

# Urosepsis caused by *Kluyvera Ascorbata* in a Pregnant Woman

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## ABSTRACT

Among the *Kluyvera* species, *K. ascorbata* has been isolated from only a few adult cases. Furthermore, there is little or no information in the literature as to whether the species of *Kluyvera* can cause a clinically significant infection in pregnant women. We report a case of urosepsis caused by *K. ascorbata* in a 23-year pregnant woman at 26 weeks of gestation who presented with left flank pain. Ultrasonography showed left grade 3 hydronephrosis, ureteral dilatation, and a 10-mm distal ureteral stone. The patient underwent laser lithotripsy and JJ placement. Ten days later, she was readmitted with urosepsis and empirical antibiotherapy and aggressive hydration were initiated. On the third day, *K. ascorbata* growth was detected in the urine culture. Based on the clinical status of the patient and the antimicrobial susceptibility testing, the treatment was switched to ertapenem 1×1 g/day and was continued for 14 days. Among the *Kluyvera* species, *K. ascorbata* is the most frequent pathogen which may be isolated from pregnant women and can cause urosepsis. To the best of authors' knowledge, this is the first report showing the isolation of *K. ascorbata* in a pregnant woman which caused urosepsis.

**Key Words:** *Kluyvera ascorbata*, Pregnancy, Urosepsis.

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## INTRODUCTION

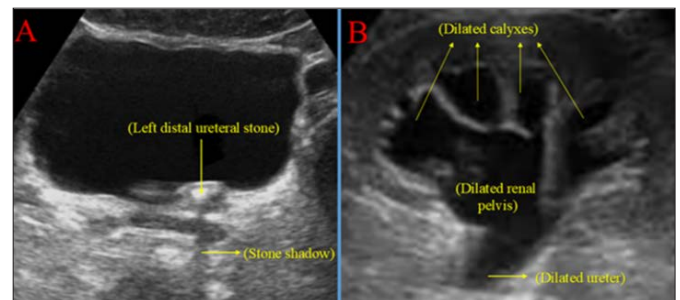
*Kluyvera* was firstly defined by Kluyver and van Neil in 1936, although its complete discovery and molecular characterisation were performed by Farmer *et al.* in 1981.<sup>1,2</sup> During the first years after characterisation, *Kluyvera* was regarded as a part of normal flora of the respiratory system, gastrointestinal tract, and urinary tract. However, in the last three decades, *Kluyvera* genus has been associated with clinically significant and serious infections. Nevertheless, our knowledge about the clinical significance of this organism is limited to case reports and small case series.<sup>3-5</sup>

Among the *Kluyvera* species, *K. ascorbata* has been isolated from only a few adult cases.<sup>6,7</sup> Furthermore, there is little or no information in the literature as to whether the species of *Kluyvera* can cause clinically significant infections in pregnant women. Herein, we report a case of severe infection (urosepsis) caused by *K. ascorbata* in a pregnant woman.

## CASE REPORT

A 23-year pregnant woman at 26 weeks of gestation presented to our hospital with left flank pain, vomiting,

and irritative lower urinary tract symptoms. Patient history indicated that the patient had spontaneous stone passage two years earlier and had no previous history of surgery and extracorporeal shock wave lithotripsy. On admission, her temperature was 37.3°C, pulse rate was 88 beats/min, and blood pressure was 105/62 mmHg. Total white blood cell (WBC) count was  $7.9 \times 10^3$  cu.mm or mm<sup>3</sup> and the hemoglobin was 10.4 g/dL. Urinalysis showed large amounts of red cells with no suspicion of urinary tract infection. Urinary ultrasonography showed left grade 3 hydronephrosis, ureteral dilatation, and a 10-mm distal ureteral stone (Figure 1). The patient was hospitalised and palliative treatment was initiated. However, the pain was not completely cured despite adequate medical treatment; and thus she underwent left ureterorenoscopy and laser lithotripsy. At the end of the procedure, a JJ stent were inserted and the patient



**Figure 1:** (A) Ultrasound image showing 10 mm-left distal ureteral stone. (B) Ultrasound image showing grade-3 hydronephrosis and ureteral dilatation.

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was discharged on the second day. The pre-procedure culture was sterile.

