Skin and Wound Care During the COVID-19 Pandemic: Challer Chief Medical Officer, WoundCentrics, LLC Chief of Staff, Christus Santa Rosa New Braunfels Hospital Regional Medical Director for Wound Care & HBOT, Christus Santa Rosa Hospital, San Ant Chief Science Advisor, Revealix, LLC Pl US Army Institute for Surgical Research

FOR WOUND AND SKIN TEAMS

- Chronic wounds are common at all times, occurring in 780 per 100,000 population in the United States
- Chronic wounds are commonly related to the same comorbidities that increase the risk for death from COVID and ARDS • Prior to the COVID-19 pandemic, wound care was already a challenging, often fraught endeavor, for caregivers and facilities
- The pandemic has further complicated the delivery of wound care, and the all important mission of protecting patients as well as caregivers. • We will be looking at a number of key topics relevant to the provision of wound care during the COVID-19 pandemic
- We will look at unique dermatologic manifestations of COVID-19 • NPIAP guidance specific to COVID-19
- Optimization of preventive skin care in COVID-19 patients Caregiver protection, including prevention of occupationally acquired pressure injury from PPE
- And finally, our experience with leveraging technology to facilitate wound care during a pandemic

SKIN AND WOUND CHALLENGES ENCOUNTERED IN COVID-19 PATIENTS SACHDEVA, M., GIANOTTI, R., SHAH, M., LUCIA, B., TOSI, D., VERALDI, S., ... & DODIUK-GAD, R. P. (2020). CUTANEOUS MANIFESTATIONS OF COVID-19: REPORT OF THREE CASES AND A REVIEW OF LITERATURE. JOURNAL OF DERMATOLOGICAL SCIENCE.

- present with a skin rash that could be misdiagnosed as another common disease. Some of these patients have been otherwise free of other COVID-19-associated symptoms
- **KNOWN SKIN MANIFESTATIONS OF COVID-19**
- MORBILLIFORM (MEASLES-LIKE)
 ACRAL LESIONS ("COVID TOES") LIVEDOID ERUPTION URTICARIAL
- VESICULAR ERUPTIONS Some of these patients are afebrile initially.
- We are seeing evidence of disseminated micro-thrombi, leading to skin lesions and skin damage
- Activation of a secondary autoimmune response against skin cells, including keratinocytes, producing unique skin pathologies
- These effects are pleomorphic, and often similar to signs seen in other disease states, and thus confusing Importantly, an individual COVID-19 patient may present with multiple simultaneous cutaneous abnormalities that differ in morphology.
- "Some of these cutaneous manifestations arise before the signs and symptoms more commonly associated with COVID-19, suggesting that they could be presenting • Cutaneous manifestations of COVID-19 may help assist in carrier identification.
- A take home here is that caregivers need to watch for these potential herald signs in patients not admitted for COVID-19

BID British Association of Dermatologists Centenary

Review Article Clinical Trial Epidemiology Qualitative and Outcomes Research Translational Re

Secukinamata far psoriasis COVID-15: prospective Psoriasis Quality of Life here unresponsive to TNFix study in Spain with 325 Instrument (APso-QOL) simp inhibitory reset.



other mechanisms • They, like others, underscore the widely varying nature of these skin manifestations, again describing Urticarial, Maculopapular, Papulovesicular, Purpuric, Livedoid,, and Thrombotic-Ischemic patterns.

GALVÁN CASAS, C., CATALA, A. C. H. G., CARRETERO HERNÁNDEZ, G., RODRÍGUEZ-JIMÉNEZ, P., FERNÁNDEZ-NIETO, D., RODRÍGUEZ-VILLA LARIO, A., ... & GARCÍA-GAVÍN, J. (2020). CLASSIFICATION OF THE CUTANEOUS MANIFESTATIONS OF COVID-19: A RAPID PROSPECTIVE NATIONWIDE CONSENSUS STUDY IN SPAIN WITH 75 CASES. BRITISH JOURNAL OF DERMATOLOGY, 183(1), 71-77

