

CASES OF PNEUMONIA CAUSED BY LEGIONELLA PNEUMOPHILA IN BAHRAIN

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ABSTRACT

Between January 1985 and August 1986, eighty patients with pneumonia admitted to Salmaniya Medical Centre were examined for antibodies to *Legionella pneumophila* by the indirect immunofluorescent technique. Four patients had titres of $\geq 1 : 128$ which by the criteria of the Association of Clinical Pathologists (A.C.P.) were provisionally diagnosed as cases of Legionnaires' disease. There were no fatalities among the cases, two of which responded to ampicillin, one to ampicillin combined with cloxacillin and gentamicin and the fourth only to erythromycin.

Since the description of the explosive outbreak of Legionnaires' disease in Philadelphia¹ numerous other outbreaks have been described worldwide. The majority of cases of Legionnaires' disease occur as sporadic, but some nosocomial infections also occur, particularly in the immunocompromised².

To date there have been no reported cases of the disease in Bahrain and the Arabian Gulf region. However, studies of antibody prevalence in

healthy blood donors in Bahrain and Riyadh, Saudi Arabia have shown a prevalence of antibodies to *L. pneumophila* to be 4% and 28% respectively^{3,4}.

A prospective study was designed to investigate the prevalence of Legionnaires' disease amongst cases of pneumonia admitted to Salmaniya Medical Centre.

METHODS

Sera from 80 patients were examined by the indirect immunofluorescent technique for antibodies to *Legionella pneumophila*. The antigen used was a formalised yolk sac antigen of *L. pneumophila* serogroup 1 obtained from the Central Public Health Laboratory, Colindale, U.K. The procedure used in the test was that recommended by the A.C.P.⁵. Initially sera were tested at 1:16 dilution. Those found to give positive results were retested to find the exact titre.

RESULTS

Four patients gave a positive indirect immunofluorescence test with titres, which by the criteria of the A.C.P. were taken to indicate genuine infection with *L. pneumophila*, i.e. titres in excess of 1:128. All routine bacterial cultures of sputum, pleural fluids and blood did not yield any of the known bacterial agents of pneumonia. Relevant details of the four cases are presented in Table I.

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TABLE I
Cases of pneumonia with positive indirect immunofluorescence test
for *Legionella pneumophila* with relevant parameters.

Age	Case 1 85 years	Case 2 40 years	Case 3 67 years	Case 4 19 years
Presenting symptoms	Unproductive cough, dyspnoea.	Fever, chills, abdominal pain, slight jaundice, dyspnoea.	Persistent cough slightly productive for 7 days, fever for 2 days, dyspnoea.	Severe back and chest pains, dyspnoea.
Physical examination	Rales at the base, middle and lower zone. Temp. 37.5° C.	Diminished air entry on left side, pleural rub on left apex, wheezes and rhonchi on left apex, abdominal distention, hepatomegally, tachycardia. Temp. 40° C.	Bilateral basal crepitation. Temp. 37° C.	Crepitation on the left lung and bronchial breathing on the back of right lung. Temp. 39.5° C.
X-ray finding	Opacity in right lower lobe.	Opacity and consolidation of left apex.	Opacity in left lower lobe, cavity in right middle lobe.	Opacity in right and left lower lobe, pleural effusion.
Laboratory findings	ESR 42 mm/hr	77 mm/hr	42 mm/hr	80 mm/hr
Indirect immunofluorescent	WBC 5900/cmm	10000/cmm	11300/cmm	14000/cmm
Antibody test titre	1 : 28	1 : 256	1 : 128	1 : 256
Predisposing factors	Old age.	Heavy tobacco and alcohol consumption.	Type II diabetes, old case of M.I., previous history of smoking.	Sickle cell disease.
Antibiotic therapy	I.V. ampicillin 500 mg 6 hourly for 3 days then orally for 7 days.	I.V. ampicillin 500 mg, cloxacillin 500 mg, gentamicin 80 mg for 1 week.	I.V. ampicillin 500 mg 6 hourly then orally for 7 days.	I.V. ampicillin 500 mg, cloxacillin 500 mg, gentamicin 80 mg for 9 days - no response then erythromycin 500 mg 4 hourly for 3 days continued for 7 days.

