

## An unusual case of *Staphylococcus pasteurii* osteomyelitis

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### Abstract

*Staphylococcus pasteurii* is a gram-positive organism found in food products as well as naturally occurring in air and on surfaces. We present the first known case of *Staphylococcus pasteurii* osteomyelitis caused by machine injection injury. The patient was treated with emergent surgical debridement as well as doxycycline for a soft tissue infection. Despite targeted therapy, the infection progressed to osteomyelitis and was treated successfully with additional surgical debridement and trimethoprim-sulfamethoxazole. There is sparse information on both infections and treatment of *Staphylococcus pasteurii*. We present our case report as well as a review of the literature on the epidemiology, susceptibility and treatment recommendations for *Staphylococcus pasteurii* infections.

### Case Report

Our patient is a 24-year-old male with no past medical history who presented with a penetrating thumb wound. The patient works at a factory where he fills vaps cartridges with cannabidiol oil and additives. A machine cartridge injection needle punctured his right thumb at the nail base and oil and additives were introduced under pressure into the digit. Over the next several hours, he experienced increasing pain, swelling and erythema in his thumb prompting him to seek medical attention in the emergency department (Figure 1).

The patient underwent emergent surgery to incise and drain the dorsal and volar surfaces of his thumb, including the interphalangeal joint and the flexor tendon sheath. A light-colored, oily appearing fluid was encountered in the pulp tissue and extended proximally around the flexor tendon sheath. A second surgical debridement procedure was completed the following day. Tissue cultures grew gram-positive cocci

and the patient was started on IV vancomycin while hospitalized. The organism was subsequently identified as *Staphylococcus pasteurii*. Susceptibilities were identified using the VITEK 2 automated diagnostic machine (Biomerieux, Durham, NC); of note, the organism was pan-susceptible to the antibiotics tested which include clindamycin 0.25 µg/mL, erythromycin ≤0.25 µg/mL, gentamicin ≤0.5 µg/mL, linezolid 2 µg/mL, oxacillin ≤0.25 µg/mL, rifampin ≤0.5 µg/mL, tetracycline ≤1 µg/mL, trimethoprim/sulfamethoxazole ≤0.5/9.5 µg/mL, and vancomycin 1 µg/mL). Based on susceptibilities, the patient was discharged on oral doxycycline (100 mg twice daily for two weeks).

Within the first two weeks after hospital discharge, swelling in the thumb worsened and new drainage from the pulp developed. A third surgical debridement procedure was completed 18 days after the injection injury; unfortunately, no cultures were sent the laboratory from this procedure. The oral doxycycline course was extended for treatment of suspected osteomyelitis (Figure 2).

An MRI of the right thumb was completed and confirmed acute osteomyelitis of the distal phalanx. At this point, the patient declined further surgeries and procedures. He was seen in the infectious disease clinic and switched to oral trimethoprim-sulfamethoxazole (two double-strength tablets twice daily for a six-week course). The patient had resolution of pain and swelling in his thumb at the final evaluation 14 weeks postoperatively. There was improved but incomplete active motion of the interphalangeal joint, diminished soft tissue bulk, and scarring of the nail bed (Figure 3).

### Discussion

*Staphylococcus pasteurii* is a gram-positive, coagulase-negative, nonmotile, yellow-appearing bacterium named in honor of French microbiologist Louis Pasteur. The species was characterized at Pasteur's namesake institution The Institut Pasteur in Paris, France.<sup>1</sup>

The bacterium is not a common skin flora, but rather has been isolated in drinking water<sup>2</sup> and a number of foods, including goat milk,<sup>1</sup> Italian sausages,<sup>3</sup> sea fish,<sup>4</sup> and retail beef,<sup>5</sup> as well as from indoor airborne bacteria,<sup>6</sup> bird eye fluid,<sup>7</sup> and stratospheric air samples.<sup>8</sup> It can be overrepresented in the gastrointestinal tract in children with active celiac disease<sup>9</sup> and can sometimes be found in platelet transfusions.<sup>10,11</sup>

*Staphylococcus pasteurii* is a rare human

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pathogen.<sup>12-16</sup> Ramnarain *et al.*<sup>12</sup> described a case wherein a patient developed osteomyelitis and endocarditis due to a pan-susceptible *Staphylococcus pasteurii* that was isolated from blood cultures using mass spectrometry.<sup>13</sup> The patient underwent aortic valve surgery and received a 12-week course of intravenous penicillin with full recovery. Savini *et al.*<sup>14</sup> reported one patient with acute myeloid leukemia who developed fevers and bone pain and was found to have *Staphylococcus pasteurii* bacteremia that was resistant to penicillin and oxacillin. Treatment was successful with piperacillin-tazobactam and teicoplanin. Morfin-Otero *et al.*<sup>15</sup> described a patient with cervical cancer who developed dysuria after foley catheter placement while undergoing chemotherapy. A urine culture grew *Staphylococcus pasteurii*: unfortunately, antibiotic sensitivities and treatment were



**Figure 1.** Images of the right thumb on initial presentation with a puncture injury extending obliquely through the proximal nail plate and radial margin of the pulp.



**Figure 3.** Images of the right thumb at latest follow-up evaluation showing healed surgical incisions, scarring of the nail bed, and narrowing of the thumb tip.



**Figure 2.** Intraoperative image of the right thumb at the third operation showing extensive damage to the volar soft tissues from the injection injury and infection.

not reported. Our patient was prescribed oral doxycycline after an initial short course of intravenous vancomycin. He experienced progression of the thumb infection while taking doxycycline. We are uncertain if clinical failure was a result of medication failure or source control. The infection resolved after a third surgical debridement procedure and a six-week course of oral trimethoprim-sulfamethoxazole. Surgical management of hand infections and typical pathogens of hand osteomyelitis are discussed elsewhere.<sup>17,18</sup>

To our knowledge, *Staphylococcus pasteuri* has not previously been documented as a cause of isolated joint infection or osteomyelitis. The bacterium has been infrequently cultured from periprosthetic tissues and has been considered a contaminant in those cases.<sup>16</sup> Based on case reports of bacteria isolated from air samples, it is most likely that the machine injection needle was colonized with *Staphylococcus pasteuri*. The bacterium is susceptible to a broad range of antibiotics; however, it is generally resistant to penicillin with the mechanism underlying resistance uncertain.<sup>16</sup>

## Conclusions

*Staphylococcus pasteuri* is a gram-positive organism found in food products as

well as naturally occurring in air and on surfaces. It is a rare cause of human disease. We present the first known case of *Staphylococcus pasteuri* osteomyelitis caused by workplace injury treated with prolonged courses of oral antibiotics and surgical debridement. As the pathogen has likely low virulence, clinicians should consider the clinical circumstances for the cause of *Staphylococcus pasteuri* infection. We recommend targeted antibiotic therapy whenever possible.

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