

## Background

Telecytology is useful for providing rapid onsite evaluation (ROSE). We sought to validate a microscope-based live viewer (LV) that allows for pathologists to control movement of slides from remote locations using remote desktop software.

## Design

A microscope-based live viewer (Motic, Schertz, TX) and a remote desktop program were used (Splashtop, Inc, San Jose, CA). Initially, 5 pathologists were trained to evaluate a validation set of consecutive, previously diagnosed adequacy specimens from interventional radiology (IR), the gastrointestinal endoscopy suite (EUS), and peripheral FNAs, after a washout period. Additional faculty were trained. Each separate instrument was validated before moving to the preferred location, where an additional set of consecutive, real-time cases was evaluated. Precision studies to assess for WiFi inconsistencies were performed on all mobile based units. Concordant case criteria were established and LV results were recorded. Any discordant cases were adjudicated via LV by a panel of three board-certified anatomic pathologists. A cut off point of a 95% concordance rate was considered a successful validation.

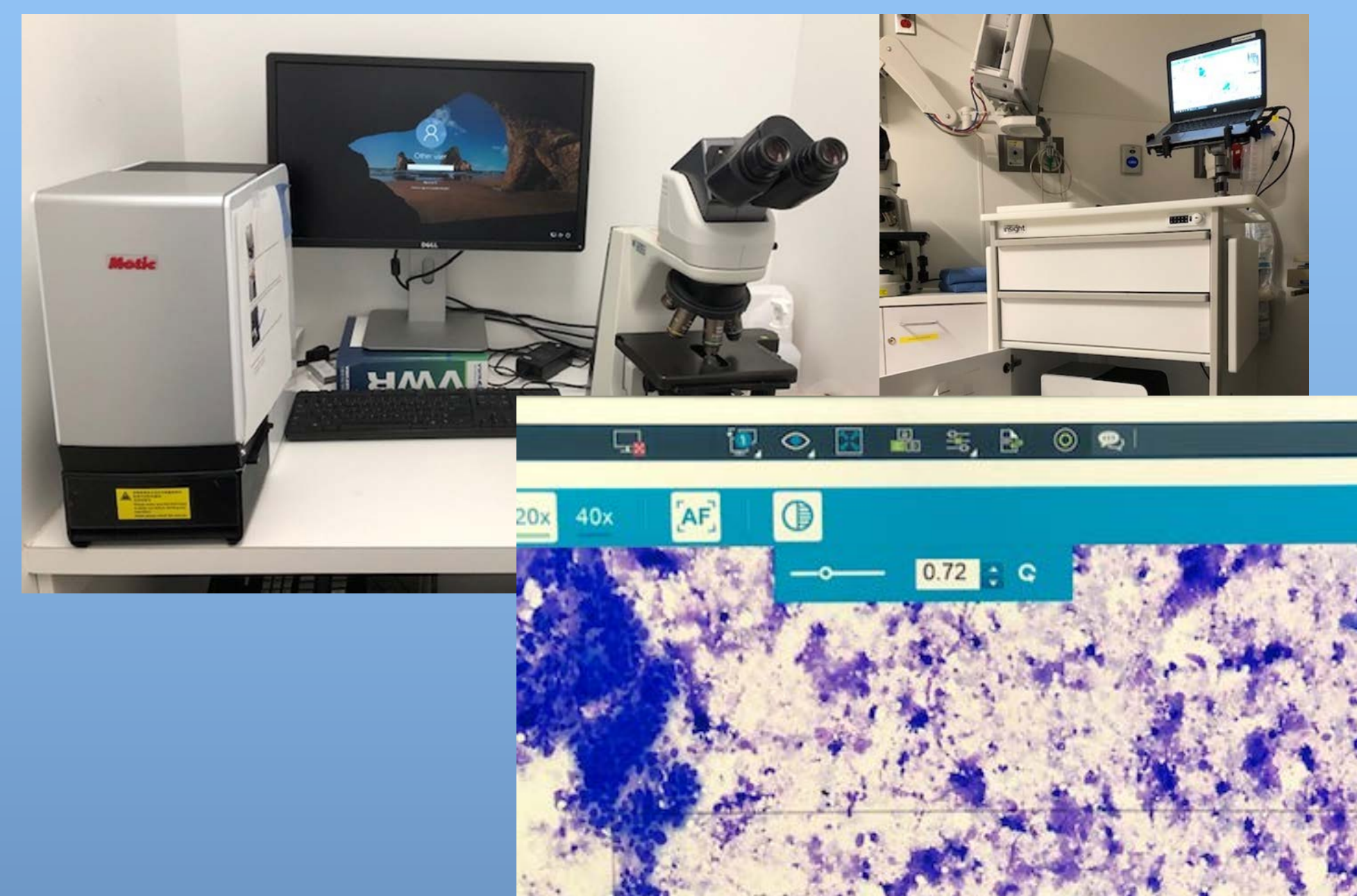
**Table 1. Different modes of telecytology**

Mode of TC	Static Image	Real time Video stream	Real time Robotic	Whole slide imaging
Cost	Low	Moderate	High	High
Speed	Slow	Fast, when slide is ready	Moderate once slide is loaded	Slow, especially with Z stacking
Who controls	On site person	On site person	Remote person	Remote person
Footprint	Small camera on a microscope	Small camera on a microscope	Robot microscope	Whole slide scanner
Special software needed?	No	Yes for viewing	Yes, for viewing and remote desktop (Splashtop)	Variable by platform
On site operator responsibility	Take and send snapshots	Prepare and drive slides	Prepare and load	Prepare and load
Access to entire slide?	No	To an extent, depends on driver	Yes	Yes
Slide requirements?	Coverslipped slides	No coverslip	No coverslip	No coverslip
Vendor examples	Literally any camera or phone	Cell Sens, Spot, Nikon, Magic App etc	Motic, Mikroskan, Aperio, Visiontek	Phillips, Leica, 3D Histech etc

**Table 2. Discrepant cases using telecytology**

Number of cases	Cases where onsite was better	Cases where Motic was better	Concordance rate	
51 cases	Pancreas – Onsite - positive Motic - necrosis with rare atypical UNDERCALL	Mediastinal mass - Onsite - atypical, (four passes needed) Motic – positive	98%	
		Pancreas - Onsite - NDx, Motic – suspicious		
		Pancreas - Onsite - atypical, Motic – positive		
70 cases	Lung – Onsite - atypical, Motic - malignant OVERCALL (aspergillus)	Pancreas – Onsite - non dx, Motic - positive on pass 3 (10 passes done)		
		Interventional radiology Groin – Onsite malignant, Motic - necrosis and atypical cells UNDERCALL	Salivary gland – Onsite - non dx, Motic – suspicious	95.7%
		Lung – Onsite - malignant, Motic - atypical and technical difficulty	Bone – Onsite - “lesional cells present”, Motic – non dx, final diagnosis was non diagnostic	

## Results



Five instruments were validated by 16 board-certified cytopathologists, 9 of whom have responsibilities at a regional site, and 15 cytotechnologists. Sites of instrument validation included two at regional hospitals, one at the EUS suite, one in IR (mobile unit) and an additional mobile cart. The adjudication panel was needed for five cases in which the pathologist had a 2-step or more discrepancy between the adequacy/final diagnosis and the telecytology diagnosis. The concordance rate by case was 102/105 (97%) and by pass was 293/305 (96%).

## Conclusions

LV was successfully validated over a 12-month period across 3 hospitals for cytology in concordance with proposed College of American Pathologists' guidelines. The procedure will allow for additional instruments to be quickly validated.