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COVID-19—The American Perspective

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Abstract The Coronavirus Disease 2019 (COVID-19) pandemic is a recent, ongoing global infection that has affected more than 200 countries worldwide, with the United States having the highest per capita infection rate. Professional organizations, accrediting bodies, licensing boards, and government agencies have been important partners to academic institutions and the health care system during this pandemic response. We review the American perspective of the impact of COVID-19 on dermatology.

Introduction

At the time of writing, the novel 2019 coronavirus (severe acute respiratory syndrome coronavirus 2) has infected more than 70 million people worldwide and has resulted in 1.5 million deaths. Nearly 20% of those infections have been in the United States, and the nation currently has the highest per capita infection rate of any country in the world.[1] Such widespread infection led to dramatic changes for the field of dermatology within weeks of the pandemic's onset. We review these changes that occurred in the shadow of the Coronavirus Disease 2019 (COVID-19) pandemic as they pertain to laws, academics, professional organizations, credentialing, and patient care from the perspective of American dermatology.

Changes to routine dermatologic care

Although teledermatology has been studied in the United States for more than 20 years,[2] widespread adoption was unenthusiastic until the coronavirus pandemic began its spread. Teledermatology was relatively common in academic settings before COVID-19,[3] with particularly high usage for inpatient consultation,[4] but broad implementation in private practice was not in place because of the restrictions on reimbursement. Nearly all our colleagues who work in private practice, for large health systems, or as part of an academic institution are reporting marked increases in teledermatology visits. This is largely attributable to the increased flexibility regarding telehealth requirements implemented under the Coronavirus Aid, Relief, and Economic Security Act. The Centers for Medicare & Medicaid Services essentially eased restrictions on what constitutes a "telehealth" visit and increased reimbursement to levels comparable to in-person clinical visits.[5] In contrast to live video-based visits, store-and-forward teledermatology services were not considered reimbursable encounters until 2019.[6] Even after the changes to the Centers for Medicare & Medicaid Services that year, store-and-forward services were only valid for established patients and had lower rates of reimbursement, despite store-and-forward possibly being better suited to certain situations (such as the evaluation of solitary skin lesions).

Some have advocated for continued teledermatology as a way to improve access for underserved communities[7] and to make it a permanent part of inpatient dermatology practice[8] in the future. Others have urged caution in delaying clinical care, with particular attention to malignant melanoma.[9] The Society of Dermatology Hospitalists issued guidance on the implementation of teledermatology in the inpatient setting, including the usage of teledermatology for patients infected with COVID-19 whenever possible.[10] Studies done before the pandemic have demonstrated that teledermatology is generally effective for inpatient consultation.[11] The

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American Academy of Dermatology (AAD) has also drafted protocols for patients who require essential and urgent dermatologic care. For inpatients and outpatients where in-person evaluation is indicated, screening questions for COVID-19 should occur before patient arrival at the office, and many hospitals have adopted broad testing strategies before admission to facilitate isolation.[12]

Comprehensive changes to the practice of Mohs micrographic surgery have also occurred nationwide due to the pandemic. The frequency of facial procedures and longer patient contact times have understandably raised numerous concerns for Mohs surgeons. A review of all physician deaths reported in the media found that in addition to practitioners working in the emergency department and intensive care units (ICUs), dentists, otolaryngologists, and ophthalmologists experienced high rates of infection and mortality.[13] Given the close face-to-face contact in these specialties, many Mohs surgeons have restricted procedures to high-risk malignancies. A recent report suggested that Mohs micrographic surgery cases (and related procedures such as excisions) should only be allowed to proceed if the patient has malignant melanoma, squamous cell carcinoma with potential for metastasis, basal cell carcinoma on areas of the face where delayed treatment would result in more cosmetic morbidity (such as the nasal ala), and other serious malignancies such as cutaneous sarcomas or adnexal carcinomas. Melanoma in situ and early-stage melanomas that were completely removed by biopsy were considered low and intermediate risk, respectively, and strong consideration for delaying definitive procedures was recommended.[14]