Ten days later, the patient was readmitted to hospital with the complaints of nausea, vomiting, dizziness, and fever for two days. Physical examination revealed left costovertebral angle tenderness. The patient appeared toxic and the temperature, pulse rate, respiratory rate, and blood pressure were 39.8°C, 120 beats/min, 32 breaths/min, and 95/52 mmHg, respectively. Preliminary laboratory results showed significant leukocytosis with a WBC count of  $18.1 \times 10^3$  cu.mm or  $\text{mm}^3$ , elevated C-reactive protein (CRP) of 146 mg/L, and hyponatremia (130 mmol/dL). On urine analysis, large amounts of red and white cells and multiple bacteria were detected. Accordingly, the patient was diagnosed as having urosepsis. After blood and urine sampling, empirical antibiotherapy (ceftriaxone 2 g/day) and intravenous (IV) hydration were initiated. The blood pressure responded to IV fluid boluses. On third day of treatment, blood culture was sterile and *K. ascorbata* growth ( $1 \times 10^5$  cfu/mL) was detected in urine culture. Based on the clinical status of the patient and the antimicrobial susceptibility testing, the treatment was switched to ertapenem  $1 \times 1$  g/day and was continued for 14 days. Her fever and general clinical status responded well to treatment; and a repeat urine culture was negative for growth. The JJ stent was removed and the patient was discharged on the 17<sup>th</sup> day of hospitalisation.

## DISCUSSION

As a common saprophytic organism, *Kluyvera* is widely distributed in the environment such as in soil, water and sewage. It is also a member of the normal human gastrointestinal, urinary, and respiratory system flora. Although it was previously known as a commensal microorganism, *Kluyvera* has been recently shown to be pathogenic in humans and to cause clinically significant infections. There are three main pathogenic species of *Kluyvera*: *K. ascorbata*, *K. cryocrescens* and *K. species* group.<sup>3,6,7</sup>

*Kluyvera* can cause clinical infections in humans such as gastroenteritis, cholecystitis, peritonitis, soft tissue abscesses, central nervous catheter infections, urinary tract infections, pyelonephritis, and sepsis. Moreover, it mostly affects immunocompromised patients, although immunocompetent individuals may also be affected. Neonates are at increased risk for *Kluyvera* infections, probably due to their immature immune system. Another important risk factor is having a chronic disease or an underlying predisposing condition.<sup>6-8</sup> Among the *Kluyvera* species, *K. ascorbata* is the most common pathogen causing clinical infections in humans. The most common clinical presentations are urinary tract infections and pyelonephritis. Neonates and immunocompromised individuals are candidates of *K. ascorbata* infection.<sup>9,10</sup> Moreover, *K. ascorbata* may also cause

urinary tract infections in immunocompetent individuals, though rarely.<sup>6-8</sup>

To the authors knowledge, lower urinary tract infection due to *K. ascorbata* has been reported only in a 18-year old pregnant patient.<sup>11</sup> However, we could not find any study reporting on severe urinary infections (pyelonephritis or urosepsis) caused by *K. ascorbata* in pregnancy.<sup>6</sup> Pregnancy is a predisposing factor for both urinary tract infection and urinary stone formation.<sup>11</sup> In particular, *K. ascorbata* becomes pathogenic in certain conditions such as bacterial overgrowth and increased virulence. This microorganism may translocate from the gastrointestinal flora to the blood stream, leading to bacteremia and localisation in distant sites. Genital infections as well as profound antibiotic and contraceptive use impair the normal perineal flora in females and prepare a suitable medium for the colonisation of *K. ascorbata* and other gram-negative organisms.<sup>7</sup> This pathophysiologic mechanism seems to be appropriate for our patient, mainly because the patient did not have immunodeficiency or any chronic disease and did not get any immunosuppressive treatment, such as steroid therapy. However, pregnancy itself can be regarded as a relative immunosuppressive condition that may cause urinary tract infection in previously healthy females.<sup>12</sup>

In conclusion, *Kluyvera* genus may result in clinically significant infections despite being an infrequent pathogen. Additionally, it can cause life-threatening infections particularly in children, immunocompromised patients, and pregnant women. Therefore, clinicians should be aware of the potential risks of *Kluyvera* species. Among the *Kluyvera* species, *K. ascorbata* is the most frequent pathogen which can be isolated from pregnant women and may cause severe infection (urosepsis) during pregnancy. Accordingly, *K. ascorbata* should be considered in the differential diagnosis of pregnant patients presenting with urinary system-related urosepsis.

## PATIENT'S CONSENT:

A written informed consent was obtained from the patient.

## CONFLICT OF INTEREST:

Authors declared no conflict of interest.

## AUTHORS' CONTRIBUTION:

AE: Conception, design, literature research and manuscript writing.

HTG, YG: Interpretation of data and revising.

HLC: Interpretation of data and revising, supervision of the final version, English redaction.

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