

## *Virtual Mentor*

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### STATE OF THE ART AND SCIENCE **Diagnosis and Management of Smallpox**

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In 1980, the World Health Organization announced that smallpox had been eradicated. Smallpox vaccination was discontinued in the US in the early 1970s and worldwide in the early 1980s. It is hard to believe that one of the major public health achievements in human history may be undone by the reintroduction of smallpox through a bioterrorist attack. Given this possibility, emergency physicians are likely to be among the first health care professionals who will see patients infected with smallpox. Accurate diagnosis and proper management is critical to treating those already infected and limiting the spread of the disease in the community.

#### **Diagnosing Smallpox**

Smallpox can appear in 4 different forms: ordinary, modified, flat, or hemorrhagic. The latter 2 forms occur in patients with compromised immune systems, and the modified form occurs in previously vaccinated patients (those who are now roughly 30 years of age or older).

#### **Physical Exam of the Skin**

1. **Ordinary form:** skin lesions first appear on the buccal and pharyngeal mucosa then the face, forearms, and hands/palms. Over the next day, the rash spreads to the trunk, typically affecting the back more than the abdomen, and finally on the legs including the soles. Skin lesions in smallpox begin as macules and over the next couple of weeks progress to firm papules, then vesicles which soon become opaque and pustular. Around day 14, the pustules begin to dry up and crust over with development of a scab. These scabs separate with those on the palms and soles separating last.
2. **Modified form:** similar to the rash that appears in the ordinary form of smallpox, except that the progression from macule to scab is much faster (usually within 10 days).
3. **Flat form:** skin lesions develop slowly and become confluent and remain flat and soft. These lesions have a "velvety" appearance, and significant desquamation occurs. Unlike the ordinary form, these lesions never progress to the pustular stage.
4. **Hemorrhagic form:** this rare form of smallpox presents as skin petechiae and bleeding from the conjunctiva and mucous membranes.

## Tips for Differentiating Smallpox from Chickenpox

Chickenpox	Smallpox
No or mild prodrome	Fever, cough, and headache are common
Skin lesions are in different stages of development, (macules>papules>vesicles>crust), with rapid evolution from macules to crust (<24 hours).	On any part of the body all the lesions are in the same stage of development, (eg, all are vesicles), slow evolution of lesions (each stage lasts 1-2 days).
Centripetal distribution with greatest concentration of lesions on the trunk; palms and soles are rarely involved.	Centrifugal distribution with greatest concentration on the face and distal extremities; lesions on palms and soles.

### Managing Smallpox

- Patients with confirmed or suspected smallpox should be isolated. Local public health officials should be consulted before deciding on the most appropriate venue for medical isolation.

- Vaccination administered within 3-4 days post-exposure can prevent disease or severe illness.
- Medical care is generally supportive and treatment of complications such as:
  1. Hypovolemia and electrolyte imbalance (eg, hyponatremia, hypokalemia) due to fluid loss from skinlesions.
  2. Bacterial infections including skin abscesses, pneumonia, osteomyelitis, and septicemia.
  3. Corneal ulceration and/or keratitis.
  4. Gastrointestinal symptoms including nausea, vomiting, and diarrhea.
  5. Viral bronchitis and pneumonitis.
  6. Encephalitis which occurs in about 1 in every 500 cases of smallpox.

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