The tabloid newspapers often resort to over-simplified and, at times, inaccurate coverage of medical diagnoses. An example of this can be seen in recent coverage of the theory that a 'fat gene' predisposes certain individuals to obesity, thereby putting them at risk of other conditions, ranging from hypertension to heart disease. The *Daily Mail* in its coverage of this included two photographs. One depicted a girl who had this gene present, the other of a girl who did not. The implication was that the readers had to decide which shape in the two photos best matched their own, and from that could determine whether or not they too had the 'fat gene'.[12] However, it is clearly not that simple and other factors that may lead to obesity need to be considered.

CONCLUSION

The media has opened up endless opportunities to the individual to self-diagnose, supposedly empowering the patient. However, the motives of the information providers, whether on the internet, or television, or in the tabloid press need to be scrutinised, since patients can be left vulnerable to misinformation and unfounded anxiety. The British Medical Association acknowledges that 'internet-informed patients are here to stay',[13] and perhaps the focus should now be on how best to manage the so-called 'cyberchondriacs', ensuring they are more accurately diagnosed, by introducing them to a more reliable and credible source of information.[2] Despite the bold claims of the media to the contrary, the truly empowered patient is still very much a thing of the future.

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Legionella

Rachel Grant

INTRODUCTION

Legionnaires' disease is an atypical pneumonia, caused by a gram negative bacterium that breeds in water.[1] It is an important cause of both community- and hospital-acquired pneumonia. Although the majority of reported cases are isolated and rare, outbreaks of the disease occur and it proves to be an important public health issue. It is the most common cause of atypical pneumonia in hospitalised patients, with upwards of 300 reported cases a year in the United Kingdom (UK).[2] This case report has been written to highlight the reasons behind the 2002 outbreak of the disease in Barrow-in-Furness – how this was subsequently handled, as well as what has been learnt from this episode.

Legionella bacteria are found naturally in low numbers in ponds, lakes and rivers. They are able to survive between 6 and 60°C.[3] Bacterial growth becomes problematic when it colonises in cooling systems, respiratory therapy equipment, spas, showers and decorative fountains.[4] There, with nutrients and a supportive environment, the bacteria can colonise to great extents. Aerosol transmission occurs from these contaminated water sources. The bacterium is inhaled and invades macrophages and monocytes where it evades phagocytic destruction. It is also capable of replicating within alveolar epithelial cells.[5] This invasion causes the resulting pneumonia.

There is an incubation period of two to ten days before the flu-like symptoms begin. These include malaise, body aches, a

fever (of up to 41°C) and a dry, dyspnoeic cough. Fatality occurs once respiratory or renal failure occurs or the patient enters a state of shock.[6] The mortality rate is estimated to be 25%, but this figure is likely to be higher as deaths may be attributed to other comorbid conditions.[3] The mortality rate is therefore likely to be higher.

Although legionnaires' disease may affect any age group, older patients exhibit greater mortality. Other risk factors for a negative outcome include smoking, diabetes, malignancy, Acquired Immune Deficiency Syndrome, end-stage renal failure, cardiopulmonary disease and alcohol abuse.[4]

In half of patients, a pleural effusion or lobar consolidation will be evident on chest X-ray. The most accurate test for legionnaires' is urinary antigen testing. This is rapid and sensitive, but only tests for the presence of *Legionella pneumophilia*, which is responsible for 90% of cases of legionnaires' disease.[5] There are currently 18 known groups of *L. pneumophilia*, with a further 42 known strains capable of causing disease, including *L. longbeachiae* and *L. micadei*.[7] It is important to culture respiratory secretions in order to compare strains of legionella. Indirect fluorescent antibody testing and nucleic acid hybridisation are useful in identifying the presence of legionella. Sensitivity and specificity of testing for *L. pneumophilia* are shown in table 1.[4]

Test	Sensitivity (%)	Specificity (%)
Respiratory secretions culture	80	100
Urine antigen testing	70	100
Indirect fluorescent antibody testing	25-75	95

Table 1 Testing for *L. pneumophilia*

Many classes of drugs are effective at treating legionella. These include macrolides, ketolides, tetracyclines and quinolones.[8] Eradicating the bacteria is best done using a combination of erythromycin and rifampicin. However, due to the gastrointestinal side effects of the erythromycin, other antibiotics may be favoured, namely doxycycline, cotrimoxazole, tetracycline and ciprofloxacin.[4] The most active drugs, levoflocaxin and azithromycin, are reserved for the seriously ill and immunocompromised.[9] It is important to also provide supportive care in the form of administering intravenous fluids, antipyretics and oxygen therapy.[4]

