INTRODUCTION

Modern pathology services are currently under pressure to provide efficient and high-quality diagnoses while managing increasing workloads and diagnostic complexity. Recent studies have shown the utility of digital pathology (DP) in pathology services and in improving laboratory workflow and efficiency. In partnership with the private sector, we initiated the conversion of our entire service to use a DP platform for primary pathology diagnosis. To achieve this goal, we implemented an incremental rollout for DP and used the CaloPix software solution to interpret the scanned images, starting with small (biopsies) to larger tissue sections (surgical specimens). The project consists of 3 major phases: collection of data before DP implementation (Pre-I), implementation of DP (I) and post-implementation (Post-I). Expected rates of adoption for our pathologists are 25% in the first year, rising progressively to 90% over a 5-year period. Daily records of issues/problems as well as successful correctives are documented. We measure the human cost-effective value of DP by recording personnel time spent on DP as well as pathologist's productivity and turn-around time. The collected data of Post-I phase will be compared to the Pre-I data (2018).

AIMS

➢ To present our DP implementation process at the CHUM
➢ To share challenges, solutions and impacts on pathology workflow

MATERIALS AND METHODS

The Centre Hospitalier de l’Université de Montréal (CHUM) is a tertiary academic center in Montreal, Canada. The pathology laboratory includes 22 subspecialized pathologists, 112 employees (47 medical technologists), and 20 pathology residents. Over the last year, the service processed 32,683/32,126 surgical/pathology specimens, 68,093 cytology specimens, 3,700 consultations, 200 autopsies and produced approximately 850,000 slides. We are the central laboratory of our hub, the largest of 11 Optilab hubs in Quebec. Since 2016, we concluded a partnership with TRIBVN Healthcare and Hamamatsu. The partnership is centered on CaloPix software (TRIBVN Healthcare), an Image Management System (IMS) working in interoperability with our LIS (Diamic, Dedalus). The DP platform currently uses 2 Hamamatsu NanoZoomer XRs, a high-throughput and high-resolution brightfield scanner (320-slide per batch).

RESULTS OF THE PILOT PHASE

Requirements for success of DP implementation were identified:

➢ Significant monetary and time investment
➢ Significant technical capacity and storage
➢ Network, scanners, software integration
➢ Coordinated change management and IT teams
➢ Motivated technologists, pathologists, residents, administrators, and institutional executive management

Number of cases and Turn-Around Time (TAT) for biopsies (Bi) and Surgeries (S).

➢ After an adjustment period (first 2-3 months), P1, P2, P3 showed TAT improvement and increment of number of cases.
➢ Due to peculiar scheduling and research activities, P4 data for 2019 are not comparable to 2018 and are not shown.
➢ Our DP TAT (2019) includes the time for whole slide scanning (1-2 working days).

ADDITIONAL INFORMATION

➢ Transition phase requires an additional scanning step (1.5 technical FTE)
➢ Slides must be technically perfect to ensure adequate quality of the images
➢ Risk of incomplete tissue images (missing fragments)
➢ Potential missed diagnoses on incorrectly scanned slides

PRE ANALYTIC

➢ Access to glass slides when slides are not correctly scanned is cumbersome
➢ slippery surface making retrieval the possibility of misidentification

ANALYTIC

➢ Decreased risk of glass slides shattering
➢ All slides are immediately available
➢ Reduced slide manipulation
➢ Tracking of visualized areas on slides

POST ANALYTIC

➢ Counts, measures and annotations are facilitated by the software
➢ Synchronous comparison of slides
➢ Remote access possible
➢ Remote consultation enabled

Teaching

➢ Using different versions: Web Access CaloPix
➢ centralized testing follow-up
➢ Quick overview of case follow-up

CONCLUSIONS

➢ Conversion of our service in DP had no major impact in our laboratory workflow but significantly improved the analytic phase of the diagnostic process, increasing pathologists’ enthusiasm enough to convert even late adopters.
➢ Turn around time for all pathologists has significantly improved after a 3 months period adjustment.
➢ Accordingly, phase II is expected to begin in the near future.
➢ Stakeholders’ objective alignment, strategic project management, infrastructure operation, and technical support are important elements that ensure smooth transition and adaption.
➢ Development of new approaches and custom applications for the purposes of image interpretation are facilitated by our partnership with TRIBVN Healthcare.
➢ Our experience highlights the importance of pathologists’ and personnel training, integrated software and prompt technical assistance, as well as significant investment from our healthcare organization.

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REFERENCES AND ACKNOWLEDGEMENTS


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