

# Integration of digital pathology in multidisciplinary breast site group rounds

Sharon Nofech-Mozes

Tanya Jorden

## Abstract

Whole slide scanning and digitizing an entire glass slide technology opens multiple opportunities for integration in clinical practice. Clinical applications other than primary diagnosis include the use of digitized slides in multidisciplinary rounds. Integration of this emerging technology requires not only adaptation by pathologists but also investment in infrastructure for hardware and software components, electronic storage solutions, support from clinicians and hospital administration as well as training personal. The process of replacing conventional glass with digitized slides in pathology case presentation in multidisciplinary rounds is discussed highlighting the strengths and weaknesses of this transition. Successful implementation relies heavily on careful preliminary workflow process design and support from leaders within Anatomic Pathology and the cancer center.

**Keywords** digital pathology; multidisciplinary rounds (tumour board); whole slide image; workflow

## Introduction

Recent improvement in the emerging technology of whole slide scanning and digitizing an entire glass slide opens multiple opportunities for integration in clinical practice. Recently released evidence-based guidelines from the College of American Pathologists determined that replacement of conventional glass slide by whole slide images (WSI) for the purpose of primary histopathologic diagnosis requires a large scale clinical validation. WSI or virtual slides are high resolution images produced by digitally scanning conventional glass slides. Currently, the US Food and Drug Administration does not approve WSI systems for primary diagnosis; however the technology is rapidly being adopted in areas beyond primary diagnosis, mainly in educational and research applications. Clinical applications, other than primary diagnosis, are beginning to thrive including the use of digitized slides to archive cases in which the original slides are sent out of the institution, quality assurance activities or when pathology is discussed in intradepartmental or multidisciplinary rounds

**Sharon Nofech-Mozes MD** Associate Professor, Laboratory Medicine and Pathobiology, University of Toronto; Department of Anatomic Pathology, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada. Conflicts of interest: none declared.

**Tanya Jorden MLT** Laboratory Information System Analyst, Department of Anatomic Pathology, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada. Conflicts of interest: none declared.

(tumour boards).<sup>1</sup> In our institution, WSI are being used in Louise Temerty Breast Cancer Centre in multidisciplinary rounds since Sept 2013.

Multidisciplinary rounds represent a patient-centred model of care that brings together, in real time, multiple members of the care team to focus on optimizing and personalizing treatment options to individual patients. This model ensures a high level of communication and collaboration among physicians from multiple subspecialties and professions. Data show that multidisciplinary rounds improve quality, efficacy and effectiveness in healthcare practice. Pathology case presentation has been an integral part of these rounds, and this presentation has been traditionally based mainly on a microscope connected to a video camera presented onto a screen or projection of static digital camera jpg photos; the former method has been used in our institution. The breast site group in our centre holds two multidisciplinary rounds per week regularly. The rounds are attended by representative physicians from surgery, medical oncology, radiation oncology, medical imaging and pathology as well as nurses, pharmacists, psychosocial and clinical trials teams. Furthermore, trainees from any of the aforementioned disciplines often attend these rounds and clinical fellows get an opportunity to present cases. As such, the rounds serve both clinical and interprofessional and multilevel educational purposes. The content of pathology presented in multidisciplinary rounds may be derived from cases that had their pathology primarily read in our Anatomic Pathology department or reviewed in consultation prior to the multidisciplinary rounds. The extent of pathology discussion is tailored based on the focus of individual patient challenge.

The purpose of this communication is to review the current literature on using WSI in multidisciplinary rounds and describe the process of replacing conventional glass slide with WSI in pathology case presentation in multidisciplinary rounds, and to identify the strengths and weaknesses related to this transition. We examine the usability and users satisfaction from the introduction of WSI in multidisciplinary rounds at the Breast Centre and describe the setup developed locally within the department of Anatomic Pathology and the breast site group. Participants and presenters in multidisciplinary rounds were surveyed about their experience with WSI in this setting.

## Methods

Our institutional experience in the planning and implementation of digital pathology for the purpose of presenting WSI instead of conventional glass slides in breast multidisciplinary rounds is described. WSI are captured by scanning conventional glass slides at  $\times 20$  objective lens. When bright field in situ hybridization slides are selected for presentation scanning is performed at  $\times 40$  objective lens.

Data about pathology discussions at rounds were retrieved from several sources. The institutional electronic multidisciplinary rounds recording database MindMerge© (Verto, Toronto, ON, Canada) was used to determine the number of patients discussed at breast multidisciplinary rounds between September 2013 and July 2014. The laboratory information system (LIS) CoPathPlus© (Sunquest, Tucson, AZ, USA) was searched to identify the number of cases and number of slides scanned for

breast rounds during this time period. The Anatomic Pathology scanning log was used to determine the number of repeat scans and personnel involved in slide scanning were asked about their experience including the time it takes to scan conventional slides and the cause of scanning errors.

