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CASE REPORT

An outbreak of tuberculosis in the South West of England related to a public house

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Summary There had been a continuous decline in *Mycobacterium tuberculosis* infection (TB) during the last century until the trend plateaued in the mid-1980's and started to increase in the early 1990's in the United Kingdom (UK). In England and Wales the incidence of TB has increased by 11% between 1993 and 1998 with an overall incidence equal to 10.9/100,000 population. In the South West (SW) of England the incidence of TB is less than the UK average (4.6/100,000). We report an outbreak of TB in the SW of England which was based around a local public house. Sixteen patients received treatment and thirteen received chemoprophylaxis. Using a rapid IS6 110- based PCR and Restricted Fragment Length Polymorphism Method, all mycobacteria isolated were shown to be identical, and all cultures were sensitive to the usual anti-mycobacterial drugs. All patients were white Caucasians and none were from high risk groups. Despite the absence of conventional close household contacts a significant number of secondary cases were detected. Possible links between TB cases should be considered even in areas of low prevalence

Introduction

In the United Kingdom (UK), there was a continuous decline in the incidence of TB over most of the last century. This trend plateaued in the mid 1980's and the incidence is currently on the increase [1–4]. We report an outbreak of TB which occurred in an area and population of low incidence in the South-West of England.

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Outbreak investigations

Index case

In June 2000, a 40-year old white Caucasian (case number 1) was admitted to Torbay hospital under a surgical team for management of worsening lower gastro-intestinal symptoms which had persisted since 1994. These were not responsive to outpatient treatment including three day-case surgical procedures under general anaesthesia. He gave a history of cough, night sweats, weight loss and diarrhoea. He was febrile and had raised inflammatory markers. A barium follow-through showed a terminal ileal stricture. As his respiratory symptoms were increasing, a Chest radiograph (CXR) was performed which demonstrated bilateral cavitating upper lobe consolidation. Sputum microscopy was positive for Acid and Alcohol Fast Bacilli (AAFB).

On close-contact screening, the brother of the index case said that he was aware of two other patients currently being treated for TB who had been in contact with the index case - a 21-year old with a biopsy-proven left tuberculous pleural effusion (case number 2), and a 58-year old with smear positive pulmonary TB (case number 3). It was apparent that they all met regularly at the local public house. Concern was raised that this cluster of cases represented a significant outbreak of TB. Further support for this was provided when a 70-year old male and his son were diagnosed with open pulmonary TB and it was discovered that they were regular attenders at the same public house.

Investigation

Two or more apparently related cases of TB should be dealt with as an outbreak [5]. A multidisciplinary team was formed according to the British Thoracic Society (BTS) recommendation [6]. This included a Consultant in Communicable Disease Control (CCDC), a Respiratory physician, a Microbiologist, a TB nurse and a Communicable Disease Control Nurse, and later on, hospital and ward managers. A plan of action was made which involved working on three fronts; the local public house; close-contact tracing; and inpatient hospital contact tracing, since the index case had had three hospital admissions (as a day-case) in addition to the current admission.

The public house was visited and inspected by the local health authority. It was of an average size and had about 200 customers per week mostly from the local population. About 90% of the customers were males which reflects the predominance of male patients in this outbreak. It had average ventilation, illumination and standards of hygiene, no special table or chair distribution and no singing activities. There was a children's play-room attached which was in communication with the main hall of the public house. Regular visitors to, and staff of, the public house were sent letters to attend screening, and all children were screened. All other attenders were offered screening and letters encouraging them to do so were made available at the public house. The letter also included educational points about TB symptoms, mode of transmission, the availability of effective treatment and a telephone help line. Local General Practitioners were kept informed and updated. People with casual contact were screened through the open access radiology service and the clerical work was co-ordinated by the CCDC. Contacts who had symptoms or an abnormal CXR were screened by the Respiratory unit of the local district general hospital.

Hospital screening

Patients who had more than 8 hours contact with the index case were screened. As no bacteriological filters were used at the patient end of the ventilator used for the index case's anaesthesia (during the period of outbreak), it was agreed that screening would focus on the next seven patients who had undergone anaesthesia using that same ventilator after each of the index case's surgical procedures. *Close-contacts* of patients diagnosed with TB were screened according to the BTS guidelines [6].

Results

The screening of hospital patients detected no new cases of TB infection or disease. 81 public house customers and close contacts of TB cases were initially screened. This included six children attending the children's play room with their parents and 18 close-contact children. Two received anti-TB treatment and seven received TB chemoprophylaxis. Out of the six children attending the play room at the public house, three received TB chemoprophylaxis and one received TB chemotherapy.

On the basis of this pickup rate the initial screening procedures were widened. A total number of

Table 1 TB treated patients.

