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# Research identifies 'bath salts' as new source of flesh-eating infection

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A study led by Russell R. Russo, MD, a third-year Orthopaedic Surgery resident at LSU Health Sciences Center New Orleans School of Medicine, has identified a new source of life-threatening necrotizing fasciitis – "bath salts." The study, describing the first known case of necrotizing fasciitis from an intramuscular injection of the street drug known as "bath salts," is published in the January 2012 issue of *Orthopedics*, now available online.

Necrotizing fasciitis is an orthopedic emergency. The ability to quickly and accurately diagnose this rapidly spreading disease can save a patient's life and limb. However, the diagnosis is complex because necrotizing fasciitis usually manifests as a less severe cellulitis or abscess while the majority of the damage rages beneath the surface of the skin. Deep muscular necrosis is often masked by a normal-looking overlying tissue bed. The potential causes and vectors, or carriers, continually change.

"As 'bath salts' gain popularity, medical centers of all disciplines must be prepared to identify not only the signs of intoxication, but the potential side effects including deadly necrotizing fasciitis," notes Dr. Russo.

Dr. Russo and his colleagues treated a 34-year-old woman who presented with forearm pain and redness that began after she attended a party. She did not report other symptoms, but there was also a small red puncture wound on her arm. Treatment for cellulitis with broad-spectrum IV antibiotics dramatically reduced the symptoms, but lingering pain at the

injection site led to an ultrasound. She then admitted that she had injected "bath salts" two days before she developed symptoms. When the patient was reexamined, she had rapidly progressing redness, skin sloughing, and drainage. Necrotizing fasciitis was suspected and she immediately underwent emergent surgical debridement and exploration, and more antibiotics were added. The infection moved so fast that pink, healthy tissue was literally dying before the surgeons' eyes. They had to keep removing tissue until they reached clear margins of healthy tissue to stop the progression of disease. By the time they were finished, the patient's arm, shoulder, and collarbone had to be amputated, and a radical mastectomy performed. The patient survived and subsequently underwent skin grafting and rehabilitation. Analysis revealed bacterial isolates including alphahemolytic *Streptococcus*, *Streptococcus viridans*, *Peptostreptococcus micros*, *Gemella morbillorum*, and *Actinomyces odontolyticus*.

The researchers note these infections are usually associated with crush traumas and farm injuries, but now physicians must also be prepared and vigilant when presented with a cellulitic patient who has a history of needle use. Even patients with their own clean needles are not immune, as evident in a report of an asthmatic patient who developed necrotizing fasciitis from an injection of subcutaneous epinephrine.

"Despite the drug's legal status, it must be treated as illicit, and one must be suspicious when examining a patient with this clinical history because the diagnosis of flesh-eating bacteria can masquerade as abscesses and cellulitis," says Dr. Russo.

Necrotizing fasciitis has a rapid time-line to tissue destruction and loss of life. A 1995 study found the survival rate of those diagnosed with necrotizing fasciitis to be as low as 50%. However, wide ranges of death exist depending on a multitude of factors.

Treatment for this virulent disease remains a swift diagnosis with extensive surgical debridement to obtain complete control of the organism and prevent death. However, the authors maintain, the best treatment is prevention with public, street-based education and early detection.

"The recent emerging popularity of this highly obtainable, injectable substance may lead to an increase in cases of necrotizing fasciitis," concludes Dr. Russo, "and surgeons must be ready to diagnose and perform extensive debridements in association with general surgeons in some instances to save limbs, preserve function, and prevent death."

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