CLASSIFICATION OF THE CUTANEOUS MANIFESTATIONS OF COVID-19: A RAPID PROSPECTIVE NATIONWIDE CONSENSUS STUDY IN SPAIN WITH 375 CASES



- We see lesions reminiscent of Urticaria, Morbilliform, drug-eruption-like rashes, Acral rashes (the classic "COVID Toes"), papular (small bump) rashes, vesicles, and
- livedoid rashes. • The widely varying characteristics of these skin findings is bound to confuse some of us, a good bit of the time.
- The authors note that vesicular eruptions (blisters) usually appear early in the course of the disease (15% of the time, before any other symptoms!). The pseudo-chilblain or COVID Toe pattern frequently appears late in the evolution of the COVID-19 disease (59% after other symptoms), while the rest tend to appear along with other symptoms of COVID-19.





thigh, and other areas, began 1 day after onset of anosmia and 1 day prior to onset of fever. Shortly thereafter, she was diagnosed with COVID-19. This would be very easy to On the right (in the circle inset): Skin abnormalities in a 68-year-old critically ill man with COVID-19 including a morbilliform rash on the abdomen (A), acral purpura suggestive of ischemia (B), and plaque-like cutaneous purpura and necrosis with livedoid borders (C). A biopsy from the abdomen (D) shows groups of apoptotic keratinocytes in the epidermis

- rrow), suggestive of a viral exanthem. According to Young and Fernandez, the most common skin manifestation in COVID-19 cases that heralded severe disease were livedoid rashes, as shown by the increasing percentages of pneumonia, hospital admission and intensive care requirements in atients with this pattern, likely reflecting the microembolic pathophysiology in these
- They also offered that In terms of arousing suspicion of COVID-19, pseudo-chilblain (COVID Toes) and vesicular lesions may be most useful as indicators of disease. They observe that there is no other viral disease which causes such a wide array of skin

YOUNG, S., & FERNANDEZ, A. P. (2020). SKIN MANIFESTATIONS OF COVID-19. CLEVELAND CLINIC JOURNAL OF MEDICINE LIVEDOID & PURPURIC SKIN ERUPTIONS ASSOCIATED WITH COAGULOPATHY IN SEVERE COVID-19



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- s we have seen, livedoid and purpuric rashes are seen often in COVID-19 patients • The presence of this rash pattern seems to herald worsening disease Again, this association between livedoid rashes and worse outcomes is most likely due to an underlying hypercoagulable state, and may be associated with elevated D-Dimer, and other markers of coagulopathy and embolic disease Some suggest that such findings may provide an indication for initiation or escalation of anti-
- Finally, there is high potential for these lesions to be confused with DTI
- **KNOWN SKIN MANIFESTATIONS OF COVID-19** mmunity-based, observational study. 336,847 UK users of the COVID Symptom Study app Results: 8.8% with a positive SARS-CoV-2 viral swab, reported a skin eruption
 - onclusions: To help healthcare professionals in this task we have established a large library of high-quality manually curated hotos, available at: https://covidskinsigns.com For further illustration of the diagnostic value of COVID-19 rashes, and other paper from British Journal of Dermatology offers
 - ome useful observational data: • In the United Kingdom, 8.8% of 336,847 patients with a positive SARS-CoV-2 viral swab reported a skin eruption.
 - In 17% a skin eruption was the first clinical feature
 - 21% of this group of respondents had no other clinical manifestations.
 - Again, the take home message is that our skin teams need to be on the lookout for ANY new rash, and report it to the hospitalist or critical care team.

BRITISH JOURNAL OF DERMATOLOGISTS: BATAILLE, V., VISCONTI, A., MURRAY, B., BOURNOT, A., WOLF, J., OURSELIN, S., ... & FALCHI, M. (2020). NAGNOSTIC VALUE OF SKIN MANIFESTATION OF SARS-COV-2 INFECTION, MEDRXIV,

Association of Dermatologists to provide images of possible skin signs of COVID-19, collected by the COVID Symptom Study App. to help increase our understanding of the disease. Images are subject to copyright and

may not be reproduced without prior consent.

