

Case Study

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## A Case Study of Uncommon *Klebsiella* Species Infection with Lymphadenopathy

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### ABSTRACT

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*Klebsiella pneumoniae* is a Gram-negative bacterium known for causing a range of infections, particularly in immunocompromised and hospitalized individuals. However, community-acquired cases, especially in young, healthy individuals, are rare. We present a case study of a 23-year-old female patient with severe *Klebsiella pneumoniae*, has been experiencing recurrent and persistent fever, shortness of breath, weakness, pain in legs and anorexia for the past 3 months and was suspected of having an eating disorder and vomiting. Based on physical, biochemical, CT scan and blood culture, the patient was diagnosed *Klebsiella infection*. Abdomen sonography report reveals mild Hepatosplenomegaly with liver mildly enlarged and spleen mildly enlarged. The patient was admitted to the hospital and initiated on intravenous antibiotics (Ciprofloxacin and Doxycycline) and fever management. The patient responded well to treatment, with resolution of fever and respiratory distress. After discharge, the patient was advised to follow up for further evaluation. But after a week, she was again affected by fever and diagnosed with lymphadenopathy. Timely diagnosis, appropriate antibiotic therapy, and supportive care can lead to favourable outcomes.

### Introduction

*Klebsiella pneumoniae* is a gram-negative bacterium primarily recognized for its association with respiratory and urinary tract infections. It is a well-established human nosocomial pathogen, frequently implicated in hospital-acquired infections. However, certain uncommon presentations of *Klebsiella pneumoniae* infections,

particularly those involving lymphadenopathy, are infrequently reported in the medical literature (Siu *et al.*, 2012; Chang *et al.*, 2023). Lymphadenopathy, characterized by the enlargement of lymph nodes, is commonly associated with various bacterial and viral infections, but its occurrence in the context of *Klebsiella pneumoniae* infections is a rare clinical phenomenon (Boonsarngsuk *et al.*, 2015; Zhang *et al.*, 2017).

This case study aims to shed light on an atypical manifestation of *Klebsiella pneumoniae* infection, where lymphadenopathy takes center stage as a prominent clinical feature.

Through a detailed examination of the patient's medical history, clinical presentation, diagnostic challenges, and treatment outcomes, we seek to enhance our understanding of this unusual scenario and contribute valuable insights to the existing body of knowledge surrounding *Klebsiella pneumoniae* infections.

The rarity of such presentations underscores the importance of meticulous clinical observation, prompt diagnosis, and tailored therapeutic approaches. As the medical community strives to comprehend the diverse manifestations of infectious diseases, this case study provides a unique opportunity to explore the complexities of *Klebsiella pneumoniae* infections when characterized by unexpected clinical features.

Additionally, the implications for patient management, including potential challenges in diagnosis and treatment, will be discussed in the subsequent sections of this report.

## Case Presentation

The patient, a 23 year old girl, from Gwalior, India was presented on April 10, 2023. She has been experiencing recurrent and persistent fever, weakness, pain in legs and anorexia for the past 3 months and was suspected of having an eating disorder. These symptoms initially appeared mild but have progressively worsened over time. Initially, she was treated with paracetamol, which temporarily alleviated her symptoms.

During this period, she has visited multiple healthcare facilities and undergone various diagnostic tests and treatments without a clear diagnosis. At the time of visiting, her blood pressure level was low (90/60 mm/Hg). However, complete blood count showed a decreased hematocrit of 33.8 %, increased neutrophil percentage 80%, decreased lymphocyte percentage 14%, increase ESR Western green 24mm/hr, decreased MCV 78.4 fL, decreased MCH 26.0 pg and a normal platelet count of  $168 \times 10^3$ /ul.

To address the diagnostic challenges and suspicion of a systemic infection, she got admitted to GR Medical College and JA group of hospitals Gwalior with high

fever and vomiting symptoms at the end of April 2023. Apart from biochemical tests, the following investigations such as blood culture, sonography and CT scan were also conducted.

Her physical findings reveal that her low blood pressure level becomes normal by 120/80 mmHg, pulse rate of 93/min and R/R 18 min (Table 1). She had a weight loss of 1 kg from 59 kg to 58 kg. At the same month, her new haematology reports showed a decreased Hg level 8.2 gm/dl, decreased RBC count 3.26 mil/cumm, normal leucocytes count of 5100/cumm, increased platelet count 4.1 lacs/cumm, decreased PCV 25.70%, decreased MCV 79.0fL, normal MCHC 32.0 g/dL, and normal MCH 25.3 pg (Table 2).

All the biochemical tests conducted including plasma glucose, serum creatinine, bilirubin levels have returned normal results (Table 3). There were no significant abnormalities in these tests to indicate a specific medical condition. She was also tested negative for Widal test. Her urinalysis reports were normal with acidic urine and pus cells range 3 to 5 HPF and epithelial cells 5 to 8 HPF. No UTI or any other abnormalities discovered (Table 4).

Moreover, abdomen sonography report reveals mild Hepatosplenomegaly with liver mildly enlarged and spleen mildly enlarged upto 11.8 cm long. CECT was performed and report showed liver enlarged in size measuring 16 cm craniocaudally and multiple subcentimetric mesenteric lymph nodes present (Table 5). Spleen becomes normal in size. The gall bladder, kidney, uterus, pancreas was remain normal.

