

CASE REPORT

Polymicrobial infection with *Kluyvera* species secondary to pressure necrosis of the hand, a case report

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Abstract

Kluyvera is a rare infection in the upper extremity. Originally identified as an opportunistic pathogen, the virulence of *Kluyvera* has been debated. An elderly male presented with multiple pressure sores after being found down for an unknown time period. A hand abscess bacterial culture grew *Kluyvera* species as part of a polymicrobial infection. Despite multiple debridements, antibiotics and wound care, his clinical course ultimately was unsatisfactory and eventually fatal.

INTRODUCTION

From its original isolates, *Kluyvera* species was proposed to be an “infrequent opportunistic pathogen” found incidentally in the respiratory tract, urinary tract and feces [1]. Due to the small number of reported clinical infections, the virulence of *Kluyvera* spp. remains uncertain but may be significant especially in debilitated patients [2]. This case highlights the clinical course of a 66 year old man admitted with multiple pressure ulcers including a thenar space abscess, which grew *Kluyvera* species as part of a polymicrobial infection.

CASE REPORT

The patient was a 66-year-old male with history of alcohol abuse, and alcoholic cirrhosis was found down with multiple, left sided full-thickness wounds to face and body. The patient was unresponsive on admission and febrile at 100.6. He also had a moderate leukocytosis, elevated creatine, creatine kinase and urinalysis indicative of rhabdomyolysis. He was stabilized

on fluids and given Vancomycin and Zosyn in ED for suspected sepsis.

The initial blood cultures were positive for 1/2 growing Coagulase-Negative Staph and thought to be a contaminant. His initial wounds were treated by general surgery with excisional debridement staged skin grafting to left face, flank and thigh with negative pressure wound therapy for left forearm. Fevers had decreased and he remained afebrile without clinical signs of infection; he was subsequently kept off antibiotics and continued monitoring. The patient later spiked fevers and a rising leukocytosis of 15 000. He was started empirically on IV Vancomycin and Zosyn. Plastic Surgery was consulted for concerns of the forearm not healing accordingly despite initial therapy. The forearm and hand demonstrated myonecrosis. The necrosis extended down to the flexor and extensor tendons, and the thenar hand musculature. Multiple debridements were performed; during debridement of the left forearm and hand, a small (15 mL) pus collection was found essentially replacing the thenar musculature. Intraoperative cultures were taken. Cultures were returned for a polymicrobial

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Table 1. Review of upper extremity soft tissue infection with *Kluyvera* spp

Reference	Patient age/sex	Underlying condition	Clinical presentation	Source of organism	<i>Kluyvera</i> spp	Antimicrobial regimen	Outcome
Lutrell	37 yo/F	None	Soft tissue infection of forearm	Wound culture	ND	Cefoperazone, TMP/SMZ, ticarcillin/clavulanic acid	Recovered
West	31 yo/M	Diabetes mellitus, local chemical and physical trauma	Cellulitis and tenosynovitis, finger	Wound culture	<i>K. cryocrecens</i>	Dicloxacillin, then ticarcillin/clavulanic acid	Recovered
Darling	15 yo/M	None	Soft tissue infection, puncture wound.	Wound culture	ND	Parenteral penicillin, clindamycin and ceftriaxone and then ciprofloxacin	Recovered
Sarria	70 yo/M	None	Finger abscess	Wound culture	<i>K. ascorbata</i>	Ampicillin-sulbactam for 5 days, then amoxicillin clavulanate for 10 days	Recovered
Carter	40 yo/F	ND	Soft tissue infection, finger of right hand	Wound culture	<i>K. ascorbata</i>	Antimicrobial susceptibility followed general trends*	ND

ND, Not discussed.

*General trends noted as ampicillin and 2nd and 3rd generation cephalosporins.

infection including *Kluyvera* 2+, *Acinetobacter baumannii* 2+ and *Enterococcus casseliflavus* 2+. Susceptibility results guided antibiotic treatment. The patient was placed on IV Zosyn. He responded to aggressive wound care and antibiotic therapy and remained afebrile. However, the wounds involved the carpal tunnel and distal radioulnar joint, but the hand remained viable. Due to the extensive reconstruction that would be required, it was decided to allow him a few weeks to recover from the multiple procedures before embarking on reconstruction, which would have necessitated flap reconstruction and wrist fusion or forearm amputation. The patient was later discharged to an extended care facility with plans for follow-up surgery. However, he passed away before returning for reconstruction.

DISCUSSION

Kluyvera species was first described in 1936 by Kluyver and van Niel [3]. It has been identified in soil, water, sewage, hospital environments and food products of animal origin; *Kluyvera* has been noted to cause bacteremia, soft tissue infections, intra-abdominal abscesses and urinary tract infections and may be clinically significant in a healthy host [4]. Soft tissue infections with documented *Kluyvera* isolates have been reported, all of which noted preceding tissue injury leading to suspected inoculation of *Kluyvera* bacteria [5,6]. See Table 1.

Kluyvera isolates with soft tissue infection secondary to pressure necrosis have not been previously described. Pressure ulcers (PUs) have serious health complications regardless of whether hospital- or community-acquired. Pressure ulcers in the extremity are usually due to incapacitation of the patient. Frequent causes of atypical pressure ulcers are substance abuse, stroke and injury. Individuals who develop PUs are more likely to die during their hospital stay, have longer lengths of stay and more often readmitted within a month of discharge [7]. None of the previously described soft tissue infections with *Kluyvera* were associated with mortality. *Acinetobacter* was also present in the culture and is associated with an increase in mortality [8]. The cause of this patient's ultimate demise is multifactorial and includes a long history of liver disease, general poor health leading to incapacitation pressure necrosis and secondary

polymicrobial infection. It is impossible to make any associations with a single case report. Since the virulence of *Kluyvera* is largely unknown, it is reasonable to include this case report in the literature.

The current case report demonstrates the clinical course of an unhealthy elderly male with a secondary polymicrobial infection of the hand and upper extremity which included *Kluyvera* species and *Acinetobacter*. Despite aggressive surgical debridement and antibiotics, the patient did not survive to complete reconstruction. While causation is impossible to determine, this case confirms the significance of gram-negative soft tissue infection and can be lethal in the debilitated patient.

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