This website has been created by the British

Covid-19 Skin Patterns

AA Covidskinsigns.com

British Association of Dermatologist

bealthy skin for all

NPIAP GUIDANCE

Evidence-based standards of pressure injury prevention have not changed. However, we reasonably anticipate that unavoidable pressure injury rates may increase during the COVID-19 crisis." IANET CUDDIGAN, PHD, RN, FAAN PROFESSOR, UNIVERSITY OF NEBRASKA MEDICAL CENTER PRESIDENT, NATIONAL PRESSURE INJURY ADVISORY PANEL -APRIL 2, 2020 and the second second

• This has been our experience across multiple care settings, including STACH, LTACH, IRF, SNF, LTC, Home, and Outpatient settings • We've had to up our game, in all settings

COVID-19 = MORE UNAVOIDABLE PIS?

- To say that these patients present challenges to our best and most evolved nosocomial wound prevention efforts would be an understatement: • The most critical COVID-19 patients may be too unstable to be physically turned, a major factor in unavoidable PIs. • Nutritional status has been a greater challenge in severe COVID-19 cases than in nearly any other disease process • Coagulopathies continue to be a key feature of severe COVID-19, with an as yet suspected, but poorly defined link to skin vulnerabilities • Further complicating matters, during surges, censuses have often been at an all-time high, and use of agency nursing staff as well support surface—including pressure redistribution or low air loss. If not, the lack of resources also needs to be documented in times of a national pandemic (NPIAP, 2020) NPIAP POSITION STATEMENT
- UNAVOIDABLE PRESSURE INJURY DURING COVID-19 PANDEMIC: A POSITION PAPER FROM THE NATIONAL PRESSURE INJURY ADVISORY PANEL 2010: National Pressure Injury Advisory Panel (NPIAP) expanded the clinical circumstances it included in the consideration of the formation of pressure injury deemed unavoidable to include situations in acute care that rendered the delivery of pressure injury prevention clinically unsafe 2014: NPIAP addressed how comorbid conditions can contribute to an unavoidable pressure injury. 2020: NPIAP recognizes that COVID-19 presents new imperatives in the understanding of "Unavoidable Pressure Injury," as well as determining wound etiology. Just because it "looks like a PI doesn't mean it is one... What factors can we carefully document to bolster our case regarding unavoidability, when appropriate?
- 1. Unsafe clinical situations are those in which harm may come to the patient by doing the preventive care, particularly turning and repositioning. 2. Many comorbid conditions (e.g., peripheral vascular disease and shock states) constitute risk factors for pressure injury development that are either non-modifiable or extremely difficult to 3. In some cases, treatments designed to stabilize physiologically unstable patients may add to pressure injury risk (e.g., vasopressors, medical devices). 4. NPIAP concluded that some cases of pressure injury are unavoidable because the magnitude and severity of risk are overpoweringly high and/or preventive measures are either contraindicated or inadequate to overcome the magnitude and severity of non-modifiable risk. NPIAP POSITION STATEMENT: SUMMARY
- Including both the intrinsic issues in the critically ill patient and the extrinsic issues in the health care facility at the time of the injury. <u>he differential diagnosis.</u> occlusions form COVID-19 increased the magnitude and severity of nonmodifiable risk to level that preventive interventions were not able to be overcome despite reasonable efforts at
- Consider all factors before decisions about avoidability/unavoidability • Don't assume that a purpuric skin manifestation is a DTI Areas of discoloration on a non-loaded area are most likely NOT PIs • When pressure injuries do occur, consider that they may be unavoidable due to microvascular occlusive factors <u>NPIAP: "INTRINSIC FACTORS'</u>
- "These skin changes appear purpuric and quickly become necrotic, they mimic the appearance of deep tissue pressure injury (DTPI)"
- appropriate support surfaces. **NPIAP: "EXTRINSIC FACTORS"** leightened risk for the development of unavoidable pressure injury."
- time for cross-training on what was known, such as critical care competencies of ventilator management, vasopressor titration, and pressure injury prevention... • We've seen not just PPE shortages, but specialty mattress shortages in some regions. • Staffing has often been a challenge, both due to patient volume and acuity, caregiver burnout, and loss of manpower due to caregiver infection with COVID. • Even the availability of agency or government personnel is not a panacea, as these personnel are often unfamiliar with facility policies and practices related to skin protection Thankfully NPIAP has called attention to these on-the-ground challenges
- These are not excuses, they are simply realities NPIAP CASE EXAMPLE



- complications of COVID-19.
- He had a persistently elevated INR of 1.6-1.9, but a normal PTT and platelet count. patient's buttocks (Fig. 2 A).

