

Neumonía por Legionella con desenlace fatal en un granjero con neumonitis por hipersensibilidad

Fatal pneumonia by Legionella in a farmer with hypersensitivity pneumonitis

Vega García López

Instituto Navarro de Salud Laboral. Pamplona, Spain.

Elena Ordoqui García

Instituto Navarro de Salud Laboral. Pamplona, Spain.

Teresa Ferrer Gimeno

Instituto Navarro de Salud Pública. Pamplona, Spain.

Jacinto Irisarri Orta

Instituto Navarro de Salud Laboral. Pamplona, Spain.

Marta García Esteban

Instituto Navarro de Salud Laboral. Pamplona, Spain.

Aurelio Barricarte Gurrea

Instituto Navarro de Salud Pública. Pamplona, Spain.

CIBER Epidemiología y Salud Pública (CIBERESP), Spain.

Correspondencia:

Dra. Vega García López

Instituto Navarro de Salud Laboral (INSL)

Polígono de Landaben C/ F

31012 Pamplona (Spain)

Tel: +34 848 423746

Fax: +34 848 422879

E-mail: vgarcial@cfnavarra.es

Resumen

Introducción: La investigación retrospectiva sobre un fallecimiento aislado por Legionelosis, hizo aflorar un caso de neumonitis por hipersensibilidad en un granjero cuidador de cerdos.

Métodos: Se realizaron las siguientes pruebas: tomografía axial computerizada de alta resolución, lavado broncoalveolar, biopsia pulmonar, gasometría arterial, pruebas de función respiratoria y autopsia. Se estudió la presencia de *Legionella* por serología y se analizaron las muestras de fuentes de riesgo para identificar el foco de *Legionella*.

Resultados: El estudio confirmó los diagnósticos de neumonitis por hipersensibilidad y neumonía por *Legionella pneumophila*. Las pruebas realizadas objetivaron la fibrosis pulmonar, un patrón respiratorio funcional restrictivo, un descenso de la difusión pulmonar, hipoxemia y la presencia de linfocitosis en el lavado broncoalveolar. Se detectó el foco de *Legionella* en una ducha y la serología fue positiva en el paciente. La autopsia confirmó la fibrosis pulmonar y el shock séptico por *Legionella* que causó la muerte.

Conclusiones: La presencia de tos crónica e infiltrados pulmonares en un granjero debería hacer sospechar la existencia de una neumonitis por hipersensibilidad. Retrasar su diagnóstico conlleva un peor pronóstico, impide evitar la exposición a los antígenos causantes del cuadro y permite el avance de la fibrosis pulmonar facilitando la aparición de infecciones oportunistas.

(Med Segur Trab (Internet) 2009; 55 (217): 27-32)

Palabras clave: Alveolitis alérgica extrínseca, factores de riesgo, Enfermedad del Legionario, subdeclaración, enfermedad relacionada con el trabajo.

Abstract

Background: The retrospective investigation of a fatal sporadic Legionnaires' disease identified an unknown case of occupational hypersensitivity pneumonitis in a swine breeder.

Methods: Chest high-resolution computed tomography, bronchoalveolar lavage, lung biopsy, arterial gasometry, pulmonary function tests and autopsy were performed. It was studied the presence of *Legionella* by serology and risk water samples were analyzed to identify the *Legionella*'s source.

Results: HP and *Legionella pneumophila* pneumonia diagnostics were confirmed. Lung fibrosis, a restrictive functional pattern, decreased diffusion, hypoxemia and bronchoalveolar lavage lymphocytosis were evidenced. *Legionella*'s source was detected in a shower and a positive serology in the patient. Autopsy verified pulmonary fibrosis and the septic shock led to *Legionella* causing the death.

Conclusions: Chronic cough and pulmonary infiltrates in a farmer should suspect the presence of hypersensitivity pneumonitis. Later diagnosis carries a worse prognosis, the offending antigens exposure can't be avoided and fibrotic stage enhanced opportunity infection disease.

(Med Segur Trab (Internet) 2009; 55 (217): 27-32)

Key words: Allergic extrinsic alveolitis, risk factors, Legionnaires' disease, underreport, work-related disease.