Several dermatology practices came under fire in April 2020 when *The New York Times* published a story about continued cosmetic services during the COVID-19 outbreak in the United States. The report argued that several private equity–backed and independently owned practices were using their designation as health care services to continue performing cosmetic procedures such as botulinum toxin and dermal filler injections.[15] This raised several ethical concerns, including the use of personal protective equipment (PPE) for nonessential medical procedures and unnecessary exposure of patients and clinical staff. The widely publicized shortages of PPE in the United States were another reason for restriction of outpatient dermatology visits to urgent appointments as part of the effort to conserve supplies. Social distancing in waiting rooms and requiring thorough cleaning of rooms between visits led to precipitous drops in outpatient dermatology capacity.

Medications and prescribing

Biologic agents and conventional medications that suppress the immune system are frequently used in dermatology to treat common widespread skin conditions such as psoriasis and atopic dermatitis. The details surrounding the inflammatory cascade elicited by COVID-19 and the effects of such medications are still being investigated. Several American foundations, such as the National Psoriasis Foundation and the National Eczema Association, have issued guidance for management of patients who are on biologic or immunosuppressive therapy or who are being considered for treatment with such drugs.[16,17] The Society of Dermatology Hospitalists and the Medical Dermatology Society, two groups focused on the care of patients with complex dermatologic disorders, published a consensus statement regarding the management of immunosuppressive medications based on experience with other conditions since the beginning of the pandemic.[18] Several medications used in dermatology such as infliximab and tofacitinib are being evaluated for the treatment of COVID-19 in several ongoing clinical trials.[19,20]

Hydroxychloroquine (HCQ) was also being evaluated internationally for the treatment of COVID-19 and was the subject of intense media attention in the United States when then-President Donald Trump announced the medication's effectiveness in March 2020.[21] The US Food and Drug Administration (FDA) issued an Emergency Use Authorization (EUA) for the medication shortly thereafter, but this EUA was revoked in June 2020 because its benefit was unclear and it could cause potential harm in the form of cardiac arrythmias.[22] At the time of the president's statements and the EUA, small studies had shown a possible benefit of HCQ when used in conjunction with azithromycin, but larger, more recent studies, systematic reviews, and meta-analyses have yielded mostly inconclusive or negative results.[23–25] While the EUA was in effect, dermatology and rheumatology patients often faced shortages of HCQ, leading to flares of conditions when treatment with HCQ was indicated, such as for cutaneous and systemic lupus.[26] In June 2020, based on ongoing analysis and emerging scientific data, the FDA revoked the EUA to use HCQ and chloroquine to treat COVID-19 in certain hospitalized patients, when a clinical trial is unavailable or participation is not feasible, based on results from a large, randomized clinical trial of hospitalized patients. This trial found these medicines demonstrated no benefit for decreasing the likelihood of death or speeding recovery.[22]

Last, isotretinoin prescribing in the United States has undergone significant changes. Physicians, prescribers, and patients must adhere to strict rules governing isotretinoin use that are monitored using a nationwide risk evaluation and management system (REMS), known as iPledge. In March, the FDA issued broad guidance for all REMS programs in the United States, recommending that laboratory, imaging, and clinical evaluation of patients taking medications that require REMS monitoring be considered on a case-by-case basis. In addition, the FDA elected to eschew action against physicians and companies that did not follow the rules of the REMS programs for the duration of the pandemic.[27] The AAD currently recommends that the monthly pregnancy test required of all patients who can become pregnant be done at home when possible and states that monthly face-to-face visits can be conducted through telehealth.[28] Calls to reform the iPledge program's onerous requirements have existed

since its creation, and many dermatologists in the United States hope that these changes made during the pandemic become permanent.

