Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Managing epidermolysis bullosa during the coronavirus pandemic: Experience and ideals

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Abstract The 2019 novel coronavirus pandemic has tremendously affected health-seeking behaviors. Fear of contracting the disease has been a major factor keeping patients from presenting to hospitals, even when urgent or emergent medical attention is needed. Hospitals limiting staff exposure and capacity to accommodate patients also limits opportunities to seek care. Although physical distancing is encouraged to curb infections, this call needs to be tempered with public health education for what constitutes emergencies and urgent medical conditions needing face-to-face attention. Measures to assuage fears among patients and their caregivers to ensure their safety in the hospital or health care setting need to be communicated and executed effectively. Epidermolysis bullosa is an inherited mechanobullous disorder that is usually stable, but in some patients with underlying comorbidities, close monitoring or face-to-face management is required . We present our experience and provide recommendations pertinent to epidermolysis bullosa patients of all subtypes during the coronavirus crisis.

Introduction

The extent to which countries and governments around the world have instituted drastic measures to curb the transmission of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which causes the 2019 novel coronavirus (COVID-19) is unprecedented. Although frequent handwashing, cough etiquette, and mask-wearing are common advice to avoid contracting the virus short of testing, physical distancing is at the core of these measures, and has greatly restricted movement in at least the busiest parts of the globe.

Whether government mandates a total lockdown or individual self-quarantines with social distancing, calls to scale back physical interaction have affected health care–seeking behavior.[1-3]

Emergency and urgent care centers that would have otherwise been busy before the COVID-19 pandemic have reported a record low volume of patient encounters. Although the decrease in emergent and even nonemergent consults may be a relief for any area that expects a surge in COVID-19–related consults, it becomes a concern when a significant percentage of patients who have life-threatening medical issues are not presenting to hospitals. This brings to the fore the is-

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sue of fear of contracting the virus among patients, should they physically consult at hospitals or even outpatient clinics or health centers.[4]

Some patients are afraid to seek or accept medical help at all for even life-threatening conditions due to fear of contracting COVID-19, with all the suffering and isolation that goes with being infected. A group has embarked on an initiative to allay fears and improve the perception of risk in an emergency department in the United States by targeted messaging about what constitutes an emergency, along with information about concrete measures taken by the hospital to ensure patient safety.[4] Many other hospitals around the world have employed a similar approach to encourage patients to address urgent or emergent health concerns by seeking medical care as soon as possible.[5-8] Whether these efforts translate to tangible, measurable improvement in morbidity and mortality has yet to be determined.

Illustrative of the fear: Epidermolysis bullosa

This scenario, however, is not unique to emergency departments with high-acuity patients. Even those who have chronic, generally stable conditions like epidermolysis bullosa (EB) may have underlying problems that may otherwise have been caught early or would have received earlier intervention if not for fear of presenting to the hospital.

EB is an inherited mechanobullous disorder with marked mechanical fragility of epithelial tissues, resulting in blistering and erosions that may follow even trivial trauma.[9] Four major types are recognized: EB simplex (EBS), junctional EB (JEB), dystrophic EB (DEB), and Kindler EB.[10]

Chronic wounds from EB are a major concern, and when occurring with other comorbidities, can enhance susceptibility to COVID-19. There is now an algorithm for care of a variety of patients with chronic wounds during the pandemic.[11]

SARS-CoV-2 enters host cells using its spike protein to bind to the cell receptor angiotensin converting enzyme 2. It is known to be expressed not only in the mucosa, such as the nasal epithelium, but also in the capillaries of the skin, basal layer of keratinocytes, and eccrine glands.[12] It has been posited that any skin wound deep enough to expose the basal epidermis is a potential entry point for the virus.[13] In addition, it has been suggested that skin damage caused by irritant hand dermatitis from frequent handwashing provides a route of entry for the SARS-CoV-2 virus.[14]

A type of bronchial progenitor cell co-expressing angiotensin converting enzyme 2 and cofactor transmembrane protease serine 2[15] may be a more likely target of SARS-CoV-2 than open wounds.[16] SARS-CoV-2 is primarily spread via droplets and is not blood-borne; no evidence exists yet to support the claim that it is transmitted via skin wounds.[17,18] Despite this, syndromic forms of EB may be associated with significant morbidity and mortality[19,20] with involvement of organ systems other than the skin that require regular follow up with a multidisciplinary team.

The phenotype of three individuals with EB from two families who contracted COVID-19 was recently described. The two women with recessive DEB (RDEB) from a family with four EB patients had disparate courses of illness. The 32-year-old younger sister had a milder course, whereas the 35-year-old sister was hospitalized due to the severity of manifestations that were comparable to those seen in the general population. These later resolved after 8 days of hospitalization. The third patient, a 35-year-old syndromic EBS, presented with mild signs of infection that spontaneously resolved after 1 week.

Although these cases are too few to extrapolate findings to all EB patients, it does provide a very helpful account: EB and EB-related complications, such as anemia, esophageal strictures, growth retardation, or nephropathy, do not guarantee a severe course. More studies will answer questions about the prevalence and outcome of EB patients with COVID-19.[19]

Authors' experiences

Measures taken by hospitals or in physician offices to reduce patient load and staff exposure to potential COVID-19 patients may have limited the options for those who are willing to seek care. D.F.M. encountered a patient with JEB on hemodialysis who developed pericarditis with a large pericardial effusion that required drainage. Due to lack of human resources for an outpatient echocardiography, the procedure could not be performed unless the patient was admitted as an inpatient.