INTRODUCTION

Occupational hypersensitivity pneumonitis (HP) is an inflammatory disease involving the lung parenchyma with three clinical presentations: acute, sub acute and chronic. The most advanced stage, moreover a lack of pulmonary function, turns the exposed worker especially sensitive to opportunist infections. With early diagnosis and avoidance of the offending antigen, the prognosis tends to be favourable and permanent respiratory impairment can be avoided. Thus, the control of the disease by an early diagnosis and the eviction of induced agents' exposure can prevent later complications.

HP is a type of interstitial lung disease secondary to repeated inhalation of an inciting agent in a previously sensitized host. The exposure to different organic and chemical antigens is found in the occupational environment, standing out farmers and breeders¹.

In this case on having treated itself of a swine breeder farm², there are several airways exposition sources that mean a potential danger in HP origin. The wide range of inciting agents included pig urine and dander, grain dust of wheat, corn, barley or soybean³, sunflower seeds, chemical products (formaldehyde, glutaraldehyde), pesticides, antibiotics, vermicides, antimycotic and antiseptic, as well as excreta and manure. Fungi are considered as the main cause of HP in the agriculturalist habitat, all of these organisms can be found in mouldy hay, grain⁴ or straw dust stored and handled by farmers⁵. Besides, the substances generated by the animal residues and the manure coming ammonia, sulphidric acid, methane and carbon monoxide are the origin of a continuous respiratory airways irritation. Their high concentrations in locked stables generate a loaded hot environment which contributes to deteriorate the lung function of exposed people, especially in the atmosphere of pork exploitations⁶.

Infection with *Legionella spp* is an important cause of severe pneumonia in the community setting and occurring sporadically and in epidemic outbreak^{7,8}.

Risk factors for Legionnaires' disease are well-known: old age, smoking or some degree of immunosuppression⁹. Other chronic diseases are identified too as cancer, hemopathy, underlying renal disease, underlying cardiac disease¹⁰ or impaired respiratory function¹¹. The use of systemic corticosteroids and chemotherapy¹² are the most common underlying conditions¹³.

CASE REPORT

We present the case of a 63-year-old non smoking farmer, with no pathological history of interest, a pig breeder in a swine farm for 35 years. For the last 10 years, he suffered recurrent symptomatic episodes of debility, coughing, expectoration, breathlessness and high temperature related to his job, which were treated as supposed pneumonias, presenting bilateral infiltrations in his chest radiograph and computer tomography.

During the last hospitalization, the diagnosis of HP was confirmed. Chest high resolution computed tomography (HRCT) showed the presence of lung chronic fibrosis with bibasal honeycombing and parenchymal opacification with alveolar component. In the bronchoalveolar lavage (BAL) we observed a predominant lymphocyte T CD8+ subpopulation and important fibrosis in the lung biopsy. Respiratory functional tests presented a restrictive pattern with a lack of lung diffusion capacity in addition to hypoxemia and inspiratory bibasal crackles on physical examination. The patient improved with systemic corticosteroid therapy and the progression of the evolution severity was stated. The initial infiltrates of acute stage turned to sub acute-chronic established alveolitis due to continuous exposure to the causative antigens.

The farmer returned home, being treated with a high dose of corticosteroids and he stayed absent from work although the house was located in the facilities of the farm. A month later he presented a rapid general deterioration, made necessary going into hospital again. The worsening of respiratory functions required attention in the critical care unit, where he finally died by a pneumonia complicated with a respiratory distress, with the serology to *Legionella pneumophila* serogroup 1 testing positive. The autopsy report verified the septic shock by Legionella pneumonia, distress respiratory syndrome and important fibrotic lung parenchyma areas.

It was not possible to determine the causative HP agent because we couldn't complete the study with a bronchial challenge test or looking for serum precipitins. The pig breeder was doing daily farm yard tasks for 35 years and, over this period, he could have been exposed to potential risk factors which could have caused the disease.

DISCUSSION

When the fibrosis phase is established the diagnosis of a HP case often is associated with the lack of previous knowledge of the suspected antigenic source of the disease. In this state the prognosis become worse and survival shorter¹⁴. Dyspnoea, cough and crackles in a farmer increase the risk of HP in relation to general population¹⁵.

