Safety during crisis: Rapid on-site evaluation at the time of COVID-19 pandemic

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Abstract
The COVID-19 pandemic is posing a worldwide challenge to control and contain. SARS-CoV-2 is a highly infectious virus. Health care providers at the front lines are at high risk of getting the infection and the risk applies also to laboratory personnel as they deal with specimens that might be contaminated with infectious material. Cytopathology teams specifically are at high risk of dealing with contaminated material because of patients encounter during fine-needle aspiration biopsies or Rapid On-Site Evaluation (ROSE) for adequacy. In our article, we discuss alternative safer staining methods to the widely used Diff–Quick stain that can be utilized for ROSE to decrease the risk of viral exposure during the current COVID-19 pandemic.

KEYWORDS
COVID-19, fine-needle aspiration, ROSE, safety, virus

1 | INTRODUCTION

In late December 2019, an outbreak of a novel coronavirus disease (COVID-19) caused by highly infectious virus (SARS-CoV-2) was reported in Wuhan, China. Subsequently, and due to the highly infectious nature of the virus, the disease became a pandemic in a relatively short period of time with over 1.6 million cases and 97,000 deaths worldwide (as of 10 April 2020). In general, most patients with COVID-19 present with mild symptoms such as fever, shortness of breath and dry cough. However, it can also be deadly due to acute severe alveolar damage and progressive respiratory failure which may require hospitalization and intensive care. The virus can easily spread from person-to-person interacting in close proximity through speaking, coughing, or sneezing even if the carrier is not having any symptoms. The virus can spread through both direct (droplets) as well as indirect contact (contaminated objects and airborne aerosolized droplets transmission). Until now, it is unclear how long the virus could stay on surfaces, but preliminary studies suggest that coronaviruses including (SARS-CoV-2) may remain infectious on surfaces for a few hours to several days depending on the different conditions including type of surface, humidity, and temperature.

2 | DISCUSSION

Rapid On-Site Evaluation (ROSE) is an important part of daily cytopathology practice. In most practices, air-dried slides stained with Diff–Quick (Romanowsky) stain are a widely accepted method for ROSE and adequacy assessment. Theoretically, air-drying of slides carry a risk of aerosolizing infectious droplets and immediate immersion in alcohol to prepare Papanicolaou (Pap) stained smears is a safer method of fixation with lower risk of contamination. Conventional Pap staining method is time-consuming and cannot be utilized for ROSE. Alternative methods for rapid cytology smears preparation are available and can be utilized during this pandemic to decrease the risk of viral exposure. One fast staining method is a rapid Pap stain. The staining steps of this technique are shown in Table 1.

Another method for rapid staining is ultrafast Pap stain which is a combination of air-dried preparation and wet fixed Pap preparation. It includes the basics of air-drying of cells, followed by rehydration with normal saline and fixation in alcohol. The purpose of air-drying is to enlarge the cells and thus increase the resolution of cellular details. Rehydration of cells is achieved with normal saline so that clarity is regained plus hemolysis of the background blood. The staining steps shown in Table 2.
In Ultrafast Pap stain, air-drying is used to minimize the artifactual changes seen in wet fixed smears due to poor fixation plus cell loss with wet fixation is avoided. But interpretation of cytoplasmic keratinization with ultrafast Pap stain is not possible due to the omission of Orange-G from the staining protocol. Another method for fast staining is using a rapid H&E stain. This technique is used universally in neuropathology smears and is also a widely accepted technique for staining frozen sections during intraoperative consultation. The staining steps are shown in Table 3.

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