



# *Klebsiella pneumoniae* Liver Abscess: An Emerging Disease



Tasaduq Fazili, MD, Calden Sharngoe, MD, Timothy Endy, MD,  
Deana Kiska, MS, PhD, Waleed Javaid, MD and Mark Polhemus, MD

## ABSTRACT

Most of the cases of *Klebsiella pneumoniae* liver abscess reported early on were from Asia, predominantly Taiwan, with a significant number of patients being middle aged diabetic men, and developing metastatic complications, especially endophthalmitis. The entity is now being increasingly recognized in the United States. In this article, the authors review those reported cases, and also the literature regarding the pathophysiology of this intriguing syndrome.

**Key Indexing Terms:** *Klebsiella pneumoniae*; Liver abscess; United States; Emerging disease; Hyperviscous phenotype. [Am J Med Sci 2016;351(3):297–304.]

## INTRODUCTION

Liver abscess is a relatively common infection caused by a variety of bacterial, fungal and parasitic pathogens. Until recently, *Escherichia coli* was the most common etiologic agent of pyogenic liver abscesses but starting in the mid 1980s, increasing case reports of *Klebsiella pneumoniae* liver abscess (KLA) began appearing in the literature. Most of these infections were reported from Taiwan. The patients were middle-aged men with diabetes, with a significant number of them developing bacteremia and metastatic complications, especially endophthalmitis. In the past decade, several cases of KLA have been reported from the United States, with a somewhat similar disease spectrum. We review all the cases that have been reported in the United States so far, and also explore the pathophysiologic mechanisms of this unique disease process.

## METHODS

We reviewed all the published case reports in the literature of KLA in the United States. This was done by performing a PubMed search, using keywords *Klebsiella* and liver abscess. Altogether, 34 cases and case series were identified and included in the review. The period of the reviewed articles was from 1949 to date.

## RESULTS

Including our case, we found a total of 93 cases of KLA in the United States (Table). Excluding 1 newborn, all the patients were adults. The age range was from 28–78 years, with a mean age of 53 years. The male-to-female ratio was approximately 3:1. The most common underlying conditions that were reported were diabetes (18 patients), hypertension (14 patients), biliary disease (10 patients) and coronary artery disease (2 patients).

Among the patients with ethnicity reported, the distribution was as follows: Asian (39 patients), Hispanic

(16 patients), White (12 patients), African-American (4 patients) and Hawaiian (2 patients).

In patients who had the location of the abscess reported, the right lobe of the liver was more commonly affected (34 patients with single lesion and 7 patients with multiple lesions). The left lobe was less frequently involved (5 patients with single lesion and 4 patients with multiple lesions), whereas multiple lesions in both the lobes were reported only in 4 patients.

Cultures were positive from the liver abscess in 73 (78%) patients, blood in 43 (46%) patients and both blood and liver abscess in 27 (29%) patients. Other less frequently involved sites with positive cultures were the cerebrospinal fluid (4 patients), vitreous (3 patients), urine (2 patients) and sputum, soft tissue abscess of the neck and mitral valve (1 patient each). Only 7 patients had a polymicrobial infection, and the other bacteria involved were *Enterococcus fecalis* and *Clostridium perfringens*. The serotypes of the isolates were unknown for most patients (85 patients). Among the 8 patients in whom serotyping was done, 4 patients were reported as K-1 positive, 2 patients as K-2 positive and 1 each patient as K-29 and *Rmp A* positive.

In the pre-1970 era, the antibiotics used were streptomycin, and penicillin or ampicillin with gentamicin. In the post-1970 era, the most frequently used combination was ceftriaxone and metronidazole. From the 1990s onwards, a quinolone with metronidazole was the next most common combination used.

Complications were not infrequently encountered in the patients in our review. The reported complications were endophthalmitis (7 patients), meningitis (6 patients), septic emboli to the lungs (4 patients) and pneumonia (2 patients). Less frequently encountered complications were renal abscess, lung abscess, septic emboli to brain, brain abscess, endocarditis, hepatobronchial fistula and tibial osteomyelitis (1 patient each). Of the 7 patients who had endophthalmitis, 3 patients required

**TABLE.** Case reports of liver abscesses due to *Klebsiella pneumoniae*.

Case no.	Ref.	Age (years)	Sex/ ethnicity	Underlying condition/risk factor	Location of liver abscess	Positive cultures	Serotype	Antibiotic treatment	Procedure	Complications	Outcome
1	1	60	F/white	Unknown	R lobe, single	Blood, liver, CSF	Unknown	Streptomycin	None	Meningitis	Died
2	2	51	F/white	Diabetes	R lobe, single	Blood, CSF	Unknown	Streptomycin/ sulfadiazine	None	Meningitis	Died
3	3	Newborn	F/white	Umbilical vein catheterization	Unknown	Blood, CSF	Unknown	Unknown	None	Meningitis	Died
4	4	48	M/black	Unknown	R lobe, single	Liver	Unknown	Unknown	Open drainage	Tibial osteomyelitis	Survived
5	5	70	F/white	Pancreatic cancer s/p Whipple procedure	Diffuse hepatitis	Blood, liver	Unknown	Penicillin/gentamicin	Surgical exploration with liver biopsies	None	Survived
6	6	68	F/hispanic	Diabetes, HTN, CHF	L lobe, multiple	Liver	Unknown	Ampicillin/ gentamicin	Open drainage	None	Survived
7	7	33	M/white	Unknown	R lobe, single	Liver	Unknown	Unknown	Percutaneous drainage	None	Survived
8	8	37	M/white	Hemorrhoidectomy	L lobe, single	Blood, liver	Unknown	Penicillin/ gentamicin/ metronidazole	Percutaneous drainage	None	Survived
9	9	50	M/white	Cholelithiasis	Both lobes, multiple	Blood	Unknown	Cefazolin	Common bile duct stent	None	Survived
10–14	10	Unknown	Unknown	"Benign biliary disease" (1) "Malignant biliary disease" (2) Pancreatitis (1) Unknown (1)	Unknown	Not specified	Unknown	Not specified	Not specified	Not specified	Not specified
15	11	61	M/not specified	None	R lobe, single	Blood, liver	Unknown	Ceftizoxime/ Metronidazole	Percutaneous drainage	Pneumonia Endophthalmitis	Survived (Needed eye prosthesis)
16	12	38	M/black	Diabetes	R lobe, single	Liver, CSF	Unknown	Ceftriaxone/ Metronidazole, then Levofloxacin/ Metronidazole	Percutaneous drainage	Meningitis Endophthalmitis	Survived
17	13	32	M/not specified	Beta-thalassemia major Splénomegaly	R lobe, multiple	Liver, vitreous	Unknown	Ceftriaxone/ Gentamicin/ Metronidazole, then Ciprofloxacin	Percutaneous drainage Vitrectomy, retinectomy	Subretinal abscess Renal abscess	Survived (Vision 20/30)

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