In this case, although the farmer presented compatible symptoms over 10 years, the diagnosis was delayed and he stayed in his job until the lung illness made impossible to reverse fibrotic lung disease. Diagnostic major criteria of HP included (I) a clinical history with symptoms and risk exposure presented, (II) BAL lymphocytosis, (III) findings compatible with HP on chest radiograph and chest HRCT with infiltrates and radiologic evidence of fibrosis and honeycombing, (IV) pulmonary histological changes with important fibrotic areas and lung parenchymal hepatisation confirmed by the autopsy. In addition minor criteria: arterial hypoxemia, bibasal crackles and decreased diffusing capacity were present¹⁶.

The vital prognosis of this pathology in advanced stage becomes worse when lung fibrosis is detected. The National Occupational Safety and Health (NIOSH) of United States, analyzed the multiple cause of death in HP, they studied for the period 1980-2002, overall age adjusted death rates increased significantly highest rate at 1.04 per million, and was significantly high for farmers PMR= 8.1¹⁷. An other study was performed with 69 patients diagnosed of HP, 26 of them were classified as fibrotic. There were 11 deaths in the fibrotic group and only one in the nonfibrotic group during the median follow-up period of 5.8 years. The age-adjusted hazard ratio for mortality in patients with fibrosis was 4.6, as a proportion of patients who died had no death certificate available for review, their vital status was confirmed only through Social Security Death Registry Index¹⁸. In our case, the time passed between HP certain diagnosis and the death was only 2 months, and the autopsy report could confirm the cause of the exitus.

HP as the underlying disease and the systemic treatment with corticosteroids made possible the infectious complications in the immunocompromised host, being sensitive to suffer the pulmonary infection by *Legionella* and developing respiratory distress with the final result of exitus. Other authors reported a few cases of Legionella pneumonia in patients treated with high dose of corticosteroids suffering from different underlying diseases as ulcerous colitis, cancer¹⁹ or a fatal severe erythrodermic psoriasis²⁰. Among cancer patients, the use of systemic corticosteroids, is too, one of the most common underlying conditions, 41% in the Jacobson study¹².

Several well known risk water samples were analyzed (showers, pressure hoses and environmental coolers) to identify the *Legionella's* source in the farm. As result of the environmental research, three of the six samples that were taken of the total risk farmer' facilities were found contaminated by *Legionella pneumophila* serogroup 1 (30,000 CFU/l) by microbiological culture²¹. One positive source was the farmer house shower. It is

necessary to point out that the house was located inside the work center and was annexed to the farm property. Other workers have used the same shower but no other case occurred. The trigger of the fatal case was the Legionella pneumonia moreover his work absence at that moment caused difficulty in the diagnosis of the underlying disease (HP) as the main cause of the death.

Some authors consider that detection of a single case should not be considered as an isolate sporadic event, but rather indicative of unrecognized cases²².

In this case the detection of a single case moved to look for the underlying conditions and it was an unknown occupational disease (HP). Frequently, this phenomenon happens and is well-known the underreporting of the true incidence of the work related injuries and illnesses estimate by the official registers based on compensation worker's systems²³. To complete this information, in Spain, like in other countries there were developing epidemiologic surveillance systems²⁴⁻²⁶.