Academics

Ensuring that trainees receive adequate education during the pandemic lead to creative adjustments in didactic curricula. Virtual dermatopathology using platforms such as PathPresenter Corp. (Delaware) and KiKoXP LLC (Pittsburgh, Pennsylvania) has become the standard at education programs around the country. Full slide scanning services have been available for many years, but widespread use for weekly "unknown" cases during resident didactics was not broadly implemented. These platforms allow for both ongoing education, as well as for preparation for the American Board of Dermatology examination, which had planned a transition from glass slides to a fully digital format for the dermatopathology portion of the assessment in 2021.

The AAD annual meeting, which draws tens of thousands of physicians, students, exhibitors, and industry personal every year, was cancelled in early April.[29] After reports of a small scientific conference held in late February 2020 at a hotel in Boston, Massachusetts being considered a "super spreader" event by the US Centers for Disease Control, many medical societies made similar decisions to cancel annual meetings.[30] The AAD was able to regroup and held an abbreviated version of the meeting on line, titled "AAD Virtual Meeting Experience," which included prerecorded online lectures followed by live plenary sessions,[31] as well as resident and maintenance of certification courses. The 2021 AAD meeting, which was to take place March 19, 2021 to March 23, 2021 in San Francisco, California, will again be virtual.[32]

Medical students in the United States have also faced numerous hardships attributable to the disruption of preclinical lectures and in-person clinical training. Medical school in the United States generally consists of 2 "preclinical" years learning the pathogenesis of disease through live lectures, followed by 2 years of hands-on "clerkship" training that consists of rotations through several general and specialty care settings. Most medical schools opted to switch to distance learning for the preclinical curriculum and initially cancelled core clinical rotations to avoid exposing students to the virus, as well as to preserve PPE. At the height of the pandemic in the spring of 2020, some medical schools offered students in their final year of classes the option of "graduating" early and caring for patients as fully trained physicians at their home institutions.[33] More recently, institutions have eased restrictions on clinical rotations as PPE has become more available and our knowledge of how the virus is contracted has grown.

Students in their third year of training expressed significant concerns regarding the National Residency Match Program's process for obtaining a residency position during the outbreak. Students seeking a residency in dermatology were particularly concerned about the inability to participate in "away rotations," which serve as an important stepping stone to achieving their goal of becoming a dermatologist. Many medical schools in the United States do not have affiliated dermatology residency programs, and some do not even employ full-time dermatologists. Both situations have the potential to hinder a student's ability to obtain a residency placement because they are unable to experience the day-to-day activities of a dermatologist and to obtain letters of recommendation for their application. The Association of Professors in Dermatology, a coalition of dermatology faculty members and program directors in the United States, issued a statement acknowledging the disruptions caused by the pandemic and promised to consider these changes in their review of applications.[34] Despite these obstacles, students have demonstrated remarkable resilience. Many students formed organizations to support frontline physicians by taking on childcare and housework responsibilities.[35]

Redeployment of physicians

Dermatology residents have been redeployed across the country to staff COVID-19 testing clinics, inpatient hospital wards, and ICUs. One of the authors (K.M.S.), a trainee in a combined internal medicine and dermatology program at the time, was reassigned to the COVID-19 ICU as part of an effort to have trainees across all specialties quarantine for 2 weeks at a time, after a 2-week period of caring for COVID-19 patients. In hard-hit places like New York City, residents from all specialties were redeployed to care for the massive influx of patients infected with COVID-19. The effect on the education and well-being of these trainees is the subject of several ongoing survey-based studies.

Pathologists in several institutions have volunteered as "family contact teams," helping patients admitted to hospitals stay in touch with their families because hospital visitation policies have been severely restricted. In cases where patients were unable to communicate, such as patients who were mechanically ventilated, pathologists relayed updates to family members to allow the hospital teams to focus on clinical tasks.[36]

