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Lung Pathology

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AUTOMATED SAMPLE PREPARATION SYSTEM FOR ENDOBRONCHIAL ULTRASOUND (EBUS): ROSE APPLICATIONS

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PURPOSE: Rapid On-Site Evaluation (ROSE) has improved patient care with increased diagnostic yield, decreased number of needle passes, and reduction in the complication rate and cost of bronchoscopic transbronchial needle aspiration (TBNA) and endobronchial ultrasound (EBUS) procedures (1-6). Despite these advances, challenges of ROSE include: (i) high variability in sample quality, (ii) cumbersome process in the procedure room, and (iii) slow specimen preparation leading to extended procedure time. We report the results of a novel automated sample preparation system (ASP Health, Chicago, IL) that combines both specimen deposition and staining in a compact/mobile unit. The system uses an integrated element to heat the specimen slide and a series of pumps to dispense microliters of fresh staining reagents onto the slide to stain the cells. Currently, the system is configured to perform DiffQuik staining, which is commonly used in the ROSE process.

METHODS: We performed a prospective, multicenter study of patients undergoing EBUS. After an initial assessment of adequacy was determined by the cytopathologist and/or cytotechnologist, samples were split into a conventional standard of care (SOC) slide preparation and preparation using the automated device. Pathologists compared the SOC slides to the slides prepared by the automated system and assessed the following metrics: nuclear and cytoplasmic quality, presence of debris/artifact, staining quality, creation of a monolayer, and ease of adequacy/diagnosis assessment. A score between 1 and 3 was assigned to the above metrics, with 3 being the best and 1 being the worst.

RESULTS: One hundred patients were recruited across three different institutions. One to three lymph nodes were sampled for each patient. The slides prepared by the automated system yielded a thin monolayer of cells with an adequate staining contrast compared to the conventional slides. Multiple cytopathologists at different institutions noted that the automated system provided an impressive staining quality (average score = 2.8) compared to the SOC slides (average score = 2.1). Similarly, the presence of debris/artifact was significantly lower on the automated slides (average score = 2.6) compared to the SOC slide (average score = 2.0). Importantly, the diagnostic equivalency between the automated slides and conventional slides was reported to be >95% confirming that the automated slides provide similar diagnostics to the current SOC, with improved slide and stain quality.

CONCLUSIONS: Initial results of this study suggest that slides prepared by the automated system are of adequate quality for adequacy assessment with a diagnostic concordance of >95% when compared to SOC slides.

CLINICAL IMPLICATIONS: This automated system is expected to improve and standardize the ROSE workflow in the bronchoscopy suite by ensuring reproducibility and efficiency.

DISCLOSURES: no disclosure on file for Mahwish Bari;

Employee relationship with ASP Health Please note: Dec 2019 - Current Added 04/04/2022 by Alexander Bluestone, value=Salary

No relevant relationships by Jennifer Duke

No relevant relationships by Christopher Hartley

Consultant relationship with Medtronic Corporation Please note: $5001 - $20000 by Amit Mahajan, value=Consulting fee

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No relevant relationships by Charles Schirmer

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Owner/Founder relationship with ASP Health Please note: 2018-2022 Added 04/15/2022 by Hariharan Subramanian, value=Ownership interest

No relevant relationships by Julie Williams

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