Case Report

Liver abscess associated with severe myopathy caused by *Klebsiella pneumoniae* serotype K1 in Romania

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Abstract
Liver abscess was diagnosed in a man presenting with fever, chills and severe myopathy. The *K. pneumoniae* isolated from blood cultures belonged to the K1 serotype. The patient responded favourably to percutaneous drainage of the abscess and antibiotics. This is the first documented report of Klebsiella pneumoniae liver abscess syndrome (KLAS) described in Romania and may indicate the emergence of this syndrome in Eastern Europe.

Key words: liver abscess; myositis; hipermucoviscous *Klebsiella pneumoniae*; rmpA.

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Introduction

Klebsiella pneumoniae liver abscess syndrome (KLAS) is an emerging invasive infection caused by highly virulent community-acquired strains of *K. pneumoniae* displaying hypermucoviscosity. The features of this syndrome include the presence of bacteremia, primary liver abscess and metastatic complications. KLAS has been described since 1980 in Southeast Asian countries, but in recent years isolated cases were reported in Europe and America. Seroepidemiological surveys suggest that serotype K1 is infrequent among *K. pneumoniae* isolates from North America, Europe, and Australia [1,2], but it is the most common serotype (21.7%) in northern Taiwan [3].

We describe a severe case of septic shock due to KLAS with an unusual clinical appearance consisting of severe myopathy. From our knowledge, it is the first case of KLAS due to serotype K1 *Klebsiella pneumoniae* involving a Romanian patient.

Case Report

A 66-year-old caucasian man was admitted to the infectious diseases department with high fever (39.6 C), chills and fatigue. He is a native Romanian, who denies travelling abroad in the last 10 years. No addiction, including alcohol or opiates was reported. His medical history included chronic ischemic heart disease with coronary stent and rapidly progressive myopathy of unknown etiology for 4 weeks. He was treated with statins for five years. The clinical examination revealed a full alert patient, unable to sustain orthostatic, non-tender proximal weakness in all four limbs: deficit in the upper limbs 4/5 on the Medical Research Council (MRC) scale and 2/5 MRC in lower limbs, with retained reflexes and mild atrophy in the tight muscles, significant hypotension (60/40 mmHg), fever (41°C) and tenderness to percussion over the right upper quadrant of the abdomen.

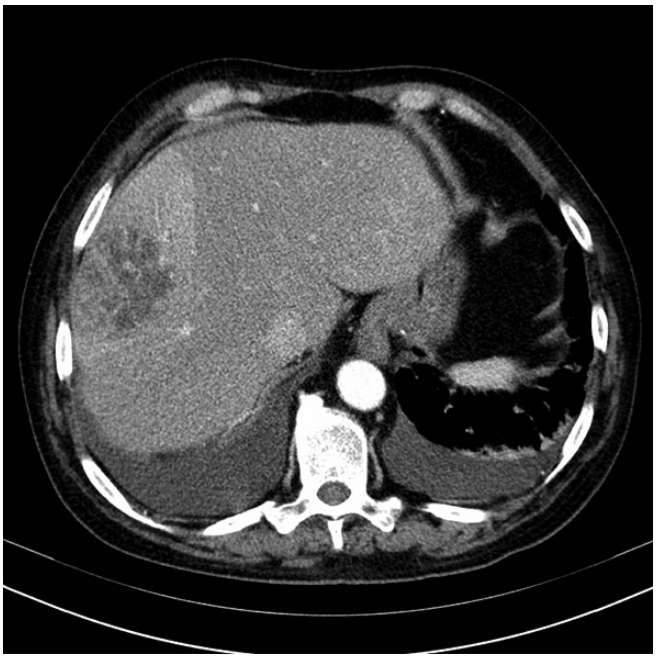
Laboratory tests showed leucopenia (2600 cells/mm^3) with lymphopenia (500 cells/mm^3), thrombocytopenia (129000 cells/mm^3), inflammation (C reactive protein 172 mg/L and procalcitonin 33.82 ng/ml), increased muscle enzymes (CK 5×ULN, CKMB 2×ULN, AST 2×ULN, myoglobin 4×ULN) and low proteinemia 4.1 g/dl and low albuminemia 2 g/dl. Fasting plasma glucose levels were normal.