Patient blood samples were cultured for 24 and 48 hrs respectively showed no growth, which initially returned negative results. No sputum cultures of bacterial pathogens were detected.

Further, blood culture samples returned positive for *Klebsiella pneumoniae*. Antimicrobial susceptibility testing was conducted, *Klebsiella* species showed resistance to amikacin, ampicillin and ceftriaxone and sensitivity to doxycycline, meropenem and ciprofloxacin.

All biochemicals (serum bilirubin, creatinine, urea) were in normal range. Except increased serum sodium level 144.08 mEq/l. Her urinalysis reports were negative. Thyroid profile showed a slightly increase thyroxine level (t4) 14.25 ug/dl, t3 and TSH level remains normal

(Table 6). However, CRP (C-reactive protein qualitative test), HBs Ag, HCV, HCTS (HIV antibodies), COVID 19 RT-PCR, Widal test were all found negative (Table 7). HRCT chest reveals no significant abnormality. She was diagnosed with *Klebsiella* infection and a proper medications provided in this hospital gave her relief.

As she become well, she was routinely discharged from the hospital at the start of May month and was advised a treatment of 5 days at home followed by a review of CBC, LFT and CECT after 5 days. But after a week, she was again affected by fever. So she visited to doctor again and diagnosed with lymphadenopathy.

### Results and Discussion

*Klebsiella pneumoniae* is a well-established human nosocomial pathogen, frequently implicated in hospital-acquired infections. In healthcare settings, it is notorious for causing hospital-acquired infections, particularly in patients with underlying health conditions, those on

prolonged antibiotic therapy, or individuals with weakened immune systems. Common infections associated with *Klebsiella pneumoniae* include pneumonia, urinary tract infections, and bloodstream infections (Paczosa and Mecsas, 2016).

Understanding the dual nature of *Klebsiella pneumoniae*, as both a harmless member of the microbiota and a potential opportunistic pathogen, is crucial for developing effective preventive measures and therapeutic strategies in clinical settings. Additionally, exploring uncommon presentations, such as the one involving lymphadenopathy, contributes to the broader understanding of the bacterium's diverse clinical manifestations.

This case highlights the significance of considering *Klebsiella pneumoniae* as a potential pathogen in young individuals. Timely diagnosis, appropriate antibiotic therapy, and supportive care can lead to favourable outcomes.

**Table.1** Physical observations at the time of visiting

Tests	Interpretation
Blood pressure	120/78 mg / dl
Pulse	93
Temperature	93.8 f
Weight	58 kg

**Table.2** Blood pathology findings at the time of admission

Complete blood count	Result	Normal range
Haemoglobin	11.2 g/ dl	11.0-15.0
TLC	9300/cumm	4000-11000
Neutrophil	18.00%	45.0-75.0
Lymphocyte	14.0%	20.0-45.0
Eosinophil	2%	1.0-6.0
Monocyte	4%	1.0-10.0
Basophil	0.0%	0.0-1.0
RBC	4.3 millions/cumm	3.8-4.8
Hematocrit	33.8%	38.0-47.0
MCV	78.4fL	80.0-99.9
MCH	26.0 pg	27.0-31.0
MCHC	33.8 g/dl	33.0-37.0
Platelet count	168×10 <sup>3</sup> /ul	150-450

**Table.3** Blood Biochemistry investigation report

Tests	Patient value	Normal value
Urea	26 mg%	20-45 mg%
Creatinine	0.64 mg%	0.6-1.4 mg %
Serum bilirubin	0.67 mg / dl	0.0-1.0
Plasma glucose	124 mg /dl	70-100 mg/dl; Random: 125 mg/dl

**Table.4** Urinalysis

Parameters	Findings
Colour	Yellow
Specific gravity	1.020
pH	Acidic
Pus cells	3-5/HPF
Epithelial cells	5-8/HPF
	Negative

**Table.5** USG Abdomen

Parameters	Clinical findings
Spleen	Slightly enlarge
Liver	Mildly enlarged 16cm craniocaudally
Kidney	Normal
Uterus and urinary bladder	Normal
Pancreas	Normal
Gall bladder	Normal
Lymph nodes	Multiple subcentimetric nodes present.

**Table.6** Hormones and markers report

Test	Value	Biological reference interval
T3	0.94 ng/ml	0.6-1.78
T4	14.4 ug/ dl	5.50-12.30
TSH	1.613 ug / ml	0.35-5.60

**Table.7** Other physical test

Test	Report
COVID 19 RT- PCR	Negative
HIV AIDS	Negative
Widal test	Negative
HBs-Ag	Negative
HCV	Negative

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Manisha Shukla: Investigation, formal analysis, writing—original draft. Sandeep Purohit: Validation, methodology, writing—reviewing. Rohit Vishwakarma:—Formal analysis, writing—review and editing. Shireen Anjum: Investigation, writing—reviewing. Harsha Lakhota: Resources, investigation writing—reviewing. Riya Vishwakarma: Validation, formal analysis, writing—reviewing.

## Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

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