COVID-19 SKIN MANIFESTATIONS: A GUIDE FOR WOC NURSING PRACTICE*

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COVID-19 Skin Manifestations: A Guide for WOC Nursing Practice

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Purpose
The aim of this document is to aid the WOC nurse with discerning wound etiology and determining reportability of skin manifestations among persons with COVID-19.

Introduction
The COVID-19 pandemic has presented unique challenges for the WOC nurse. Clinicians have identified skin manifestations on or near bony prominences that are atypical of classic pressure injury (PI) among persons diagnosed with COVID-19 (SARS-CoV-2). In some cases, it may be difficult for the clinician to initially discern COVID-19 related skin manifestations from other etiologies. Uncertainty with skin manifestation etiology directly impacts the prevention, management, documentation, and coding of these lesions. A literature search was conducted in CINAHL, PubMed, Scopus, and Medline using search terms COVID, pressure injury, skin, documentation, prevention, and management. In the past year, there have been numerous publications describing the clinician’s experience of skin related manifestations identified among persons with COVID-19. These publications represent smaller sample size retrospective and prospective designs as well case study reports identifying COVID-19 related skin manifestations. These include pseudo-chilblains, other vesicular eruptions, urticarial lesions, maculopapular rash, and livedo or necrosis.1-3 Livedo or necrosis include areas of truncal or acral ischemia.1 Illustrations and descriptions by these authors appear similar to what clinician’s report observing at the bedside.4

COVID-19 related articles were also identified on the management of prone positioning, medical device related pressure injury (MDRPI), and PI prevention due to personal protective equipment (PPE).4-7 There is a paucity of literature on the prevention, management, or documentation of COVID-19 related skin changes, likely due to relative recency of the pandemic.

Wound Assessment & Data Collection
The scope of WOC nursing practice includes the assessment, collection, and reporting of data regarding PIs and other etiological skin manifestations. This data is utilized to determine the etiology and classification of wounds for the purpose of ensuring accuracy of coding and monitoring quality of care. During the pandemic, WOC nurses were challenged with understanding skin related manifestations of COVID-19 and how it impacts reporting accuracy.

WOC nurses are often involved with determining Hospital Acquired Conditions (HAC) or present on admission (POA). HACs include PIs (PIs stage 3, 4 & unstageable) that fall in the category of Patient Safety Indicators (PSI-03). HAC drives improvement in patient safety and reduces the number of conditions experienced during hospitalization. Another quality reporting database is through the National Database of Nursing Quality Indicators (NDNQI). This program focuses on nursing quality by identifying nursing sensitive indicators (e.g. PIs) that evaluate the process, structure, or outcome of an identified quality indicator of nursing care. This data is available for hospitals and nursing groups to compare nursing processes and outcomes for this specific quality indicator to improve the care provided by nurses.8

WOC nurse expertise is relied upon for the accurate wound classification and determination of potential avoidability. Both the WOCN Society®7 and the National Pressure Injury Advisory Panel (NPIAP)9 have
created guidance documents for helping with determining the avoidability of PIs. These documents may be helpful when discerning PIs from COVID-19 related skin manifestations.

Prior to COVID-19, clinicians have noted challenges with differentiating PIs from other etiologies. Even within the diagnosis category of PIs, there is debate about the concepts of avoidable and unavoidable PIs, as well as skin failure, particularly among people who are critically ill or at the end of life. As a result of these challenges, PIs can be mistakenly classified as facility acquired. Misclassification of PIs can have significant quality and financial implications and the COVID-19 skin manifestations compound these challenges.

**COVID-19 Related Skin Manifestations**

The COVID-19 pandemic has impacted the role of the WOC nurse. In persons with COVID-19, skin manifestations may precede, may be the only manifestation of COVID-19 illness, and may progress during the course of illness. While there is an abundance of evidence-based literature to support the assessment, prevention, and treatment of PIs; it is a challenge for WOC nurses to assess and identify the etiology of COVID-19 skin manifestations and formulate evidence-based treatment plans. The ability to correctly differentiate COVID-19 skin manifestations from PIs or other etiologies is important to determine appropriate treatment plans. The exact pathologic mechanism of COVID-19 skin manifestations is poorly understood and may be caused by an immune response and/or vasculitic and thrombotic vasculopathy. This is different from the causative factors related to PI, although it may potentiate the development of PIs by decreasing tissue tolerance. More common cutaneous manifestations identified among persons with COVID-19 include chilblains-like lesions (e.g., COVID toes), purpuric lesions, urticarial rash, maculopapular/morbilliform lesions, and purpuric “vasculitic” pattern lesions. Purplish colored COVID-19 related skin manifestations mimic the appearance of PIs such as Deep Tissue Pressure Injury (DTPI).

