Tuberculosis and diabetes

Rowan Hillson

Diabetes is fuelling the spread of TB

Marie Duplessis, the beautiful 19th century French courtesan, attracted many admirers. Sadly, her fashionably pale complexion and increasing slimmness were due to consumption (tuberculosis), from which she died aged 23. She lives on in Dumas’ ‘La Dame aux Camélias’ and ‘La Traviata’ by Verdi.

But tuberculosis is not a beautiful disease; its effects can be devastating. Worldwide, over one in 10 sufferers die from the disease; in 2015, 1.8 million of the 10.4 million people with known tuberculosis died. Sixty percent of people with tuberculosis are in India, Indonesia, China, Nigeria, Pakistan, and South Africa. Most tuberculosis goes undetected. It is estimated that one in three of the world’s population (about two billion people) has latent tuberculosis, subsequently reacti-vated in one in 10.

In England, in 2015, 5758 cases of tuberculosis were reported, 10.5/100 000. Sixty percent of cases occur in people not born in the UK who have lived here for more than six years. The rate of tuberculosis in the non-UK born population is still 15 times higher than in the UK born population, and 73% of all tuberculosis cases notified in 2015 (4087) were born abroad.

In 2015, there were about 415 million people with diabetes worldwide, 155.2 million in the Western Pacific, 78.3 million in South East Asia, and 4.5 million in the UK. Internationally, one in 11 adults had diabetes. The numbers are rising inexorably. Diabetes is more common in South Asian and African Caribbean people. Over 20 years, in a UK cohort including Europeans and first-generation migrants, aged 40–69 years without diabetes at baseline, 14% of Europeans, 33% of South Asians, and 30% of African Caribbeans developed new diabetes.

Diabetes and tuberculosis are common, so people worldwide will have both. People with diabetes are also more likely to develop tuberculosis. The Persian physician, Avicenna or Ibn Sina (980–1037), noted that having diabetes increased the risk of phthisis (tuberculosis) and that phthisis caused complications in diabetes. A meta-analysis found a relative risk of tuberculosis of 3.11, (95% CI 2.27–4.26) in those with diabetes vs those without. Other risk factors for tuberculosis are undernutri-tion, smoking, alcohol, HIV and indoor air pollution.

Should people with diabetes be screened for tuberculosis or vice versa? Screening (usually via symptoms and X-rays) has been used in India and the Pacific Islands, and may be appropriate in other countries with a high prevalence of tuberculosis and diabetes. More evidence is needed. In countries like the UK with a low incidence of tuberculosis, clinicians should consider the diagnosis in patients with symptoms and in those who have had contact with people with tuberculosis. Detecting and treating latent tuberculosis could prevent reactivation, but further research is needed.

Symptoms of tuberculosis

Symptoms include persistent cough with or without blood, worsening breathlessness, poor appetite, weight loss, extreme tiredness and fatigue, and pyrexia. Tuberculosis may present as lymphadenopathy, or with musculoskeletal, gastrointestinal (e.g. abdominal pain), urinary, reproductive, or neurological symptoms, including confusion, headache or fits. Seek tuberculosis vigorously in patients with pyrexia of unknown origin.

A 73-year-old woman with diabetes was admitted with congestive heart failure and compression fractures of the spine. She had backache, and a fever with weakness, malaise, sweating, and a non-productive cough. She was found to have both pulmonary and spinal tuberculosis.

A London hospital found 11 patients with tuberculosis among 431 dialysis patients (incidence 1187/100 000 renal patients per year). Four of the 11 had diabetes (56%) vs 19% among the total dialysis population.

An eight-year-old girl with a three-year history of type 1 diabetes was admitted to a Turkish hospital with a 24-hour history of nausea, vomiting, fever, lethargy, and headache. She was found to have diabetic ketoacidosis so intravenous fluids and insulin were started. She became stuporose and bradycardic. A CT scan showed cerebral oedema which was treated with mannitol and dexamethasone. Diabetes insipidus developed, treated with desmopressin. Her conscious level did not improve. An MRI scan showed probable tuberculomas. A diagnosis of tuberculous meningitis was confirmed by finding acid-fast bacilli in her cerebrospinal fluid. Quadruple therapy was started.

A 78-year-old Japanese woman with diabetes, atrial fibrillation, hypertension and renal impairment presented with painless swellings in the neck, some of which had ulcerated. She was apyrexial. Radiology showed widespread lymphadenopathy. Despite intensive investigations, including for tuberculosis, it was nine weeks before deep biopsies found *Mycobacterium tuberculosis* which was treated with quadruple therapy.

Treatment

See Box 1. People with diabetes who have tuberculosis respond less well to treatment than non-diabetic patients. A meta-analysis found that the risk ratio of treatment failure or death was 1.69 (95% CI 1.36–2.12). After adjusting for confounders such as age, the risk of death was 4.95 (2.69–9.10) among people with diabetes vs those without. There was an increased risk of relapse (RR 3.89; 2.43–6.28).

Improving glycaemic control and increase blood glucose monitoring. The combination of anti-tuberculosis treatment, diabetes self-management and treatment of any complications places a considerable burden on patients and may reduce adherence to treatment. Provide increased support.

Standard anti-tuberculous therapy usually combines isoniazid, rifampicin, pyrazinamide and ethambutol. Multi-drug-resistant tuberculosis is an increasing and


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Summary

People with diabetes are three times more likely to develop tuberculosis than people without diabetes.

Suspect tuberculosis in patients with: persistent cough (haemoptysis), breathlessness, anorexia, weight loss, fatigue and pyrexia; unexplained lymphadenopathy; or unexplained symptoms in a patient with a past history of tuberculosis. Tuberculosis can affect most parts of the body, as can diabetes.

Tuberculosis is harder to treat successfully, and is more likely to recur in people with diabetes than in those without diabetes.

Beware drug interactions, and the need to adjust both anti-tuberculosis treatment and hypoglycaemic treatment. Rifampicin interacts with most oral diabetes drugs. Be alert to the hyperglycaemic effect of infection, and the hypoglycaemic effect of recovery.

Support the patient and family/carers to enhance adherence to treatment.

Ensure good communication between all teams caring for the patient. All teams must know that the patient has tuberculosis and how to manage infection control, as well as the medication and monitoring issues.

Remember tuberculosis. It is a disease of the present, not just the past.

References