REFERENCES

1. Faria NM, Facchini LA, Fassa AG, Tomasi E. Farm work, dust exposure and respiratory symptoms among farmers. *Rev Saude Publica* 2006; 40: 827-836.
2. Schlegel V, Liebetau G, Pohl WD. Swine breeder's lung-a form of exogenous allergic alveolitis. *Z Erkr Atmungsorgane* 1990; 174: 143-148.
3. Zubeldia JM, Gil P, Miralles P, De Barrio M, Aranzabal A, Herrero T et al. Hypersensitivity pneumonitis caused by soybean antigens. *J Allergy Clin Immunol* 1995; 95: 622-626.
4. Moreno-Ancillo A, Domínguez-Noche C, Gil-Adrados AC, Cosmes PM. Hypersensitivity pneumonitis due to occupational inhalation of fungi-contaminated corn dust. *J Invest Allergol Clin Immunol* 2004; 14: 165-167.
5. Roussel S, Reboux G, Dalphin JC et al. Farmer's lung disease and microbiological composition of hay: a case-control study. *Mycopathologia* 2005; 160: 273-279.
6. Iversen M, Dahl R. Working in swine-confinement buildings causes an accelerated decline in FEV1: a 7 yr-follow-up of Danish farmers. *Eur Respir J* 2000; 16: 404-408.
7. Diederer BM. Legionella spp. and Legionnaires' disease. *J Infect* 2008; 56: 1-12.
8. Cunha BA. The atypical pneumonias: clinical diagnosis and importance. *Clin Microbiol Infect* 2006; 12 suppl 3: 12-24.
9. Marston BJ, Lipman HB, Breiman RF. Surveillance for Legionnaires' disease. Risk factors for morbidity and mortality. *Arch Intern Med* 1994; 154: 2417-2422.
10. Poupard M, Campèse C, Bermillon P, Che D. Factors associated with mortality in Legionnaires' disease, France, 2002-2004. *Med Mal Infect* 2007; 37: 325-330.
11. Broome CV, Fraser DW. Epidemiologic aspects of legionellosis. *Epidemiol Rev* 1979; 1: 1-16.
12. Jacobson KL, Miceli MH, Tarrand JJ, Kontoyiannis DP. Legionella pneumonia in cancer patients. *Medicine (Baltimore)* 2008; 87: 152-159.
13. Carratala J, Gudiol F, Pallares R, Dorca J, Verdagué R, Ariza J et al. Risk factors for nosocomial Legionella pneumophila pneumonia. *Am J Respir Crit Care Med* 1994; 149: 625-629.
14. Vourlekis JS, Schwarz MI, Cherniack RM, Curran-Everett D, Cool CD, Tuder RM et al. The effect of pulmonary fibrosis on survival in patients with hypersensitivity pneumonitis. *Am J Med* 2004; 116: 662-668.
15. Lacasse Y, Selman M, Costabel U, Dalphin JCh, Ando M, Morell F et al. Clinical diagnosis of hypersensitivity pneumonitis. *Am J Respir Crit Care Med* 2003; 168: 952-958.
16. Schuyler M, Cormier Y. The diagnosis of hypersensitivity pneumonitis. *Chest* 1997; 111: 534-536.
17. Bang KM, Weissman DN, Pinheiro GA, Antao VC, Wood JM, Syamlal G. Twenty-three years of hypersensitivity pneumonitis mortality surveillance in the United States. *Am J Ind Med* 2006; 49: 997-1004.
18. Hanak V, Golbin JM, Hartman TE, Ryu JH. High-resolution CT findings of parenchymal fibrosis correlate with prognosis in hypersensitivity pneumonitis. *Chest* 2008; 134: 133-138.
19. Miyara T, Tokashiki K, Shimoji T, Tamaki K, Koide M, Saito A. Rapidly expanding lung abscess caused by *Legionella pneumophila* in immunocompromised patients: a report of two cases. *Inter Med* 2002; 41: 133-137.
20. Eisendle K, Fritsch P. Fatal fulminant legionnaires' disease in a patient with severe erythrodermic psoriasis treated with infliximab after a long-term steroid therapy. *Br J Dermatol* 2005; 152: 585-586.

21. Ministerio de Sanidad y Consumo. Recomendaciones para la Prevención y Control de Legionelosis. <http://www.msc.es>. [In Spanish] (accessed November 2008).
22. Sabrià M, Campins M. Legionnaires' disease: update on epidemiology and management options. *Am J Respir Med* 2003; 2: 235-243.
23. Azaroff LS, Levenstein C, Wegman DH. Occupational injury and illness surveillance: conceptual filters explain underreporting. *Am J Public Health* 2002; 92: 1421-1429.
25. Orriols R, Costa R, Albanell M, Alberti C, Castejon J, Monso E et al. Ocupacional Respiratoria (MOR) Group. Reported occupational respiratory diseases in Catalonia. *Occup Environ Med* 2006; 63: 255-260.
24. Instituto Navarro de Salud Laboral. Red de Médicos Centinela de Salud Laboral de Navarra. <http://www.cfnavarra.es/insl>. [In Spanish] (accessed December 2008).
27. Albertí C, Benavides FG. Vigilancia epidemiológica de las posibles enfermedades laborales atendidas en la Atención Primaria de Salud. Casos notificados a la Unidad de Salud Laboral de Sabadell, 2001-2005. *Arch Prev Riesgos Labor* 2007; 10: 144-147.