Pseudo-chilblains also referred to as pernio: Commonly presenting as “COVID toes”, is a local inflammatory skin disorder of acral surfaces that presents as edema and discoloration to the affected area. The chilblains may present as erythematous-violaceous papules, macules or nodules, accompanied by itching and pain. Unlike true chilblains, pseudo-chilblains are not associated with exposure to cold temperatures resulting in vasoconstriction.

Morbilliform rash: Erythematous, maculopapular rash. Primarily involving the trunk but may extend to extremities. Associated with viral exanthems. Most common skin manifestation observed in COVID-19.

Urticaria: Commonly known as hives. Itchy, raised, reddened or skin-colored welts on the skin. Triggered by an allergen resulting in release of high levels of histamine. These can vary in size and appearance, disappear and reappear rapidly.

Petechiae/purpura lesions: Skin rash consisting of red or purple spots caused by bleeding from small blood vessels. May also be seen on mucous membranes. Associated with coagulation and vascular disorders.

Vesicular rash: Small fluid filled blisters often seen with viral and less often bacterial infections. Larger, tense lesions that may be painful. A less common manifestation seen in COVID-19.

Livedoid lesions including livedo racemosa and livedo reticularis lesions: Vascular lesions often seen on the lower extremities and feet. Lesions may be erythematous or violaceous and present in a branched or irregular pattern. Lesions are often painful and may become necrotic.

**Interpreting Data**

Differentiating COVID-19 related skin manifestations from PI requires the same expert nursing clinical judgement skills when discerning PIs from other etiologies, determining PI avoidability, and when examining skin failure. Lesions developed in the presence of a person with COVID-19 should be assumed a COVID-19 related skin manifestation without further investigation. WOC nurses must have a firm understanding of the
definitions of PIs and specific quality reporting criteria. When presented with a clinical scenario, the WOC nurse should consider all possible etiologies related to the person's overall physiologic status and clinical care provided. Understanding common COVID-19 related skin manifestations, such as urticaria and "COVID toes" can aid the nurse with easily identifying manifestations over areas not exposed to pressure. Clinicians have reported difficulty with differentiating COVID-19 related purpuric lesions from DTPI in common PI sites. In the absence of readily available diagnostic skin tests or histopathological reports, the WOC nurse must rely on clinical judgement skills.

Clinical judgement skills for the WOC nurse rely on the expert knowledge of PI causation, prevention, and ability to differentiate PIs from other skin pathologies such as moisture, friction/skin tears, and diseases. When assessing lesions in areas less common for PIs, consideration should be given to patient positioning such as proning in persons with respiratory failure. Ultimately, the WOC nurse must rule out pressure and/or shear as a causative factor before classifying the lesion as a COVID-19 related skin manifestation. Using the best available evidence such as wound guidelines, HAC criteria, avoidable versus unavoidable PI guidance, end of life/skin failure literature, and common COVID-19 related skin manifestation all within the context of the person's condition should be considered when determining skin manifestation etiology.

Discussion
There is still much to learn about how COVID-19 affects skin integrity. WOC nurses have been instrumental in providing skin care and developing treatment plans for persons with COVID-19. It is crucial to perform comprehensive skin assessments, review current health status, and consider comorbidities that contribute to these skin manifestations. It is imperative to stay abreast of new evidence-based literature regarding COVID-19 skin manifestations. Collaboration with other healthcare professionals (e.g., dermatology, vascular, infectious disease) may assist the WOC nurse with diagnosis and development of treatment plans. COVID-19 skin manifestations may present with different clinical features and may appear at any time during the disease process. In fact, cases have been reported where the skin manifestations are the first symptom of COVID-19 and can also be the only symptom present. Thus, expert clinical judgement of WOCs nurses is essential to differentiate between PIs and COVID-19 related skin manifestations. Furthermore, it is important to ensure that organizations understand the impact of COVID-19 on skin integrity as it relates to public reporting and coding. The complex pathology of COVID-19 only reinforces the importance of comprehensive prevention, assessment, and management of skin manifestations in this population.

Case Study 1
A 60-year-old Hispanic woman admitted to an urban, 793-bed academic teaching hospital with febrile neutropenia. Past medical history: newly diagnosed lymphoma, chemotherapy, and a recent diagnosis of Coronavirus (COVID-19).

On Day 1, the patient presented to the outpatient clinic with fever 38.9 °C (102 °F) at home without complaints of cough, shortness of breath, sputum production, nausea, vomiting, diarrhea, constipation, mucositis, neuropathy or dysuria. Upon arrival to the emergency department vital signs: blood pressure 112/57, pulse 133, temperature 39.4 °C (103 °F), respiratory rate 30, and oxygen saturation 96%. Patient was admitted to the hospital for treatment.

