Enterprise Implementation of Digital Pathology: Feasibility, Challenges, and Opportunities

Romero Lauro Gonzalo, MDA, University of Pittsburgh Medical Center; Douglas J. Hartman, MD (Presenter)

Background

Digital Pathology has matured to the point where it is technically feasible to produce high quality digital images that can be used for diagnostic interpretation. However, in the United States, digital pathology is mainly used for consultations, medical education, and research [1,2,3,4]. The use of digital pathology for primary clinical diagnosis has been limited mainly due to regulatory hurdles related to the classification of Whole Slide Imaging Devices as Class III by the U.S. Food and Drug Administration (FDA) [6].

An Integrated Digital Pathology solution was identified to be implemented across an integrated hospital system including 16 Hospitals. The solution is fully interfaced with the Laboratory Information System (LIS) and includes Histology workstations, Pathologist workstations, short- and long-term archives and whole slide imaging scanners.

Evaluation

Histology workflow process data was collected from a high-volume histology laboratory and several use cases were piloted and evaluated in different sub-specialties including Dermatopathology, Gastrointestinal, Autopsy, Gynecologic/Breast, Pediatric Pathology, Genitourinary and Immunohistochemistry. Physicians were asked to provide feedback via an electronic survey link on their desktop. Additional data was also collected to measure the impact on workflow of hardware and software failures.

Discussion

A digital pathology workflow provides highly reliable images, which are portable and easy to share. This enables an organization to route cases by sub-specialty regardless of the physical location of the slides and the physicians. Imaging information is presented along with other patient information and relevant priors in an organized manner providing efficiency in the workflow and improving accuracy of the diagnosis and turnaround time. Even more powerful is the ability to couple images with computer-aided image analysis tools, which are under continued development.

However the biggest challenges when adopting a fully digital workflow are technical readiness, operational readiness and cost [5].

Revision of throughput of scanners, rate of failures and resolution turnaround time can have a significant impact on cost in order to ensure the appropriate level of redundancy is achieved so that workflow is not interrupted.

The introduction of a digital workflow does not eliminate the legacy tasks of a histology lab and adds incremental tasks. Specimens must still be processed and glass slides must still be prepared before they can be digitized. This ultimately results in incremental workload as no efficiency is gained in the histology lab.
Operational readiness includes hiring and training of the appropriate personnel to manage the technology both in IT and in the histology lab, orientation and adoption of new workflows and the challenges associated with change management and the need to manage both legacy and digital workflows.

Conclusion

Digital Pathology is a key enabler of improved patient care and provides an organization with the ability to introduce economies of scale, centralization of services and sub-specialty coverage.

However, implementing a fully digital pathology workflow can be costly and requires significant changes to existing workflows and an assessment of the technological infrastructure to ensure appropriate levels of service.

Reference


Keywords

Digital Pathology, Whole Slide Imaging, Operational Readiness, Impact of Hardware and Software Failures, Impact of Digital Pathology On the Histology Laboratory