13	2.00	5.00
Histology Processing	2.00	3.00	5.00
Resident Reporting Time	1.00	2.00	3.00
Consultant Reporting Time	0.00	1.00	2.00
Transcription	0.21	1.00	2.00
Verification	0.04	0.08	1.00
TAT	7.29	11.00	15.00

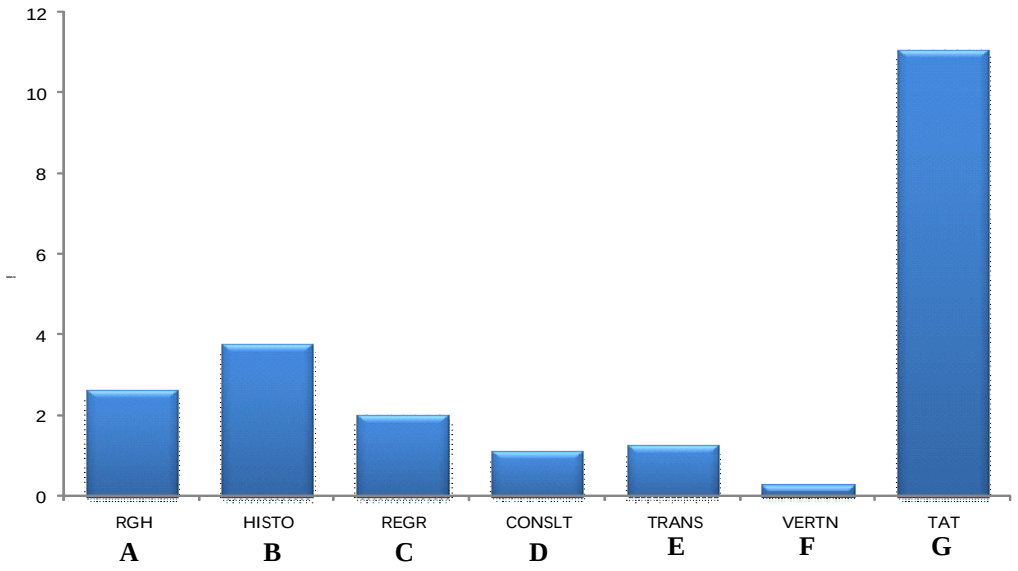

Fig. A bar chart representing the timing of each processing stage

Key:

A *(Mean Reception-Gross Handling Time),* ***B*** *(Mean Histology Processing Time)* ***C*** *(Mean Resident Doctor Reporting Time)* ***D*** *(Mean Consultant Reporting Time)* ***E*** *(Mean Transcription Time)* ***F*** *(Mean Verification Time)* ***G*** *(Mean Turnaround Time)*

laboratory in the community of health care providers.[5]

While TAT is a routine surgical pathology procedure in developed countries,[4] there are scarcity of publications on intra laboratory TAT in developing countries, an indication that in practice, emphasis has not been on improving the intra laboratory TAT. Besides, there is no consensus benchmark reference TAT, for reporting surgical pathology specimen in these developing countries.

From this study, the mean TAT of routine surgical specimens was found to be 11.10 days with histology processing stage accounting for the greatest time consumption 34.10% of the time. This is at variance with the report from Zarbo et al, where 95% and 98% of the routine biopsy specimens were reported within two and three working days respectively.[4] In Spain, a mean TAT of 6.24 days and a range of 2-27 days has been reported for surgical specimens.[8]In a physicians satisfaction survey, across USA in 2001, it was shown that one of the lowest satisfaction scores were attributed to timeliness of reporting,[7] indicating that clinicians, are greatly dissatisfied with the TAT of surgical pathology process.

The gap in TAT between the developed countries and developing country can be attributed to a complex of intra-laboratory factors, infrastructural underdevelopment, economic and political factors, inter-professional rivalry and the absence of instituted internal quality assurance programme.[9]

The reception-gross handling interval shows a mean of 2.6 days (range of 0.01-11 days), accounting for 23.8% of surgical pathology processing time. The practice in ISTH is such that specimen are batched over two to three days, as a measure to decrease work load and reducing cost, invariably impacted negatively on the TAT. The strict following of standard operating procedure, such as appropriate specimen-formalin fluid ratio will invariably decrease the tissue fixation time. The training and supervision of non-technical staff to handle the specimen from the theatre till cut-up time will enhance quality of this pre-laboratory stage.

Laboratory handling of surgical specimens is a rather complex process involving specimen processing, blocking, embedding, mounting, microtoming, staining and labeling. Achieving proficiency in this art goes beyond having a bachelor's degree in the school of medical laboratory science. There is a need to ensure that the right people with the expertise and right working ethic are employed in the histology laboratory. The rivalry between laboratory scientist and the pathologists has to be put in check and work description spelled out even before the laboratory scientists are employed.

The study shows that the cumulative resident doctors and consultant reporting accounted for 28.1% of the surgical pathology process. This delay may be attributed to intralaboratory consultation, few number of reporting microscopes and the absence of multiheader microscope for conference reporting. Also the poor state of the resident doctors' room does not encourage them to work beyond their official working hours.

The mean transcription time in this study accounted for 11.2% of the entire surgical pathology process (mean of 1.3 days and a range of 0.04-5days). This is contributed by the increased volume of secretarial job preformed by the departmental secretary whose responsibility it is to transcript reports into results. The department has only one computer, one printer and one secretary, which supports the entire technical and administrative needs of the department. Overwhelming work load translates therefore to increased transcription time and a significant delay in TAT. Separation of the administrative work from histopathology reporting work through increasing the number of secretaries, computers and printers will impact positively on the TAT.

Power failure is still a serious problem in developing countries and contributes significantly to delay in each of the stages of the surgical pathology process. There is need for hospitals to have an alternative constant independent power supply to eliminate delays resulting from inconsistent power supply.

In developed countries the application of information technology to laboratory practice has significantly enhanced the speed of transcription, verification, delivery of laboratory reports to clinicians as well as easy of assessing quality in the laboratory. This is lacking in developing countries and when implemented, will revolutionize laboratory practice through improving the timeliness of surgical pathology reports.

Conclusion

Improving timeliness in surgical pathology will invariable improve patient care. The combined efforts of all, including the secretarial and technical staff, the laboratory scientists, the pathologist, and the hospital management staff is essential to achieve an optimal TAT. We believe that if each laboratory in developing countries routinely examines their processes and evaluate their TAT, they may identify the causes of delay and therefore improve their TAT without compromising the quality of their reports.

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