• There was a significant degree of interstitial and perivascular neutrophilia with prominent leukocyte infiltration • The message here is not that you need to order a skin biopsy to prove that cases like this DO NOT represent PIs. However, our wound care team and hospitalists need to be astute about this aspect of COVID-19 pathophysiology • Skin Manifestations with COVID-19: The Purple Skin and Toes that you are seeing may not be Deep Tissue Pressure Injury. An NPIAP White Paper HTTPS://CDN.YMAWS.COM/NPIAP.COM/RESOURCE/RESMGR/WHITEPAPERS/COVIDSKINMANIFESTATIONSAN.PDF

- IDENTIFICATION OF POA PI PRESENTS NEW CHALLENGES IN COVID-19 PATIENTS If patient had been proned prior to admission to your facility, a careful anterior skin survey is essential. • In our experience, identification of Present on Admission wounds has been complicated significantly by the COVID pandemic • It is quite common for patients transferred from one hospital to another to have had limited skin evaluation, monitoring, and treatment at the transferring facility
- Even now, many facilities are staffing wound care teams on a limited or contingency basis • Skin teams have been denied routine access to COVID-19 wards in some cases, due to limited PPE and other factors • This makes the initial skin survey at the receiving hospital all the more important, and much more likely to yield POA skin diagnoses • What is key is that there are more pressure points on the anterior body surface to screen! Don't get tagged with another facility's nosocomial wound! Have regular huddles around thorough head to toe examination of all new patients
 My teams have long championed provider led (APP or Physician) head to toe skin examination of ALL new patients, and it has been a high-yield practice at all of our hospitals. It only takes one extra POA PI to make it pay off.

PRESSURE POINTS



shoulder Under/around medical devices

1 1

• Because of the similarity of COVID-19 skin signs to other conditions there exists a very real possibility that a patient with COVID-19 might initially

Spanish report categorized skin findings in 375 patients with suspected and confirmed COVID-19, including livedoid and necrotic eruptions, which were noted in patients with more severe disease. The authors suggested that these skin manifestations may be

• On the left, we see a 39-year-old woman with an urticarial rash involving her (A) trunk &







• In an April 2, 2020 letter to NPIAP members, Janet Cuddingan provides much needed affirmation of what we have all seen on the ground: COVID)-19 is a "perfect storm" for nosocomial

• The key is documenting that all standard interventions have been implemented or attempted (even if unsuccessfully) in case a PI develops. Every effort must be made to secure an adequate

1. Before any decision is made about the avoidability or unavoidability of a pressure injury that developed during the COVID-19 crisis, all factors should be considered on a case-by-case basis 2. Before labeling purpuric skin manifestations in COVID-19 patients consider that the skin manifestation of COVID-19 may mimic the appearance of pressure injuries and should be considered in B. Areas of skin discoloration or tissue injury on non-loaded anatomic locations (i.e. no history of pressure and/or shear stress, no use of medical devise) and most likely not pressure injuries. 4. When pressure injuries occur on anatomical locations likely subjected to pressure and/or shear stress in patients with COVID-19, the pressure injury may be unavoidable IF: a. Microvascular

 "The virus itself creates a systemic coagulopathy including hypercoagulation and microvascular occlusion which has led to ischemic stroke, myocardial infarction, venous thromboembolism, acute limb ischemia and pulmonary embolism. 5-9 While the overall mechanism of this hypercoagulable state is till not completely understood at this time is does involve the skin." • "If the vessels are significantly or fully occluded, then adequate reperfusion is not achievable even in the presence of reasonable repositioning and turning of the patient and the use of