The patient was empirically treated with intravenous piperacillin-tazobactam 18 g daily but spiking fever persisted. An abdominal ultrasound revealed a 6 cm diameter lesion in the right lobe of the liver. A computed tomography scan showed a 6/5.3 cm hypodense lesion with internal septa (Figure 1). Sonography-guided percutanous drainage was placed yielding 60 ml of purulent fluid whose Gram stains showed gram-negative bacilli. Histological

examination disclosed inflammatory cells and no markers for malignancy. Cultures from blood and urine yielded a gram-negative lactose-fermenting bacillus identified as *Klebsiella pneumoniae*. The isolated strain was hypermucoviscous, belonged to K1 serotype and was *rmp*, *aerobactin* and *alls* positive. The strain was susceptible to all tested antibiotics, including cephalosporins, amoxicillin-clavulanate, quinolones and aminoglycosides. The patient was treated for three weeks with intravenous ceftazidim 4g daily (1g intravenously every 6 hours) and metronidazole 2g daily.

This therapy lead to clinical improvement, the patient being able to ambulate by himself. The antibiotics were switched to oral doxycycline and the patient was discharged after 4 weeks; the antibiotic treatment was followed for other 16-week course until complete abscess resolution. Muscular deficit has improved but the elevation of muscle enzymes persisted. The electromyography suggested a a polymyositis. There was no clinical evidence of pyomyositis or diffuse bacterial myositis due to direct infection of the muscle during bacteremia.

Figure 1. Computed tomography imaging examination of the liver. The image of the liver shows a solid mass of 6×5.3 cm located in the right lobe



Discussion

In recent years, cases of community-acquired liver abscess caused by hypermucoviscous *K. pneumoniae* in patients with no history of travel to Asia have been reported from Europe and the USA, demonstrating the emergence of these strains outside Asia [4, 5]. We documented the first case of KLAS due to K1 serotype identified in our hospital and most probably the first one reported from Romania. We cannot sustain the direct import of this strain from Asia, and it is probably that, with the free movement of people, the carrying of K1 serotype is largely underestimated.

The hypermucoviscous strain of *K pneumoniae* isolated from our patient presented several virulence factors *rmp*, *aerobactin* and *alls*, and belonged to capsular type K1, like most of the isolates from patients with KLAS. Overproduction of extracellular polysaccharide, encoded by the chromosome and positively controlled by the plasmidic *rmpA,* protects these strains from phagocytosis and from complement activation [6]. The *aerobactin* gene, located in the same plasmid as *rmpA,* encodes a siderophore that enhances the virulence of *K pneumoniae*. [7] A*lls*, encoding the activator of the allantoin regulon, a chromosomal region containing genes associated with allantoin metabolism is described in K1 serotypes; the allantoin-utilizing capability in *Klebsiella pneumoniae* may confer replicative advantages in patients with diabetes mellitus or other diseases with increased allantoin levels [8].

Our patient presented myositis, a clinical syndrome occuring in different diseases. He had a treatment with statins for five years, without side effects (muscle pain or rhabdomyolysis). Severe infections myositis may be the result of immune response or microorganisms invasion in the muscles. Moreover, the autoimmune conditions can be exacerbated by infections, and the clinical appearence may include myositis. The patient's chronic myopathy, possibly of inflammatory type, was exacerbated by the presence of a severe infection with Klebsiella, although there was no clinical evidence of pyomyositis or diffuse bacterial myositis due to direct infection of the muscle during bacteremia. The clinical improvement of the muscle strength after antibiotic therapy and drainage of the liver abscess suggests a strong relationship between the myophatic syndrome and infection. A muscle biopsy should have been a good source of information but the patient refused it, so diagnosis was based only on clinical aspects, nonspecific biological data and imagistic data.We chose not to use corticosteroids, because of their controversial benefit in severe sepsis.

We think that by reporting an atypical case we could contribute to expanding the clinical coverage of KLAS; and to indicate the necessity of considering the

existence of this syndrome, especially in patients with *K pneumoniae* bacteremia without clinical symptoms of localized infection.The rising occurence of severe infections caused by highly virulent *K. pneumoniae* is worrying and calls for increased national and international surveillance, including virulence factor assessment, typing and registration of isolates to monitor the geographical spreading of these infections.

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