Other severe RDEB and JEB patients have been declining in-person reviews of their wounds, placing them at risk for developing aggressive squamous cell carcinoma (SCC). One patient has even been refusing funded EB nursing visits to the home, solely for changing dressings, out of fear of contracting COVID-19. This has continued despite the very low community transmission of SARS-CoV-2 in New South Wales. To our knowledge, no Australian EB patient has contracted COVID-19. This highlights the many obstacles an EB patient may encounter amidst the pandemic.

M.R.-Q. reported even fewer EB patients seeking direct care in dermatology centers other than virtually in the Philippines. As of this contribution, the Philippines has the highest prevalence of COVID-19 cases in the Western Pacific Region at nearly 300,000 cases.[21] Most patients with mild to moderate EB will have chronic wounds. It is not clear whether the profile of EB patients who consult is influenced by early mortality of the patients with more severe EB types in this country.

Ideal approach

An international panel of EB experts, including the authors of this contribution, published a consensus on the multidisciplinary approach to the care of EB patients during the

COVID-19 pandemic (Table 1).[22,23] Other recommendations for EB patients, caregivers, and health workers have also been published.[20,24,25]

Although EB patients do not seem to be at an increased risk of contracting COVID-19 compared with the general population, those with significant internal complications may have secondary risk factors that weaken their ability to fight infection, COVID-19 included. General precautions apply, such as staying home and limiting nonessential travel, and ensuring an adequate stockpile of supplies for EB care such as dressings.[26] Open communication lines between the patient and EB specialist or team is also vital.

Hand dressings worn by EB patients to cushion mechanical injury preclude frequent handwashing as recommended by the World Health Organization.[27] The 20-second rubbing together of skin with soap and water in a patient with inherent skin fragility affects compliance, as does the preferred antisepsis of rubbing the hands with an alcohol-based formulation, even if this has been found to be more effective at killing lipophilic enveloped viruses like SARS-CoV-2 *in vitro* and *in vivo*, more time-saving, and easier to use.[28] Noncompliance occurs even though alcohol-based sanitizers have been found to be more effective at killing lipophilic enveloped viruses like SARS-CoV-2 in vitro and in vivo, more time-saving, and easier to use.[28] An outer layer of dressings or bandages that is changed frequently is an acceptable alternative for patients who cannot perform these manners of hand hygiene.[20]

Personal protective equipment (PPE) should be worn by patients as well as all nursing and medical staff when attending to EB patients. EB patients should apply protective dressings to areas of skin where the mask may rub on their skin. In addition, they should apply a bland moisturizer to their facial skin before donning the mask to reduce the friction of the mask on their skin.[22]

Local PPE recommendations according to local prevalence rates and availability of PPE should be followed[29] (Figure 1).

Fig. 1 A patient with RDEB admitted to the ICU amidst the COVID-19 pandemic. *COVID-19*, coronavirus; *ICU*, intensive care unit; *RDEB*, recessive dystrophic epidermolysis bullosa.

Specific recommendations

Newborns with EB

During the pandemic, instead of transferring neonates with EB to regional EB centers, these infants should be cared for in their local hospitals with virtual guidance from the regional EB multidisciplinary team.

Patients with low risk for internal disease and SCC: EB simplex, dominant dystrophic epidermolysis bullosa (DDEB) and localized JEB

This group of EB patients who are seen at 6 to 12 months should be managed virtually. This permits the various multidisciplinary team (MDT) members to communicate together about their care.

Patients with internal disease but not high risk of SCC: Infants and young children with RDEB and failure to thrive, patients with JEB and any internal complication such as cardiomyopathy/renal/respiratory involvement, and severe EBS infants

This group of EB patients is typically reviewed in-person by the MDT every 3 months. If their blood tests and any other scan results are available ahead of time, a virtual MDT should occur in advance of the visit, in which there is communication with the patient and his/her caregiver. The leaders of the team, such as the EB dermatologist and EB nurse, could perform this review along with any other relevant team members based on the current problem list.

RDEB patients 15 years and older and anyone who already has an SCC

It is more difficult to examine the whole skin using telehealth in this high-risk group, and ideally, this should be done face-to-face. Sometimes, the SCCs just look like normal wounds, but the pain quality or intensity may differ from usual wounds. The patient, caregiver, and clinical team should all wear masks and appropriate personal protective equipment (PPE).

Nursing and the EB patients

Because EB patients are so vulnerable, any EB specialist nurse or part-time nurse should not care for an EB patient if working or having done any shift in a hospital or other health care facility where there have been COVID-19–positive patients. Such workers should not have visited any hotspot areas or have had contact with any infected relatives or friends.

Admission to the hospital in the case of a patient with EB contracting COVID-19

If an EB patient contracts COVID-19, he or she should ideally have a private room. Such patients are especially vulnerable and require open wounds to be redressed every 1 to 2 days. Anticoagulation therapy should be continued.

Conclusions

The COVID-19 pandemic has led to a decline in face-to-face consults, even in patients with syndromic EB, who may have underlying problems that require monitoring or urgent intervention. We present our experience and recommendations based on an international consensus of EB experts that was coordinated by D.F.M. and recently published.[22] Anecdotal advice is offered in light of a paucity of information on the challenges and issues faced by EB patients in these unprecedented times, with the hope of decreasing preventable morbidity or even mortality in this unique subset of patients.

Conflict of Interest

None.

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