"The unique complexities of the COVID-19 (patient combined with the rapid volume of their admissions outpacing the available critical care support surfaces, places the COVID-19 patient at "The unprecedented need to supplement staffing with nurses from other specialties as well as agency and traveling nurses further contributed to the care challenges...and they had limited

NPIAP presents this example case in their COVID-19 PI Guidance illustrating that a purpuric area (red or purple spots that do not blanche) can develop on the skin unrelated to pressure, shear strain, or use of a medical device, and that these areas can quickly • This lesion occurred after 4 days of mechanical ventilation in a 32 year old, otherwise relatively healthy man, admitted for severe • He had an elevated d-dimer of 1024ng/ml (5X normal) on presentation, which peaked at 2090ng/ml

• After only 4 days on ventilator support, these purpuric areas were noted with extensive surrounding inflammation on the

• Skin biopsy showed a striking thrombogenic vasculopathy accompanied by extensive necrosis of the epidermis and dermal structures (i.e. full-thickness injury)



GRIFFITHS, M.J.D., ET AL., GUIDELINES ON THE MANAGEMENT OF ACUTE RESPIRATORY DISTRESS SYNDROME. BMJ OPEN RESPIR RES, 2019. 6(1): P. E000420. AVAILABLE FROM: HTTPS://SPIRAL.IMPERIAL.AC.UK:8443/BITSTREAM/10044/1/74593/2/GUIDELINES%200N%20THE%20MANAGEMENT%200F%20ACUTE%20RESPIRATORY%20DISTRESS%20SYNDRO ME.PDF 3. PAPAZIAN, L., ET AL., FORMAL GUIDELINES: MANAGEMENT OF ACUTE RESPIRATORY





• The prone position itself Long treatment periods (immobility) in prone position Patients are critically ill • Low oxygenation levels, infection, medication (sedatives, vasoactives)

- Moisture (incontinence, sweating, mucus, saliva) • In any position, where there is pressure on the skin and subdermal tissues, there is risk for PI development.
- systematic and high-yield.
- key areas of the body. • They noted that this method also supports securing of the endotracheal tube with a commercial device that allows the tube to be frequently repositioned, thus reducing
- the likelihood of a medical device-related injury to the lip or nares. ATHTIALA ET AL, WOUND INT, 2018 EPUAP, NPIAP, PPPIA: 2019





Facial pressure ulcers in COVID-19 patients undergoing prone positioning: How to prevent an underestimated epidemic? A. Perrillat^a, J.-M. Foletti^{a,b}, A.-S. Lacagne^a, L. Guyot^{a,c}, N. Graillon^{a,b,*} tment of oral and maxillofacial surgery, CHU Conception, AP-HM, 147, boulevard Baille, 13005 Marseille, France TTAR, LBA UMR_T24, Aix-Marseille university, boulevard Pierre-Dramard, 13916 Marseille, France ^cCNRS, EFS, ADES, Aix-Marseille university, boulevard Pierre-Dramard, 13344 Marseille, France

- PRONING-SPECIFIC PREVENTIVE MEASURES • Do not use hard ETT tube holders
- Cloth tape only for ETT • Apply bispectral index (BIS) sensors to post-auricular area or occiput
- Glide sheets Crescent Shaped Face Cushion if available Beware of edema under devices





Use digital collaboration tools to facilitate challenging diagnoses and optimize care



PROTECTING PATIENTS

THE MOST EFFECTIVE PREVENTION STRATEGIES FOR COVID-19 PATIENTS



ddition to the unusual, our teams have seen rather typical PIs **COVID-19 ICU** patients:

64 year old male w CAD, HTN, SVT, Ol

- nitted from ED with COVID-19 pneur He was on high flow oxygen and unable to be weaned from this > BiPAP > Intubation
- Did not tolerate proning
- Transferred to LTACH for continuing care. Developed apparent DTIs on the lateral and plantar surfaces of the left foot. The area was irregularly shaped and dark maroon, and non
- Staff suspect the area rested on a bed rail vs other etiology. This was managed by simple betadine application.

