



# Saving Limbs in the Time of COVID

Here's a pandemic diabetic foot triage system.

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**C**urrently (as of June 27, 2020), more than 10 million people worldwide have been infected with the novel COVID-19 virus and over 499,000 deaths have resulted from this pandemic.<sup>1</sup> Strict quarantine and safer-at-home orders were designed to “flatten the curve” to limit the number of infections in the United States and prevent healthcare systems from becoming overwhelmed. The secondary effect has resulted in limited care and access for patients to reach their healthcare providers. Many offices

were closed due to lack of protective equipment and personnel, and others were complying with policies to conserve limited resources.<sup>2</sup> Those offices that remained open were able to treat patients and remove further burden from hospitals. It is now evident that an effective and streamlined triage system for patients is necessary to provide care when faced with limited resources.

Podiatrists treat a large number of patients with diabetes. They provide preventative care and handle acute issues in this patient population. They are essential at reducing the risk of in-

fection and amputation in this patient population.<sup>3</sup> Immunocompromised patients such as those with diabetes are at significantly higher risk for having serious complications and higher mortality related to COVID-19.<sup>4</sup> Podiatrists and practitioners in outpatient settings helped to prevent hospitalizations and emergency room visits to reduce the risk of transmission of the virus.

## Triage System

Recently, Rogers et al. described a diabetic triage system (Figure 1) identi-

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<b>Critical</b> (0.25% of patients with diabetes)	<ul style="list-style-type: none"> <li>- IDSA Severe and some Moderate infections</li> <li>- Gas gangrene</li> <li>- SIRS/Sepsis</li> <li>- Acute limb-threatening ischemia</li> </ul>	<b>Hospital</b>	<b>Priority 1 Urgent</b>
<b>Serious</b> (0.75% of patients with diabetes)	<ul style="list-style-type: none"> <li>- IDSA Mild and some Moderate infections (including osteomyelitis)</li> <li>- Chronic limb-threatening ischemia (CLTI)</li> <li>- Dry gangrene</li> <li>- Worsening foot ulcers</li> <li>- Active Charcot foot</li> </ul>	<b>Outpatient Clinic Office-based Lab Surgery Center Podiatrist Office</b>	<b>Priority 2</b>
<b>Guarded</b> (3% of patients with diabetes)	<ul style="list-style-type: none"> <li>- Improving foot ulcer</li> <li>- Inactive Charcot foot (not yet in stable footwear)</li> </ul>	<b>Podiatrist Office Home Telemedicine</b>	<b>Priority 3</b>
<b>Stable</b> (94% of patients with diabetes)	<ul style="list-style-type: none"> <li>- Uncomplicated venous leg ulcer</li> <li>- Recently healed foot ulcer</li> <li>- Inactive Charcot foot (in stable footwear)</li> <li>- Healed amputation</li> <li>- Diabetic foot risk assessments</li> </ul>	<b>Home Telemedicine</b>	<b>Priority 4</b>

Figure 1: Diabetic Triage System Identifying Critical, Serious, Guarded, and Stable Patients

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fying critical, serious, guarded, and stable patients.<sup>5</sup> This system was designed to identify the acuity of the patients to determine if care could be provided away from the hospital or emergency room. It also evaluated the role of telemedicine for high risk patient populations. By utilizing this triage system, patients with diabetes classified as critical required in-patient care or hospitalizations included: IDSA severe or moderate infection, gas gangrene, SIRS/sepsis, or acute limb-threatening ischemia; while less acute issues were addressed either in the outpatient setting or telemedicine.

The triage system allows providers to give patients access to care while keeping them as safe as possible.

Due to the exponential number of people affected by the COVID-19 virus and an expected second or third wave, the need for an effective triage system in the hospital and clinical facilities cannot be overstated, especially with the high-risk diabetic patients. At our university-based hospital and clinic system, many of our podiatric patients have multiple co-morbidities and high risk conditions such as dialysis dependency or are transplant recipients. These patients require close monitoring for critical limb threatening ischemia, peripheral vascular disease, uncontrolled diabetes mellitus, and neuro-pathic osteoarthropathy.

