Virtual clinicopathologic correlation rounds for inpatient consult skin biopsies during the COVID-19 pandemic: A quality improvement study

In dermatology residency programs, dermatopathology (DP) rotations vary widely in availability and duration. Several programs do not offer DP rotations at all. Standard teaching with glass slides is limited by available space and microscopes, inconvenient locations, and social distancing requirements during the Coronavirus Disease 2019 (COVID-19) pandemic. These barriers are particularly salient for inpatient consultative dermatology services that may require rapid clinicopathologic correlation (CPC) to establish high-stakes diagnoses and initiate treatment. Studies have assessed modifying DP curricula through use of virtual slides and creation of a virtual multiheaded scope. To our knowledge, however, the use of live interactive teledermatopathology (TDP) to review biopsy specimens procured by the inpatient dermatology consult service has not been evaluated.

A retrospective chart review of a 3-month period (November 2019 to January 2020) found that only two of 36 (6%) specimens were personally reviewed by our department’s consultative dermatology team. Our intervention used live interactive video slide TDP rounds to review skin specimens biopsied by the inpatient dermatology consult service. Each month, the DP service consisted of several attendings, one fellow, and one resident, and the inpatient consult service consisted of one attending and two dedicated consult residents. We used slide image capture software in combination with a secure, Health Insurance Portability and Accountability Act-compliant platform (Microsoft Teams, Redmond, Washington) that integrates text and image chat with video conferencing (Figure 1).

The primary outcome was the proportion of slides reviewed by the inpatient consultative service using the intervention during a 3-month period compared to the historical control. Secondary outcomes were participant satisfaction, perceived educational and service value, and change in diagnosis. The number of cases reviewed per call, time per call, participants, clinical differential diagnosis, and instances where the CPC rounds led to a change in diagnosis were also recorded. All participants completed a post-intervention survey assessing satisfaction with the protocol, clinical/DP educational value, influence on patient care and DP interpretation, and recommendations for improvement. The findings are reported in accordance with the Standards for Quality Improvement Reporting Excellence (SQUIRE).

Forty-seven of 48 (98%) specimens biopsied by the inpatient dermatology consult service during the intervention phase were reviewed using TDP. One case was reviewed in-person without the intervention. The median time spent discussing each case was 6.5 minutes. Using the plan-do-study-act cycle, a four-step model for iterative improvement often used in quality improvement, it became standard to post clinical vignettes with images in the chat to aid in discussion. Furthermore, in cases where immunofluorescence was performed, representative findings were captured and shared with the team in a similar fashion.

Fourteen members of the department, three of whom were DP attendings and two dermatology consult attendings, participated in the intervention. The proportion of specimens reviewed using TDP increased from 6% during the historical control to 98% during the intervention phase. The median time spent discussing cases decreased from 6.5 minutes during the historical control to 3.5 minutes during the intervention phase. All participants reported high satisfaction with the protocol, clinical/DP educational value, and influence on patient care and DP interpretation. Recommendations for improvement included improving the efficiency of slide capture and sharing, and expanding the use of TDP to other dermatopathology services.

FIGURE 1 Clinicopathologic workflow. (A) The dermatology consulting team receives a page to evaluate a new patient. (B) After clinical evaluation, the team determines whether histopathology would assist in diagnosis and/or treatment. Clinical photographs are captured, and a skin biopsy is performed. (C) A brief clinical synopsis, differential diagnosis, and clinical photos are posted on Microsoft Teams. (D) The dermatopathology fellow alerts the clinical team when the histopathology slides are ready for review over Microsoft Teams, and a video chat is started using teledermatopathology to review the histopathology. The case is further discussed to refine the differential diagnosis and potential treatment plan.
intervention and completed the post-intervention survey (response rate 100%) (Figure 2). Four (29%) were female and nine (64%) were residents. All participants would recommend TDP CPC rounds to others and that it become a permanent part of the curriculum. On average, participants (DP and inpatient attendings, residents, and fellow) estimated they were able to attend 62% (±32) of the cases reviewed. One participant was slightly satisfied with image and video quality. Possible sources of decreased quality include using a mobile device with a small screen and occasional glitches with the live slide capture software. In the free response section, an attending noted the discussion enabled quicker access to preliminary results, especially when outstanding immunohistochemical stains might delay sign-out of the case.

The range of pathology reviewed during the 3-month intervention was broad, spanning inflammatory, neoplastic, and infectious diseases. There were three cases where CPC rounds led to a change in diagnosis that would not have been made in the pre-intervention model: staphylococcal scalded skin syndrome, subcutaneous Sweet syndrome, and reactive arthritis. In all instances, discordance between the pathology and primary clinical differential diagnosis led to further discussion and correlation of case data to generate a new primary diagnosis.

Our project represents a novel workflow to improve access to CPC for residents and faculty. One barrier was that the lack of a pre-determined, daily schedule for TDP rounds may have created challenges in attending meetings. However, flexibility in the timing of rounds aligns with variability in slide availability and consult workflow. Our study is also limited by software and hardware requirements, single institution design, and small sample size. While this model was applied to inpatient biopsies, this intervention has potential for outpatient clinics and between institutions. With the ongoing COVID-19 pandemic and varied access to physical slides, CPC rounds offer a unique approach to enhancing DP education and service.

IRB approval status: Reviewed and exempted by the Emory University Institutional Review Board.

CONFLICT OF INTEREST
The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT
The data that support the findings of this study are available from the corresponding author upon reasonable request.

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FIGURE 2  Participant post-intervention survey. Post-intervention survey measuring participant satisfaction with workflow, image quality, and education. In every category, >85% (12/14) participants were at least very satisfied (black and diagonal lines) with every component of the intervention. Attending physicians were either very or completely satisfied in all fields surveyed.
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REFERENCES