

## Vasopressor-induced Peripheral Gangrene Secondary to COVID-19: A Case Report

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### Introduction

This is a case report of a 37-year-old male who presented to our clinic with dry gangrenous changes to bilateral hands and forefeet. Previously, he was found unresponsive at home and later brought to the Emergency Department of an outside hospital. He was diagnosed with COVID-19 and subsequently admitted to the ICU for further care. The hospitalization was complicated by acute hypoxemic respiratory failure requiring ventilation, acute kidney injury/rhabdomyolysis, bacterial pneumonia, and septic shock requiring the use of vasopressor medications. He received Norepinephrine and Vasopressin. He then developed the gangrenous changes to bilateral hands and forefeet (Figures 1-4). He was examined by the podiatry and vascular surgery teams and recommended no acute surgical intervention given the lack of acute infection. He received local wound care to the sites with iodine and keeping the area clean and dry during the demarcation period.

Figures 1 and 2: Left foot at time of presentation



Figures 3 and 4: Right foot at time of presentation



### Treatment

This patient was referred to the University of Michigan Podiatry and Plastic Surgery clinics after discharge for continued management of the affected areas. Prior vascular studies revealed multiphasic waveforms at all major arteries of the lower extremities, no significant stenosis, and absent flow of all toes. Dorsalis pedis and posterior tibialis pulses were palpable. The patient elected for continued demarcation for eventual amputation. Two months later, the left foot was fully demarcated and ready for final amputation. This surgery was done simultaneously with plastic surgery. Podiatry performed a left transmetatarsal amputation with closure (Figure 5) and the plastic surgery team performed partial finger amputations of each affected digit. He went on to heal uneventfully.

His right foot was monitored for two more months, and full demarcation was noted. However, there was not enough tissue to allow for closure. Plastic surgery was consulted to assist with a flap for closure. He was subsequently admitted and underwent a right guillotine amputation with podiatry (Figure 6). Plastic surgery monitored him for one week to ensure no further non-viable tissue remained, and then performed an anterolateral thigh flap for final closure (Figure 7). He went on to fully heal this procedure.

Figure 5: Left foot status post transmetatarsal amputation



### Discussion

Early amputation versus prolonged demarcation is an important consideration in these cases as it will determine the level of amputation. Unfortunately, there is a lack of literature and clear guidelines for the demarcation process. The Sequential Organ Failure Assessment tool evaluates organ systems and evaluates organ function. It can be useful in determining the likelihood of developing gangrenous changes. Kwon et al. found that those patients with poor scores in cardiovascular, hematologic, and neurovascular systems are more likely to develop vasopressor-induced gangrene (1). Also, those patients with a higher weight-compensate mean dose of Norepinephrine, Dopamine, and Epinephrine have a higher incidence of gangrene. This can help determine the level of risk for these patients. Allowing for full and prolonged demarcation can help achieve limb salvage by ensuring that the most distal amputation possible is performed.

### References

1. Kwon JW, Hong MK, Park BY: Risk Factors of Vasopressor-Induced Symmetrical Peripheral Gangrene. *Annals of Plastic Surgery* 80(6): 622-627, 2018.