- Medical devices, EKG, urinary catheters, IV lines, cables and wires, intubation tube, nasogastric tube, etc.
- Athtiala, et al in an article in International Wounds underscored key factors relevant to the care of the COVID-19 pandemic patient population:
- First, protecting the skin while the patient is placed in a prone position is challenging when care is increasingly bundled to minimize use of PPE, resulting in less
- frequent contact with patients. Teams need to maintain a high-level of awareness that normal processes are being deferred, and make what contacts do occur, Second, they found that strategic placement of prophylactic foam dressings over pressure points, was beneficial for pressure injury prevention.
 Third, they observed that the use of static air overlay support surfaces eased repositioning the patient while prone, helping maintain needed pressure redistribution to

 - The face is uniquely vulnerable in proned patients Periillat, et. Al provide an excellent review of the issues related to facial PI prevention in COVID-19 patients • On the left we see a CT-scan of the head showing inflammatory edema of the masseter muscle (red arrow), without abscess next to the cheek; this is a Stage IV pressure ulcer (with arrow). • Upper right: The optimal positioning of the head in prone position on a specifically designed semi-lunar head cushion, which protects the bony structures with a wide peripheral contact surface, without any isolated pressure on the cheekbone, devices, or prone position sessions (case 1). rillat et. al recommeno Stomatology Oral & Maxillofacial Surgery
 - Lower right: A 27-year-old man with morbid obesity presenting with pressure ulcers on the right side of his face: on the forehead affecting the eyebrow, the cheekbone, the cheek next to the masseter (NPUAP stage 3), and the labial commissure (NPUAP stage 2) after A specific softer prone -positioning head cushion, with space for the ET tube, and a better distribution of pressure points on the whole face or silicone gels or silicone foam dressings [9]
 - Head position should be changed 2 or 3 times over 8 hours during a prone position session and the position of the ETT tube should be changed between each prone position session [5].
 The circumferential fixation should be silcone protected with gauzes or replaced by a specific endotracheal tube holder with a silicon shield in contact with the cheek and the labial
 - They note that Incomplete eyelid closure can lead to the occurrence of a corneal ulcer. An occlusive dressing must be applied on each eyelid and checked after prone positioning. • Prolonged facial pressure (more than 8 hours) on the same points is strongly associated with pressure ulcer risk [10], and thus regular changes in head position are required during each prone position session. They underscore the value of correcting systemic parameters interfering with wound healing, such as xemia. anemia. and malnutritio
 - Use an abdominal binder to support pendulous breasts • Use reverse Trendelenberg position to reduce facial edema
 - Use lateral rotation as soon as tolerable Assess tongue for edema and injury
 - Move ECG electrodes to patient's back Lubricate and protect eyes Inspect prominences often
 - If ever there were a PUP Pearl, it is appropriate utilization of prophylactic bordered foam dressings • There are branded foam dressings made for purpose on most GPO formularies- Kerrapro, KerraLite, and Kerra Foam Gentle
 - Face Cheeks Anterior Shoulders Sacrum • Iliac Crest • Knees • Toes

Apply to pressure

- **HIGH YIELD SKIN PROTECTION** Aggressive moisture management-Skin barrier essential Maintain an adequate supply of moisture-barrier products, such as Cavilon, which can provide
- protection to vulnerable skin for up to a week • Address diarrhea quickly. Consider FMS early.

CONCLUSIONS

- Make sure teams know the skin manifestations and pathophysiogly of COVID-19
- Skin discoloration or injury on non-loaded locations are likely not PIs • PI on anatomical locations under pressure and/or sheer may be considered unavoidable if:
- Microvascular occlusions increase non-modifiable risk, superseding preventative interventions Multi-system organ dysfunction prevents normal skin resilience to injury and trauma
- And/Or evidence-based preventative care is limited by extrinsic factors when our healthcare system is at crisis capacity Implement best-practices to protect patients, especially when proning
- **DISCLOSURES:** I have no financial interest nor business relationship with any of the products or companies discussed in this presentation.
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