CASE REPORT

A rare presentation of Legionnaires' disease

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SUMMARY

We present an interesting case of Legionnaires' disease masquerading as acute pyelonephritis, with complete absence of respiratory symptoms on admission. A 45-year-old man was diagnosed with Legionnaires' disease 2 days after presenting to hospital with dysuria and right loin pain. He became critically unwell during the hospital admission, with headache, uncontrolled fever, breathlessness, decreasing oxygen saturations and increasing oxygen requirements. A CT pulmonary angiography demonstrated right upper lobar consolidation and *Legionella* urinary antigen was positive. He was treated with ciprofloxacin and rifampicin and made a full recovery.

BACKGROUND

First described in 1977,¹ Legionnaires' disease is caused by bacteria of the genus *Legionella*.² It is a well-known cause of pneumonia and a potentially fatal infectious disease.³ It can present atypically, without the respiratory symptoms usually associated with pneumonia, such as breathlessness, cough and sputum.⁴ We present an interesting case of Legionnaires' disease presenting with clinical symptoms and signs of pyelonephritis. This case teaches a number of important lessons—it reminds the physician that pneumonia can present atypically without any respiratory features and serves as a timely reminder of the importance of regular review of the acutely unwell patient. The medical physician should not be afraid to review and change the original diagnosis if the patient does not improve with initial treatment.

CASE PRESENTATION

A 45-year-old man, a factory manager with no medical history, presented with a 2-day history of dysuria, foul-smelling urine, right loin pain and rigours. There was associated headache and malaise. He denied chest pain, shortness of breath, cough, sputum, palpitations, dizziness or collapse. He did not take any medications and his medical history was completely unremarkable. He smoked 10 cigarettes daily and was a social drinker. On admission, he looked unwell but was not distressed. There was no jaundice, anaemia, cyanosis, clubbing or oedema. Initial observations were normal except for temperature of 38.5°C. Cardiovascular and respiratory examinations were unremarkable. Tenderness of the right loin was detected. Urinalysis showed the presence of blood and protein; blood results showed elevated C reactive protein (CRP) and white cell count (WCC) (CRP 397, WCC 12.8), hypoalbuminaemia (albumin 30), and normal U&E and liver function. The chest

X-ray showed haziness of the right upper lobe. The lung fields were not hyperexpanded. The ECG showed sinus rhythm. The working diagnosis of sepsis secondary to pyelonephritis was made on account of the presenting features and right loin tenderness.

Despite treatment with broad-spectrum antibiotics and intravenous fluids, the patient's condition deteriorated on day 1 of the hospital admission, with new-onset breathlessness, severe headache and uncontrolled fever. Ultrasound and CT of the kidneys and pelvicalyceal system did not show any evidence of pyelonephritis or hydronephrosis. The diagnosis of pulmonary thromboembolism was considered and an urgent CT pulmonary angiography performed. The scan ruled out pulmonary thromboembolism but demonstrated right upper lobar consolidation. The diagnosis was changed to community-acquired pneumonia with sepsis, and clarithromycin was added to the treatment regime.

OUTCOME

The patient was reassessed on day 2 of the hospital admission. While still reporting severe headache, he was now requiring 10 L of oxygen to maintain adequate saturations and his temperature was 40°C. Blood and urine cultures were negative. *Legionella* urinary antigen was positive, and antibiotic therapy was switched to intravenous ciprofloxacin and rifampicin following advice from the microbiology department. In view of the deterioration in his clinical condition, the patient was transferred to the intensive treatment unit (ITU) for invasive monitoring and management of hyperpyrexia. He never required invasive ventilation or inotropes at any point during the course of his stay in the ITU. He made an excellent recovery and was discharged home 9 days postadmission.

When seen as an outpatient, he was feeling well and had no respiratory or urinary symptoms. The repeat chest X-ray was unremarkable. The patient recalled that he had taken a shower at his place of work a few days prior to the onset of symptoms. Investigations later confirmed that this was the source of infection.

DISCUSSION

This is an unusual case of Legionnaires' disease presenting initially with dysuria and loin pain. We postulate that haematogenous 'seeding' of *Legionella* bacteria from a primary focus of infection in the right lung led to the formation of micro-abscesses in the cortex of the right kidney below the capsule, thereby causing irritation of the capsule and contributing to this patient's symptoms of right loin pain and foul-smelling urine. Interestingly, the

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primary focus of infection in the right lung initially did not lead to any presenting symptoms, the patient developing breathlessness while in hospital. This theory was not conclusively proven during the course of the admission, as we also postulate that the seeding of *Legionella* bacteria in the right kidney did not lead to macroscopic changes readily visible on imaging.