THE BARROW-IN-FURNESS OUTBREAK

Summary of events

On 29 July 2002, a hospital microbiologist at Furness General Hospital (FGH) noted that there was a significant increase in patients being tested for community-acquired pneumonia. The Communicable Disease Surveillance Centre was contacted to see if similar patterns were seen elsewhere. The following day, the first case of legionnaires' disease was confirmed and details were subsequently forwarded to the Health Protection Agency (HPA). A second case was then confirmed in East Lancashire. The HPA convened an outbreak control team, which consisted of the Acute Trust, the Primary Care Trust, and FGH, in addition to community police, fire, ambulance and environmental health officials. The source of the infection was found to be the cooling tower at Forum 28, a council-run community centre. Subsequent molecular typing confirmed the legionella found in the tower was responsible for the illnesses.[10]

The outbreak was the largest ever of legionnaires' disease in the UK. Over a period of ten days, there were 498 admissions, resulting in 180 confirmed cases. The gravity of the situation resulted in elective surgeries at FGH being cancelled and the neighbouring hospital, the Royal Lancaster Infirmary, was placed on standby for help. The hospital implemented an early warning system in order to alert staff to potentially critical cases. Staff who were taking annual leave were asked to return to work and existing shifts were extended in order to deal with the increase in workload. Community nurses were transferred to hospital work.[11] In total, seven people died as a result of the outbreak, ranging in ages from 54 to 89.[12]

Events leading up to the outbreak

In 2000, Forum 28 changed the company responsible for the maintenance of heating, ventilation and water system due to delay in callouts with the existing company. The new company was only contracted for maintenance of the heating and ventilation systems and was unaware that the manager had presumed they would also to treat the water. In addition, there was no documentation outlining the responsibilities of the contracted company. An engineer employed by Forum 28 twice addressed his concerns to management about the lack of water treatment, but no action was taken. As a result, he decided to obtain a quote himself, but subsequently left the company without water treatment being put in place.[10]

After the outbreak, auditors determined that there had been insufficient risk assessments by the council, which put service users at risk. They ascertained that several major errors had occurred. Firstly, there were inadequate definitions of roles and responsibilities of the managers. Secondly, the designated manager failed to ensure that water treatment was being provided. The failures of the management to ensure water treatment was being provided in line with current legislation was dealt with at Preston Crown Court in 2006. Although the defendants were cleared of corporate manslaughter, damages were awarded against the Borough Council and Forum 28.[9, 10]

The report from the inquest into the outbreak recommended a number of changes. Firstly, a key council employee should be appointed to oversee specific health and safety issues. They would be responsible for ensuring premises are kept up to date on health and safety issues. They should also ensure adequate contracts are in place for water treatment. In addition, they would be responsible for ensuring there is optimal communication, both written and in person, between all people involved in treatment. This would ensure that water systems are being kept in a suitable condition. It is also important to ensure the council has clear written policies, which staff can readily access. Although costly, these measures would prevent future errors of such magnitude and maintain the health of service users.[10]

Primary prevention of legionella infestation

There are currently methods of treating and preventing legionella infestation in water. Commonly used treatments include thermal treatment, followed by biocides, ultra-violet irradiation and ozone treatment.[13]

Regular sampling of water in cooling systems should be sensitive enough to pick up less than 100 legionella bacterium in one litre of water. Sampling should be conducted by a trained person and follow guidelines produced by the British Standards Institute. If disinfection is going to occur, then water samples must first be taken.[14]

General methods should also be followed to control risk. These include ensuring water spray is minimal, such as with water fountains or saunas, keeping water at an unfavourable temperature for growth and keeping pipes as short as possible (which prevents water from stagnating).[15]

Hospitals must follow legislation and carry out regular monitoring of their water supply. This should prevent any cases of hospital-acquired legionnaires' disease, although cases do still occur. Risk assessments are important and should be reviewed regularly.

There are substantial costs associated with preventing legionella growth. For example, University Hospital of Wales in Cardiff uses chlorine dioxide in their hot and cold water systems. The associated costs are in excess of £250,000 per year.[16] Treatment of the disease is also costly. In August 2005, 12 patients were treated for legionnaire's disease in south-east London. Treatment costs ranged from £2,184 to £201,648, with a total cost of £391,592.[17]

CONCLUSION

Legionella infection is a preventable disease if appropriate measures are in place. It has become the leading cause of atypical pneumonia in hospitals. Although outbreaks rarely occur, it is important to consider it as a differential diagnosis for community- or healthcare-acquired atypical pneumonia. Close liaison between engineers, infection control doctors, microbiologists and managerial staff is vital for its control. From extensive examination of current guidelines, the management plans for handling an outbreak of legionnaires' disease are sufficient. There are designated roles and responsibilities in place to ensure adequate testing and treatment of water occurs. In addition, prompt referrals should be made to higher bodies. The reasons behind the outbreak in Barrow-in-Furness were not due to failure of established guidelines, but rather failure of individuals to ensure infection control measures were being followed. It is of the utmost importance to follow government guidelines and ensure both risk assessments and water maintenance are carried out. Learning from past mistakes is necessary to ensure the health of the population.

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