Case number	Age	Sex	Symptoms	Chest radiograph	Heaf test	Comments
1 *Index case*	40 yrs	Male	Cough, Night sweats, Weight loss	Bilateral cavitating consolidation in upper lobes	ND	Sputum AAFB smear and culture positive
2	21 yrs	Male	SOB Reduced appetite, Night sweats	Left side pleural effusion	ND	Pleural biopsy AAFB culture positive
3	58 yrs	Male	Cough, Weight loss, Fever	Left upper lobe consolidation	ND	Sputum AAFB culture positive
4	70 yrs	Male	Haemoptysis, Fever	Pneumonia	ND	Sputum AAFB smear and culture positive
5	35 yrs	Male	Cough, Weight loss, Night sweats	Bilateral upper lobe consolidation with cavitation on the right side	ND	Son of case 4 No bacteriology performed
6	21 yrs	Male	SOB Weight loss	Right side pleural effusion	Grade III	Pleural fluid protein 50 g/l Pleural biopsy showed lymphocytic infiltrate
7	29 yrs	Female	Cough, Haemoptysis, Night sweats	Left upper lobe patchy shadow	Grade IV	Bronchial lavage AAFB culture positive
8	24 months	Female	Unwell for few months	Right hilar gland enlargement and right pleural effusion	Grade IV	Attends children's play room with her mother
9	34 yrs	Male	Cough	Left apical consolidation	Grade IV	Sputum AAFB culture negative
10	57 yrs	Female	Screening	Nodule left upper lobe	Grade III	Excisional biopsy AAFB microscopy and culture positive
11	27 yrs	Male	Screening	Cavitating lesion left upper lobe	Grade III	Bronchial washing AAFB smear and culture negative
12	24 yrs	Female	Screening	Cavitating lesion left upper lobe	Grade IV	Bronchial washing AAFB smear negative culture positive
13	32 yrs	Female	Cough, Pleuritic chest pain	Pleural effusion	Unknown	Lives in another district and visits the pub with her boyfriend once every 4 weeks Pleural fluid AAFB culture positive
14	40 yrs	Female	Weight loss	Left upper lobe shadow History of contact with TB	Grade II	Bronchial washing AAFB negative strong contact history
15	51 yrs	Male	Cough, Weight loss	Bilateral bronchopneumonia	ND	Sputum AAFB smear and culture positive
16	36 yrs	Male	Productive cough	Left upper lobe shadow	Grade IV	Sputum smear and culture negative

Abbreviations; AAFB (alcohol and acid fast bacilli), SOB (shortness of breath), yrs (years), ND (not done).

Table 2 Patients who received TB chemoprophylaxis.

Number	Age	Sex	Heaf test	Chest radiograph	Comments
1	13 yrs	Male	Grade II	Normal	No previous BCG
2	7 yrs	Female	Grade II	Normal	Spent 1—3 hours at the pub per week
3	3 yrs	Female	Grade IV	Normal	Spent an average of 20 hours at the pub per week
4	10 yrs	Female	Grade IV	Normal	
5	9 yrs	Male	Grade IV	Normal	
6	11 yrs	Male	Grade IV	Normal	
7	2 yrs	Male	Grade III	Normal	
8	13 yrs	Male	Grade IV	Normal	Landlord's son
9	15 yrs	Male	Grade IV	Normal	
10	12 yrs	Male	Grade II	Normal	No previous BCG
11	9 yrs	Female	Grade II	Normal	No previous BCG
12	11 yrs	Male	Refused	Normal	
13	13 yrs	Female	Grade II	Normal	No previous BCG

184 persons were screened. As would be expected in this setting, there were difficulties in contacting some of those who may have been at risk, and a number of those invited for screening failed to attend. At the end of the outbreak 16 patients were given anti-TB treatment nine of whom were culture positive (Table 1) and 13 had TB prophylaxis (Table 2). All the mycobacteria isolates were fully sensitive to first line anti-TB drugs. Using IS6-110-based PCR method and Restriction Fragment Length Polymorphism (RFLP) techniques (performed at the Mycobacteria Reference Unit, Kings College Hospital), the DNA patterns of all isolates were indistinguishable.

Discussion

Only a small number of TB outbreaks have been reported in the UK over the last two decades [7—12]. The South West of England has remained relatively spared and has maintained a disease prevalence of less than half of the national average. The overall incidence of TB in England and Wales has been on the increase recently. In 1998 the number of notified TB cases increased by 11% and 21% compared with the years 1993 and 1988 respectively [4]. In the South West of England, the incidence rate of TB was 4.4 per 100,000 population in the year 2001 compared with 4.6 per 100,000 population in 2000 [15]. This is partly due to the low percentage of ethnic minority population living in the region. However, in the South West of Devon the number of newly notified TB cases has increased dramatically from 20 cases in 1999 to 33 cases in 2000 and 42 in 2001 [13]. This is largely due to the reported outbreak.

In the outbreak described, all the affected patients were white Caucasians with no known risk factors for developing TB. Most of the affected group were males reflecting the 90% male customers attending the pub. Two thirds of the children attending the play room at the pub received either treatment or chemoprophylaxis reflecting the susceptibility of children to the disease. Although the source appeared to be highly infectious, no positive cases were detected in hospital screening. Microbiological diagnosis was obtained in nine out of the 16 patients receiving treatment. All mycobacteria isolates were fully sensitive to the first line anti-TB drugs. DNA fingerprinting has been used successfully in confirming and managing TB outbreaks [14,15]. Using the RFLP technique, all mycobacteria isolated showed indistinguishable DNA patterns confirming a significant source.

The reported outbreak of TB was among a white Caucasian population who had no high risk factors for developing TB in an area of low TB prevalence.

Conclusion

We have reported an outbreak of TB among a white Caucasian population who had no high risk factors for developing TB. It is essential to remain vigilant in the detection of TB, to trace contacts, and to consider possible links between cases even in low incidence areas. A multidisciplinary team approach is fundamental to the proper management of such an incident. In this outbreak, despite the absence of close household contacts, a considerable number of patients have been detected and treated appropriately.

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