A triage system allows providers who treat complicated patients with guidance as to how and when to utilize surgical intervention instead of waiting for the risk for hospital exposure. While this system is centered around patients with diabetes, it has also allowed for evaluation of other podiatric concerns and provided patients with care for non-diabetic-re-

lated issues while practicing social distancing and minimizing contact risk. Providing care and education via teleconferencing allowed us to help patients who needed help while keeping the patients and office staff safe. Creating a framework to provide guidance to help patients, even if they cannot be physically in the office, has been a critical component for providing care for our patients.

The current success and benefits of this system currently outweigh the risks during this hazardous time. Delayed care and lack of oversight from a provider can be detrimental and lead to severe infection and limb loss. Patients

initial stay-at-home orders, we reserved in-office clinic visits for patients with existing or previously infected or gangrenous ulcerations, active or recently reconstructed Charcot joints, or new wound consults deemed high-risk by the vascular surgery team or outside treating physician.

Patient visits were scheduled for longer blocks of time to allow for social distancing, and to prevent patients co-mingling with other patients in the waiting rooms. Initial regulations halted all elective podiatric procedures unless infected or limb-threatening. Non-systemic or moderate infections were managed in the office

with temporizing procedures such as partial amputations or local irrigation and debridement to prevent hospitalizations (Figure 1).

Rigorous COVID testing was performed on high-risk diabetic patients to allow them to undergo surgical intervention for abscesses and/or osteomyelitis. Staged procedures were also utilized to help prepare the wound for future skin graft application, flap, or reconstruction (Figure 2). In these cases, application of wound VACs or



**Figure 2:** A 72-year-old male clinic office visit; infected diabetic foot ulceration with cellulitis and verrucous hyperplasia. Triage stratification: Serious.

**Figure 3:** A 52-year-old male clinic visit; status-post removal of infected hardware and Charcot reconstruction with midfoot osteotomy and application of external fixator. Triage stratification: Serious.

need to have a method of communication with specialists such as podiatrists to guide and dictate patient care and whether or not they should present to emergency rooms. Patients who wait to seek care can have catastrophic results such as permanent cardiac damage and limb loss.<sup>6,7</sup>

Through utilization of guidelines established by IDSA and SVS WIFI, we have been able to stratify patients to determine the patients with the highest risk classifications. Those with poorly controlled diabetes and peripheral vascular disease who are high-risk and need continual monitoring are managed and are sent to the hospitals and clinics for acute issues. During the ini-

continual wound care was performed until a definitive procedure could be performed safely. Our diabetic Charcot patients are off-loaded and surgery is deferred unless they have concomitant osteomyelitis (Figure 3). For patients with known critical limb ischemia or worsening peripheral arterial disease, collaboration and communication with our vascular surgeons are planned for timing of debridement and revascularization (Figure 4). Many vascular laboratories were closed for non-invasive testing so aggressive wound care and off-loading were implemented to preserve tissue before patients could have open or

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endovascular repair. Close monitoring and triaging of patients were also helpful to determine the order in which patients underwent revascularization when restrictions were lifted.

cine and remote patient monitoring for these podiatric patients classified as stable or guarded have enabled treating physicians to maintain their continuum of care. Active communication with patients via videoconferencing or telephone allowed for

utilized is home healthcare nurses. Utilizing reliable companies and home nurses to provide documentation, photographs, and alerts for patients who require further care or are experiencing worsening symptoms is extremely useful.

## Active communication with patients via videoconferencing or telephone allowed for symptom management and education to prevent any further damage.

### Pandemic Challenges

During this current viral pandemic, it has been challenging to evaluate patients with varying degrees of foot and ankle pathology in-office. Hospital-based radiology was closed as were many stand-alone radiology centers. Implementing telemedi-

symptom management and education to prevent any further damage.