We found a single published case of Legionnaires' disease involving findings of acute pyelonephritis on autopsy. In this case, the patient was a 62-year-old man with metastatic bladder carcinoma who was diagnosed with widespread brain metastases during the course of a prolonged hospital admission. He became febrile shortly after all modalities of treatment had been withdrawn and died 1 day later. In contrast to our case, there were no signs or symptoms of acute pyelonephritis or, indeed, respiratory illness. Autopsy examination showed confluent bronchopneumonia with several small abscesses and acute pyelonephritis with abscess formation. *Legionella pneumophila* (serogroup 4) was isolated in pure culture from lung tissue post-mortem and also shown by direct immunofluorescence in the kidney and spleen. This was the first case of an extra-thoracic inflammatory lesion associated with *L. pneumophila*.⁵

The question also arises as to whether the right loin pain experienced by our patient was in fact referred pain from primary lung pathology, rather than pain due to direct involvement of the right kidney in the infective process. Pneumonia affecting the lower lobes is a well-recognised cause of referred pain and is one of the medical causes of acute abdomen.⁶ Abdominal pain caused by pneumonia is also well documented in children.^{7,8} Abdominal pain and associated symptoms may be so pronounced as to simulate acute abdominal disorders such as acute appendicitis, acute cholecystitis and intestinal obstruction. We question whether loin pain in the context of pneumonia is referred pain or pain caused by alternative pathophysiological mechanisms, as the visceral pain fibres that innervate the thoracic and abdominal organs enter the spinal cord at different levels. Therefore, it seems unlikely that pneumonia would result in referred pain in a distant site supplied by pain fibres that are not directly related to the lungs or their associated innervation. We consider it more likely that our patient's loin pain was caused by direct seeding of bacteria in the right kidney.

While it is already well recognised that pneumonia can present with symptoms related to the primary respiratory infection and constitutional symptoms related to the systemic inflammatory response syndrome (SIRS) provoked by pathogenic organisms,⁹ this case reminds the physician that pneumonia can present with symptoms related to haematogenous 'seeding' of bacteria in other organs. Secondary haematogenous spread of *Legionella* spp from the lungs has been reported in the literature, as summarised in a paper by McClelland *et al.*¹⁰ Previously described sites of infection include the spleen,^{11,12} liver,¹³ skeletal muscle,¹⁴ myocardium,¹⁵ pericardium,¹⁶ and skin and soft tissue.¹⁷ In 1981, Evans and Winn published findings relating to the presence of *L. pneumophila* bacteria in the extra-thoracic organs of six fatal cases of Legionnaires' disease from an epidemic in Vermont in 1977. The bacteria were identified in the spleen, liver, lymph node and kidney tissue. There were no acute inflammatory lesions in any of these organs.¹⁸

This case was also notable for the fact that, although the patient had no respiratory symptoms or signs on initial assessment, there were radiographic changes indicative of lung consolidation. This shows that pneumonia can occasionally present with radiographic changes on chest X-ray but without any respiratory features—this is the opposite of the old maxim that radiographic changes lag behind symptoms and signs of

pneumonia. Therefore, this case demonstrates the importance of the chest X-ray as a fundamental initial investigation for a patient presenting with symptoms related to possible infection. We believe that pneumonia should be one of the differential diagnoses in any patient presenting with acute illness and SIRS.

The differential diagnosis of right upper lobe pneumonia includes tuberculosis and aspiration pneumonitis. There were no risk factors for immunosuppression or aspiration in this man, and the diagnosis of Legionnaires' disease was supported by the serology results and rapid improvement in his medical condition following antibiotic treatment. Therefore, bronchoalveolar lavage was not performed, as it was not indicated in the management of this case.

This case also underlines the importance of obtaining a social history when the diagnosis of pneumonia is contemplated. This aspect of the history is often neglected, yet useful information relating to the cause of the underlying illness can be obtained. In this case, it was important to trace the source of the infection and put in place measures to safeguard the health of the public.

Last but not least, this case demonstrates that the good physician should not be afraid to change the original diagnosis of an acutely unwell medical patient, especially if there is no initial clinical improvement. The physician should be able to review the whole clinical situation and investigations without making assumptions, and change treatment if the facts no longer support the initial working diagnosis.

Learning points

- ▶ Pneumonia can present with symptoms and signs related to haematogenous spread of bacteria to secondary sites.
- ▶ Pneumonia can present without any respiratory symptoms or signs.
- ▶ Consider pneumonia in the differential diagnosis of anyone presenting with acute illness and systemic inflammatory response syndrome.
- ▶ Always take a detailed social history when seeing patients with respiratory pathology, as this can provide useful diagnostic pointers.
- ▶ Arrange regular review of the acutely ill patient and do not be afraid to change the initial diagnosis if necessary.

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