Clinical trials

COVID-19 has disrupted clinical trials in all medical specialties across the United States. Difficulties with social distancing of high-risk trial patients in clinics, supply of study materials including medications, remote working of entire research teams, and the preoccupation of administrative offices have all played a role in slowing active dermatologic research.[37] Dermatology research often involves patients with metastatic cancer or autoimmune conditions being treated with immunosuppressive medications,

which represent groups of patients at risk for severe COVID-19.[38] New investigational therapies in dermatology with the potential to suppress the immune system also faced uncertain futures. Even studies that did not enroll such patients were withdrawn because of low enrollment, as was observed with the CALISTA trial (a phase 3 trial assessing the effectiveness of sodium thiosulfate in treating calciphylaxis).[39]

Board certification and continuing medical education

The American Board of Dermatology, which administers the certification examination and continuing medical education requirements for all dermatologists in the United States, has made several changes to its processes since the outbreak. The certification examination for graduating residents was initially scheduled for July 2020, but due to social distancing requirements and the challenges of glass slide review for the dermatopathology portion of the test, the decision was made to convert the testing process into a completely digital format.[40] This change had been slated to occur in 2021 with the transition to the new Applied Examination format, so immediate changes were required. Due to the number of medical and nonmedical organizations seeking to convert their professional examinations to an online format, the American Board of Dermatology faced considerable delays in implementing this change, necessitating a delay of the testing date. In the United States board-certified specialists are required to participate in continuing medical education activities between certification renewals to maintain their status within respective specialty medical boards. Participation is based on a credit system, requiring a combination of live and self-directed learning. Continuing medical education requirements were suspended by the American Board of Dermatology for the year 2020.

Physician licensing was accelerated in several states such as New York, where Governor Andrew Cuomo issued executive orders to expedite the processing of license applications with the aim of allowing physicians to practice in New York state within 1 week of submitting their application. Reciprocity requirements for physicians, nurse practitioners, physician assistants, and nurses were also significantly relaxed, essentially allowing any provider with a license in good standing from another state to work in the state of New York with fewer restrictions.[41] This was done to shore up overwhelmed frontline hospitals in New York City, but many have called for the expansion of relaxed reciprocity requirements, which are currently a significant obstacle to physicians relocating or practicing across state lines.

AAD response

Beyond cancelling the planned annual meetings, the AAD has established a database for cutaneous manifestations of COVID-19. The results of this study were published by the Academy in July 2020.[42] Compared with the initial study from Spain, which originally documented the appearance and frequency of skin findings in infected patients,[43] far fewer patients had proven COVID-19 infections, and this was attributed to the severe limitations of testing in the United States during the early weeks of the pandemic. The findings of the Spanish study were, nonetheless, consistent with the findings of others, and the database and reporting form remains active to continue documenting the skin findings of COVID-19. The AAD, along with the American Society for Dermatologic Surgery, has provided guidance for solo practitioners and private practices facing financial hardships, including resources for applying to the variety of business assistance programs put forth by the US government.

Vaccination

On December 12, 2020, the FDA issued an EUA for the Pfizer-BioNTech (New York, New York) COVID-19 messenger ribonucleic acid vaccine.[44] This announcement follows similar approvals in Europe and around the world. At the authors' institutions, dermatologists covering inpatient consultations were among the first providers to receive the vaccines, after providers caring directly for COVID-19 patients in the inpatient/ICU setting and the emergency departments. Dermatologists working primarily in the outpatient setting were among the next cohort to be vaccinated. Although messenger ribonucleic vaccines for other diseases have been developed, none have been tested in the large-scale clinical trials conducted for COVID-19.[45]

Conclusions

The severe acute respiratory syndrome coronavirus 2 pandemic has disrupted nearly every aspect of dermatologic care in the United States. Given the astonishing number of cases in the United States, many parts of dermatology that we took for granted just 1 year ago have been changed forever. From resident dermatopathology education around a shared microscope, to the bustling waiting rooms of private practices, there is no facet of dermatology that has not been affected. Dermatologists in the United States have risen to the challenge by describing the cutaneous manifestations of COVID-19, redeploying to overwhelmed hospitals, and pioneering telemedicine platforms in health systems across the country.

Declaration of Competing Interest

The authors declare no conflict of interest.

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