Further cooperation with physical therapy and private practitioners also allows for a greater spectrum of care if the patient could not make it to a university or hospital-based office. Another resource that has also been

### Patient Education

Education of patients and non-podiatric providers regarding recogni  
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tion of diabetic foot infections remains to be a challenge in the midst of the COVID-19 pandemic. Many patients with existing wounds have chosen to practice social distancing guidelines, minimize contact risk by avoiding medical facilities, and have put themselves at risk for worsening progression and/or death when they lose communication with their providers. On the other hand, patients who wish to seek help are limited in the options. With the closing of several urgent care clinics and physician offices, many patients have a tendency to flock toward emergency rooms and many put themselves at greater risk for a stable wound.

Consults from emergency medicine providers for patients with non-infected, non-ischemic stable wounds in diabetic patients can be an improper use of resources and unnecessarily expose patients to higher risk environments (Figure 5). One of the goals of implementing the diabetic foot triage system is to help minimize the patient overload in emergency departments for patients with non-emergent or non-threatening limb pathologies. Continual supplemental education of non-podiatric providers on recognizing and triaging patients will assist with reserving emergency departments for higher risk patients. Proper education of other providers would therefore re-route these patients to receive proper podiatric care based on their risk stratification and receive either hospital, in-office, or telemedicine care.

## Shift in Health Model

Having the pre-existing health model shift away from hospital-based care to clinic-based and virtual-based care has afforded the opportunity to reduce the patient COVID-19 risk through identification and prioritiza-

tion of patients with varying degrees of ailments complicated by diabetes and peripheral arterial disease. Although a few barriers currently exist regarding this shift, many patients and providers have greatly benefited from its application, and it serves as a pillar in clinical decision-making. Different regions have recommended or mandated social distancing guidelines, but these patients and their loved ones must still be able to become cognizant of their own health, risks, and the foot care options available to them.

The role of podiatry will continue to be increasingly essential in identifying, educating, and aiding these patients, as well as provide other members of the patient care team. Recent implementation of the diabetic foot triage system is serving as a crucial step and has the potential to become a model for our colleagues across all health professions in the continuation of care and protection of patients during this viral pandemic. **PM**



Figure 4: A 84-year-old male inpatient visit; bilateral chronic limb threatening ischemia, forefoot gangrene, underlying sepsis and cellulitis. Triage stratification: Critical.

## References

- <sup>1</sup> Coronavirus Update (Live): 6,532,186 Cases and 385,404 Deaths from COVID-19 Virus Pandemic—Worldometer. <https://www.worldometers.info/coronavirus/>.
- <sup>2</sup> O'Sullivan, E. D. PPE guidance for COVID-19: be honest about resource shortages. *BMJ* m1507 (2020) doi:10.1136/bmj.m1507.
- <sup>3</sup> Gibson, T. B. et al. Podiatrist care and outcomes for patients with diabetes and foot ulcer. *International Wound Journal* vol. 11 641–648 (2014).
- <sup>4</sup> Guo, W. et al. Diabetes is a risk factor for the progression and prognosis of COVID-19. *Diabetes. Metab. Res. Rev.* e3319 (2020).
- <sup>5</sup> Rogers, L. C., Lavery, L. A., Joseph, W. S. & Armstrong, D. G. All Feet On Deck—The Role of Podiatry During the COVID-19 Pandemic: Preventing hospitali-



Figure 5: A 64-year-old male inpatient clinic with stable, non-infected, non-ischemic ulcerations to distal 2nd digit. Triage stratification: Guarded

zations in an overburdened healthcare system, reducing amputation and death in people with diabetes. *J. Am. Podiatr. Med. Assoc.* 0000–0000 (2020).

<sup>6</sup> Reza, N., DeFilippis, E. M. & Jessup, M. Secondary Impact of the COVID-19 Pandemic on Patients With Heart Failure. *Circulation: Heart Failure* vol. 13 (2020).

<sup>7</sup> Andrea, V. et al. Unheralded Lower Limb Threatening Ischemia in a COVID-19 Patient. *Int. J. Infect. Dis.* (2020) doi:10.1016/j.ijid.2020.05.060.



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