On Day 7, the patient presented with cough, episodes of hypoxia requiring oxygen with short periods of activity. The patient's oxygen requirements increased from 10 LPM to 12 LPM with a nonrebreather mask. The patient continued to experience periods of desaturation at rest and exertion, with oxygen saturation in the high 80's. As a result, the patient required ICU level care and ventilatory support for Acute Respiratory Distress Syndrome (ARDS) from COVID-19, cardiogenic/ distributive shock, and renal failure. Medical management included proning for extended periods of time (>16 hours in a 24-hour period) to improve pulmonary oxygenation. A WOC nurse consultation was ordered. During the first surge of the pandemic the WOC nurse collaborated with the clinical nurse for full assessment, descriptors, documentation within the medical record and use of photo documentation to stage PIs and determine etiology. The photo documentation supported the development of an area of necrosis over a bony prominence. PI prevention
interventions while proning included application of a foam silicone bordered dressings to all pressure point areas. (e.g., sacrum & knees). On day 20 a deep tissue pressure injury (DTPI) was found on the buttocks/sacral coccygeal (Figure 1).

Figure 1. Buttocks/Sacrococcygeal Unstageable Pressure Injury

The WOC nurse concluded that the skin breakdown was a DTPI with progression to an unstageable PI (Figure 1). A PI treatment plan was developed to prevent further skin breakdown. PI treatment plan included a pressure redistribution support surface, local wound care that promoted autolytic debridement of the necrotic tissue, placement of a fecal management system and nutritional optimization. During this period ARDS from COVID-19 pneumonia continued to worsen. Despite maximal support, and collaboration by all providers, the patient's overall condition deteriorated, and the patient expired eight days after the WOC nurse initial consult completed.

At the time of this case, the WOC nurse based the assessment on current knowledge, given the timeframe of progression, and complexity of this patient. Although the WOC Nurse determined this is a PI, it is not unreasonable to consider the presence of COVID-19 may have contributed to the development of this PI.

Case Study 2
A 70-year-old male admitted to the medical intensive care unit (MICU) with hypoxemic respiratory failure due to COVID-19 pneumonia. Past medical history of cardiac sarcoidosis, hypertension, chronic kidney disease and pre-diabetes. The patient had a complicated ICU course with respiratory failure (s/p tracheostomy), prolonged proning (>16 hours in a 24-hour period) shock, hypoperfusion, bacterial and viral infections, and arrhythmias. In addition, the patient developed deep vein thrombosis and gastrointestinal bleeding thought to be related to COVID-19 vasculopathy causing small areas of ischemic colonic ulceration.

A comprehensive skin assessment by the WOC Nurse identified multiple PI on the following sites: DTPI on the right ear helix and lobe, left and right knees (figure 2), nose, mucosal PI on the tongue and upper inner lip. Some of the PI's were thought to be related to proning therapy.

After 90 days the patient was discharged directly from the MICU to a rehabilitation center. All PIs healed with the exception of the 2 DTPIs on the bilateral anterior aspects of the knees (figure 2 and 3). The WOC nurse had expected the DTPI's to evolve based on past experience in caring for critically ill patients and knowledge
of progression DTPIs. After the prolonged length of stay without notable progression of the DTPIs the WOC Nurse believed the etiology is pressure.

Notes from a month prior, indicated incongruence from typical Pts, stating, “right knee proximal wounds remain intact: deep purple/maroon tissue that has extended, edges jagged, wandering, irregularity.” Reflecting back on the systemic changes, the patient had vasculopathic manifestations noted in the GI tract and the etiology of the cutaneous skin lesions were attributed to vasculopathies related COVID-19.

![Figure 2. Right knee day 1 of discovery.](image1)

![Figure 3. Right knee day 40.](image2)

![Figure 4. Right knee day 48.](image3)
Summary

These case studies represent challenges in identifying COVID-19 related skin manifestations versus PI's. Some skin manifestations related to COVID-19 may initially present as a PI. However, they may not present with the same expected evolution as PI's. The skin manifestations are likely multifactorial, a combination of hypoxemia, vasoconstriction and decreased blood flow leading to ischemia and tissue death with or without the presence of pressure. Patients with COVID-19 may present with elevated D-dimer levels as well as thrombocytopenia. The cutaneous lesions may present with bruised (purpura) appearance and/or reddish/purple in color (petechiae), very similar to the characteristics we commonly see with deep tissue injuries. Some of the skin manifestations may or may not present on a bony prominence or under a medical device. In addition, some of the skin changes may be related to microemboli due to clotting disorders.23 The true etiology of the skin damage is sometimes unknown, and treatment is based on clinical assessment.

It is essential for the WOC Nurse to use clinical judgement when determining etiology as the body of evidence is still developing in this area. The WOC Nurse is in a pivotal position to continue to advance the science on COVID-19 related skin manifestations as more is discovered about the progression of the disease.

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