Review of whole slide imaging for pediatric specimens advances validation process

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Whole slide imaging is an emerging technology that is poised to impact the practice of medicine by extending the virtual reach of pathologists. Classified as a medical device by the U.S. Food and Drug Administration, whole slide imaging must be validated and approved before use in primary diagnosis. The College of American Pathologists has published guidelines for this validation, and a new study applies those guidelines specifically to specimens in the pediatric population.

The journal Pediatric and Developmental Pathology reports results of a whole slide imaging review of 60 surgical pathology cases and an attempted review of 21 cytopathology cases. This study, undertaken at Nationwide Children's Hospital in Columbus, Ohio, offers guidance for further development of whole slide imaging systems and advances the technology toward regulatory approval for use in primary diagnosis.

Whole slide imaging is a digital scan of an entire glass slide, allowing the digital file to be viewed on a computer monitor rather than through a microscope. The College of American Pathologists points out that it has the advantages of accessibility, portability, and easy archiving as well as the use of computer-aided diagnostic tools. Validation will determine whether whole slide imaging can replace the light microscope as the method pathologists use to review specimens and render diagnoses.

In accordance with the College of American Pathologists guidelines, this study reviewed varied specimens, including complex and less common diagnoses. Results of whole slide imaging were compared with the

original glass slide diagnoses. Essentially identical results or those with only minor differences that would not affect diagnosis were considered concordant while major differences or slides that were unsatisfactory for evaluation were deemed discordant.

Of the 60 surgical pathology cases, which included 130 specimens in 473 slides, only 1 was found discordant. Review of cytopathology cases proved more difficult, with a discordant rate of 33.3 percent. Nucleated red blood cells and eosinophilic granular bodies were particular challenges when using whole slide imaging for pediatric specimens. The authors noted that image capture in multiple focal planes is likely needed to successfully review cytopathology specimens.

This first review of exclusively pediatric specimens confirms the feasibility of this technology. "Our experience with whole slide imaging extends the possibilities for this technology further into the field of pediatric pathology and supports the validation model proposed by the College of American Pathologists," said author Michael A. Arnold.

More information: "The College of American Pathologists Guidelines for Whole Slide Imaging Validation Are Feasible for Pediatric Pathology: A Pediatric Pathology Practice Experience." *Pediatric and Developmental Pathology*: March/April 2015, Vol. 18, No. 2, pp. 109-116. doi: dx.doi.org/10.2350/14-07-1523-OA.1

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