DISCUSSION

The diagnosis of any bacterial infection should ideally be based on isolation of the organism from clinical materials. However, in many instances retrospective diagnosis is made on serological grounds by demonstrating a four-fold or greater rise between the acute and convalescent sera. It is now being increasingly recognised that it not always possible to demonstrate a four-fold rise in the titre, particularly when the first serum sample is obtained at a late stage of the disease. In the original Philadelphia outbreak of Legionnaires' disease it was found that 87% of the patients meeting clinical criteria for a case of Legionnaires' disease had antibody titres of 1:128 or more in sera obtained at least three

weeks after the onset of the disease⁶. In the presence of clinical symptoms a single high titre serum is sufficient to make a provisional diagnosis of Legionnaires' disease⁵.

Unfortunately in the four cases described here, only one serum sample was obtained from each patient. Nevertheless, these samples were taken at least ten days after the onset of symptoms and therefore represented convalescent stage sera.

Apart from the positive immunofluorescent antibody test, further evidence that the four cases were genuine infections with *L. pneumophila* is the absence of known agents of pneumonia in the bacterial culture of sputum, pleural fluid and blood.

To confirm further the diagnosis of Legionnaires' disease it was necessary to exclude other aetiological agents of pneumonia, including Atypical and viral pneumonias. Viral pneumonia usually follows an upper respiratory tract infection and does not respond to antibiotic therapy. *Mycoplasma pneumonia* can be ruled out clinically because it is usually associated with upper respiratory tract signs and symptoms such as sore throat, coryza, hoarseness and earache, none of which were present in any of the patients. In addition, the radiographic picture is usually of the interstitial pattern of pneumonia².

Variation in the severity of the cases were noted. The first and third were mild, whereas the second and fourth were severe pneumonias. In the mild cases fever was not present but in the severe cases, fever and chills were present. The fourth patient had a relatively large pleural effusion, the gram stain of which showed some polymorphonuclear cells but no bacteria.

Infection with *L. pneumophila* usually affects the immunocompromised. Predisposing factors are old age, malignancy, immunosuppression as well as factors such as heavy alcohol and tobacco consumption. In the four cases described, two were elderly men. In addition, one was diabetic and an old case of myocardial infarction. The third patient was a heavy consumer of alcohol and tobacco. The fourth patient, although young, was a known case of sickle cell disease.

The drug of first choice in the treatment of Legionnaires' disease is erythromycin, or a combination of erythromycin and rifampin. In the cases described here, antibiotics were instituted empirically before a precise diagnosis. In two of the patients, with milder symptoms, intravenous ampicillin in the usual dose was effective. There was a good clinical response and general improvement in the patients condition. In the other two cases, where the infection was more severe (cases 2 and 4), ampicillin combined with cloxacillin and gentamicin was effective in one patient. In contrast, this regimen was ineffective in the other patient. There was no improvement in his general condition, his temperature remained elevated despite receiving the three drug combination for ten days. When erythromycin was started however, there was a rapid

improvement in the patient's general condition. His temperature returned to normal within 48 hours, he continued to improve and was discharged ten days later.

The role of antibiotics, other than erythromycin and tetracyclin, in the treatment of *Legionella pneumonia* has not been fully established. It is of interest to note that ampicillin alone was effective in two cases and combined with cloxacillin and gentamicin in the third. In the fourth case this combination was ineffective, and only when erythromycin was used was the disease brought under control.

CONCLUSION

Sporadic cases of *Legionella pneumonia* occur in Bahrain. Although they are rare, they should be considered in the differential diagnosis of pneumonia.

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