A survey was distributed by e-mail to presenters and participants in breast multidisciplinary rounds using SurveyMonkey®. To capture the perception of presenters, breast pathologists and clinical fellows in pathology were asked about their satisfaction from the quality of low and high power H&E, immunohistochemistry and in situ hybridization images and utilizing annotation tools. To capture the perception of attendees, participants were asked whether WSI were comparable, inferior or superior to the image projected from glass slides, lag time for opening files and flipping between slides. Data from the survey were entered into Microsoft Excel de-identified for analysis. One-way frequency tables were used to show the distribution of the responses for each question.

The study was approved by the institutional ethics review board. Surveyed participants were given an opportunity to consider their participation and consented to participate in the study by electronically submitting their forms.

## Results

### Getting started

The option to consider replacing traditional projection of conventional glass slides via a video camera connected to a microscope with WSI was raised by the breast pathologist lead as part of the planning and design of a new lecture theatre in Louise Temerty Breast Cancer Centre. The new technology was favoured since it allows projecting images of cases for which conventional glass slides may not be readily available such as consultation cases after the original glass slides are returned to the submitting institutions. Since certain patients are presented at rounds more than once at variable intervals, WSI can be easily retrieved from image archive and re-presented without additional scanning. Furthermore, over time, archival images remain available even if the original glass slides have been moved to offsite storage.

In the initial planning stage, a team from Anatomic Pathology, the Breast Centre and information technology (IT) examined its feasibility in terms of allocating resources towards the main hardware and software components consisting of the slide scanner, scanner PC, digital slide repository of considerable size and speed, secure network connections and operating personnel. Comprehensive considerations leading to choosing a slide scanner encompass other indications and are beyond the scope of this manuscript. Once the resources were secured a workflow was designed and piloted within Anatomic Pathology with continuous involvement of the Breast Centre and IT representatives.

At this stage we identified the need to build a “scan slide order” within the Laboratory Information System (LIS) and create an associated work log. A system to arrange images in a searchable catalogue was generated using eSlide Manager (Leica Biosystems), a web-based system for managing whole slide eSlides and their associated case information. Key identifiers that allow for retrieval of individual images include the medical record/hospital file number and pathology accession number. In

addition, the date of multidisciplinary rounds is entered to allow for ease of sorting of all the cases requested for that session. Pathologists can add comments such as the type of staining or the main finding in a comment field.

Viewing software was installed on the pathologists PCs to allow image viewing through eSlide Manager. The pathologists had a short training session to eSlide Manager, in addition to the annotation tools in the viewing software (ImageScope). More comprehensive training sessions occurred on an individual basis for each of the three clerical staff with regards to both eSlide Manager and the scanning software (ScanScope Console application). An initial training session introduced the staff to the scanning process, followed by two or three hands-on training sessions. Most staff were competent to perform scanning without any assistance after these few sessions.

Standard operating procedures (SOPs) were developed to provide staff with additional detailed information, if needed.

The departmental LIS analyst agreed to provide ongoing support and answer emerging questions from both pathologists and clerical staff.

The clinicians in the breast site group were informed about the planned change in pathology presentation in breast multidisciplinary rounds at least three months prior to implementation. As part of the transition to the new technology, clinicians were requested to submit their list of requested cases to pathology no later than noon of the day prior to the planned rounds. Each request for pathology presentation at multidisciplinary rounds is accompanied with a note outlining the focus of the discussion to allow pathologists to scan and annotate the most appropriate slides. The cutoff times and the need to provide the reason for pathology review were not new; these existed prior to the transition to digitizing slides but had to be reinforced. Prior to the transition, exceptions were frequently made to accommodate late and even same day requests for pathology presentation based on a close and friendly relationship between the pathologists and clinicians in our group. Given the additional stages in preparing cases for pathology presentation there was a need to clarify that unless previously scanned, late requests could not be accommodated. In addition, the site group accepted to tolerate the consequences of system or process failure. In such cases, the pathologist would discuss cases without the accompanied images.

Stakeholders within the department of Anatomic Pathology, namely the Director of Digital Pathology Service, Director of Education and Director of Research acknowledged that scanning slides for breast multidisciplinary rounds would receive priority over scanning for other purposes given the constraints of a tight timeline for preparation from the time the list of patients is finalized to presentation (24 or 28 hours).

Few “walk through” exercises were conducted prior to implementation. These consisted of preparing cases with WSI in parallel to conventional glass, without presenting the WSI using real volumes and timing. This provided opportunity to test the time cutoffs, network connectivity as well as to reach a suitable comfort level by all prospective users.

### Current process

The WSI data is stored on a physical server located in our corporate server room, managed by the LIS team.

Download English Version:

<https://daneshyari.com/en/article/4131070>

Download Persian Version:

<https://daneshyari.com/article/4131070>

[Daneshyari.com](https://daneshyari.com)