

## 10 Golden Considerations for EMS Regarding COVID-19 Thrombotic Complications

1. Patients with **baseline cardiovascular disease**, such as hypertension, diabetes, or obesity, appear to be at **increased risk for complications** from COVID-19.
2. Microthrombi in cardiac or pleural tissue may manifest as **chest tightness** that may be positional in nature or change with deep respirations even in the face of normal oxygen saturations or unremarkable electrocardiographs.
3. **Microthrombi formation** may play a role in multiorgan dysfunction that can first present in an isolated manner in one organ system or as multiple symptoms and signs, be they in the lungs, brain, heart, gastrointestinal tract, kidneys, skin, or even as a cardiac arrest.
4. Intuitively, as is the case with pulmonary embolism, leg pain or swelling may be a manifestation of a blood clot within the venous circulation of the leg, but arterial clots may also cause the involved extremity to lose pulses with or without associated pain, discoloration, or loss of motor/sensory function. Such an arterial complication can lead to a potential loss of the extremity if not recognized and treated quickly enough. **Asymmetric distal pulses** may not be appreciated and are usually a late sign.
5. Signs or symptoms of **neurological deficits** such as those seen in a **stroke** could be another manifestation of blood clotting triggered by COVID-19. Young patients can have such deficits, and a presentation of **confusion or altered mental status**, such as that seen in any encephalopathy, may be another sign of neurologic involvement. As described, **changes in smell or taste**, even if isolated symptoms, also should not be ignored.
6. COVID-related blood clotting problems and respiratory distress may contribute to **preterm labor** in pregnant women.
7. Responders should look for **strange rashes, hematomas, petechiae, and purpura** (bruise like findings) they may not see on a regular basis. These findings may be a sign of cutaneous injury due to microthrombi formation, especially at the fingertips and toes. In addition, reddened conjunctiva, erythematous skin blotches, and strawberry-colored tongue appearance may be manifestations of COVID-19 in children, resembling the syndrome of inflamed arteries often seen with Kawasaki disease, including coronary artery involvement.
8. **Diarrhea and cramping** can be associated with COVID-19 and may not be a benign process. **Abdominal pain with a minimally tender abdominal exam**, whether in a younger or older person, may actually be due to blood clot formation in the vessels supplying blood to the intestines. This could be catastrophic if not appreciated early, and in the setting of COVID-19, it needs to be considered.
9. **Flank pain** could be a manifestation of renal microinfarction and swelling from microembolic ischemia in the kidney. At the same time COVID-19 could also be creating microinfarction-induced myonecrosis (muscle cell injury), either in the flank or elsewhere.
10. COVID-19 is a **great masquerader**, and its clotting complications can lead to pulmonary, cardiac, neurologic, gastrointestinal, cutaneous, genitourinary, renal, musculoskeletal, face, eye, nose, and tongue problems—whether individually or in conjunction with one another. Overall, the most predictable pattern in COVID-19 is that the signs and symptoms of SARS-CoV-2 infection are often not predictable. Awareness needs to remain at a heightened level.